Biomethane zoning for Ukraine

Biomethane in Ukraine: Opportunities and Development Conference
June 12, 2025

Yuri Matveev, Ph.D.
Bioenergy Association of Ukraine
Supervisory Board Member

Biomethane zoning - what does mean?

"Biomethane zoning" refers to the process of **identifying and designating specific geographical areas as priority locations for the development of biomethane production facilities.** This strategic approach aims to streamline the establishment of new biomethane plants by taking into account various crucial factors.

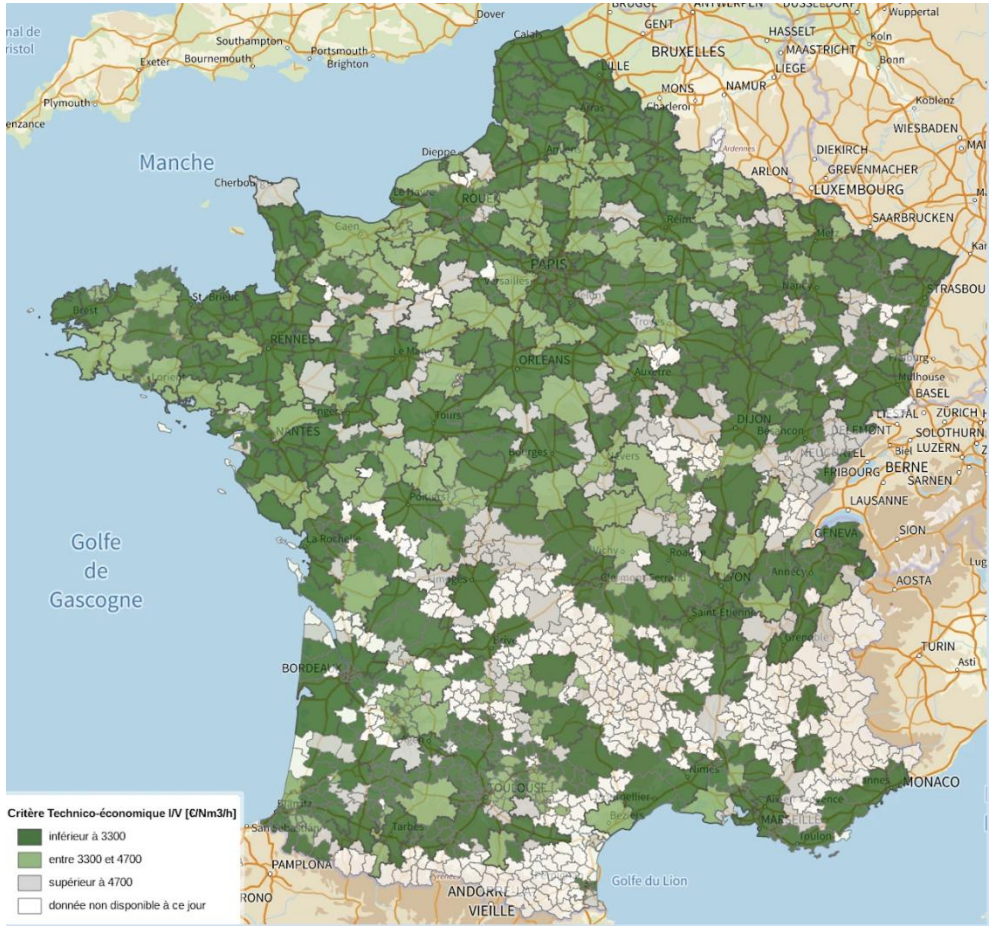
Prioritization of Areas: Biomethane zoning identifies regions that are most suitable for biomethane production based on:

- **Availability of sustainable feedstock:** Access to organic waste materials like agricultural residues, manure, industry and food waste, sewage sludge, which are the raw materials for biomethane.
- **Proximity to gas grid infrastructure:** The ability to easily connect new biomethane plants to existing natural gas transmission and distribution networks.
- **Demand for biomethane:** Local or regional gas consumption patterns that can readily absorb the produced biomethane.
- **Minimizing environmental impacts:** Siting facilities away from vulnerable ecological areas or other sensitive zones.

Biomethane zoning - why?

- **Streamlined Permitting:** A key benefit of biomethane zoning is to accelerate the permitting process for new projects within these designated zones. By pre-identifying suitable areas and conducting initial assessments, the bureaucratic hurdles and delays often associated with new infrastructure projects can be significantly reduced, or even result in automatic permitting in some cases (countries).
- **Facilitating Investment:** Clear zoning helps attract investment by providing certainty and reducing risk for developers. They know where they can build and that the process will be more efficient.
- **Strategic Planning:** Biomethane zoning is a tool for national and regional energy planning, allowing governments and energy companies to strategically develop the biomethane sector to meet renewable energy targets (like the EU's REPowerEU plan to increase biomethane production).
- **Economic Development:** By fostering the growth of biomethane production, zoning can contribute to rural development, create jobs, and improve energy independence.

France example (I)



Source: https://www.terega.fr/en/biomethane-in-your-territories/

France is the fastest growing biomethane market in Europe.

By the end of 2023, 652 French biomethane plants were injecting biomethane

86% of these were connected to the distribution grid and 14% to the transport grid

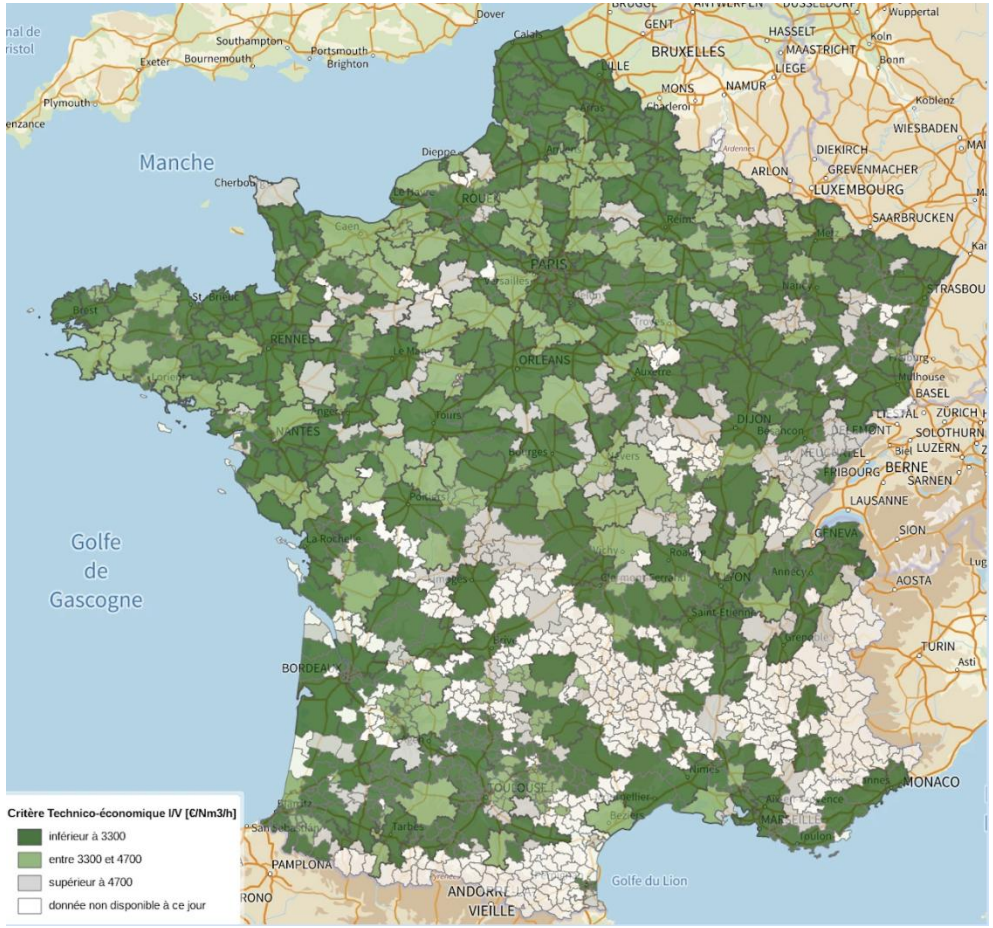
In addition, there are currently 1,232 projects at various stages of development, set to become operational before the end of 2027, with a combined production capacity of 26.6 TWh/year

France's total biomethane production in 2023 amounted to 9.135 TWh

Feed-in-tariff for biomethane differentiated by feedstock type

The 'right to inject' was enforced in 2019 and was implemented from that date onwards, securing gas networks as an outlet for project developers

France example (II)



Source: https://www.terega.fr/en/biomethane-in-your-territories/

The French energy regulator (CRE) tasked the network operators to develop a technoeconomic potential map for France

First version was published in March 2020. Mapping is targeted for approximately 500 zones for their biomethane production potential, their required costs for gas networks adaptation, and their identified best biomethane grid connection scheme.

Additionally, zoning determines the operator network responsible for the connection and guarantees technical and economic conditions are met, ensuring users adequate access to network services.

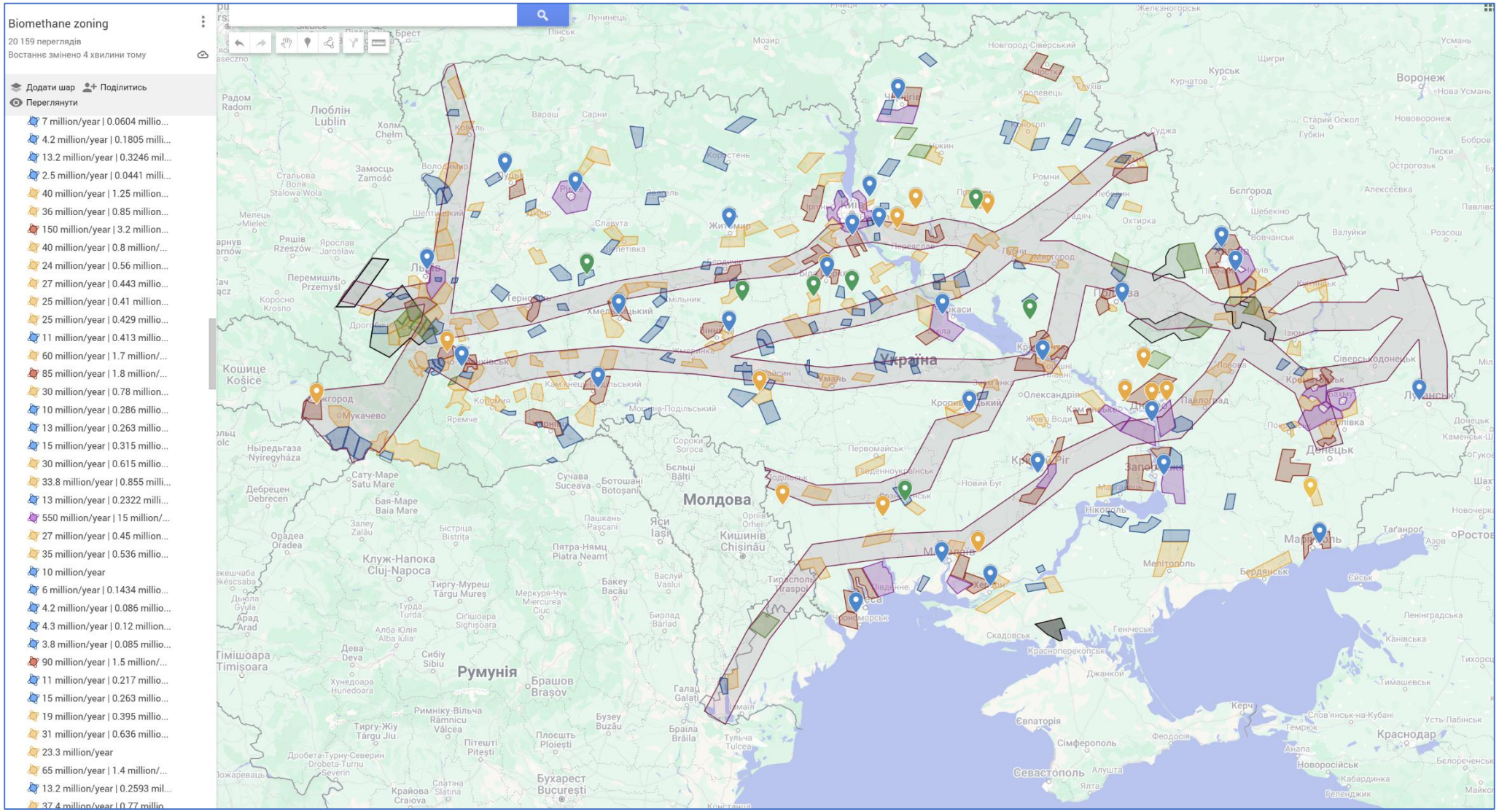
Zoning criteria – three groups

- Connection cost < 3300 €/m^3/h
- Connection cost 3300 - 4700 €/m^3/h
- Connection cost > 4700 €/m^3/h

As a result, reverse flow facilities are built to compress and send biomethane from the distribution grid to the transmission grid, thereby enabling more biomethane injection in rural areas.

There were 27 active reverse flow facilities in France in mid-2024 and 14 in construction.

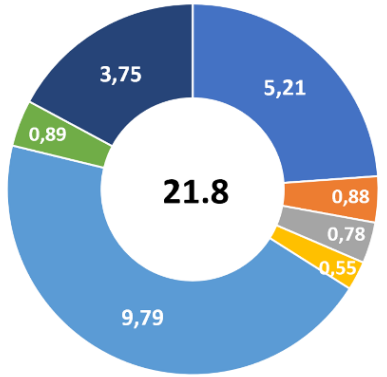
Ukrainian example: interactive map of optimal zones for location of biomethane plants in Ukraine



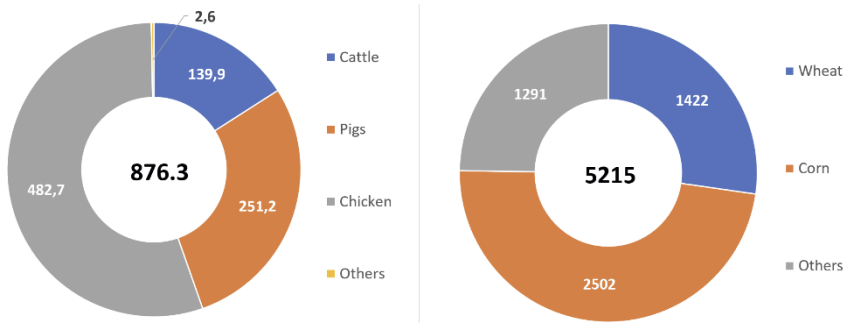
Link to the map: https://www.google.com/maps/d/u/0/edit?mid=1ttZ12uWjd2NxxH-xc3Lin61fN_4JrE1D&usp=sharing

Availability of sustainable feedstock in Ukraine

Bioqas/biomethane potential, billion m^3 CH_4/year	bcm
Biogas from animal waste	0,9
Biogas from harvest residues of agricultural crops	5,2
Biogas from by-products of the food processing industry	0,7
Biogas from municipal solid waste (MSW)	0,5
Biogas from municipal waste water treatment plants	0,1
Energy crops: biogas from corn silage (from 1 mill ha)	3,8
Biogas from cover crops (20% of arable land)	9,8
Biogas from biomass obtained by thermal gasification (10%)	1,0
TOTAL BIOGAS/BIOMETHANE	21,8



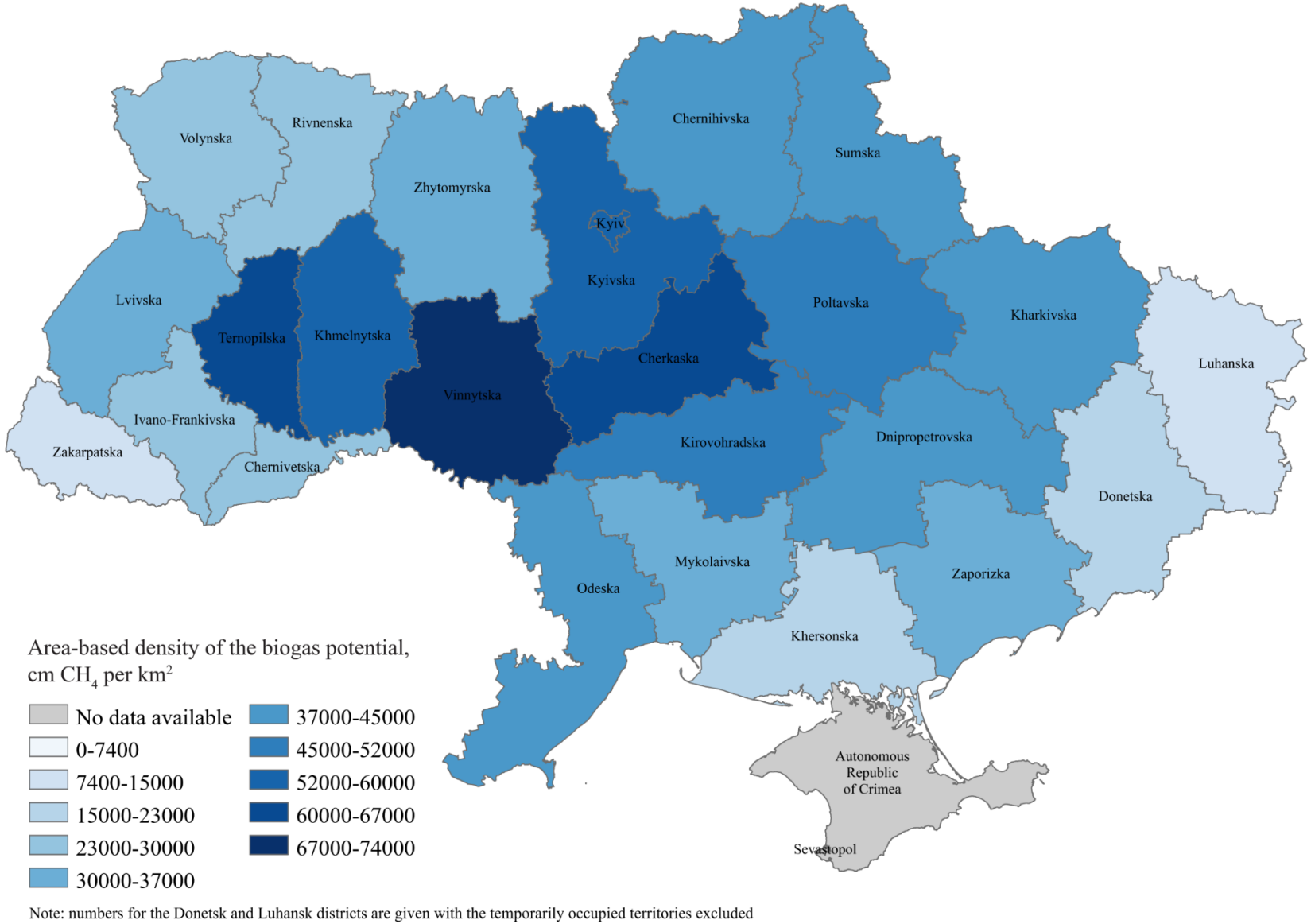
Biomethane potential from the most prospective feedstock types



Biomethane potential by types of animal waste and crop residuals, mln m3 CH4 a year

Availability of sustainable feedstock in Ukraine by regions

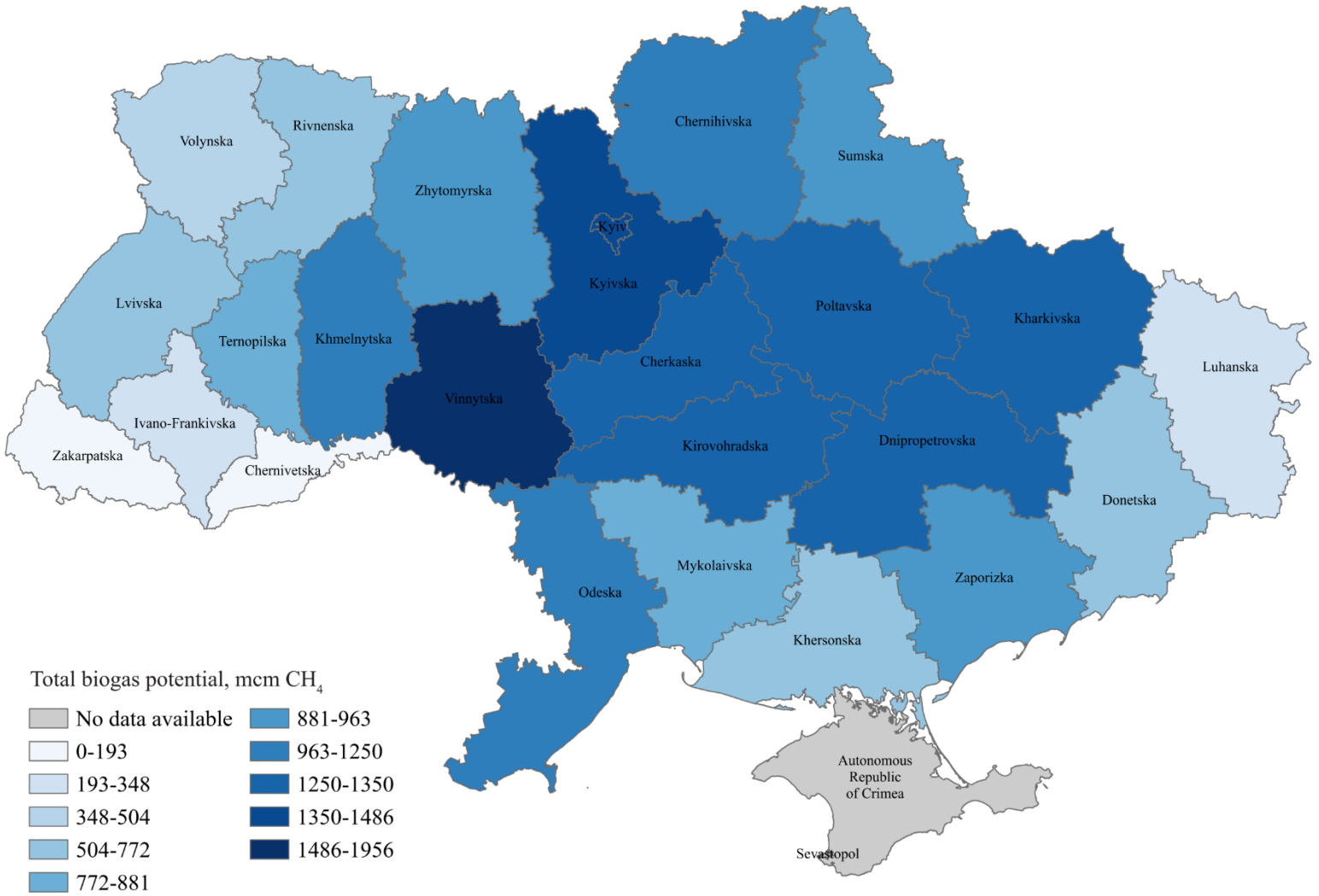
(density in m^3 CH_4/km^2)



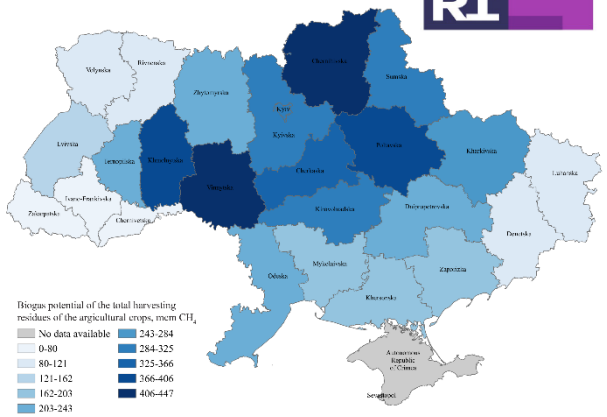
Note: numbers for the Donetsk and Luhansk districts are given with the temporarily occupied territories excluded

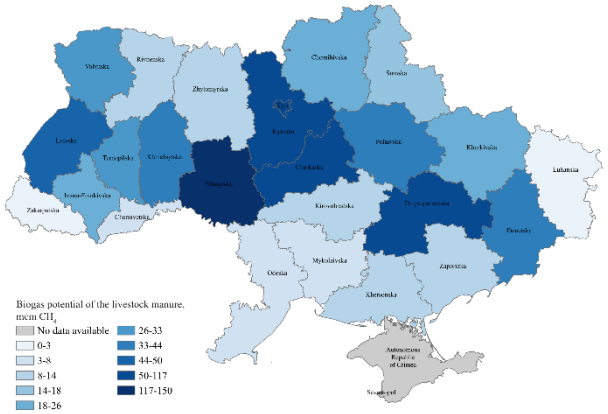
- Almost half of the potential concentrated in western and central regions
- The regions with the biggest area-based density of potential are Vinnytsya, Ternopilska, Cherkasy, Kyivska
- The regions with the biggest potential are Vinnytsya, Kyivska, Dnipropetrovska, Poltavska, Kirovohradska

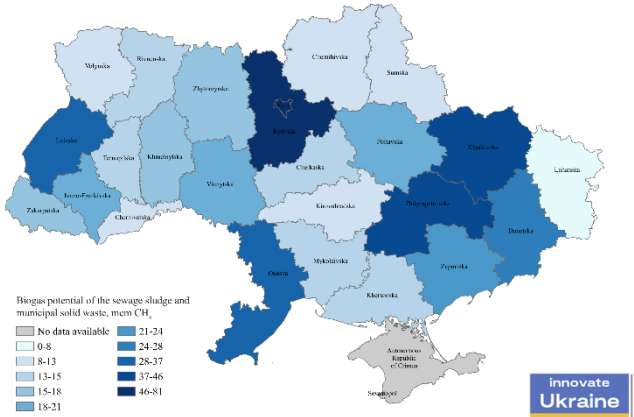
Availability of sustainable feedstock in Ukraine by regions



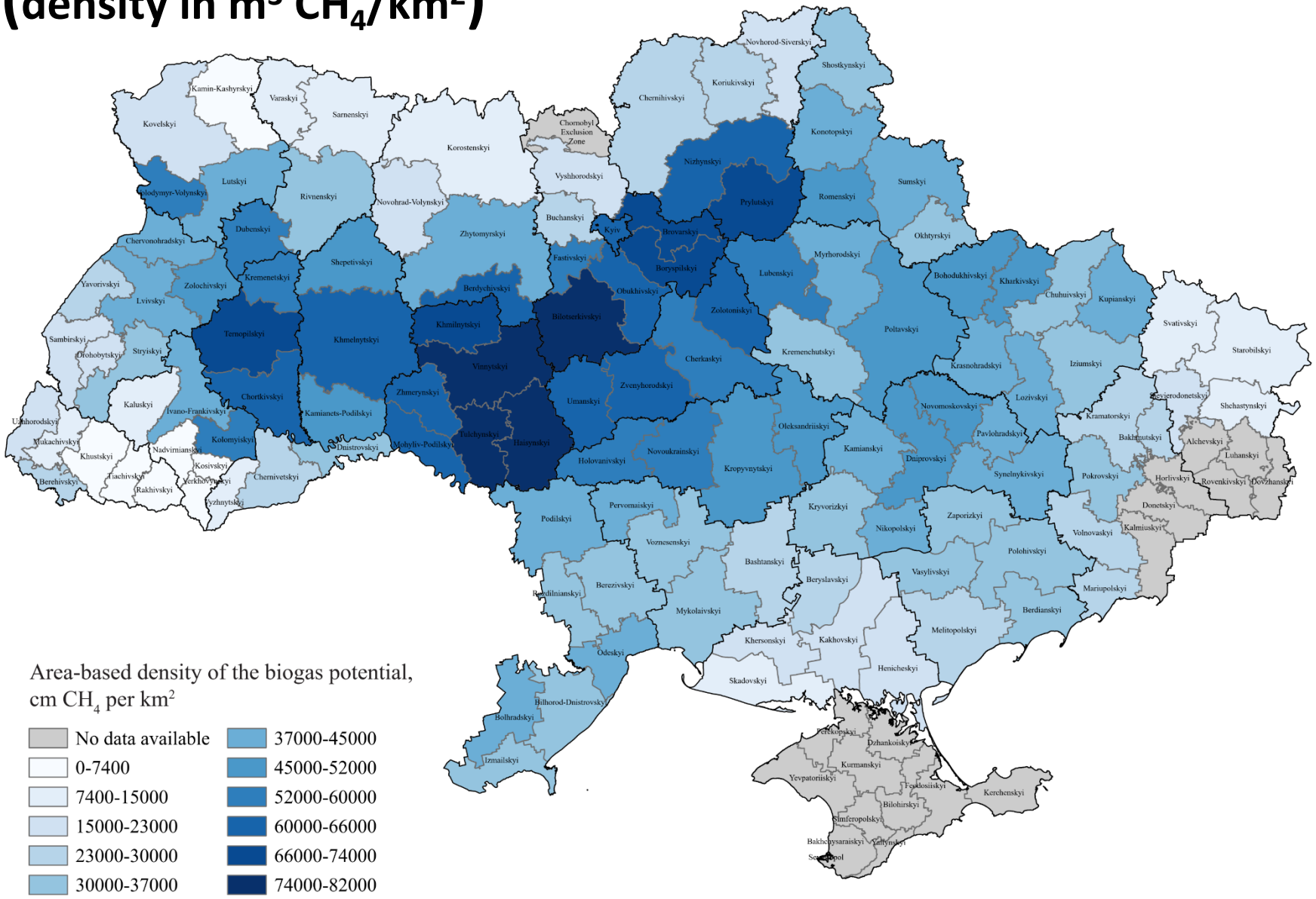
Note: numbers for the Donetsk and Luhansk districts are given with the temporarily occupied territories excluded





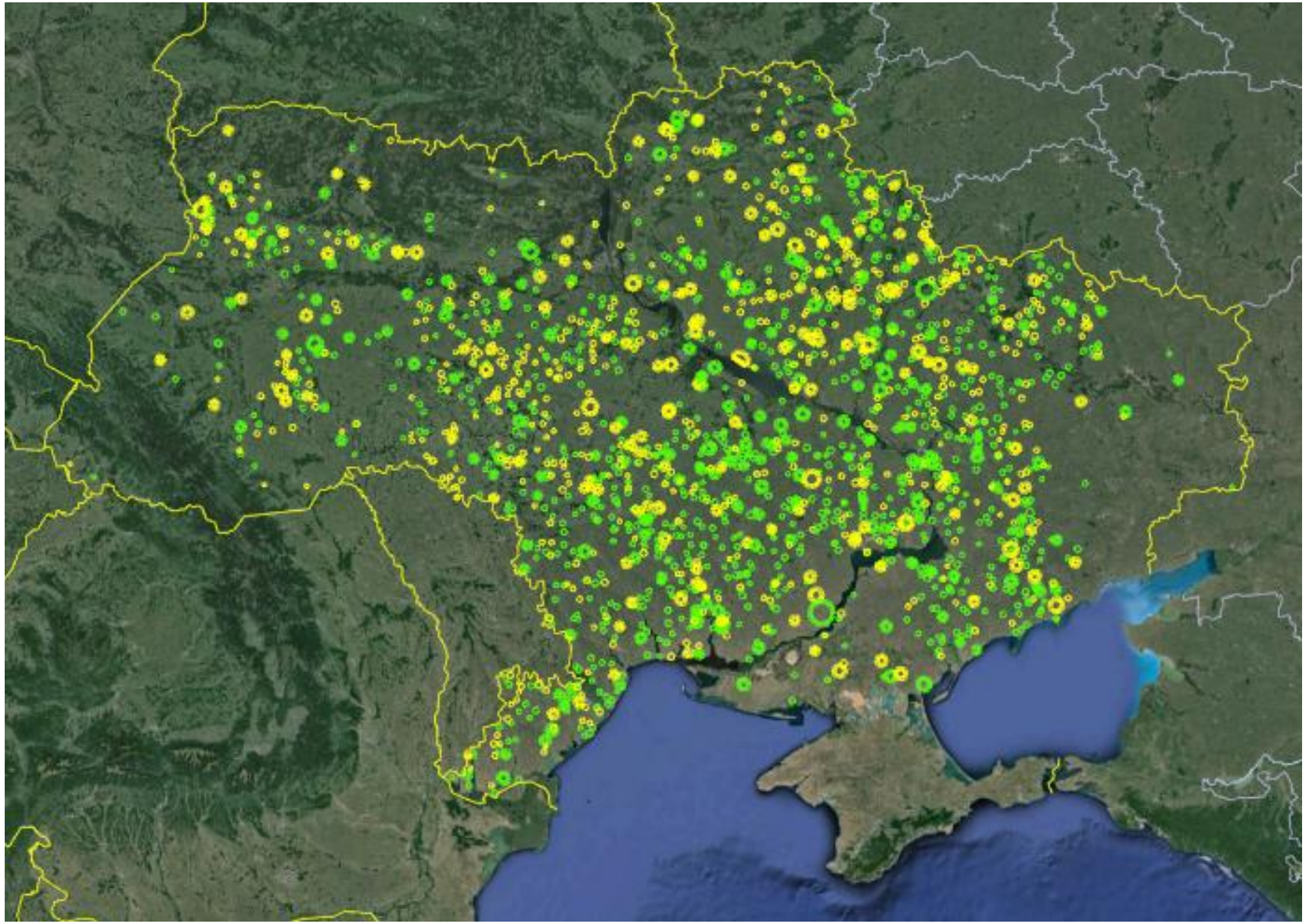


Availability of sustainable feedstock in Ukraine by districts (density in m³ CH_4/km²)



- District's biomethane potential is up to 707 mcm CH_4/year
- Average district's biomethane potential equals 182 mcm CH_4/year
- Density of potential is up to 81,270 m³ CH_4/km² (average - 35,730 m³ CH_4/km²)
- Almost half of the potential concentrated in western and central regions as Vinnytsya, Kyivska, Dnipropetrovska, Poltavska, Kirovohradska

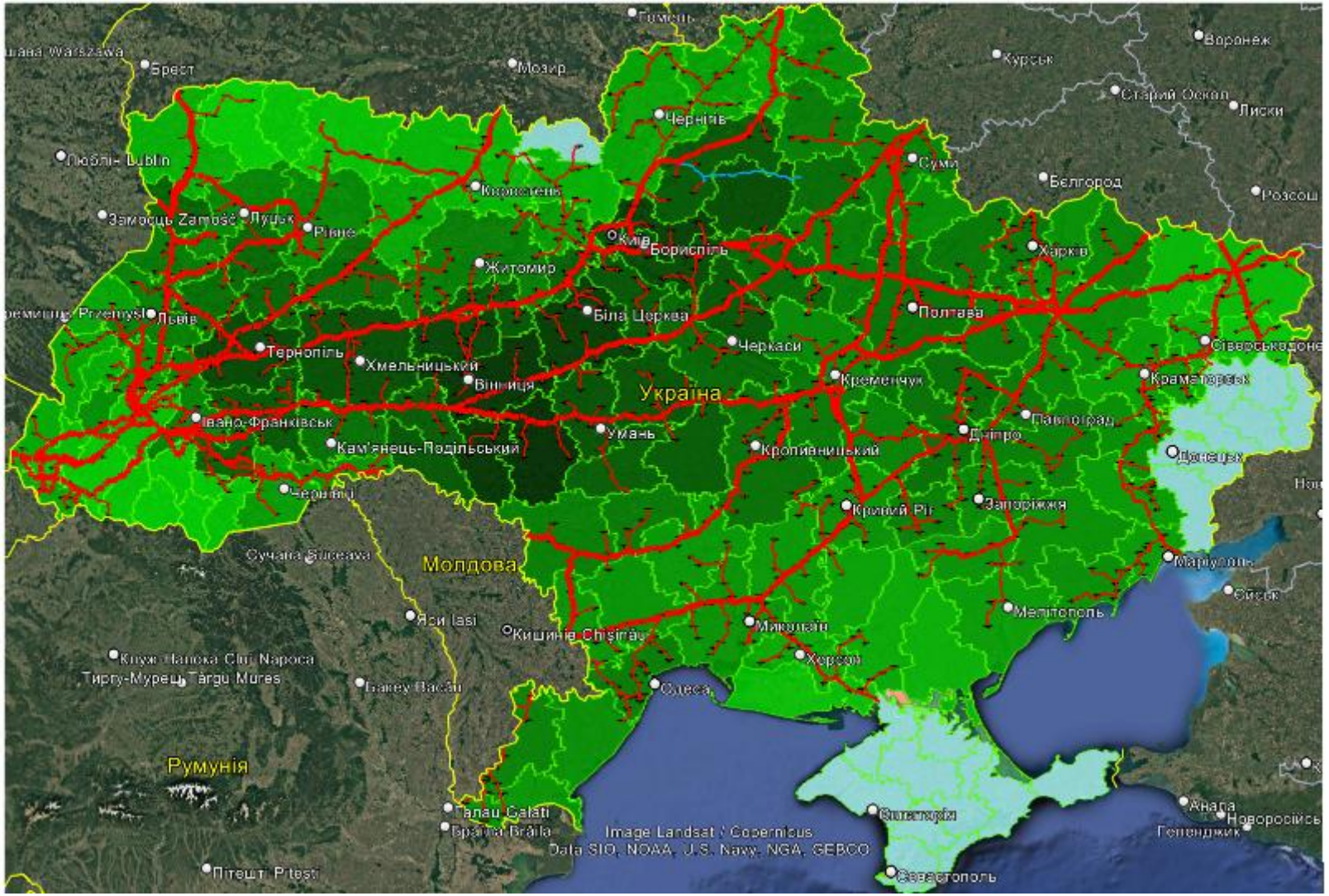
Potential biomethane producers



- Database of agricultural companies cultivating more than 1,500 ha of arable land
- The database includes information on more than 1,900 Ukrainian enterprises
- Total land bank is 5.8 million hectares
- Green - companies engaged in cultivation of agricultural plants only.
- Yellow – including own livestock farming.

Source: https://kurkul.com/

Proximity to gas grid infrastructure (GTS)

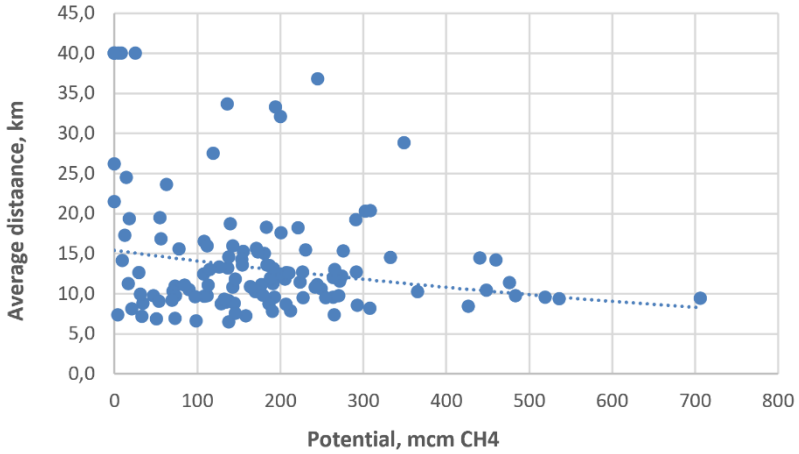


Total length of GTS pipelines is 33,400 km

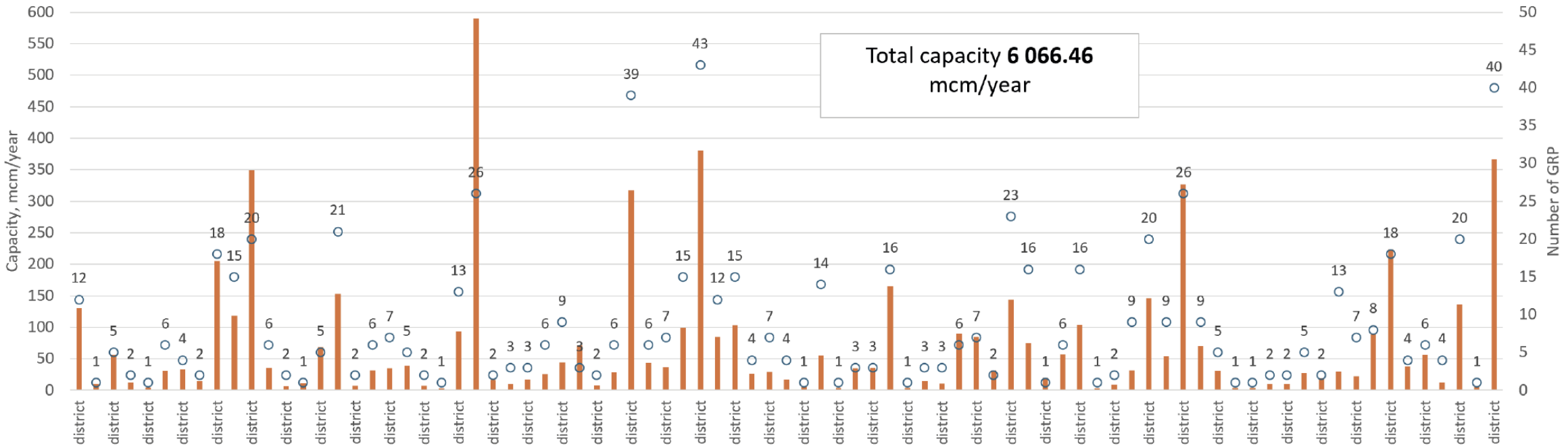
- main pipelines - 21,100 km
- branch pipelines - 12,100 km
- distribution pipelines - 200 km

Total number of gas distribution stations is 1390 units

All regions of Ukraine with the greatest biomethane potential are quite well covered by GTS infrastructure



Proximity to gas grid infrastructure (GDS)



Number of GRPs suitable for connection of biomethane plants by the districts of Ukraine. Source: UABIO

- Total length of the networks of the GDS operators is approximately 309,000 km
- There are 44 GDS operators in Ukraine
- Process of unification of GDS operators under the National JSC "Naftogaz of Ukraine“ management

Conclusion

1. Thanks to the extensive GTS infrastructure, all regions with the greatest potential for biomethane production are quite well covered by elements of this infrastructure, i.e., either main pipelines pass through their territory, or branches to the gas distribution system are located in these territories.
2. There are quite a few districts where are no any elements of GTS infrastructure. However, this does not mean that even in an area with a sufficiently dense GTS infrastructure, connection to the gas transmission system is easily accessible at any point.
3. In many cases connection to GDS is only possible. However, quite often GDS operators indicates that the distribution network cannot accept all biomethane on a uniform schedule, most often there are restrictions in the summer period.
4. Companies planning to build a biomethane production plant initially choose available land with sufficient area and located as closer as possible to the most substantial sources of raw materials and access roads. Most often, companies do not know in advance where the natural gas pipelines suitable for connecting their future capacities are located, or have only an approximate idea of it.
5. Development of GDS will be needed in order to accept full volume of produced biomethane. It may include reverse flow facilities to compress and send biomethane from the distribution grid to the transmission grid, joining of separated so far segments of the distribution system, construction of dedicated gas input facilities, etc.
6. Further development of zoning concept is needed.

Thank you for your attention

UABIO

Yuri Matveev
Bioenergy Association of Ukraine
matveev@uabio.org