User feedback

Use Case 1: Solar energy potential and energy efficiency of buildings

Project document

Co-financed by the Connecting Europe Facility of the European Union

2022-10-13

Revision History

Version	Status	Author	Modifications
0.1	23.8.2022	Lena Hallin-Pihlatie	
0.2	14.9.2022	Camille Cossec	
1.0	13.10.2022	Lena Hallin-Pihlatie	
1.1	13.10.2022	Camille Cossec	Completion, review, formatting, and appendices

Distribution

Version	Status	Recipient
1.0	13.10.2022	Morten Borrebaek, Mikko Visa, Antti Jakobsson

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User feedback - Use Case 1: Solar energy potential and energy efficiency of buildings

Introduction

User interviews were held as a Proof-of-Concept test for the already developed GeoE3 service infrastructure and to collect feedback concerning work in progress from real life. The interviews focused on the use case on Solar energy potential and energy efficiency of buildings in changing climate and smart cities. This report sums up the provided feedback to be considered in further development of services in GeoE3 and beyond. It also acts as a documentation of the methods and questions used.

Interviews

In spring 2022 GeoE3 partners provided contact information to companies and organisations, which are relevant stakeholders for the use case Solar energy potential and energy efficiency of buildings. More than a dozen requests and follow-up reminders were sent out. In the requests it was stressed that the interviews are confidential and that no personal information or business secrets would be included in the report.

Interview contents

Interviews were held during a period from June to August 2022. The duration of the interviews was 1.5 – 2 hours, including a 10 - 15 minutes break. Teams and Zoom were used. All interview objects had watched the GeoE3 platform tutorial YouTube video https://www.youtube.com/watch?v=0xYJi6UutPA prior to the interview.

The structure of the interview was the following:

Introduction
GeoE3 demonstration platform and APIs
Quality Dashboard

During the introduction part everyone presented themselves. Lena Hallin-Pihlatie gave a short PowerPoint presentation to highlight the overall goals the project and to make the user to be interviewed aware of the user requirements work done so far and the impact and role of the interview results. During the introduction part the users to be interviewed were asked general questions to get an overview of their profile and previous experience from spatial data and services.

In part two, Lena Hallin-Pihlatie asked questions (Appendix A) related to the GeoE3 demonstration platform and APIs available at the time. Camille Cossec collected feedback to the mock-up of the Quality Dashboards with her questions (Appendix B). Lena and Camille took turns in taking notes. Maria Angeles Jimenez Solana was present during the interviews of the Spanish interview subjects to assist with possible language issues and managing Zoom.

Results

Basic information

The Norwegian and Spanish users interviewed have a suitable profile (Table 1). They work for small companies in the solar energy industry and have either experience from using GIS, APIs or both. (https://www.dnb.com/business-directory.html). We will refer to them from here onwards in the report as "the users".

Table 1. Profile of the interviewed users

Interview subject	Company profile	Company size	Tasks of user interviewed	GIS experience	API experience
Nr 1	Company installing photovoltaic systems: bifacial system for flat roofs and a building and integrated system for sloping roofs, walls and facades	< 10 employees	Product manager/ project manager/ sales representative / other roles. Helps another sister company that provides software and uses APIs when coding.		X
Nr 2	Company doing installation calculations for buildings based on relevant information	< 10 employees	Half-time calculation of photovoltaic installations, half-time civil servant	X	X
Nr 3	Solar thermal and wind projects	30 employees	Environmental documenting and GIS analysis	X	

It is also worth noting that they were from Norway and Spain and that the situation may not be the same for users in other countries.

Feedback – General feedback

Overall, the users found the project's objectives and deliverables (platform, APIs, services) very relevant, and the platform, APIs and data provided useful.

Feedback - GeoE3 demonstration platform

We got feedback that the interface feels comfortable and intuitive. It was considered a positive thing that the platform is based on open source. That said, watching the video beforehand may have helped the users in understanding the platform and how to use it.

One user suggested to add the following new features to the platform:

- Scale bar on upper-right window expressing min and max values and units for example solar energy potential and the temperature maps ;
- Slide bar for going through the data of the year, day by day preferably or monthly.

The importance of the 3D building models, sun potential and weather information depends on if the work is done on a more detailed or general level:

- General level: "useful only to show the project sites to the administration"
- Detailed level: "The platform and the APIs are, if calculated as expected, an effective for visualising solar potential, sunlight and shadows in its 3D representation and the APIs make it possible for companies to save resources as they seem to contain information which is now collected on site and processed by using AI."

It was appreciated that the platform itself supports downloading of datasets, such as Digital Surface Model (DTM) and Digital Terrain Model (DTM).

Feedback – APIs

The level of enthusiasm for APIs correlated with the level of previous experience of using APIs:

- The user with lots of experience saw a clear cost-saving potential in using the APIs to gather data that they are currently producing and calculating themselves for example using drones and AI processing.
- The user with some experience is interested in getting data sets for the whole country from APIs, which hasn't been possible before.
- The user with no previous experience is not particularly interested in using web services/APIs, but more interested in using bulk download and the platform itself

The most experienced user proposed to produce "APIs for dummies" guidelines to lower the barrier for new users of APIs that have no previous knowledge or have never used them up until this point.

Feedback – Data

On general level, the users where very happy with the data contents. There were however different views on if the data provided and its description are sufficient.

Depending on their work tasks and area of interest (general projects vs. building-specific) they found different dataset to be of highest importance:

- For the countryside/general level projects, those were DTM, DSM and data on fauna and flora abundancy and protection.
- For building level projects, they were the 3D building representations, solar energy potential estimates and information on climate conditions.

All users interviewed said that for the energy sector in general, it would be useful to have access to the energy rating of buildings (A, B, C, D, …), as it tells how energy is consumed by a building. One of the users explained that energy consumption estimates are done on daily basis and having energy rating information attached to buildings would be a great asset. Energy rating information for buildings in Finland has already been integrated by the GeoE3 project using the API of the energy register and linking it through the building id. However, for a lot of energy certificates the building ids are missing, as this is not compulsory information. In Spain, the Spanish cadastre is currently working on including energy certificate information in their cadastral database.

It was brought forward that for thermal/solar projects temperature and windspeed would be useful for countries for which they are missing.

One of the users said that it is critical to know more about the data to be able to evaluate its fit-for-purpose. There is for example a need to know the name of the data producer, data units, possible standards used

in data production, data licensing, how has the weather information been measured and how has the original datasets have been further processed by the project, for example to produce the solar energy potential and weather layers. This information is to some extent available in the metadata describing the source datasets, which could be easily linked. Other information could be described on the project or platform web site.

One user would like to get day-to-day or monthly information on the sun energy potential, additional information on characteristic windspeed and rain amount estimates (https://api.met.no). He explained that it would be ideal to be able to make evaluations on daily level in the software in question. One of the users stressed the importance to have a detailed description on how the data has been calculated and which possible standards have been used in the data production. There is for example an European standard for windload calculation.

If available from APIs, Natura 2000 sites and information on the birds and animals https://natura2000.eea.europa.eu/ could be added.

One of the users encouraged the project or its continuation to support the re-use of 3D models and data produced by companies and other stakeholders by developing and using some quality-checks.

Feedback – Quality Dashboard

The feedback from the interviews was overall **very positive**. The people interviewed were enthusiastic, understood the concept of a quality dashboard and were very interested in the value that new features could bring to their work in association with the GeoE3 platform. Quoting interview subject number one: "I think this is a very useful tool" and "wish[ed] everyone could have this".

We received **suggestions** to upgrade the dashboard to include the indicators' definition, source – the ISO standard for instance –, the score computation method, and finally the original values used for the score computation. Users expressed their interest in being able to access the different levels of quality assessment that are displayed in the dashboard, from raw data to calculated scores.

Quality indicators have sometimes appeared abstract and **unintelligible** to users. We should aim to popularize not only the visualization of the score of indicators, but the explanations relatively to the quality indicators themselves.

Although the people interviewed were curious about the metrics we used and where they came from, it was not something they would have sought out by themselves. On that account, we can draw the conclusion that the quality dashboard, even in a version that appeared chaotic and cluttered to some, succeeded in raising awareness and curiosity on data quality.

This is a positive point for two reasons: first, this means that a quality dashboard might attract users to the GeoE3 platform with little knowledge in data quality, and secondly it might raise awareness about the importance of selecting the right dataset.

To quote another interview: "if you can't evaluate what you're looking at in 5 seconds, there is **too much information**." This point came up in the first two interviews we held. This version presented displayed most of the quality indicator categorized by quality dimension in three 16:9 format windows, one for each point of view (see Appendix C for example of one of the panels demonstrated).

A second version of the dashboard was presented to the third interviewee. This version displayed on the main screen only the three viewpoints' scores and required the user to interact with the dashboard to access deeper levels of information. Feedback received here suggested this allowed the information to be more easily understood and the dashboard to be more engaging.

Feedback – Other

All users interviewed stated that it is important to have information from different countries in a similar manner and format. There was a request to add data and services covering the situation in Sweden.

Recommendations

Based on the interviews, our recommendations to the project are the following:

- Create an "APIs for dummies guidance" package to lower the barrier for new users of APIs;
- Develop the new features suggested, at least the scale bar showing units and min and max scale;
- Describe the source data (metadata) and how they have been further processed by the project in a better way on the platform and in links of the APIs;
- Make efforts to include weather information for all countries;
- Include energy certificate information (at least ratings) if possible;
- Make possible improvements and additions to existing weather information for example by adding day-by-day or monthly averages and showing it day-by-day wise or monthly on the platform;
- Engage the users we interviewed in the project somehow to create an iterative feedback process and to ensure fit-for-purpose.

Final remarks

The biggest challenge of this work was to find users in the domain that were willing to be interviewed and to schedule meetings with them. We contacted all project partners to ask for contact information and invited them for interviews on Teams by email. Acknowledgements goes to María Ángeles Jiménez Solana and Amalia Velasco for the help they provided in getting hold of users to interview. For some, it was clearly an obstacle that the interviews were carried out in English. It is also worth mentioning that the results are probably to some extent biased as users not being positive would probably not have agreed to take part in an interview.

Everything visible that was available was useful for gathering feedback, that is the demonstration platform, the video explaining how to use it and the mock-up images of the Quality Dashboard. In that way the timing was right for asking feedback.

In further project activities it might be useful to be present at an event relevant for a certain use case asking questions directly after a live demo. A questionnaire for collecting feedback could be available on the platform itself. The questionnaire could be available in several languages, for example, English, German, Spanish and French to lower the barrier to give feedback.

Appendix

Appendix A : Interviews questions – Part 1

General Questions:
Name and Company/Organisation
Description of company and the role of the user to be interviewed
Has the user used spatial data or APIs before?
What's your immediate reaction? Can you relate to the project in some way?

GeoE3 demonstration platform and API-specific questions:
1 A. Does the GeoE3 platform (Pygeoapi visualization) seem useful and relevant for energy efficiency estimation in your company/organisation?
1 B. Does the APIs seem useful and relevant for energy efficiency estimation in your company/organisation?
1 C. Does the APIs seem useful and relevant for energy efficiency estimation other companies/organisations in your country?
If yes;
Which datasets and/or piece of information in particular?
What types of data are you using, or plan to use in the future? (Energy efficiency certificates?)
What makes it useful (versus other services, name them)?
What functionalities could be further improved? Please specify
What contents could be further improved or added? Please specify.
Any tabular data of interest that should be added?
Would you consider changing from possible other services to ours? Under what conditions?
Can GeoE3 platform provide something new?
- The demo service user interface
- The 3D visualisation
- Information from several countries provided in a harmonised way
- API services

Something else you'd like to add or raise?
If no; why not?

Appendix B : Interviews questions – Part 2

Quality Dashboard-specific questions
Does the GeoE3 demo seem useful and relevant for solar energy estimation in your company?
If yes;
What information would you like to see on the dashboard?
What information should appear / be prioritized in your opinion?
What are problems with the data you usually encounter that could be the focus of an analysis on the dashboard? On which issues would the dashboard be helpful? Which issues should be pointed out by the dashboard?
On which scales should the analysis be able focus on (one building, one neighbourhood, one city, …)?
Who are the users? Do they have prior knowledge in geospatial data, what is their level of competence?
Would an interactive map associated with the dashboard be of use to the users? Do you think you need a preview of the data? Link to the platform, where the data is shown?
Is there a need for a mobile app or is the web user interface sufficient?
Are you using today a service similar to this? What would make our dashboard useful (versus other services, name them)?
Would you consider changing from those other services to ours? Under what conditions?
Would you use it regularly?
What functionalities could be further improved? Please specify
What contents could be further improved? Please specify
Would you work from a computer or mobile?
Do you think it would be useful to have this?
Should the windows be cleaner/less information?

Concluding questions
Can we be in contact if there is some issue we'd like to get back to? Interested in collaboration?
We're looking for more contacts to interview or to meet up with. Any companies/organisations in mind?
Any suitable energy efficiency events where we could have a stand?

Appendix C : Interviews questions – Part 2

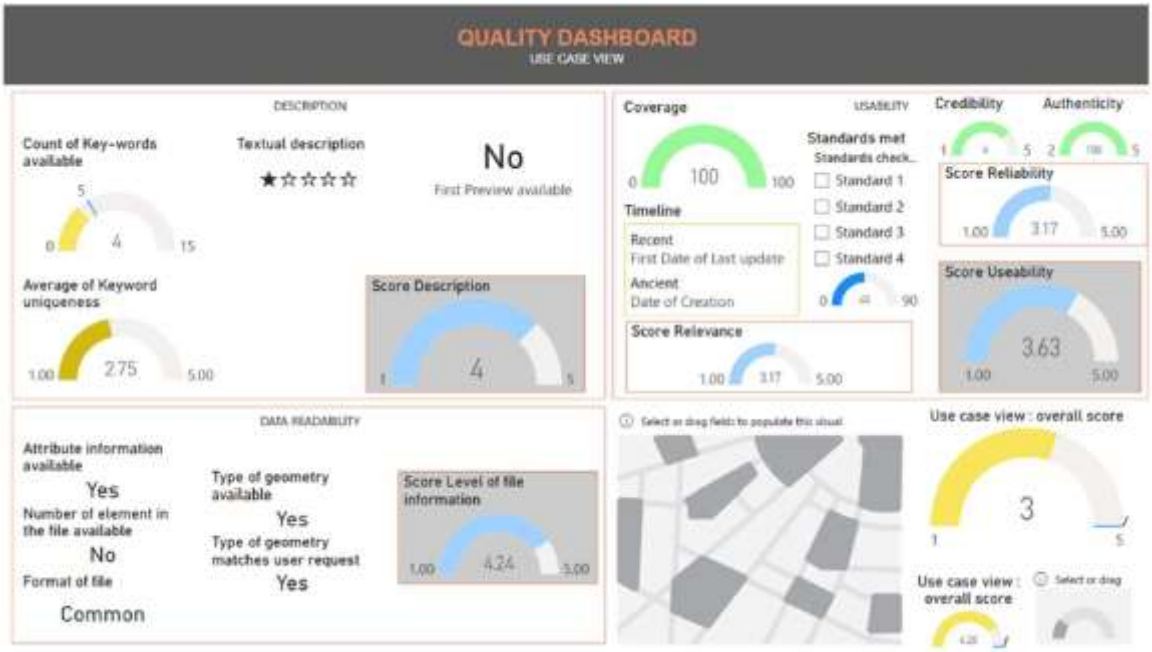

Figure1: Quality dashboard version demonstrated to the first two users: use case point of view