DanuP-2-Gas

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

Gasimporte aus Russland, 2020

Interreg
Danube Transnational Programme
DanuP-2-Gas

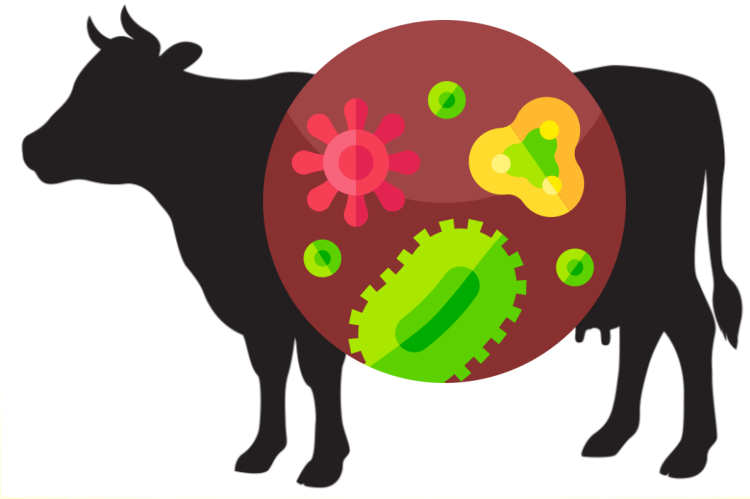
ENERGIE

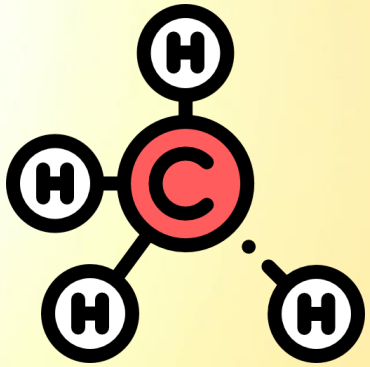
Quelle: Eurostat


Interreg
EUROPEAN UNION
Danube Transnational Programme
DanuP-2-Gas
Poland
Germany
Belgium
Ukraine
Czech Republic
Sloviakia
France
Austria
Hungary
Romania
Slovenia
Croatia
Danube River
Italy
B&H
Serbia
Bulgaria
Montenegro
North
Macedonia
Albania
Greece
ENERGIE

Substitution von Gasimporten...

… durch grünes, erneuerbares Erdgas





Erneuerbares, grünes Erdgas

Elektrolyseur

Biologische Methanisierung

Erneuerbares, grünes Erdgas

Torrefizierung, Vergasung

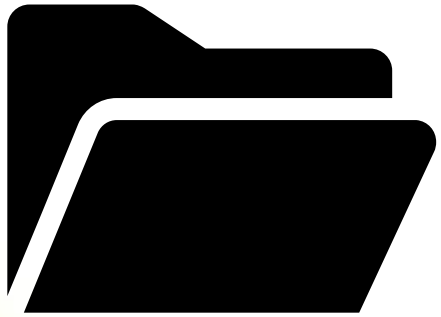
Synthesegas

Herausforderungen für den Donauraum

§§

Rechtliche Barrieren

Herausforderungen für den Donauraum



Fehlende Daten

Herausforderungen für den Donauraum

Fehlende Anreize und Unterstützung für Investitionen

Herausforderungen für den Donauraum

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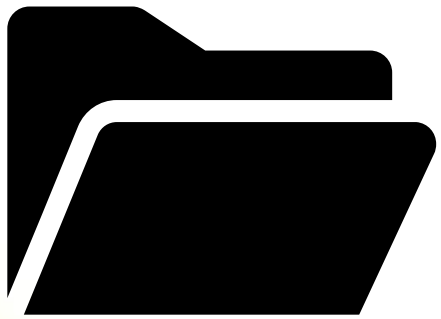


€

Rechtliche Barrieren

Fehlende Daten

Fehlende Anreize und Unterstützung für Investitionen

→ Transnationale Zusammenarbeit

Projektkonsortium

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)

§§ Rechtliche Barrieren

1. Schritt

Analyse der rechtlichen und politischen Rahmenbedinungen für Power-to-Gas

2. Schritt

Identifikation von Barrieren

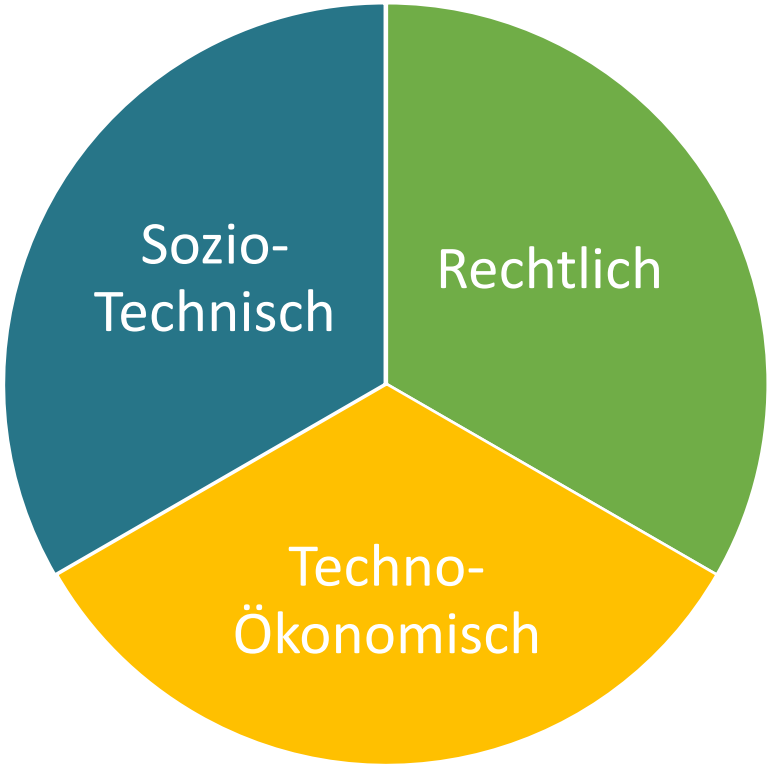
§§ Rechtliche Barrieren

3. Schritt

Entwicklung von strategischen Roadmaps

4. Schritt

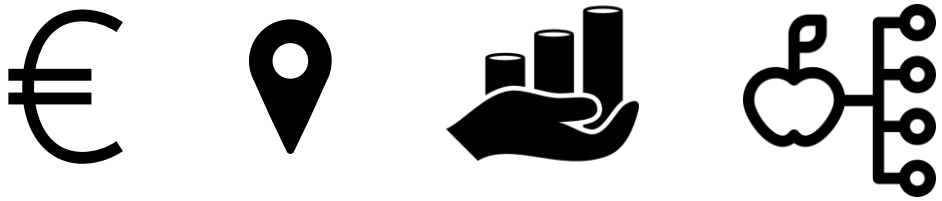
Entwicklung einer transnationalen Strategie



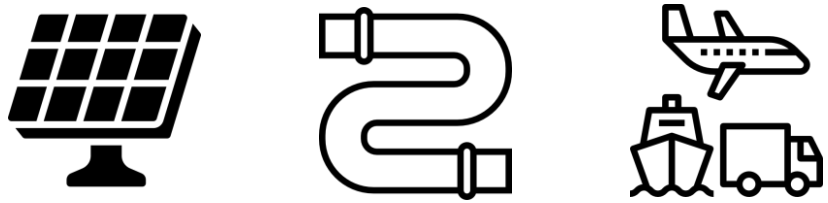
Datengrundlage

Interreg
Danube Transnational Programme
DanuP-2-Gas

Biogene Rest- und Abfallressourcen

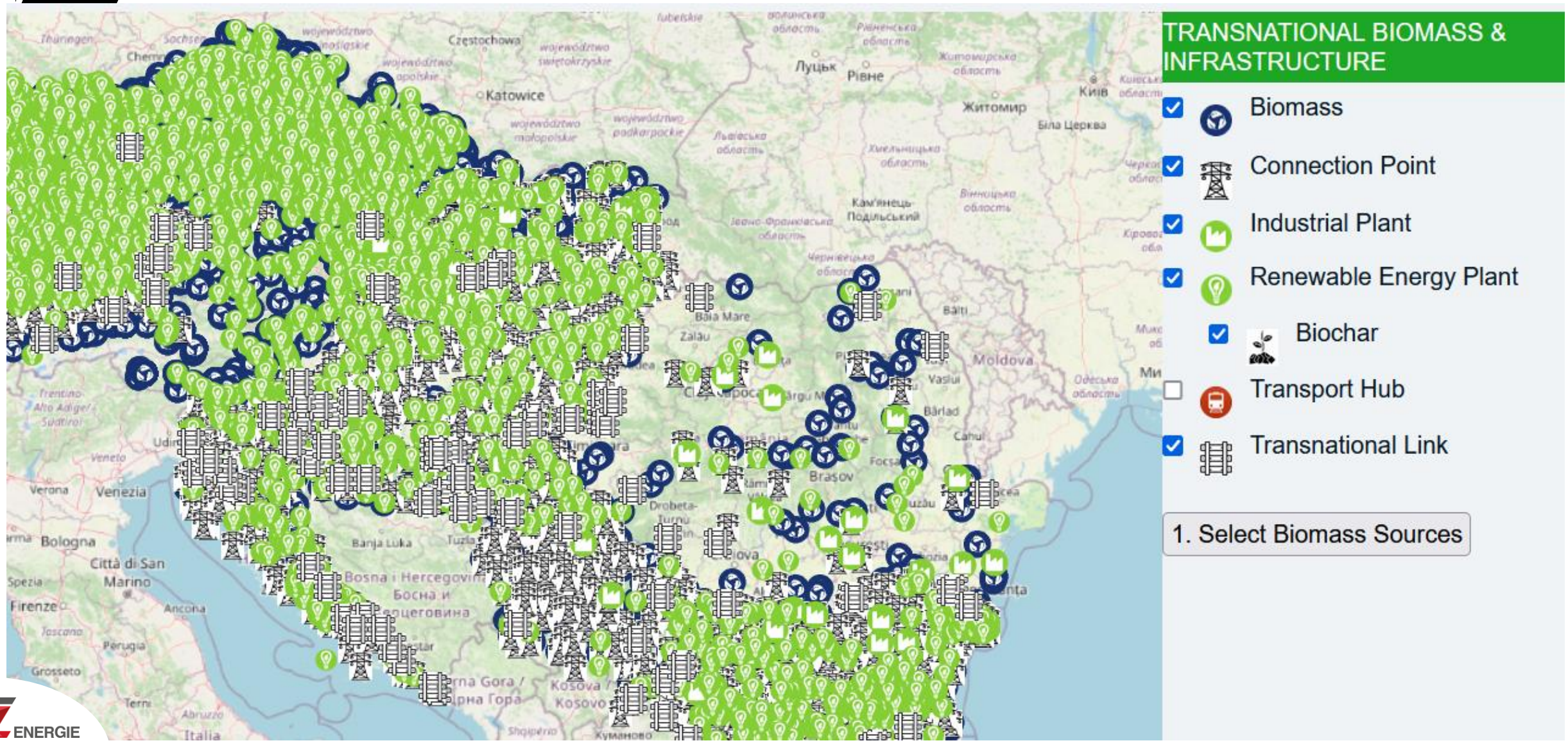


Infrastrukturelle Rahmenbedingungen

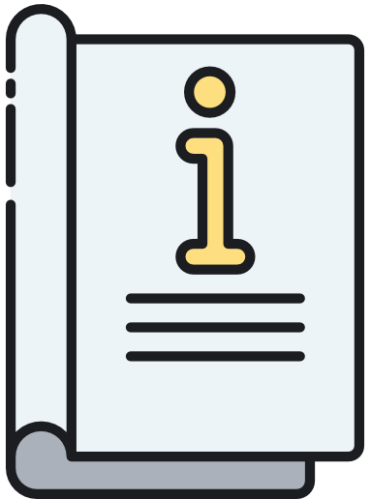


	Identification		Quantity		Characteristics					Price	Transport hubs		
BM-ID	Type	Location	Amount	Status	LHV	Bulk density	Moisture	Hemicellulose	Carbon	Euro	Transport price	TH 1	TH 2
BM-1	Herbaceous biomass	48.7665° N	12770	Idle	19301		78			5	0,9		
BM-2	Herbaceous biomass	48.1351° N	44899	Idle	19301		78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

Transnationaler Erneuerbare Energien Atlas



€ Unterstützung von Investitionen



Start Optimization

Förderkatalog

Optimierungstool

Workshops für Stakeholder

Optimierungstool

Investment parameters		
Parameter	**Value**	**Unit**
Maximal investment payoff period	20	years
Administration and building period	5	years
Maximal investment	1.000.000.000	€
Use same subsidy for all parts of the P2G hub?	Yes	
Investment subsidy	0,0	%

Optimization parameters		
Parameter	**Value**	**Unit**
Starting date of simulation	01.01.2022	Pick date
Last date of simulation	31.12.2022	Pick date
Sampling time for electrical part	24	h
Amount of memory required (cca)	1,37	GB

Additional sales parameters			
	Parameter	**Value**	**Unit**
H_2	Price for selling hydrogen		€/kg
	Limit of daily hydrogen sale		kg/day
O_2	Price for selling oxygen		€/kg
	Limit of daily oxygen sale		kg/day
CH_4	Price for selling methane		€/kg
	Limit of daily methane sale		kg/day
BC	Price for selling biochar		€/kg
	Limit of daily biochar sale		kg/day
	Tax on CO2 emissions		€/kg

Monthly precipitation					
Month	**Value**	**Unit**	**Month**	**Value**	**Unit**
January		mm	July		mm
February		mm	August		mm
March		mm	September		mm
April		mm	October		mm
May		mm	November		mm
June		mm	December		mm

Start Optimization

Optimierungstool

Ergebnisse

→ Ideale Parametrisierung und Betriebspläne für Power-to-Gas-Hubs

→ Ideale Inputs und Outputs

→ Investitions- und Betriebskosten

→ Rentabilitätsdauer

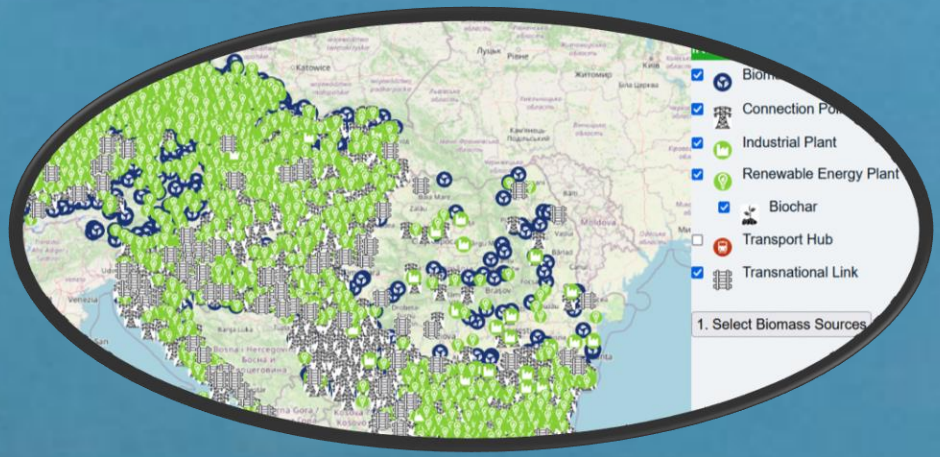
Investment specifications

	Element	Price		Size	
Processes	Dry anaerobic digestor	0.00	€	0.000000	kg/s
	Wet anaerobic digestor	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
	Demineralizer	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
	Methane 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
	Net consumption with investment	42,778.42	€	178.62	MWh
	Peak power with investment	9,385.82	€	1,877.16	kW
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
	Consumed by P2G	0.00	€	-17.78	MWh
	Net production with investment	0.00	€	17.78	MWh
Methane	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
	Produced by P2G	0.00	€	0.00	MWh
	Net consumption with investment	0.00	€	0.00	MWh
Water	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



Stärkung transnationaler Kooperation…

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DanuP-2-Gas

… um Power-to-Gas-Projekte im Donauraum zu fördern.

Transition von Gasimporten …

Interreg
Danube Transnational Programme
DanuP-2-Gas

ENERGIE

Transition von Gasimporten …

… zu grünen und unabhängigen Energiesystemen in Europa.

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