HIGH SUN

HIGH resolution **S**olar expos**U**re calculatio**N** for the production of renewable energy

Spokes involved: TS1

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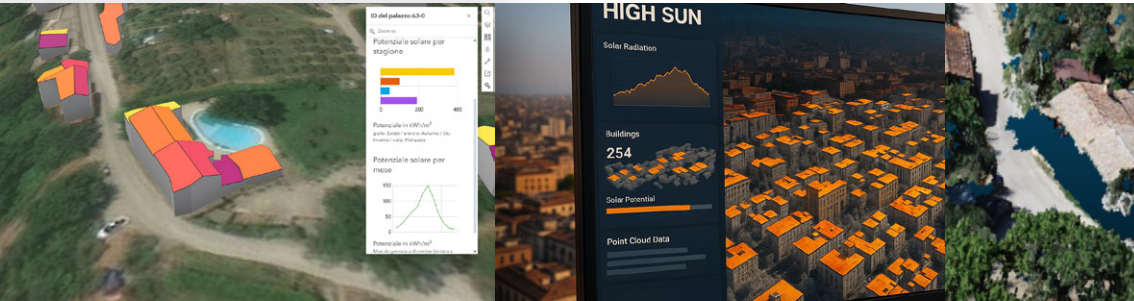
MOTIVATION

- **Urbanization and Energy Impact**
  Rapid urbanization increases energy consumption and CO_2 emissions world-wide, necessitating sustainable solutions.
- **Renewable Energy Transition**
  Transitioning to renewable energy sources like photovoltaic systems is critical for sustainable urban development.
- **High SUN Project Overview**
  The High SUN project uses geospatial tools to assess solar exposure and energy yield potential in cities.

OBJECTIVES

- **Establish** a standardized workflow to assess rooftop solar potential.
- **Classify** buildings and rooftops by suitability for photovoltaic installation and usage types.
- **Visualize** solar irradiance potential and supporting decision-making.
- **Ensure** the approach is adaptable and scalable across diverse urban environments.

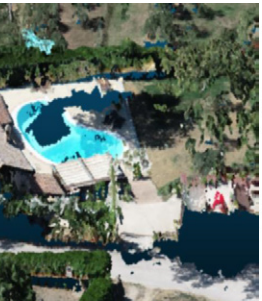


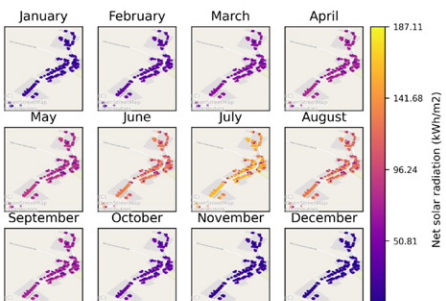
SCALABILITY

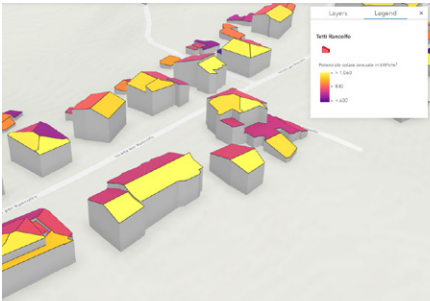
- **Transferable Methodology**
  Applicable across cities provided with LiDAR or photogrammetric point-cloud datasets.
- **Customizable Dashboard**
  Adaptable to municipalities, energy planners, and private stakeholders.
- **Domain Extensibility**
  Supports applications to PEDs and RECs, enabling simulations of energy exchange and collective self-consumption.

RESULTS

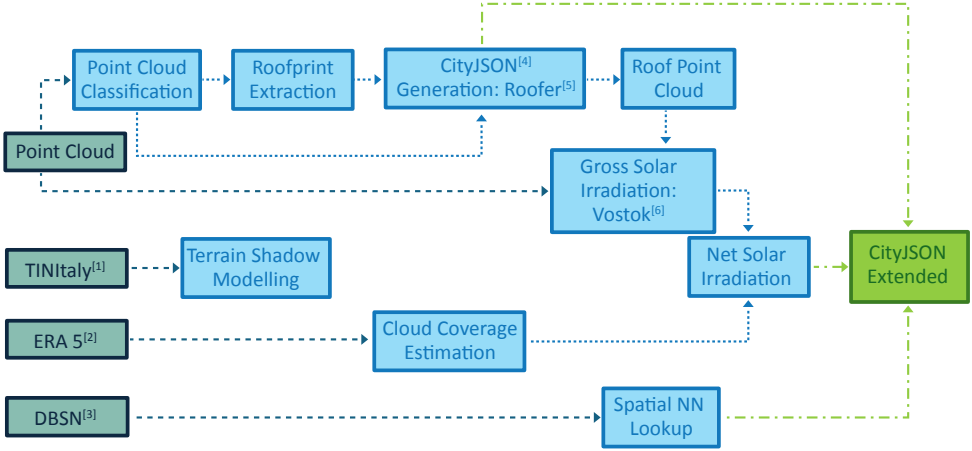
- **3D Model**
  Creation of a 3D city model in CityJSONformat, an OGC standard for high efficiency and interoperability.
- **Solar Potential Estimation**
  Solar radiation potential calculated for each building roof at different time intervals: monthly, seasonal, and annual.
- **Reproducible Workflow**
  Defined and implemented a reproducible workflow based on point clouds, using open-source tools and datasets.
- **Interactive Dashboard and Stakeholder Engagement**
  Development of an intuitive dashboard, created with stakeholder input, to meet the needs of public administrations.







METHODS


Point Cloud Classification
Roofprint Extraction
CityJSON[4] Generation: Roofer[5]
Roof Point Cloud
Point Cloud
Gross Solar Irradiation: Vostok[6]
TINItaly[1]
Terrain Shadow Modelling
Net Solar Irradiation
CityJSON Extended
ERA 5[2]
Cloud Coverage Estimation
DBSN[3]
Spatial NN Lookup

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