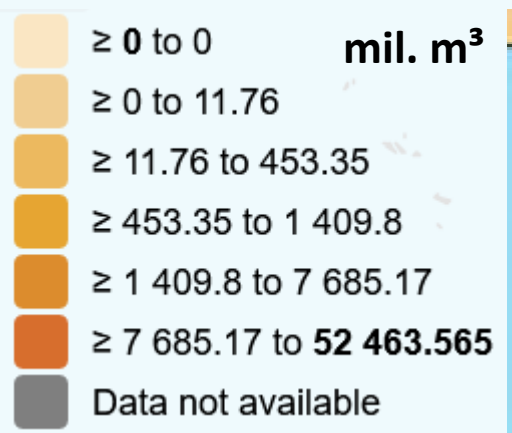


An aerial photograph of a wide river flowing through a deep valley. The river is the central focus, winding through the landscape. On the right bank, a paved road curves along the edge of a steep, forested hillside. The background features rolling mountains under a clear sky. The overall color palette is dominated by blues and greens, with a soft light source creating a gentle glow on the water's surface.

DanuP-2-Gas

Innovative model to drive energy security and diversity in the Danube Region via combination of bioenergy with surplus renewable energy

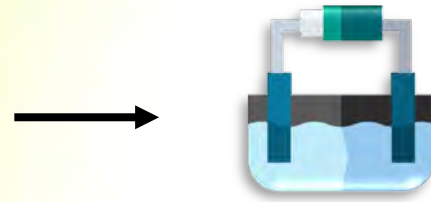
Gas Imports from Russia, 2020



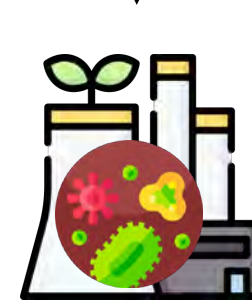


Substitute Fossil Gas Imports with **Renewable** Natural Gas

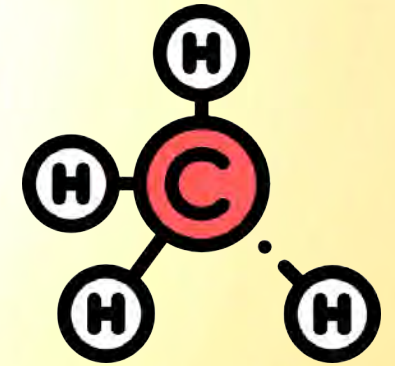




Electrolysis



Biological
Methanation



Renewable
Natural Gas



Torrefaction, Gasification

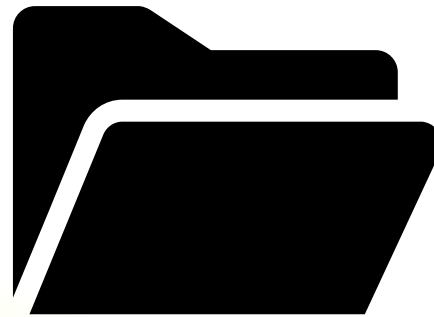


Syngas

Challenges for the Danube Region



Legal barriers



Lack of data



Lack of entrepreneurial support
and incentives

→ Transnational Connectivity and Cooperation

Project Consortium



Technology Centre for Energy (Lead Partner)

- Deggendorf Institute of Technology (PP6)
- Energy Agency of Savinjska, Šaleško and Koroško Region (PP1)
- Tolna County Development Agency (PP2)
- MAHART Freeport Co. Ltd. (PP9)
- Energie Institut an der Johannes Kepler Universität Linz (PP3)
- Black Sea Energy Research Centre (PP4)
- URBASOFIA (PP5)
- National Recycling Agency Slovakia (PP7)
- Institute of Technology and Business in České Budějovice (PP8)
- International Centre for Sustainable Development of Energy, Water and Environment Systems (PP10)
- Energy Institute Hrvoje Pozar (PP11)
- University of Zagreb, Faculty of Electrical Engineering and Computing (PP12)
- Regional Agency for Socio Economic Development - RDA Banat (IPA PP1)

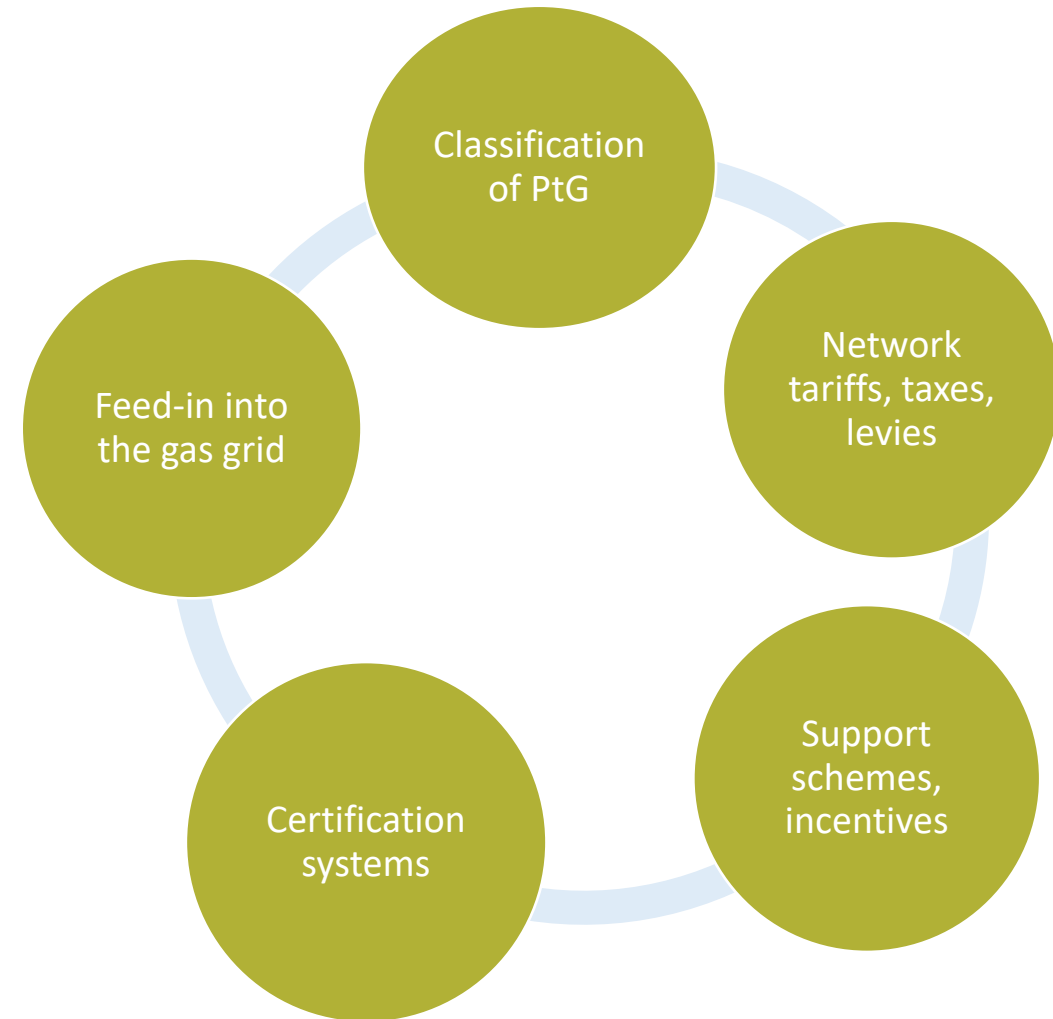
§§ Legal Barriers

1st step

Analysis of legal and policy situation for Power-to-Gas plants in each involved country

2nd step

Identification of barriers



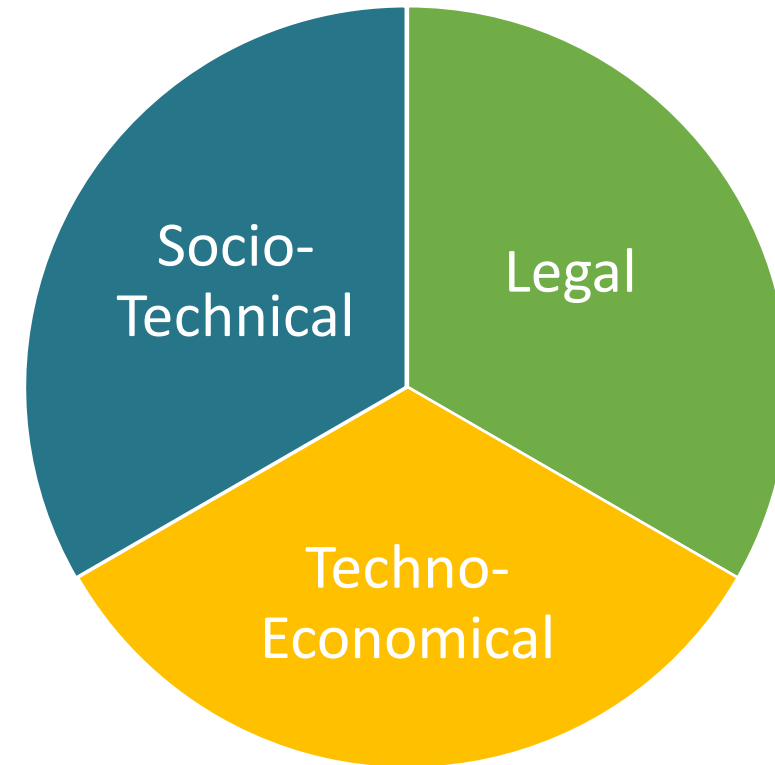
§§ Legal Barriers

3rd step

Development of strategic roadmaps for participating countries

4th step

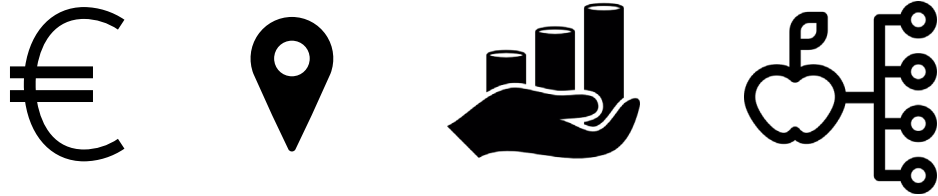
Development of transnational strategy for the Danube Region



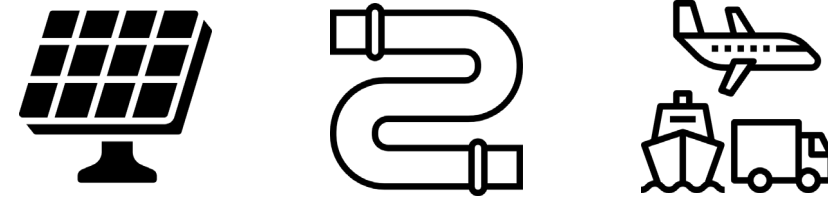


Data Collection

Biogenic waste resources



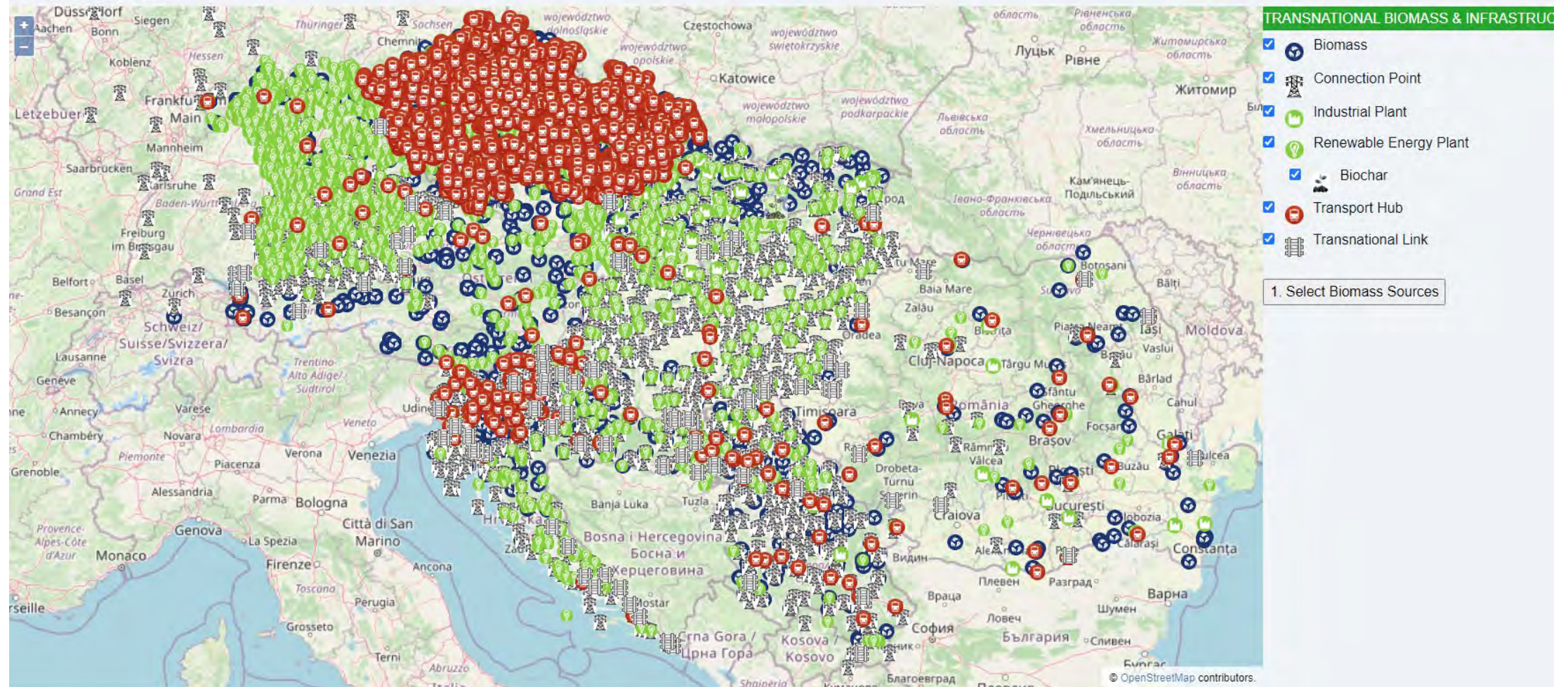
Infrastructure information



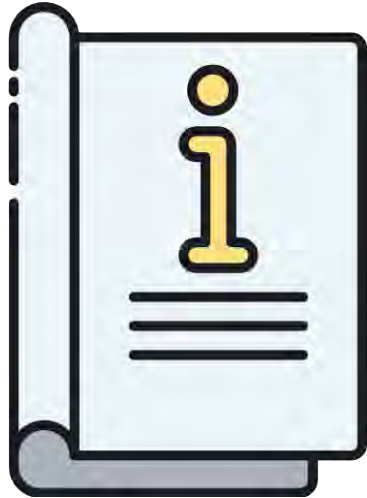
BM-ID	Identification		Quantity		Characteristics					Price	Transport hubs		
	Type	Location	Amount	Status	LHV	Bulk density	Moisture	Hemicelulose	Carbon	Euro	Transport price	TH 1	TH 2
BM-1	Herbaceous biomass	48.7665° N	12770	Idle	19301		78			5	0,9		
BM-2	Herbaceous biomass	48.1351° N	44899	Idle	19301		78			5	0,9		

Transnational Renewable Energy Atlas

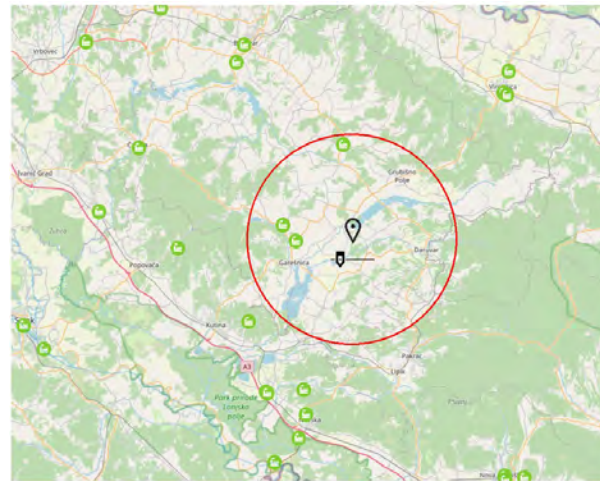
Danup-2-Gas Atlas



€ Entrepreneurial Support



Subsidies Catalogue

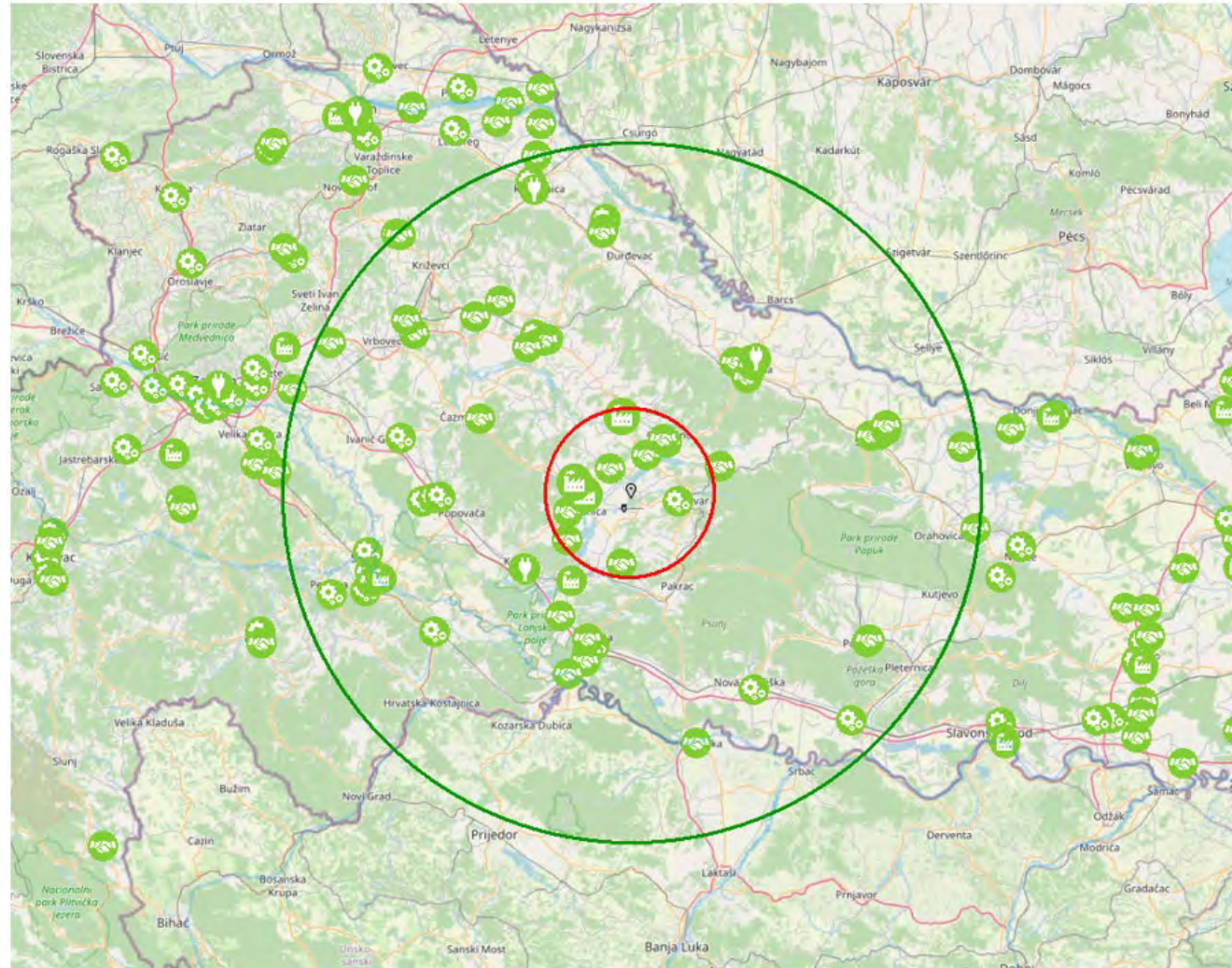


Optimisation Tool



Stakeholder Workshops

Optimisation Tool



Optimisation Tool

Results

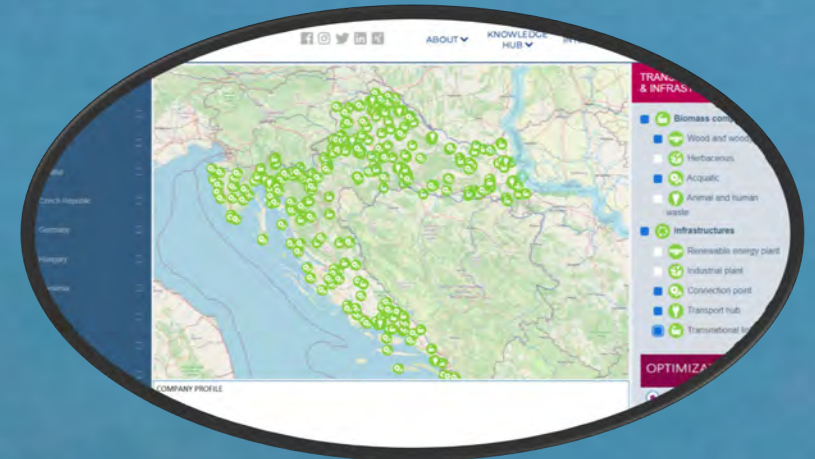
- Ideal power-to-gas parametrization and operation schedule
- Ideal inputs and outputs
- Investment and operation costs
- Payoff period

Investment specifications			
	Element	Price	Size
Processes	Dry anaerobic digester	0.00 €	0.000000 kg/s
	Wet anaerobic digester	0.00 €	0.000000 kg/s
	Dry biomass to biochar plant	0.00 €	0.000000 kg/s
	Wet biomass to biochar plant	0.00 €	0.000000 kg/s
	Biogas separator	0.00 €	0.000000 kg/s
	Gasification + water gas shift plant	0.00 €	0.000000 kg/s
	Combined heat and power (CHP)	0.00 €	0.000000 kg/s
	Carbon capture plant	0.00 €	0.000000 mol/s
	Electrolyser	2,367,188.16 €	1,893.75 kW
	Deminerlizer	39,751.32 €	4.184349 mol/s
	Precipitation collector	1,000.00 €	1,000.00 m ²
	Methanation reactor	0.00 €	0.000000 mol/s
	Heat exchanger	9,323.08 €	186.4616 kW
	Total for processes	2,417,262.56 €	
Storages	Dry biomass storage	0.00 €	0.0000 kg
	Wet biomass storage	0.00 €	0.0000 kg
	Biochar storage	0.00 €	0.0000 kg
	Water storage tank	11.81 €	1,181.0940 mol
	Oxygen storage tank	0.00 €	0.0000 mol
	Hydrogen storage tank	142.90 €	168.1119 mol
	Carbon dioxide storage tank	0.00 €	0.0000 mol
	Total for storages	154.71 €	
Connections- enlargement	Electrical connection	0.00 €	0.00 MW
	Gas connection	0.00 €	0.00 MW
	Water connection	0.27 €	0.27 m ³ /h
	Total for connections	0.27 €	
	Total investment	2,417,417.54 €	
	Payoff period	4.38 years	

Operational costs for selected period			
		Price	Amount
Electrical energy	Produced by REP	-283.29 €	2.13 MWh
	Consumed by IP	0.00 €	0.00 MWh
	Net consumption without investment	-283.29 €	-2.13 MWh
	Peak power without investment	0.00 €	0.00 kW
	Consumed by P2G	43,311.94 €	180.76 MWh
Heat	Produced by REP	0.00 €	0.00 MWh
	Produced IP	0.00 €	0.00 MWh
	Net production without investment	0.00 €	0.00 MWh
Methane	Consumed by P2G	0.00 €	-17.78 MWh
	Net production with investment	0.00 €	17.78 MWh
	Produced by REP	0.00 €	0.00 MWh
	Consumed by IP	0.00 €	0.00 MWh
	Net consumption without investment	0.00 €	0.00 MWh
Water	Produced by P2G	0.00 €	0.00 MWh
	Net consumption with investment	0.00 €	0.00 MWh
	Water consumed by P2G	10.44 €	26.11 m ³
Inputs	Dry biomass bought	0.00 €	0.00 t
	Wet biomass bought	0.00 €	0.00 t
	Biochar bought	0.00 €	0.00 t
Outputs	Biochar sold	0.00 €	0.00 t
	Hydrogen sold	60,000.00 €	4.00 t
	CO2 emitted	0.00 €	0.00 kg
	Total operational cost without investment	-283.29 €	
	Total operational cost with investment	-7,825.32 €	
	Savings with introduction of P2G	7,542.04 €	



Danube Energy Platform





PROJECT

PARTNERS

ATLAS TOOL

ATLAS MANUAL

SUBSIDIES

BIOMASS REPORT

INFRA-STRUCTURE REPORTS

TOOL FOR OPTIMIZING SECTOR COUPLING HUBS

STRATEGIC ROADMAPS

STUDY ON ECONOMIC FEASIBILITY OF LOCAL SECTOR COUPLING

Next Steps

- Development of national roadmaps and a transnational strategy (September 2022)
- Publication of the Atlas Tool (August 2022)
- Publication of the Optimisation Tool (September 2022)
- Online webinars

Stakeholder Involvement

- National workshops for project development (Autumn 2022)
 - Get in touch with the national partner!
 - Trainings to use the Danube Energy Platform
 - Thorough introduction into the Optimisation Tool
 - Networking with other stakeholders
 - Project development
- Project final meeting
 - November 2022
 - Stakeholder conference

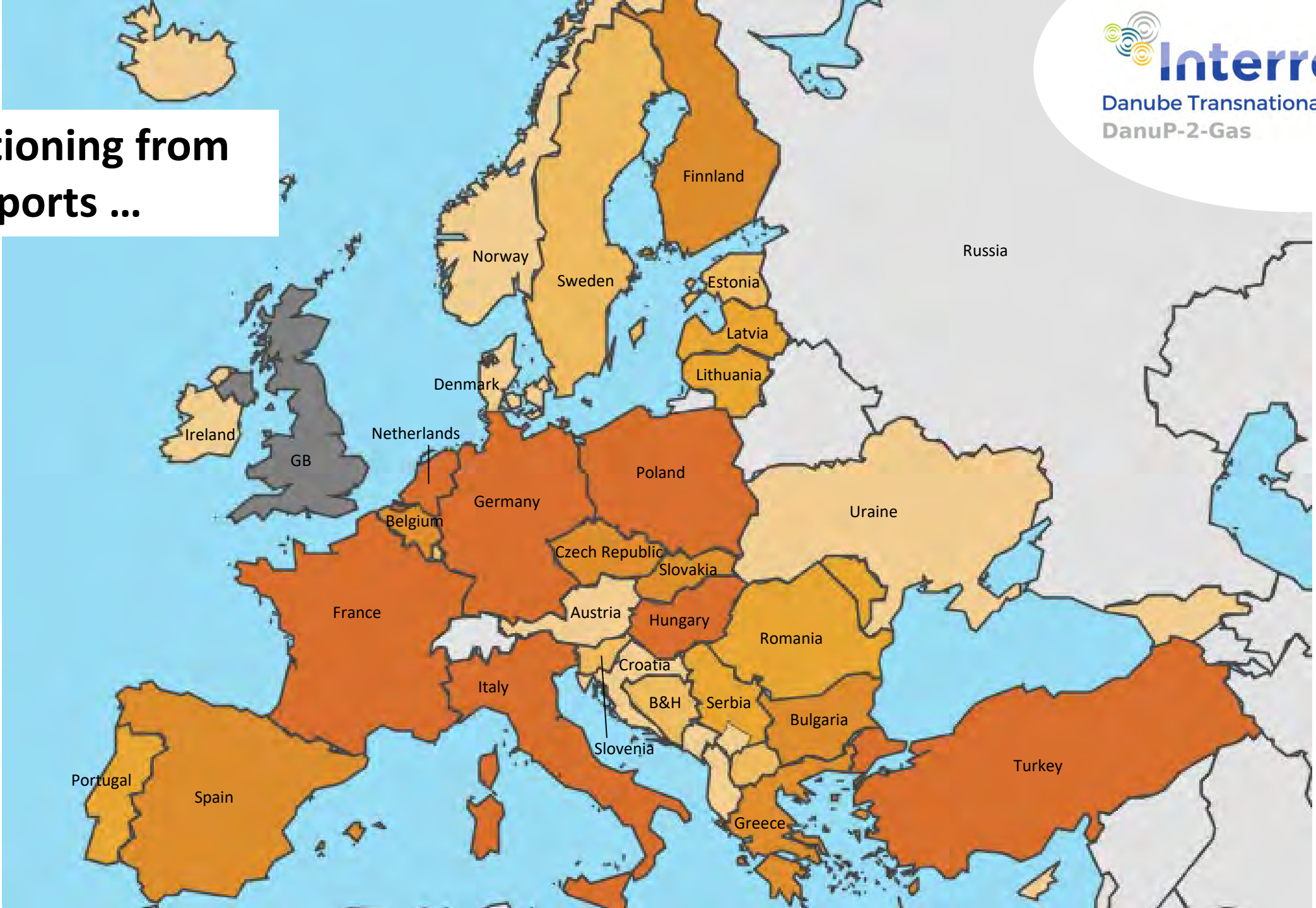
Foster Transnational Cooperation ...



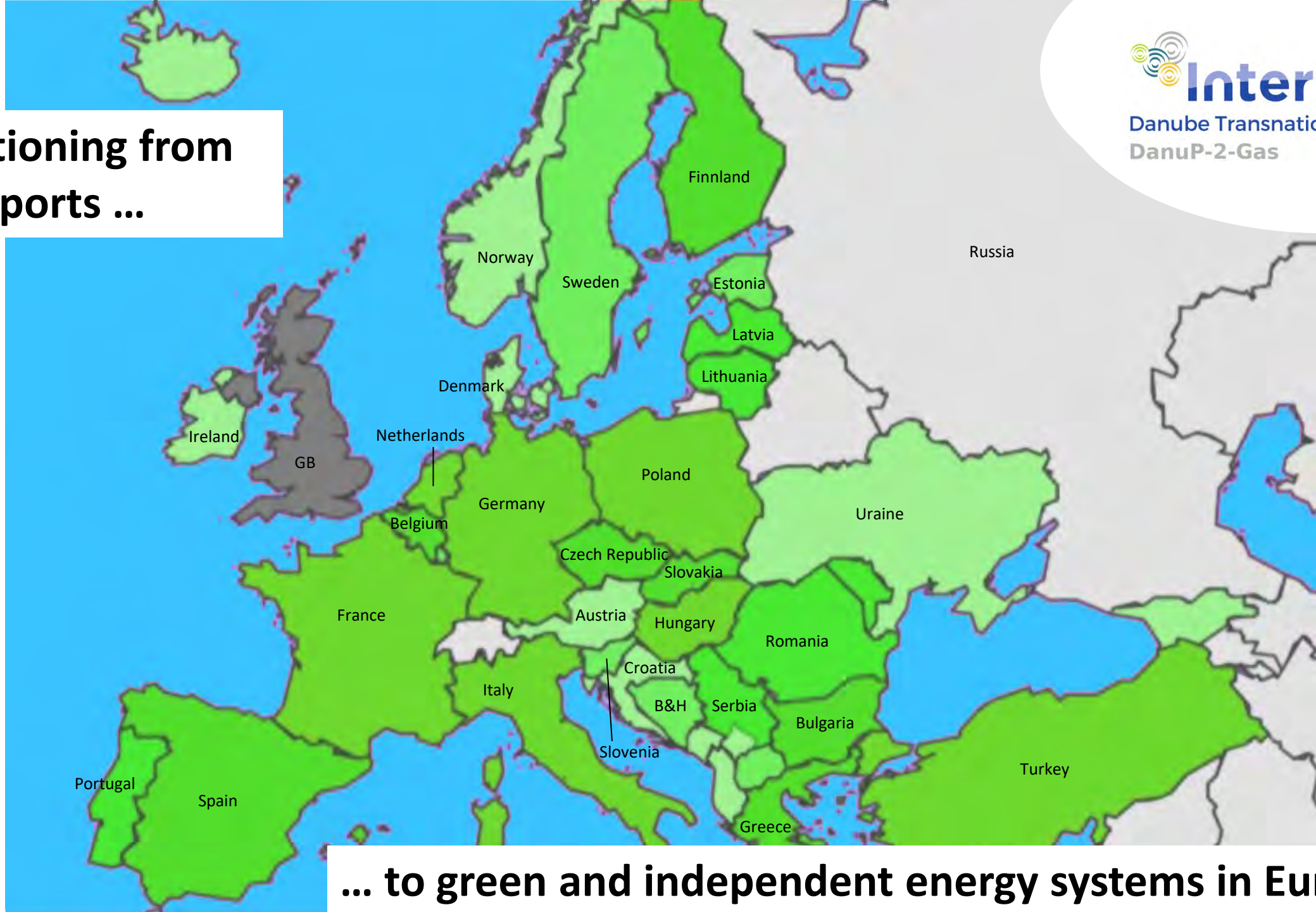
... to create X-to-Gas Projects in the Danube Region.



Transitioning from gas imports ...



**Transitioning from
gas imports ...**



... to green and independent energy systems in Europe.



CONTACT

Lead Partner:
Technology Centre for Energy, University
of Applied Sciences Landshut
Astrid Heindel
+49 8531 914 044-68
astrid.heindel@haw-landshut.de



Follow the project on **Social Media**:
www.twitter.com/DANUP2GAS
www.facebook.com/DanuP2GasProject

Danube Energy Platform: www.danup2gas.eu
Project Website: <http://www.interreg-danube.eu/danup-2-gas>
Newsletter: <http://www.interreg-danube.eu/approved-projects/danup-2-gas/campaigns>