

# GeoSmartCity

*open geo-data for innovative services and user applications  
towards Smart Cities*

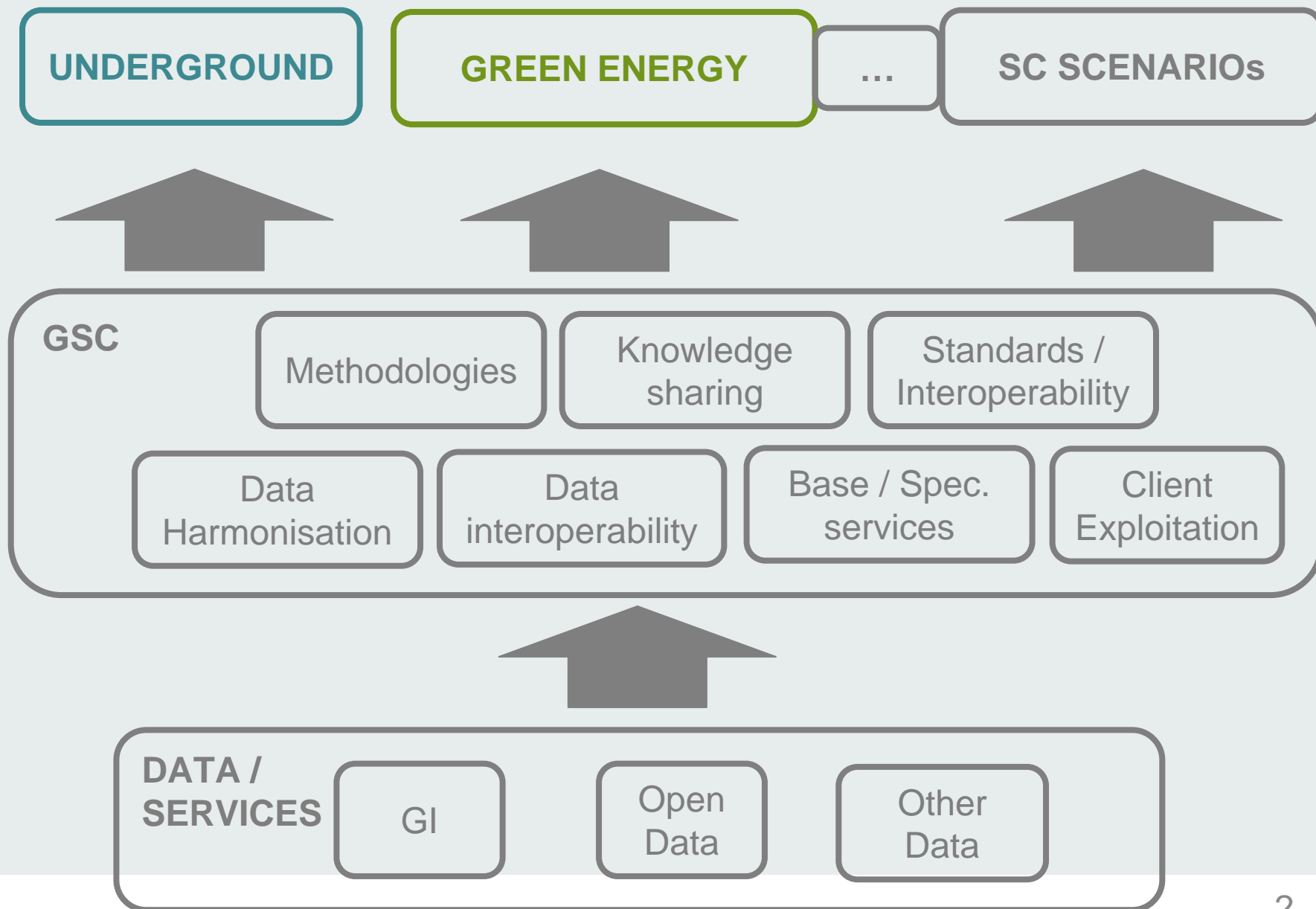
## The GeoSmartCity Portuguese Pilot

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CIP ICT-PSP Project n. 621150

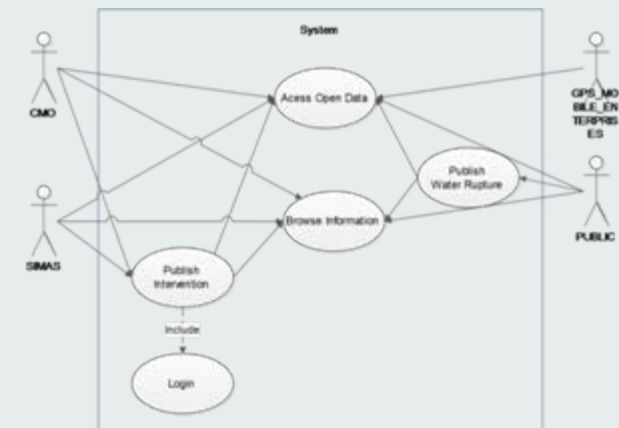
Start date 01-03-2014, duration 36 months





## Use Cases Definition

- Green Energy Scenario
  - Urban Sustainable Planning Tool
  - Zero-balance calculation
  - Calculation of energy performance (EPBD class energy) at building level
- Underground Scenario
  - Underground Event Management



- Green Energy Scenario Specialized Services
  - Estimation of energy performance of buildings
  - Buildings CO2 emissions estimation
  - Solar potential calculation
  - Upload of “future” buildings datasets
  - Zero-balance layer

- Estimation of energy performance of buildings
  - based on physical/thermal properties
  - using basic attributes (age of construction, building type, height,...)
  - display existing energy certificates
  - communicate new/missing energy certificates
  - The output will be a map (WMS/WFS ) representing the performance classification of buildings

- Estimation of energy performance of buildings





- Estimation of energy performance of buildings

The screenshot displays the GeoSmartCity web application interface. The main map shows a residential area with buildings colored according to their energy performance. A sidebar on the left contains a 'Legenda' (Legend) with energy labels A through G, each represented by a colored arrow. Below the legend are sections for 'Energielabels' (Energy labels) and 'Achtergrond' (Background). The top navigation bar includes a search bar and a 'Meer info' (More info) button. A central panel shows a list of buildings: 'Apartment One', 'Apartment Two', 'Office One', and 'Store One'. The 'Office One' entry is selected, and a pop-up window displays its details, including 'Address', 'Energy Label', 'Certificate', 'Year', 'Area', and 'Use'. A red button labeled 'Communicate missing certificate' is visible at the bottom of the pop-up. The bottom right corner features a 'Legend' button.

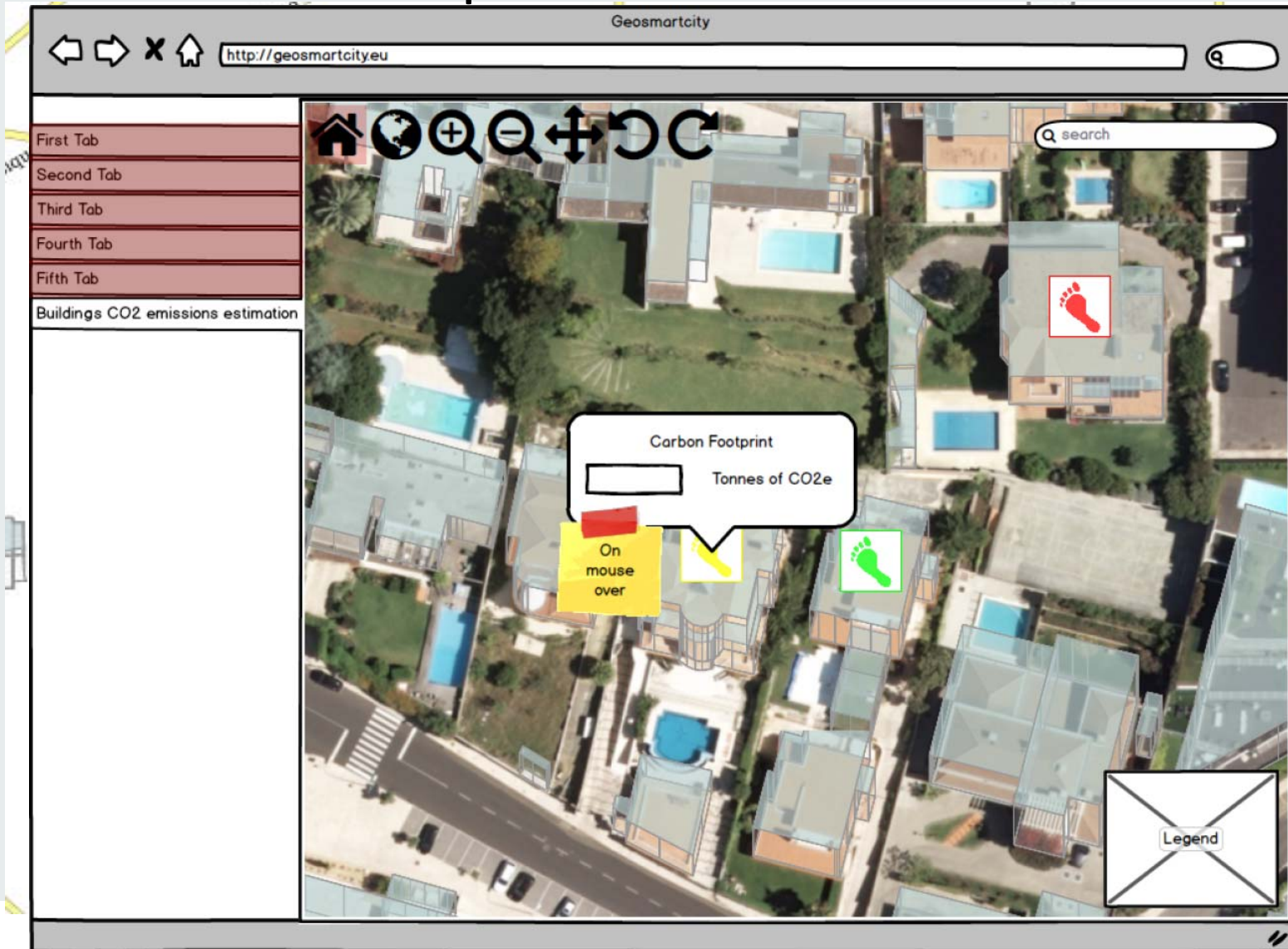


- Estimation of equivalent tons of CO2 emissions
  - based on an algorithm using input spatial feature (buildings) with attributes either containing:
    - energy performance of buildings, or
    - real energy consumption (amount of energy will be based on annual consumption values, coming from official/authoritative sources)
  - both cases could be also considered, for further benchmark analysis and comparisons
  - the value of the estimated CO2 emissions values may vary during the time

- Estimation of equivalent tons of CO2 emissions



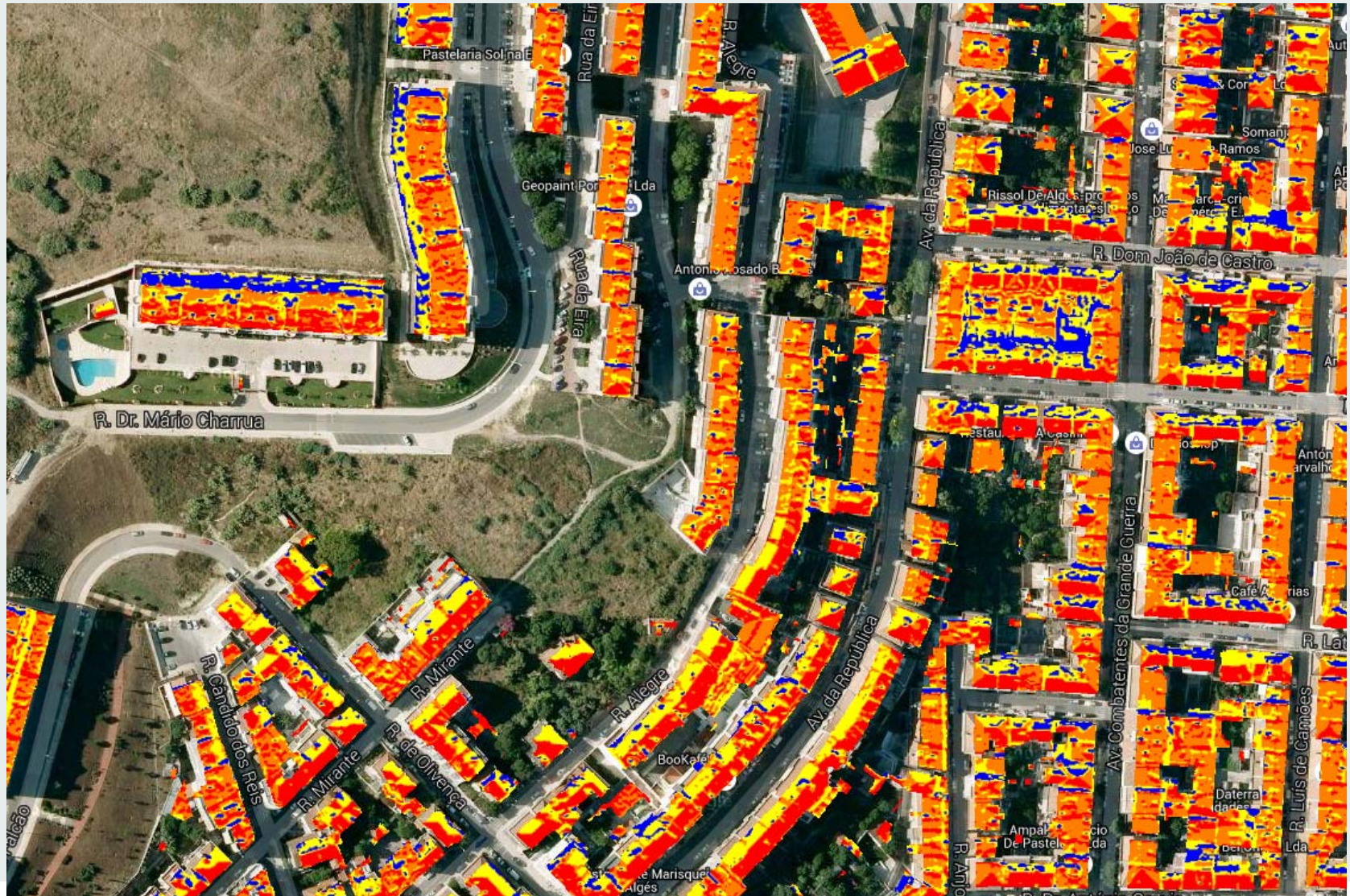
- Estimation of equivalent tons of CO<sub>2</sub> emissions



- Upload of “future” buildings datasets
  - ingestion of datasets representing spatial features of new/designed buildings to perform solar potential analysis (SHP, GML, CityGML)
  - data will be ingested into a spatial database (PostGIS)
  - optional attribute to be taken will be the “heightAboveGround”, i.e., vertical dimension of new (2D) buildings
  - the new buildings added will be used to calculate the solar potential in a buffer area around them
  - will be performed as a WPS operation

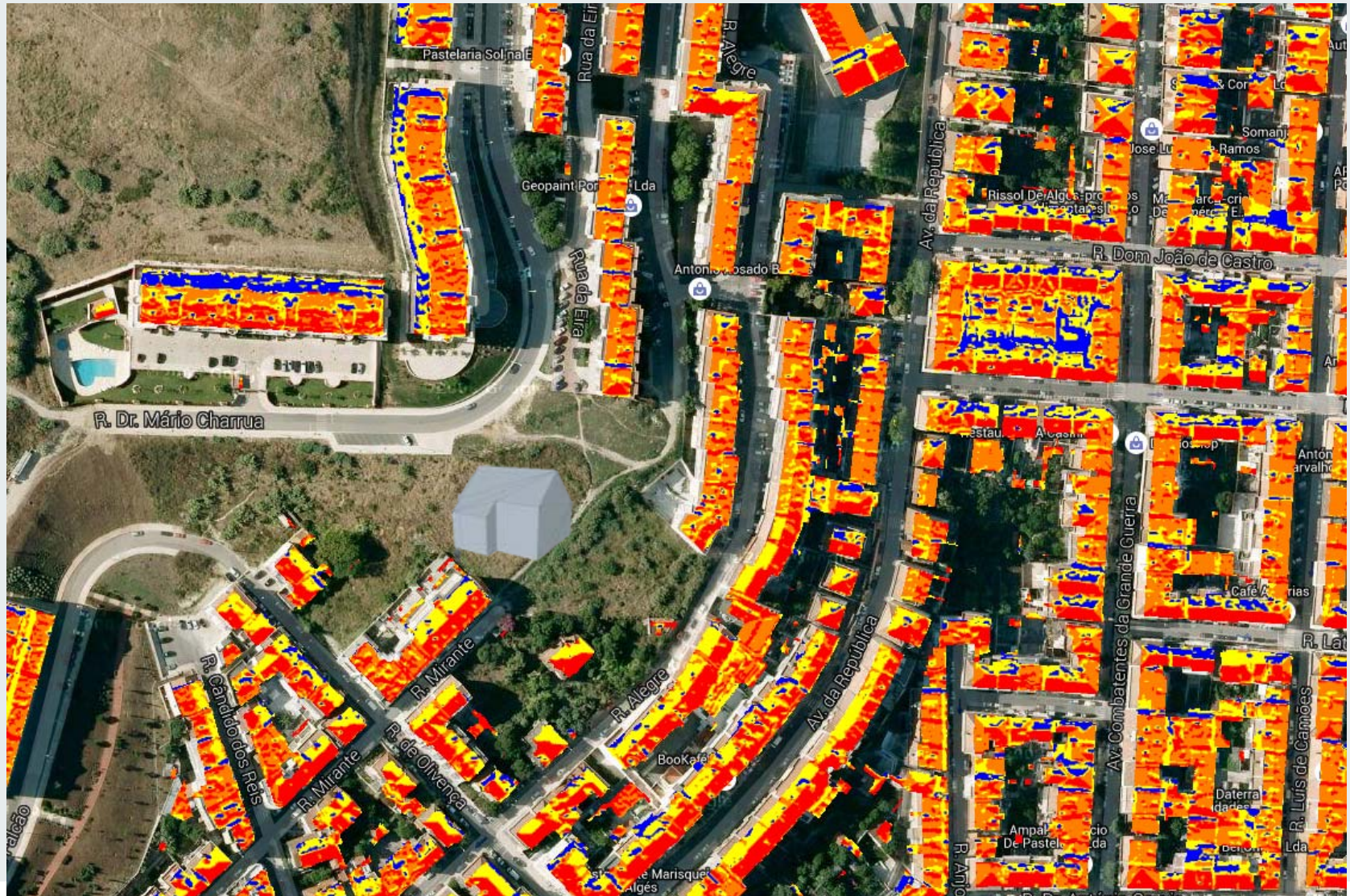


- Upload of “future” buildings datasets



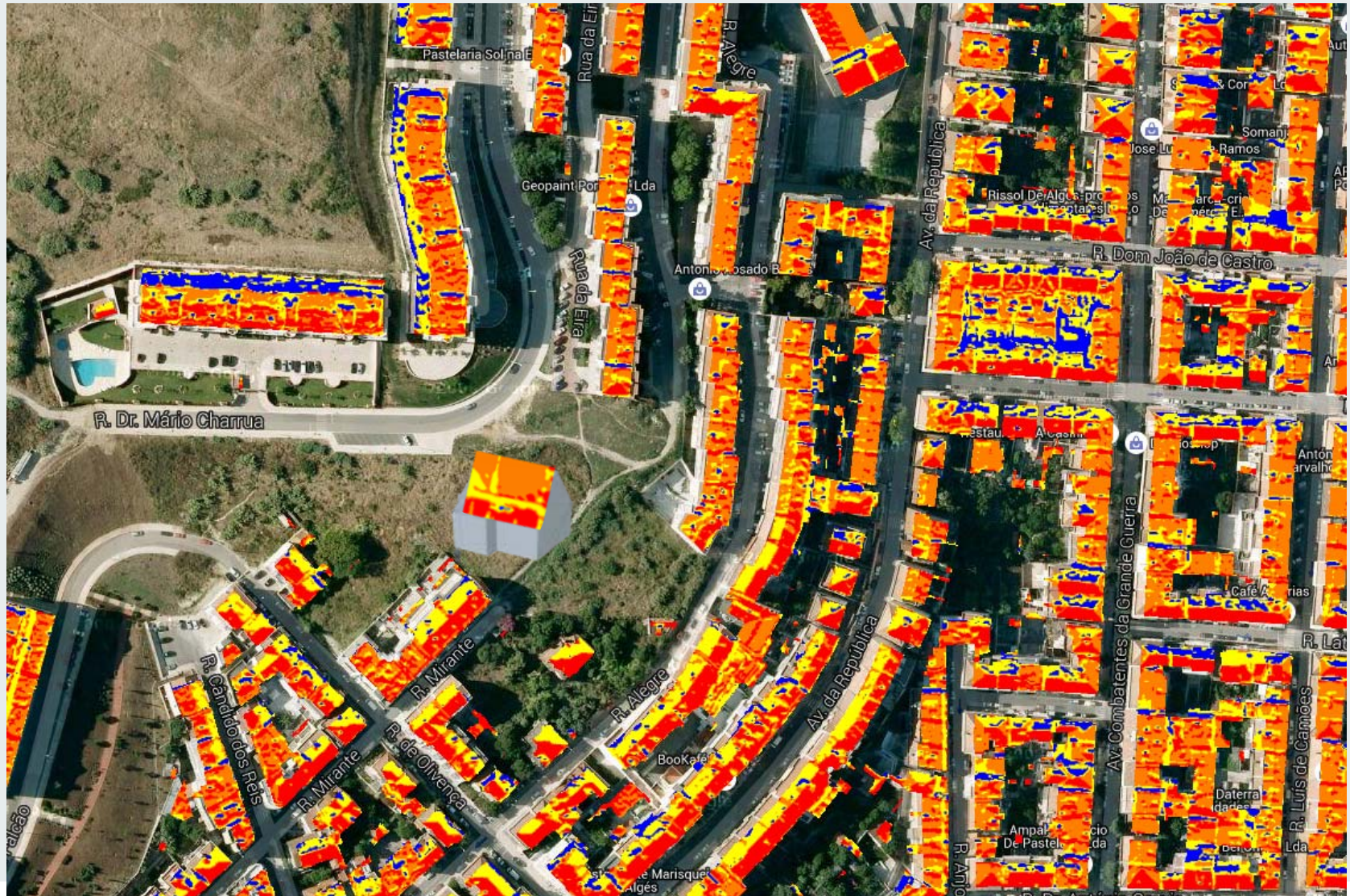


- Upload of “future” buildings datasets



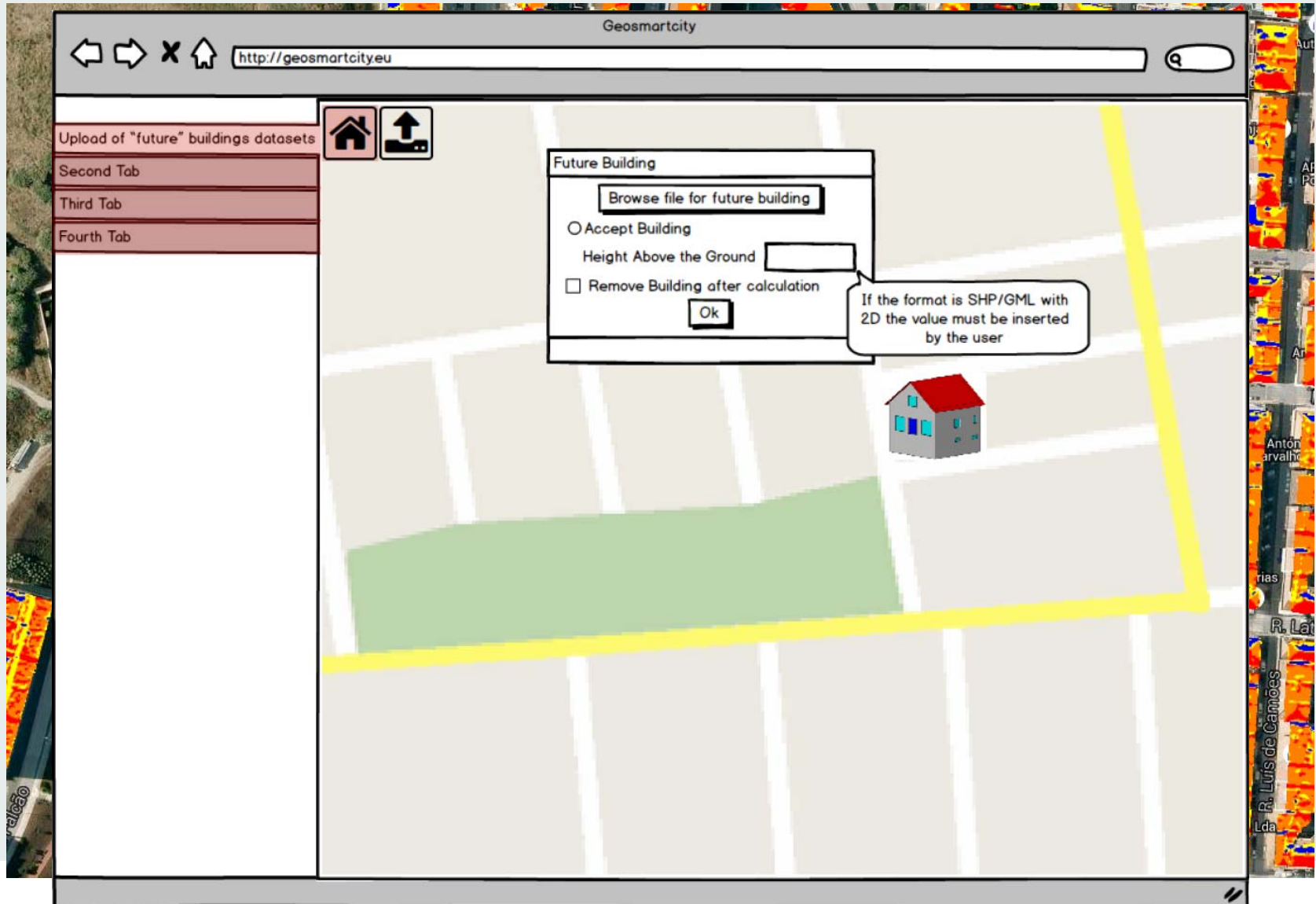


- Upload of “future” buildings datasets





- Upload of “future” buildings datasets



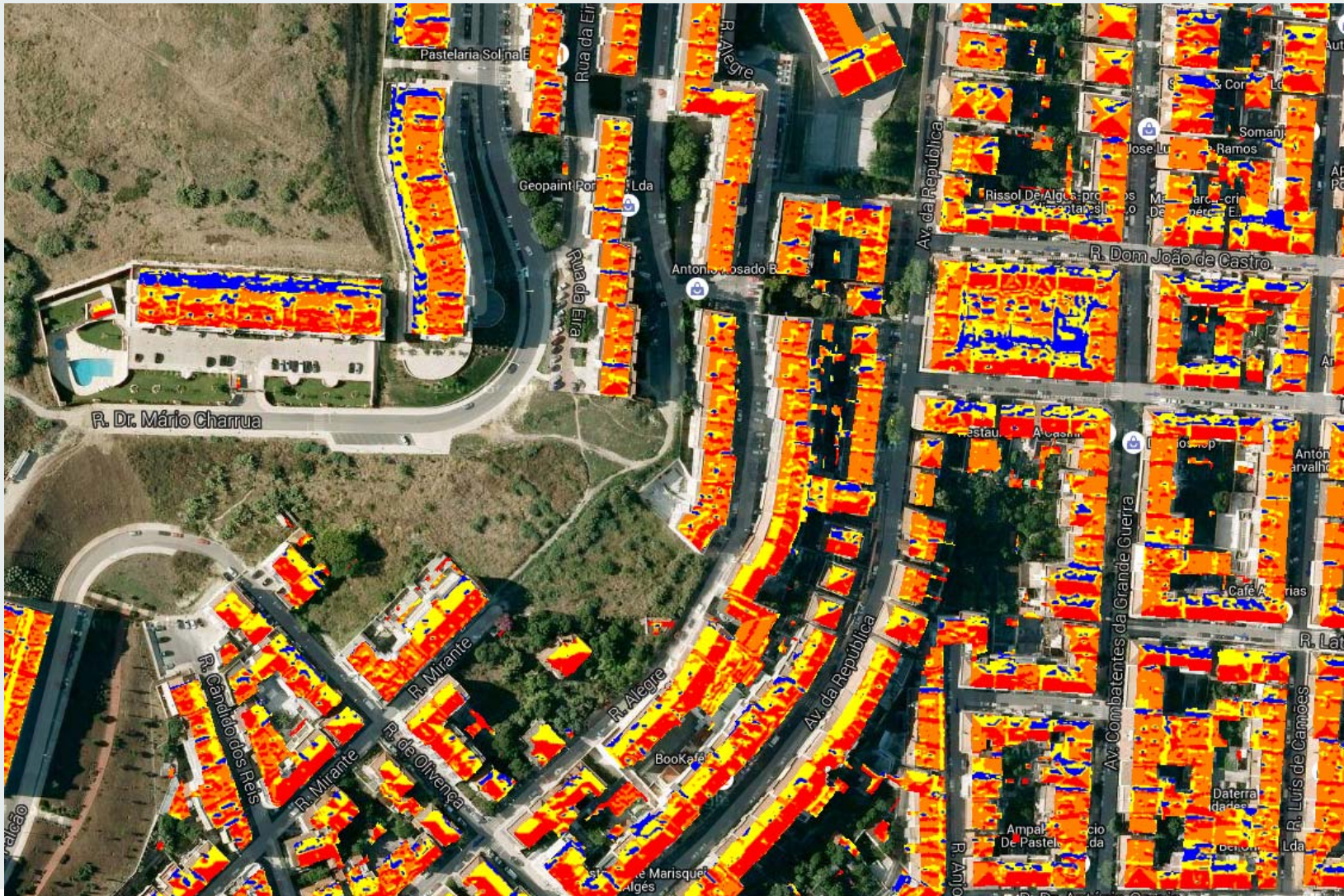
- Upload of “future” buildings datasets



- Solar potential calculation
  - estimation of solar potential of buildings (roofs)
  - for each building, the incoming solar irradiation are determined individually based on the available roof surface area
  - select the typology of solar panel to calculate the potential energy production
  - input parameter (DSM, 2D/3D building shapes and properties: albedo, clearness coefficient, slope, aspect, etc.) and an optional clipping area where to perform/limit the calculation
  - the result will be a WMS map, each building will be classified on the basis of the “potential for renewable energy production” range, in kWh/sqm/day

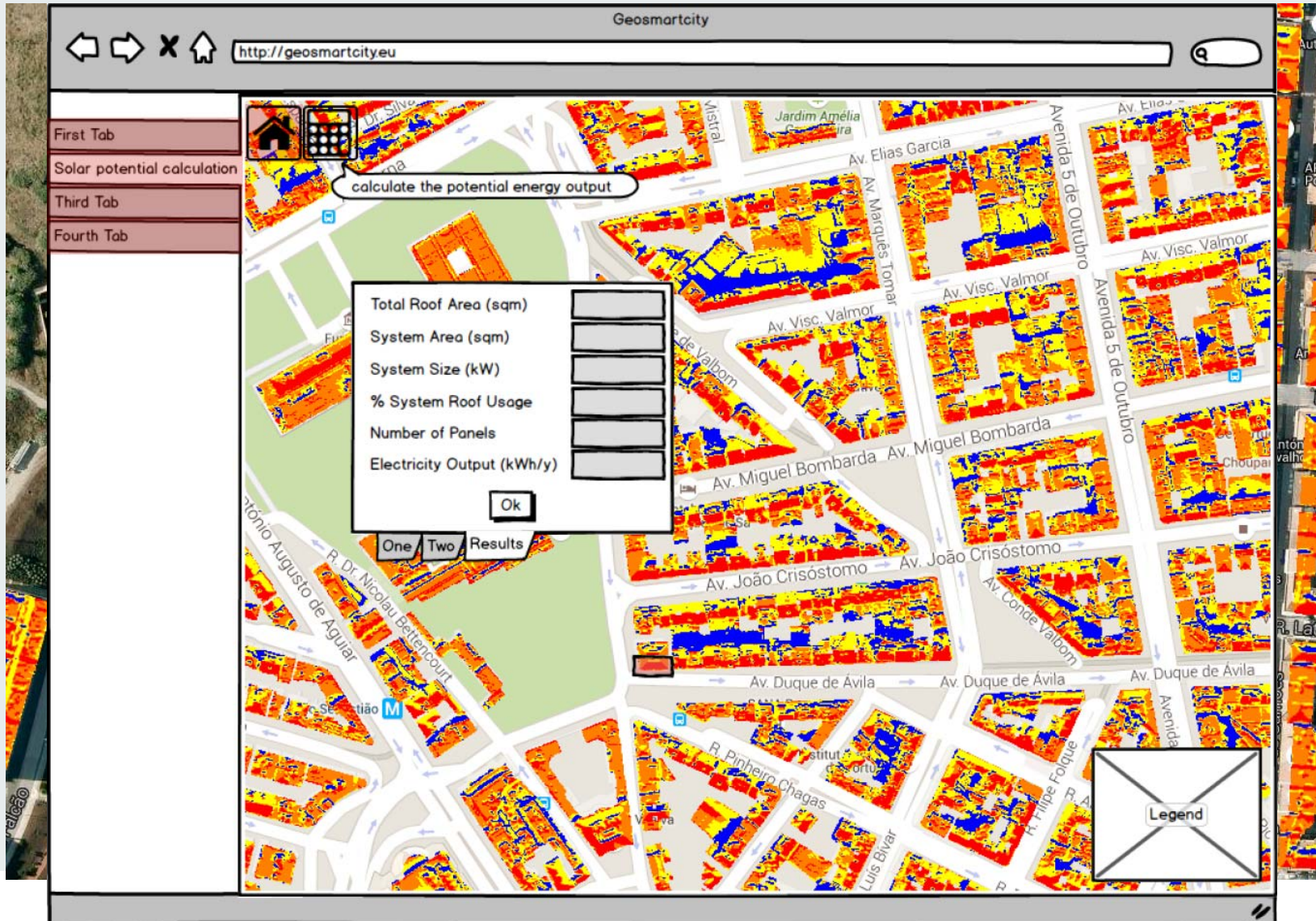


- Solar potential calculation





- Solar potential calculation





- Solar potential calculation

**dist - Float**  
Sampling distance step coefficient (0.5-1.5) (default: 1.0)

**buildings\* - SimpleFeatureCollection**  
Buildings

Method

Mime type

URL

**bufferArea - Integer**  
Meters for buffered area

**email - String**  
Email address to send the solar calculation

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**Process outputs**

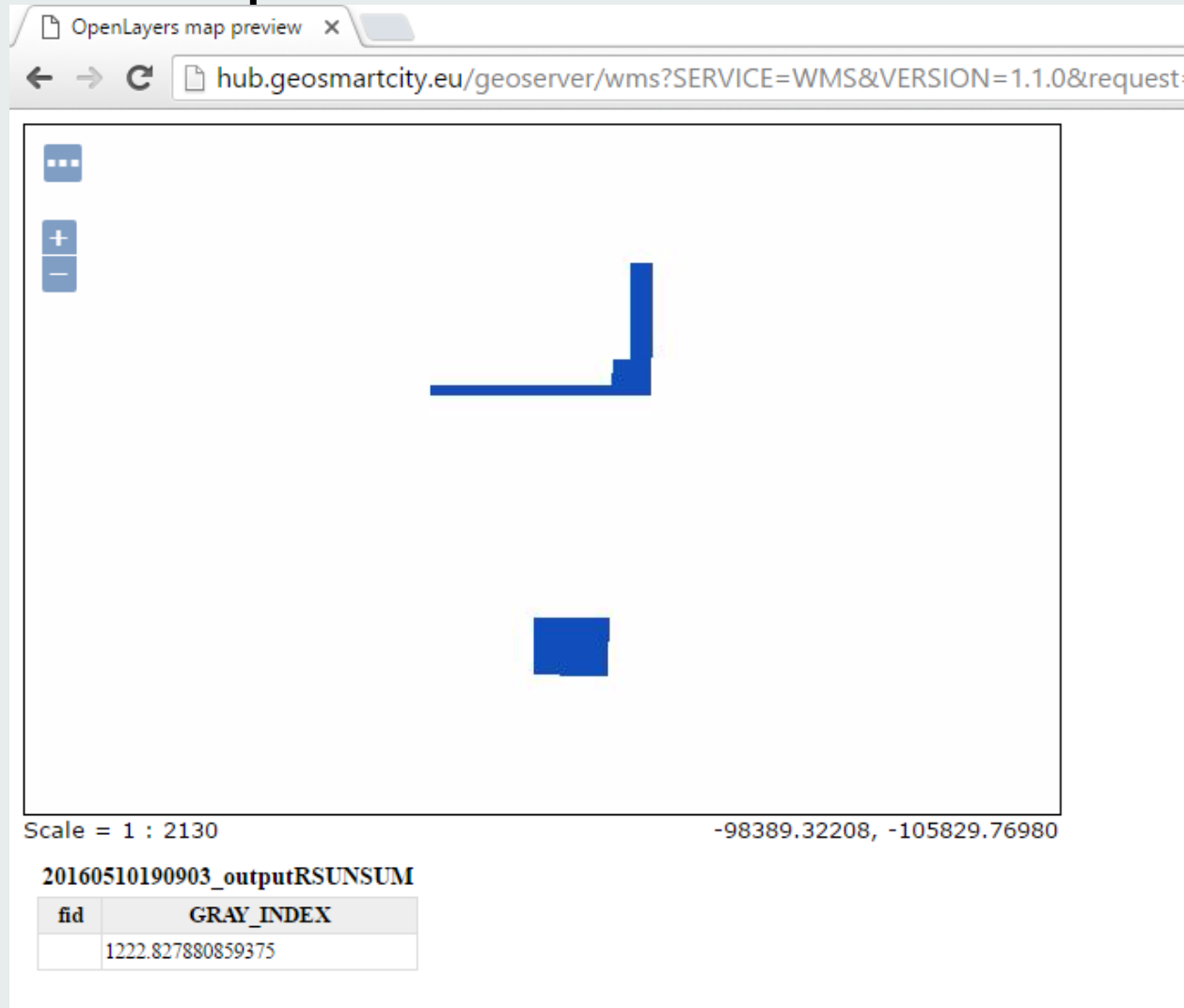
**result\* - String**  
output result  
☒ Generate

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**Authentication**

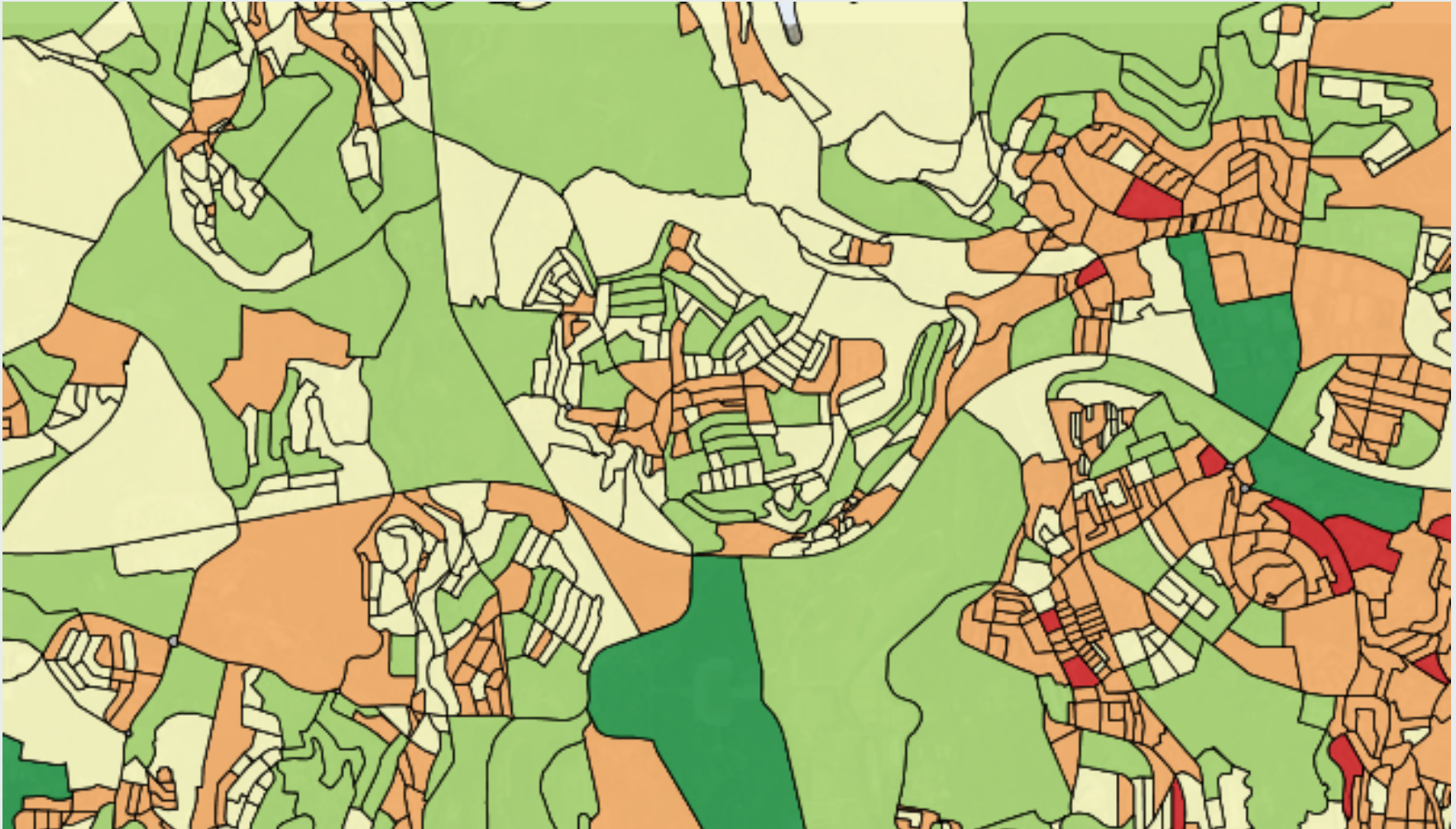
☐ Authenticate (will run the request as anonymous otherwise)

- Solar potential calculation



- Zero-balance layer
  - aims to be a innovative planning tool
  - the result of a “difference” between the potential production of energy estimated by the “Solar potential” service and the estimated consumption of energy - aggregated at block of buildings level
  - operation will be performed again as a WPS interface
  - possible to manually enter estimated values for other sources of renewable energy, for instance, wind
  - output will be a WMS/WFS with predefined SLD styles

- Zero-balance layer



- Zero-balance layer





- Zero-balance layer



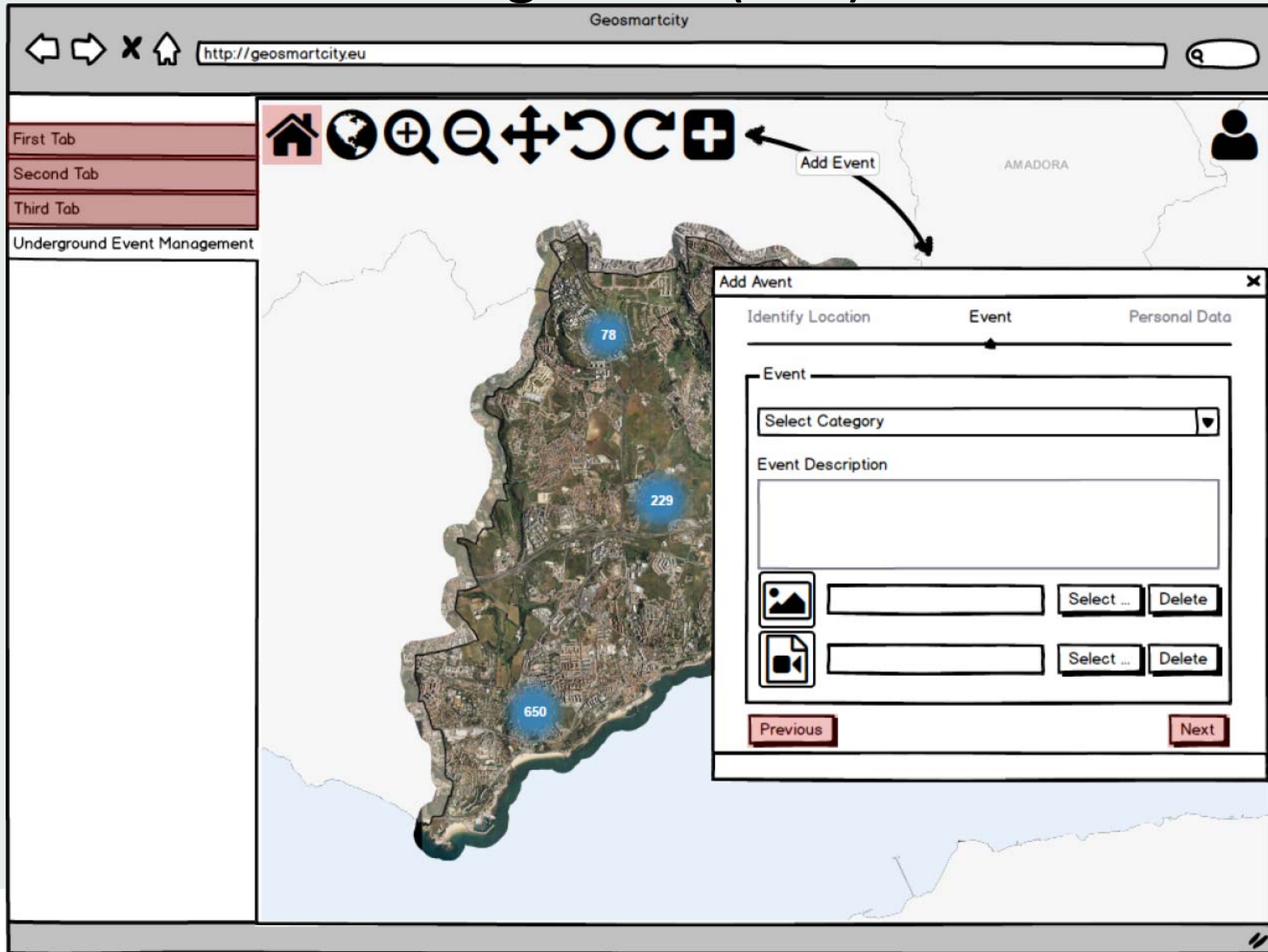


- Underground Scenario Specialized Services
  - Geo crowd-sensing client (VGI)
  - Geo crowd-sensing mobile client (VGI)
  - Geo crowd-sensing platform management

Note: crowd-sensing term is used to mean “event notification from human or mobile devices” and crowd-sourcing for scenarios like collaborative mapping.

- Geo crowd-sensing client (VGI)
  - actually a Volunteered Geographic Information tool
  - collaborative communication of events related to underground networks such as water pipe rupture, water leakages, bad water quality observation or sewage obstructions
  - in order to foster the use of the platform, authentication will not be required
  - submission should with minimum number of possible steps
  - suggestion of existing events near the location reported so the user may subscribe or add comments on existing events or submit a new event

- Geo crowd-sensing client (VGI)

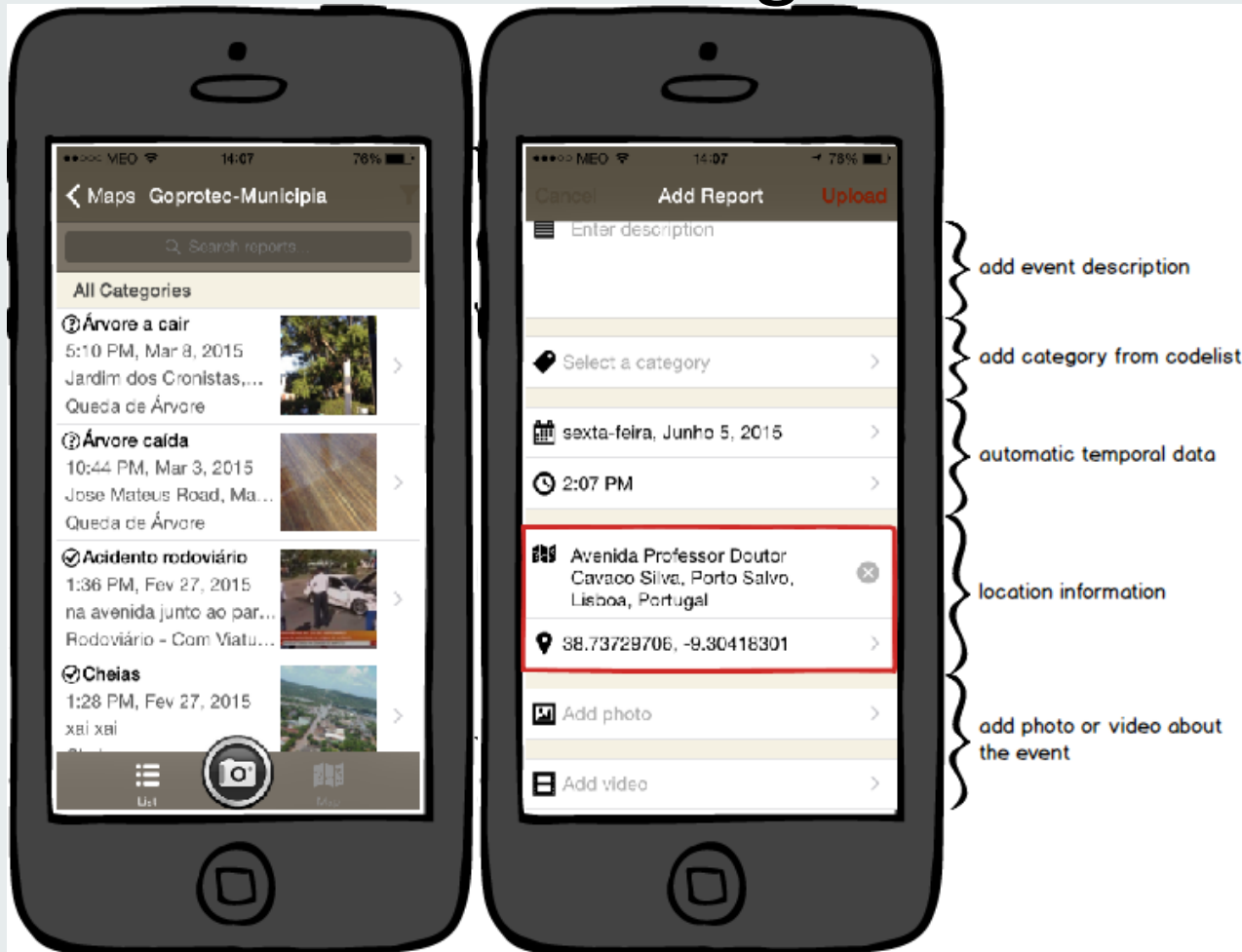


- Geo crowd-sensing mobile client (VGI)
  - actually a Volunteered Geographic Information tool
  - specific interface tailored to mobile devices
  - will facilitate the submission of events, automating as much as possible
  - attach picture or video taken from the mobile camera
  - suggest location from GPS, Mobile network or metadata from the picture
  - record event description instead of writing
  - events stored locally in case of disconnection from mobile network, synchronized when network coverage is available

- Geo crowd-sensing mobile client (VGI)

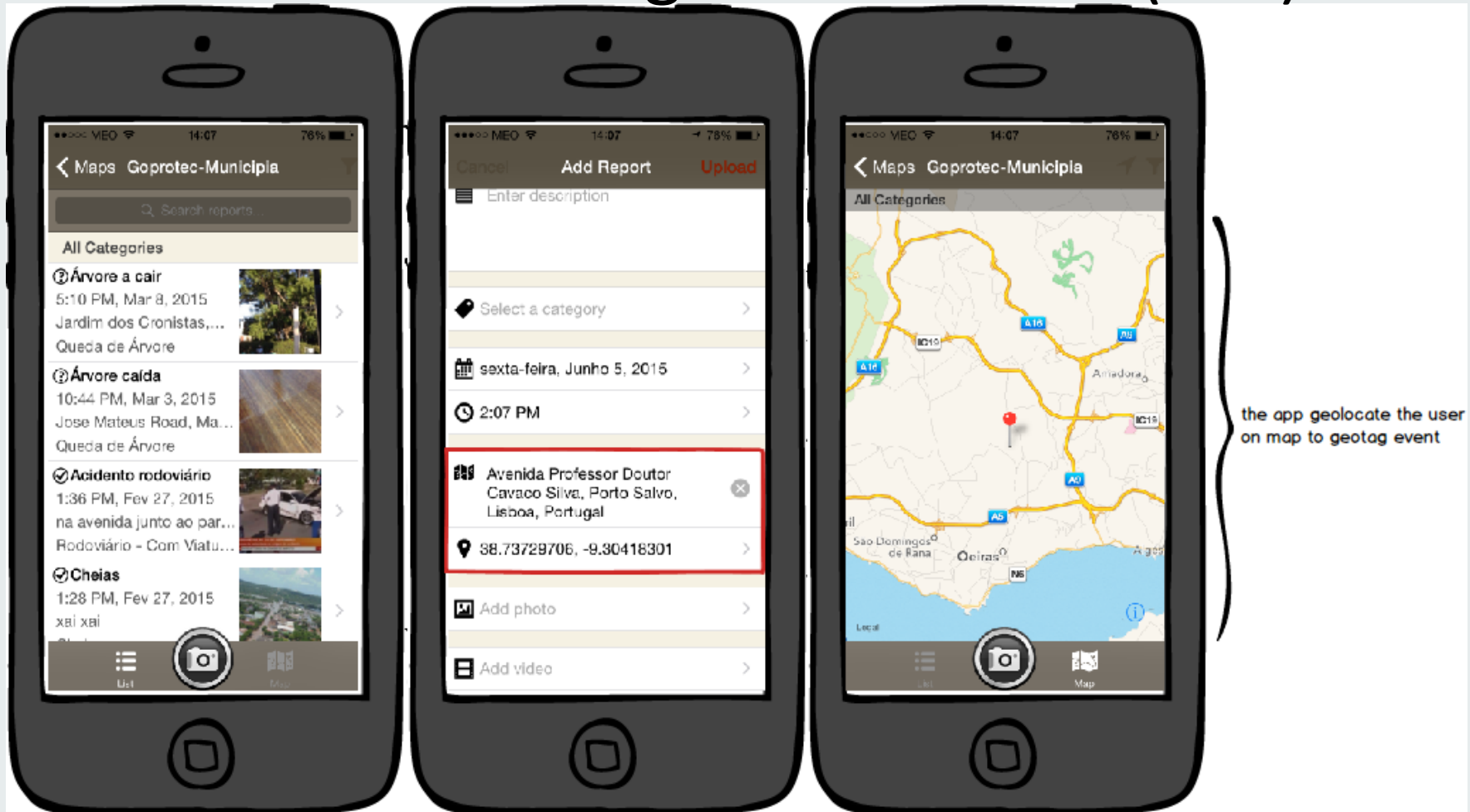


- Geo crowd-sensing mobile client (VGI)





- Geo crowd-sensing mobile client (VGI)



- Geo crowd-sensing platform management
  - management of the crowd-sensing platform
  - features to be configured:
    - approval policy (workflow)
    - events assignment
    - events solving
    - information to display on map

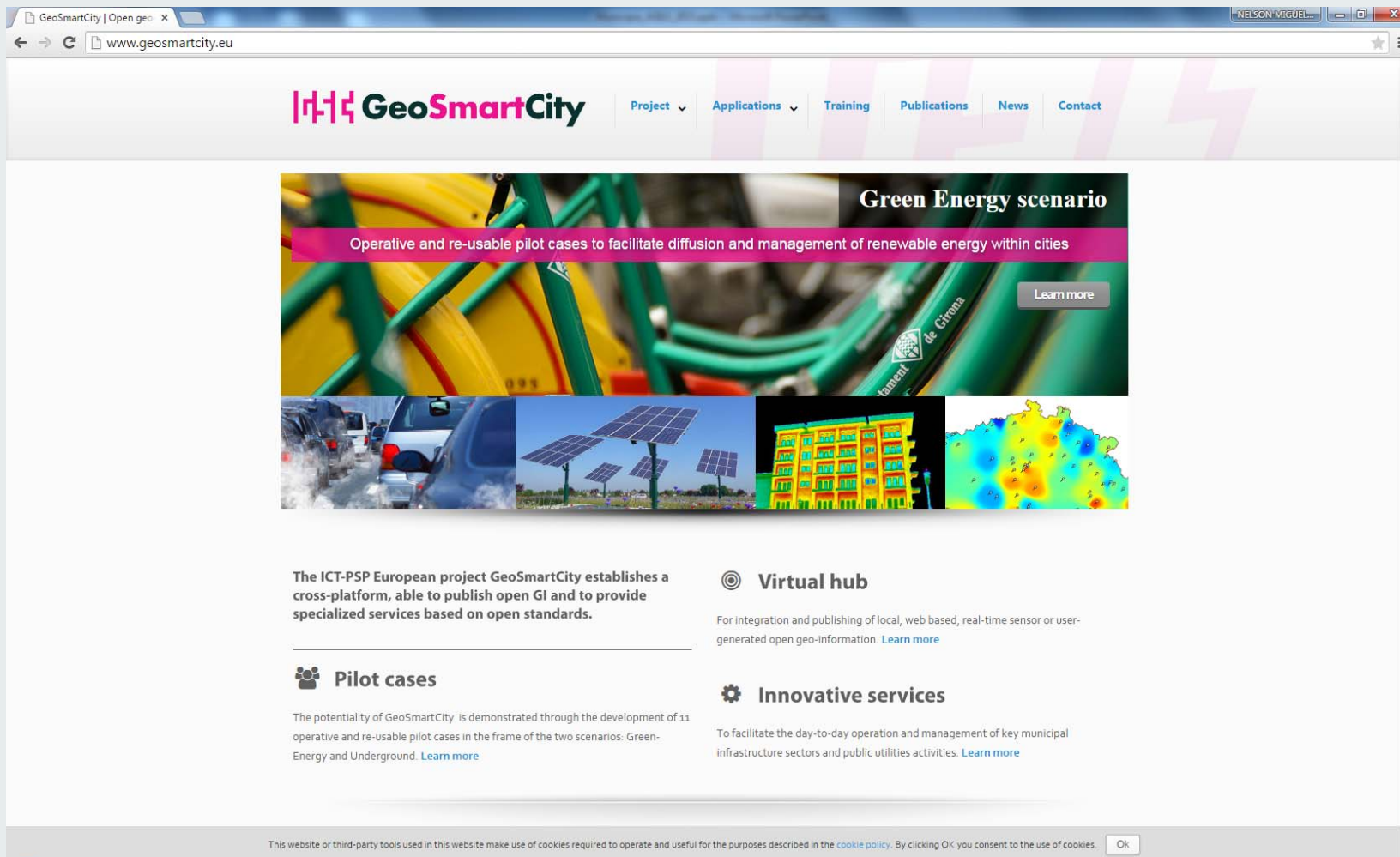
- Geo crowd-sensing platform management

The screenshot shows a web browser window titled "Geosmartcity". The address bar contains "http://geosmartcity.eu". On the left side of the page, there are four tabs labeled "First Tab", "Second Tab", "Third Tab", and "Underground Event Management". The main header area includes navigation icons (home, globe, zoom in, zoom out, pan, rotate, add layer, remove layer) and a search bar. A "Login" button is visible next to a user profile icon. Below the header, a map of AMADORA is displayed. A "Backoffice" label points to a specific location on the map. In the foreground, a "Backoffice" modal window is open, featuring a table with columns "state", "Category", "Location", and "Date". To the right of the table is a form with fields for "Date", "Event id", "Location", "Category", "Description", "State", "Name", "Email", "Id Number", and "Telephone". At the bottom of the form are icons for adding new records, uploading images, attaching files, deleting records, and confirming actions.

- Geo crowd-sensing platform management

[illegible]

# Obrigado!



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## Green Energy scenario

Operative and re-usable pilot cases to facilitate diffusion and management of renewable energy within cities

Learn more

The ICT-PSP European project GeoSmartCity establishes a cross-platform, able to publish open GI and to provide specialized services based on open standards.

### Pilot cases

The potentiality of GeoSmartCity is demonstrated through the development of 11 operative and re-usable pilot cases in the frame of the two scenarios: Green-Energy and Underground. [Learn more](#)

### Virtual hub

For integration and publishing of local, web based, real-time sensor or user-generated open geo-information. [Learn more](#)

### Innovative services

To facilitate the day-to-day operation and management of key municipal infrastructure sectors and public utilities activities. [Learn more](#)

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