Energy Community Secretariat

Uniting Europe's Energy, Today

CROSS-BORDER SUSTAINABLE RENEWABLES ACCELERATION AREAS IN UKRAINE – PHASE II

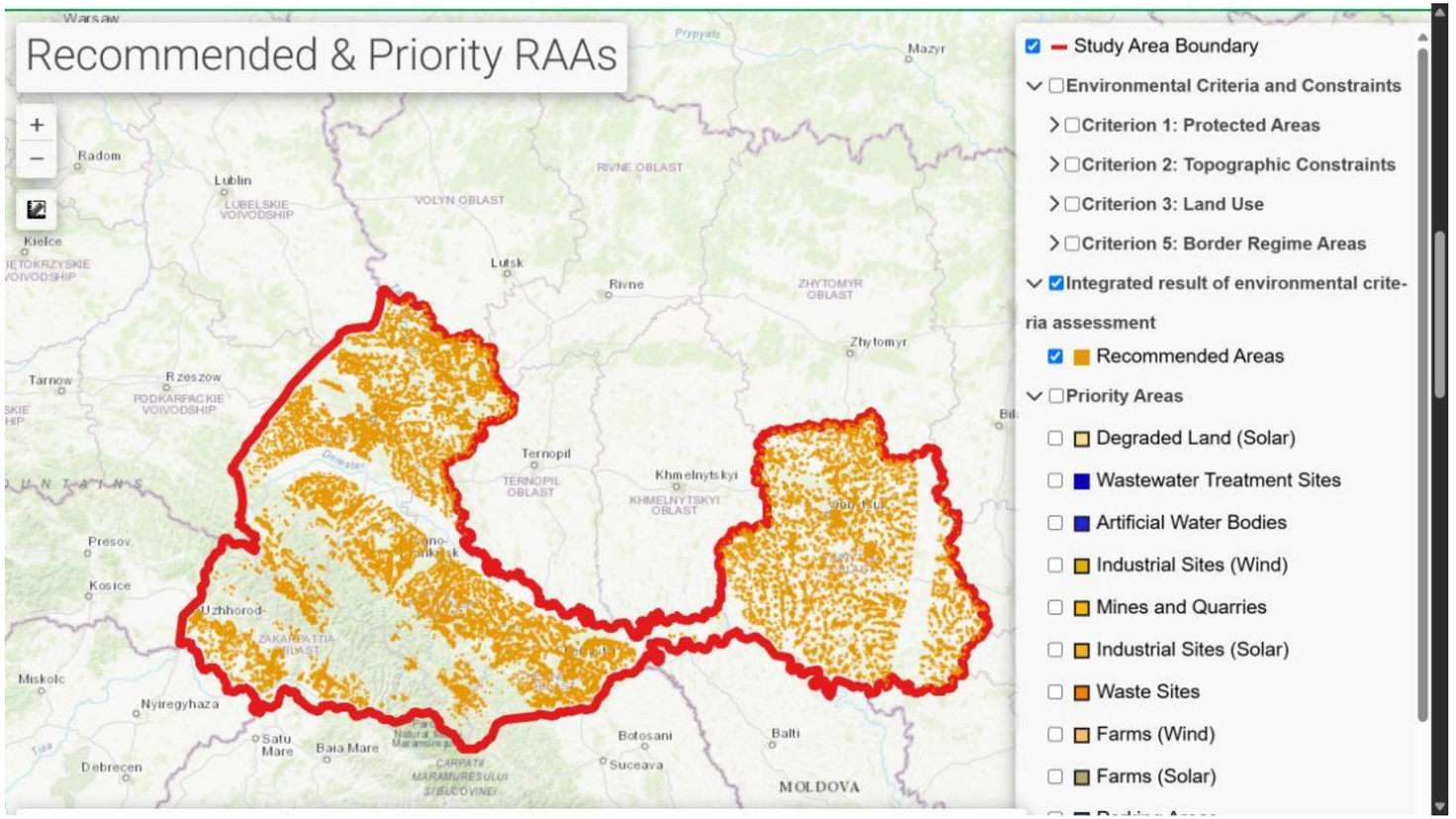
INTEGRATING GIS ANALYSIS AND SPATIAL DATA INTO RAA IDENTIFICATION PRACTICE: FROM LAYER SKILLS TO AUTHORITY DECISIONS

Sergii Gapon

Агенція геопросторових рішень
АГЕОРА

13 November 2026

Project map and five pilot areas



Pilot communities

Rukshynska Community
Chernivetska Oblast

Drohobytska Community
Lvivska Oblast

Horodkivska Community
Vinnytska Oblast

Kolomyiska Community
Ivano-Frankivska Oblast

Yasinianska Community
Zakarpatska Oblast

Five areas documented in the pilot reports

Rukshynska

Chernivetska



3 ha

Ground-mounted PV

Drohobytska

Lvivska



39.97 ha

Ground-mounted PV

Horodkivska

Vinnytska



16.10 ha

Ground-mounted PV

Kolomyiska

Ivano-Frankivska

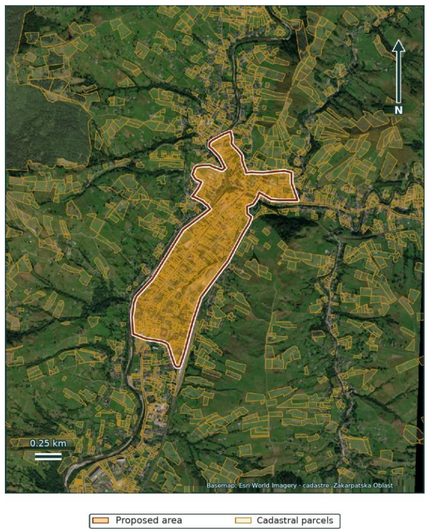


20.59 ha

Ground-mounted PV

Yasinianska

Zakarpatska



110.86 ha

Rooftop PV

Applying criteria to site assessment

Assessment topic	Combined data	Assessment output
Environmental conditions	Nature Reserve Fund, forests, Emerald Network, water	Applicable regimes and natural features
Land use	Boundaries, cadastre and planning information	Land-use context of the proposed development
Energy potential	Solar resource, terrain and buildings	Indicative scale of electricity generation
Grid options	Power lines, substations and transport access	Options requiring further consultation

Spatial conditions

Site characteristics

→

Comparison of options

Combined criteria

→

Proposal

Evidence for discussion

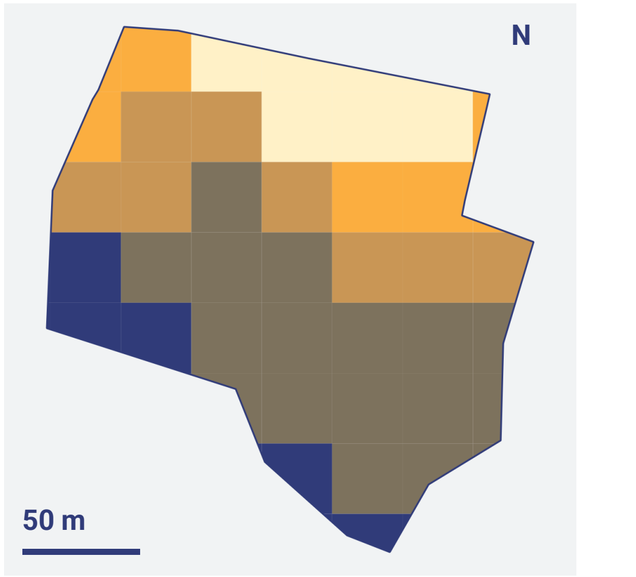
Spatial datasets and analytical tools

Data	Processing in QGIS / GEE	Analytical output
Boundaries and land use	Spatial intersections and attribute joins	Site characteristics
Environmental and natural features	Layer overlays and context analysis	Overlaps and conditions of use
Power lines, substations and roads	Distance and location analysis	Grid context
Solar resource and terrain rasters	Zonal statistics and class areas	Resource and terrain indicators
Buildings and roof characteristics	Footprint and functional-class analysis	Usable area and rooftop potential
Google Earth Engine time series	Collection processing and seasonal analysis	Resource distribution over the year

Results are brought together in reports, maps and the Energy for Communities app

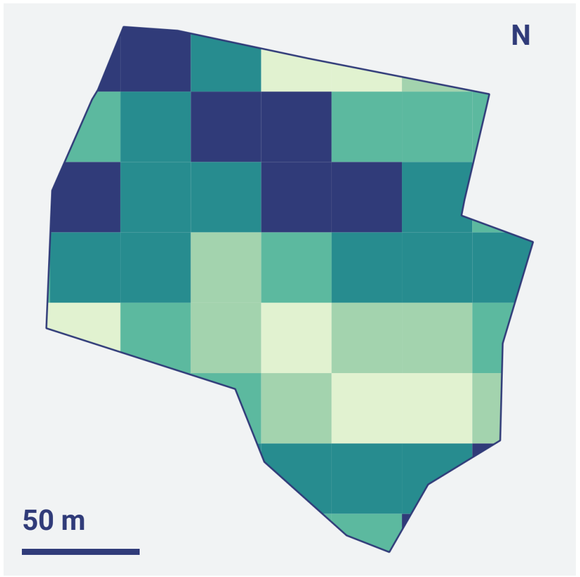
Rukshynska Community: terrain of the PV site

Elevation, m





Surface slope, °





82%

of the area has a slope below 2°

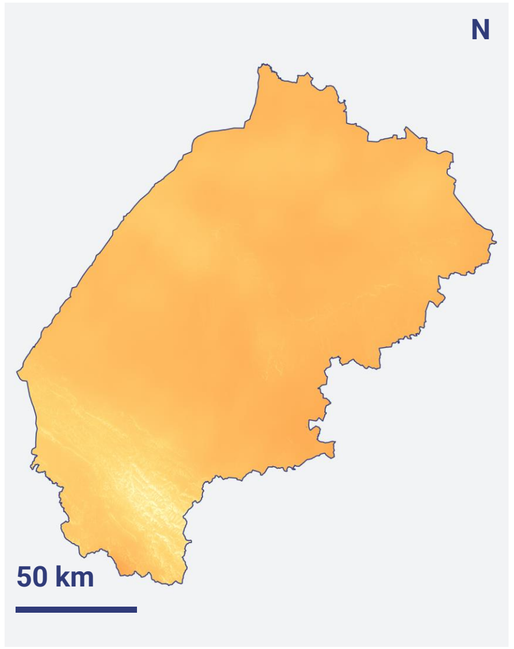
Predominantly gentle terrain

Terrain informs the layout of a ground-mounted PV plant

Solar resource across Lvivska Oblast

Annual GHI

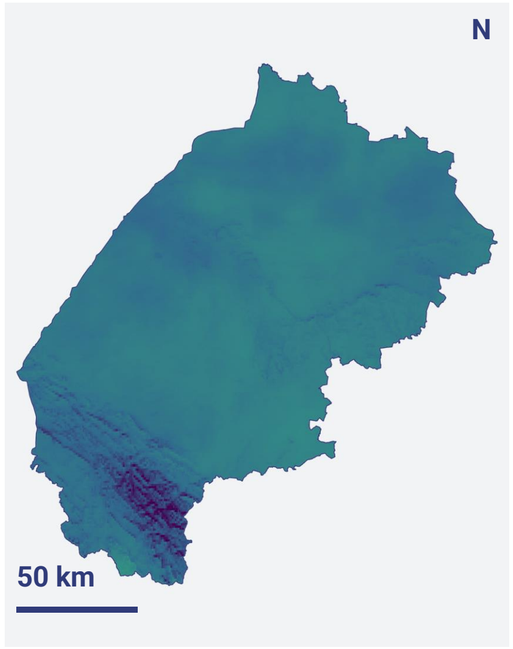
kWh/m²



1000 1100 1200 1300

Annual PVOUT

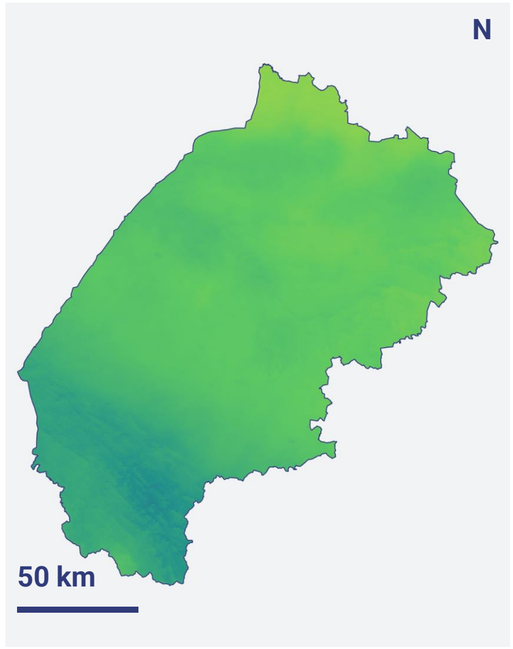
kWh/kWp



1000 1100 1200 1300

June PVOUT

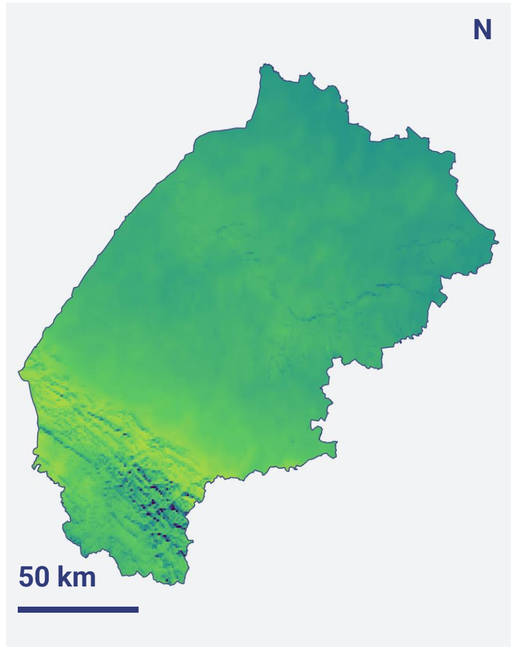
kWh/kWp



90 105 120 135 150

December PVOUT

kWh/kWp

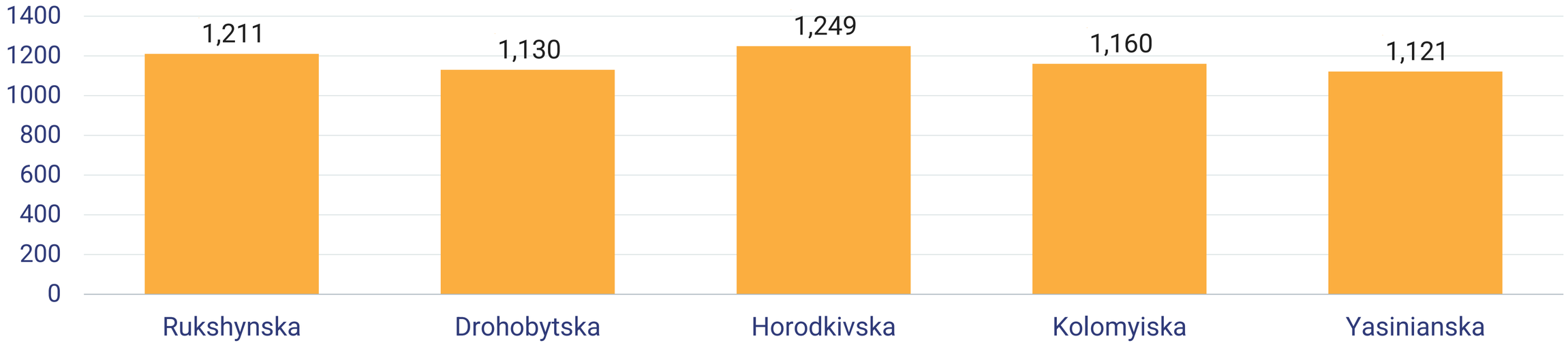


10 20 30 40 50

Global Solar Atlas

Zonal statistics: an indicator for each pilot area

Mean annual solar irradiation, kWh/m²



Area boundary

Site or community

→

Raster values

Values within the boundary

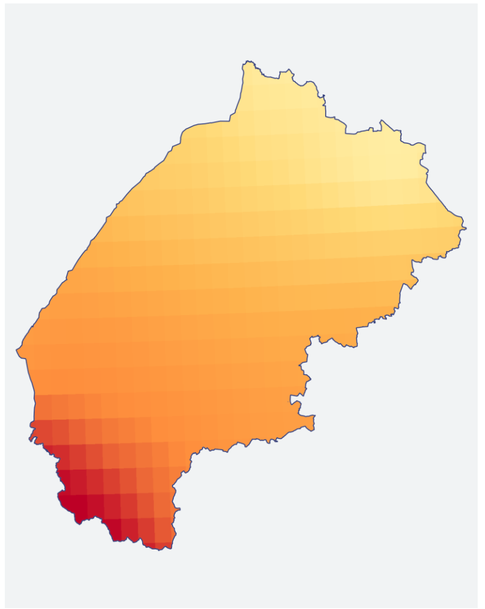
→

Numerical assessment

Resource and class areas

Google Earth Engine: seasonal resource profile

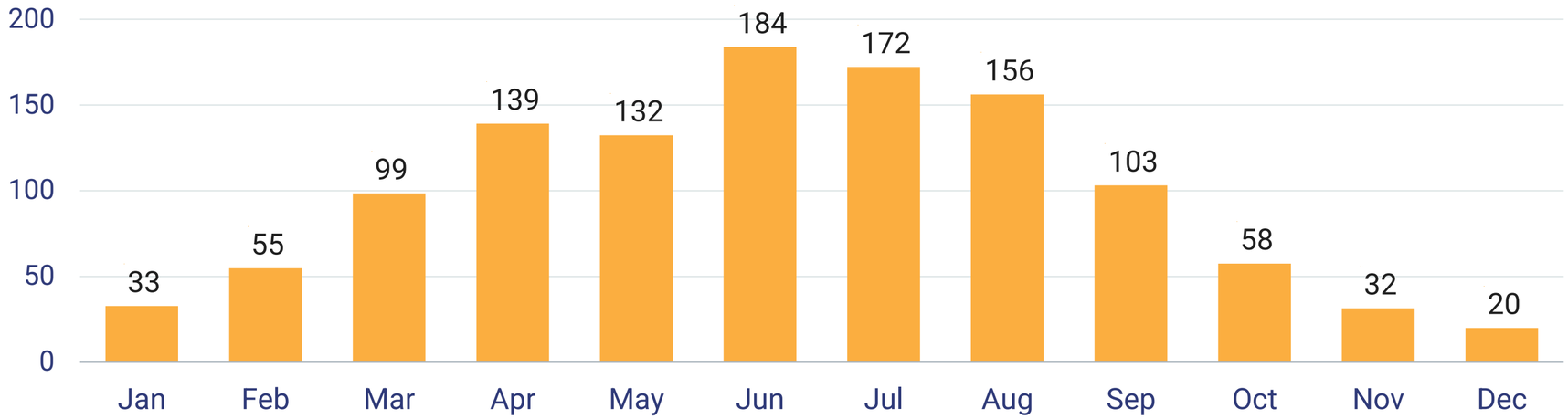
Lvivska Oblast, 2025





June, kWh/m²

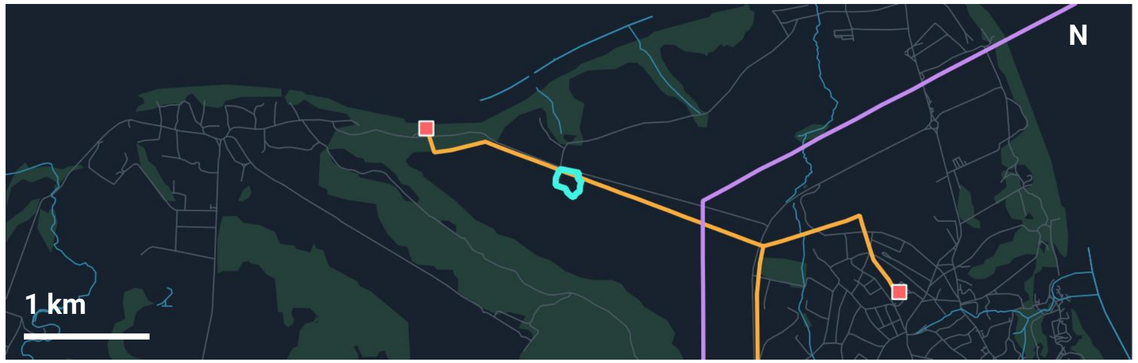
Mean monthly solar irradiation, kWh/m²



Seasonality informs the assessment of demand, storage and PV operation

Energy networks around the pilot areas

Rukshynska Community



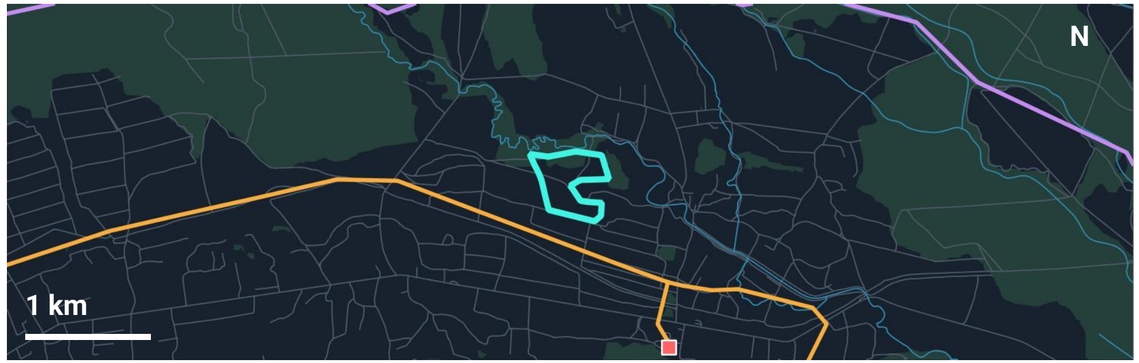
Drohobytska Community



Horodkivska Community



Kolomyiska Community



Lines ≥110 kV | 35 kV lines | Local networks | Substations | Pilot area

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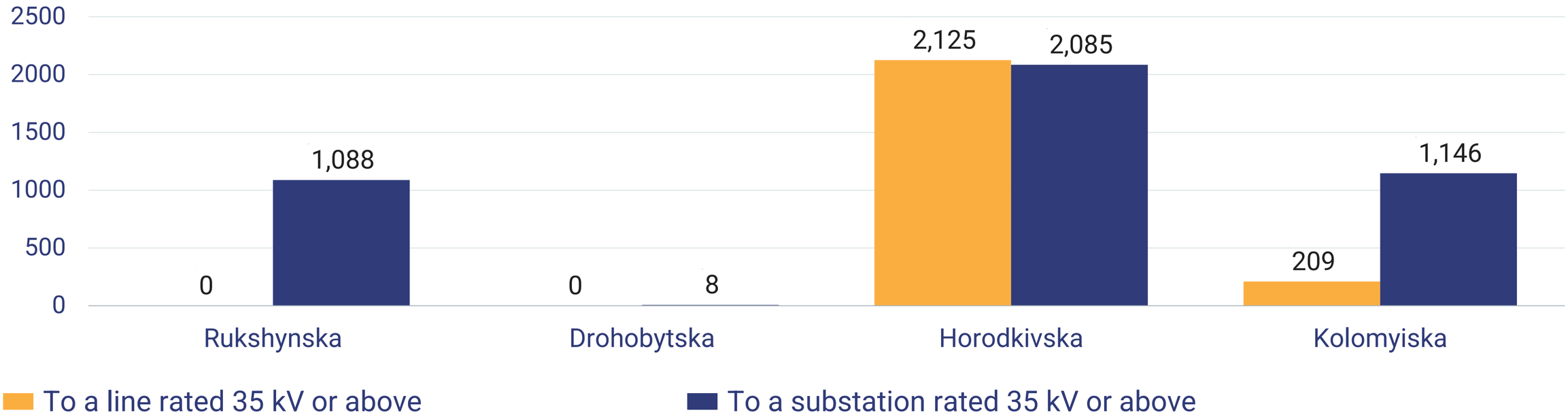
Distances to power lines and substations

Shortest distance from the pilot area, m



Horodkivska: grid assets about 2.1 km away. Drohobytska: a substation next to the site.

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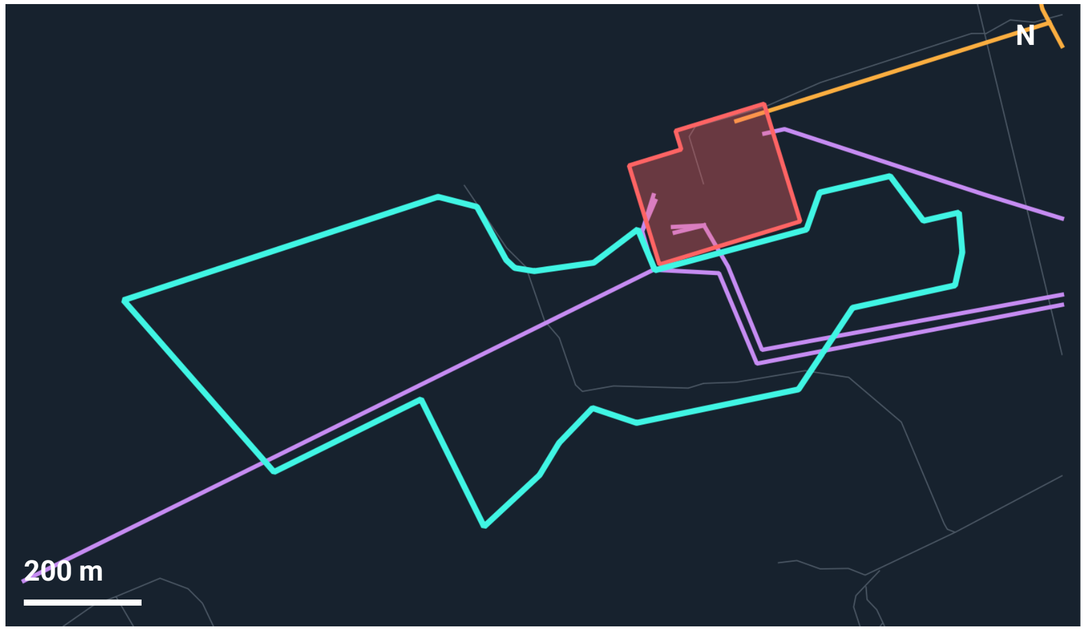
A grid node next to the Drohobytska site

Drohobych 330 substation and adjacent lines



Pilot area Substation Lines ≥110 kV 35 kV lines

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What the map shows

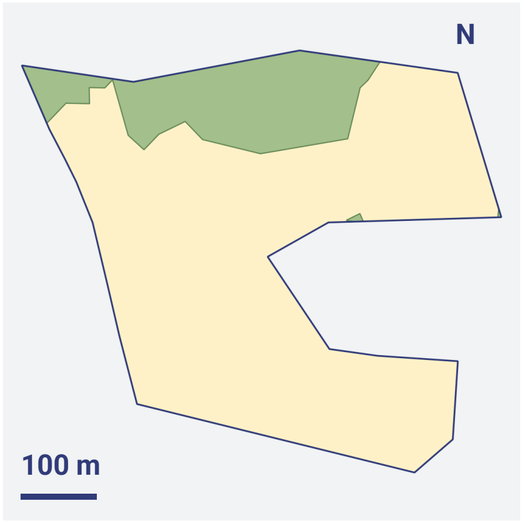
Location of grid nodes
Nominal voltage
Proximity to the site

What the operator determines

Available capacity
Possible connection point
Cost and delivery time

Kolomyia: vegetation, terrain and grid proximity

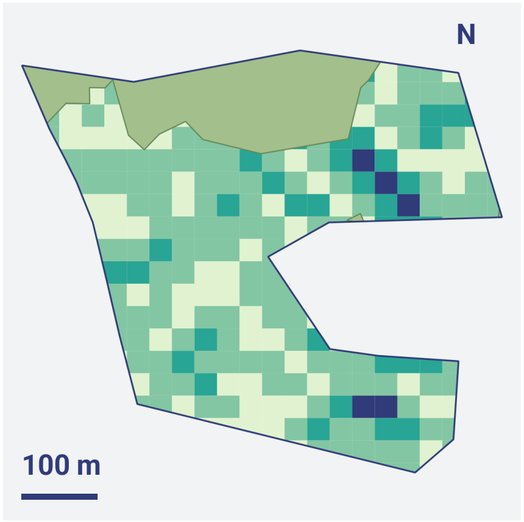
Forest cover



Forest cover

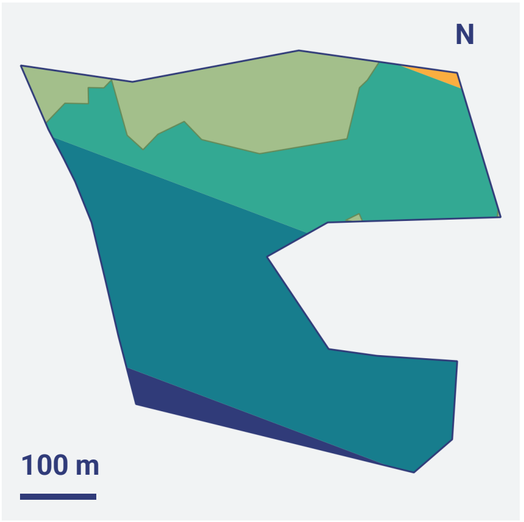
Outside forest cover

Slope, °



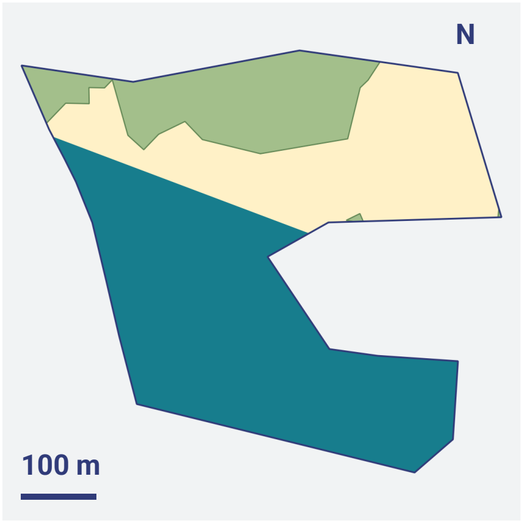
<1 1–2 2–3 ≥3

Distance to a line, m



≤250 250–500 500–750 >750

Within 500 m of a line



Within 500 m

Over 500 m

10.53 ha outside forest cover lies within 500 m of a power line

© OpenStreetMap contributors; forest cover: project data

Rukshynska Community: potential of the full site



3 ha

Site area

3.53 MW

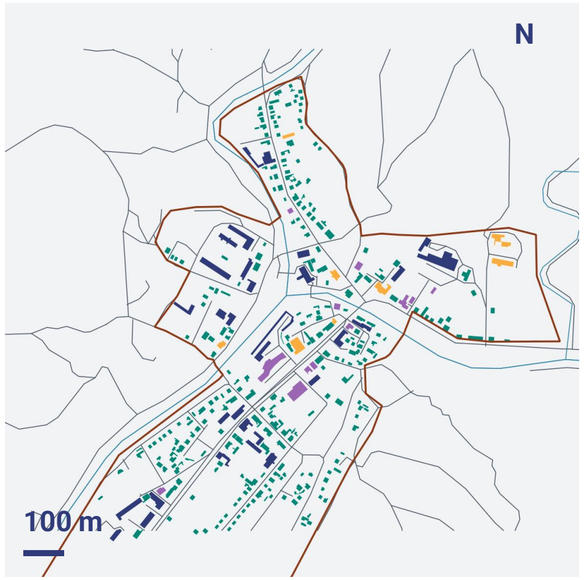
Theoretical installed capacity

4.16 GWh/year

Indicative annual generation

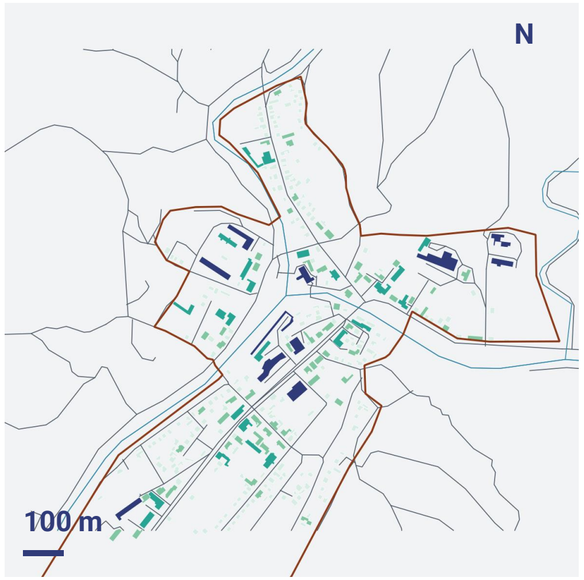
Yasinia: spatial characteristics of buildings

Functional classes



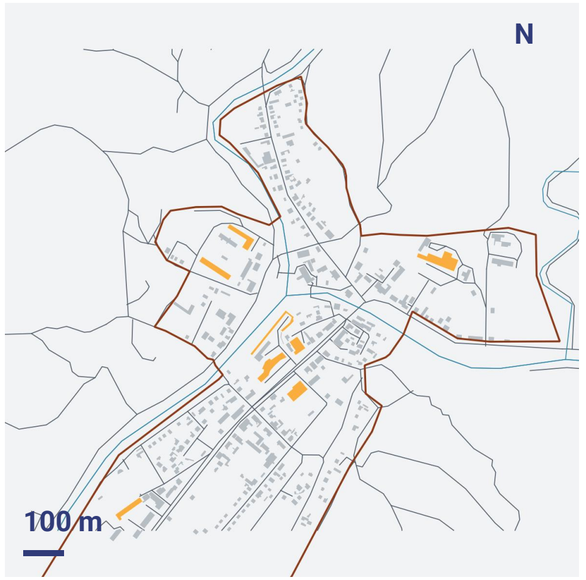
- Residential
- Public
- Commercial
- Industrial
- Other non-residential

Usable roof area, m²



<100 | 100–250 | 250–500 | ≥500

Largest roofs

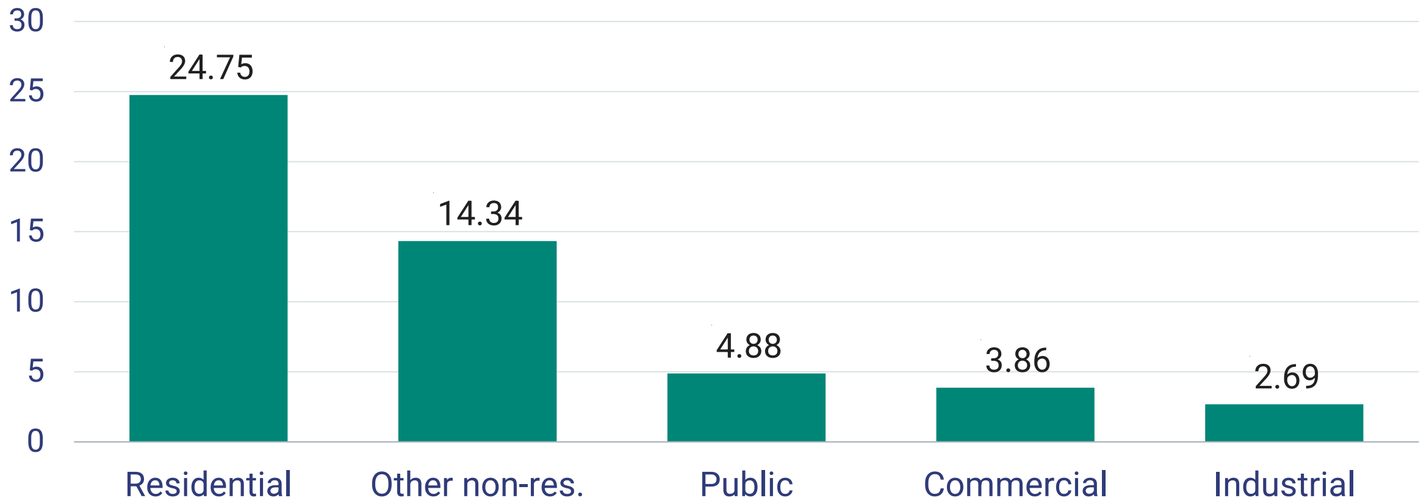


- Top 10
- Other buildings

Central Yasinia excerpt. © OpenStreetMap contributors

Yasinia: concentration of usable roof area

Usable area by class, thousand m²



9.00 ha of building footprints. 5.05 ha of estimated usable roof area.

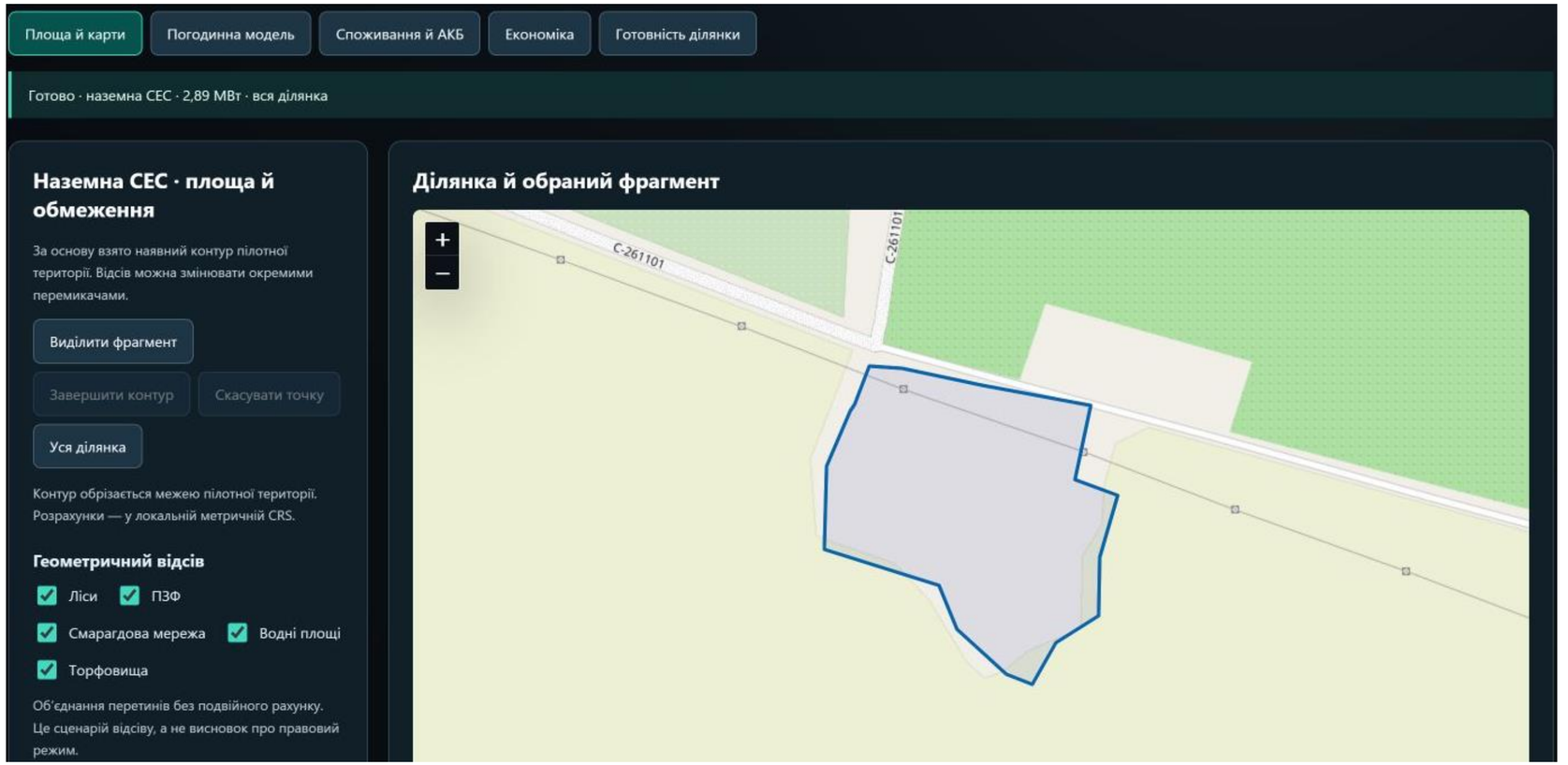
19.5%

of usable roof area is concentrated in 10 of 412 buildings

From the map to a list of buildings

Ownership, roof condition and demand inform further priorities

Energy for Communities: spatial scenarios



The app allows users to

Compare the full site and its parts

Change layout parameters

Estimate capacity and generation

Scenario assumptions determine the result

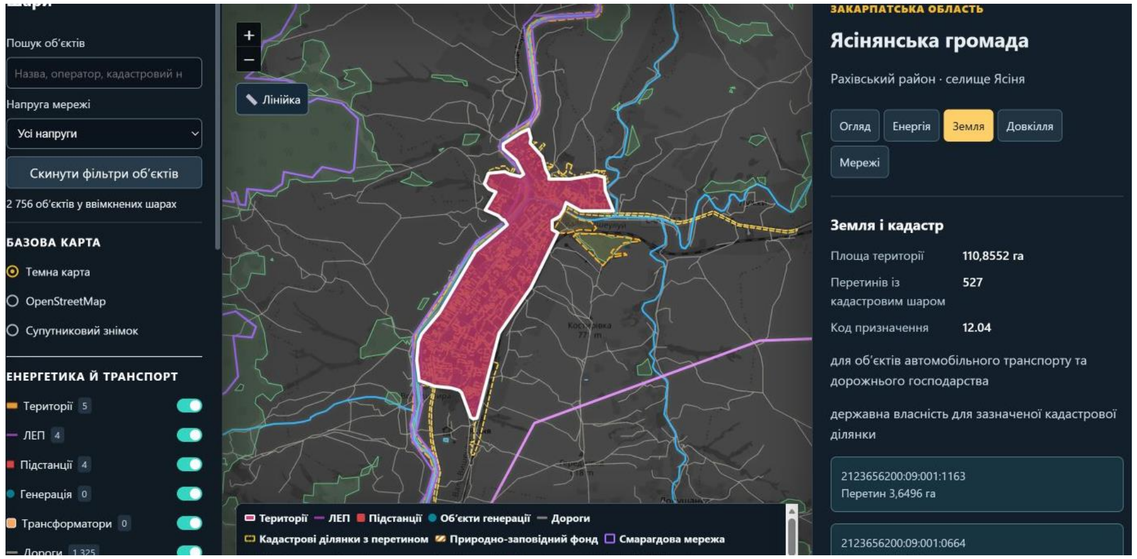
Area comparison and site profiles

Comparison



Potential, resource and grid context in one overview

Site profile



Site characteristics, spatial conditions and discussion materials

Thank you for your attention

RAA project map

energy-community.org

Energy for Communities

Interactive maps of five pilot areas

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