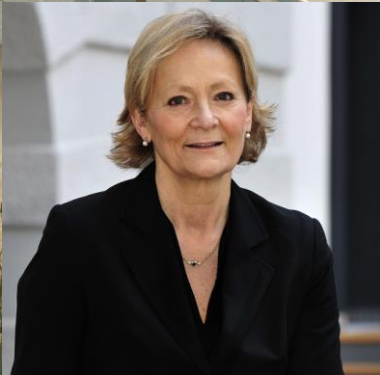


# Feasibility Study Upper Rhine Innovation Region - Fessenheim

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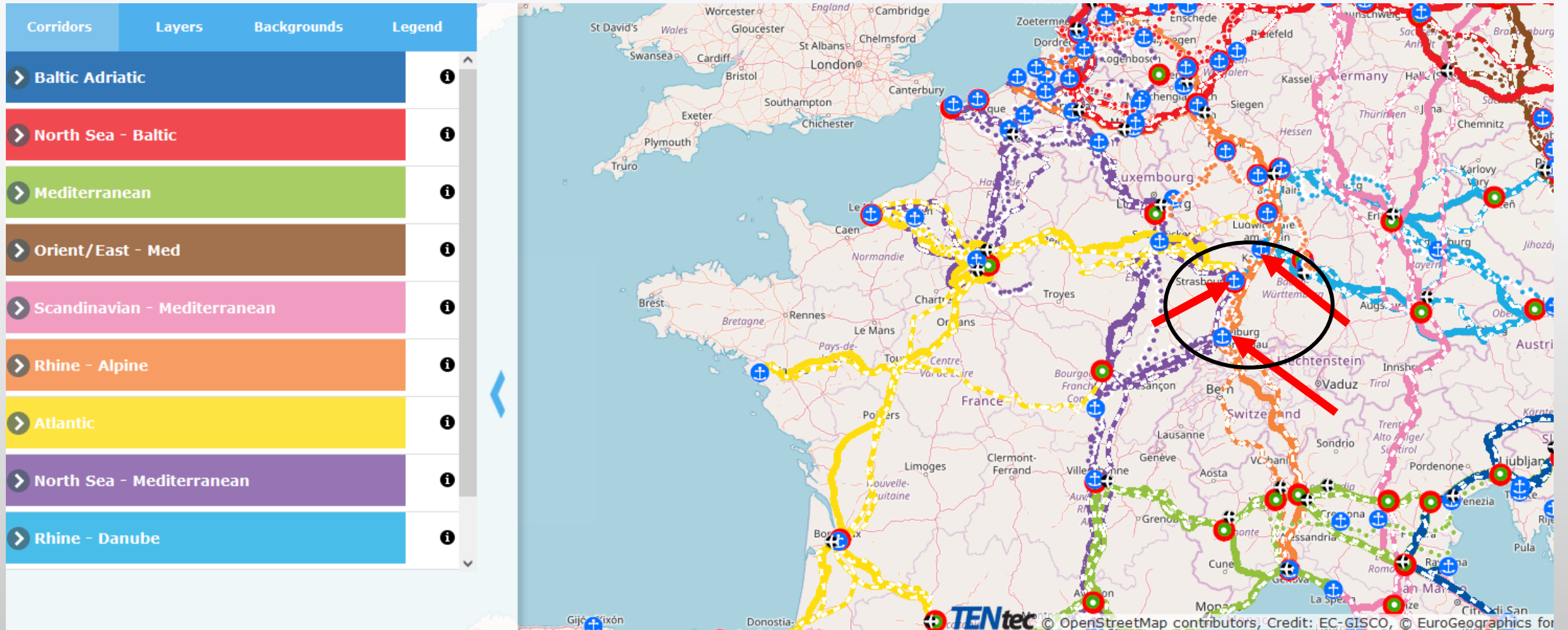
# Regional strength



- ✓ High research and innovation competences in the region
- ✓ Large human resources of well-educated young people (approx. 2000/year)
- ✓ Dense transnational research and innovation network (over 300 companies in the network)
- ✓ Best legal framework through the Aachen Treaty (experimentation clause)
- ✓ Industrial cluster in the Basel - Mulhouse - Chalampé - Karlsruhe region (Wörth)
- ✓ Rhine as a transport corridor with port loading and unloading capacities
- ✓ TN Transport Corridors Alpine-Rhine (Rotterdam-Genoa), Northsea-Mediterranean (Rotterdam-Marseille), Danube-Black Sea (Strasbourg-Black Sea) and Atlantic (Strasbourg-Paris-Spain).
- ✓ European gas pipeline from Amsterdam/Rotterdam and Mena countries to the Upper Rhine
- ✓ European electricity grid (Fessenheim connection)
- ✓ First European model for the transition to sustainability after the closure of a nuclear power plant in France

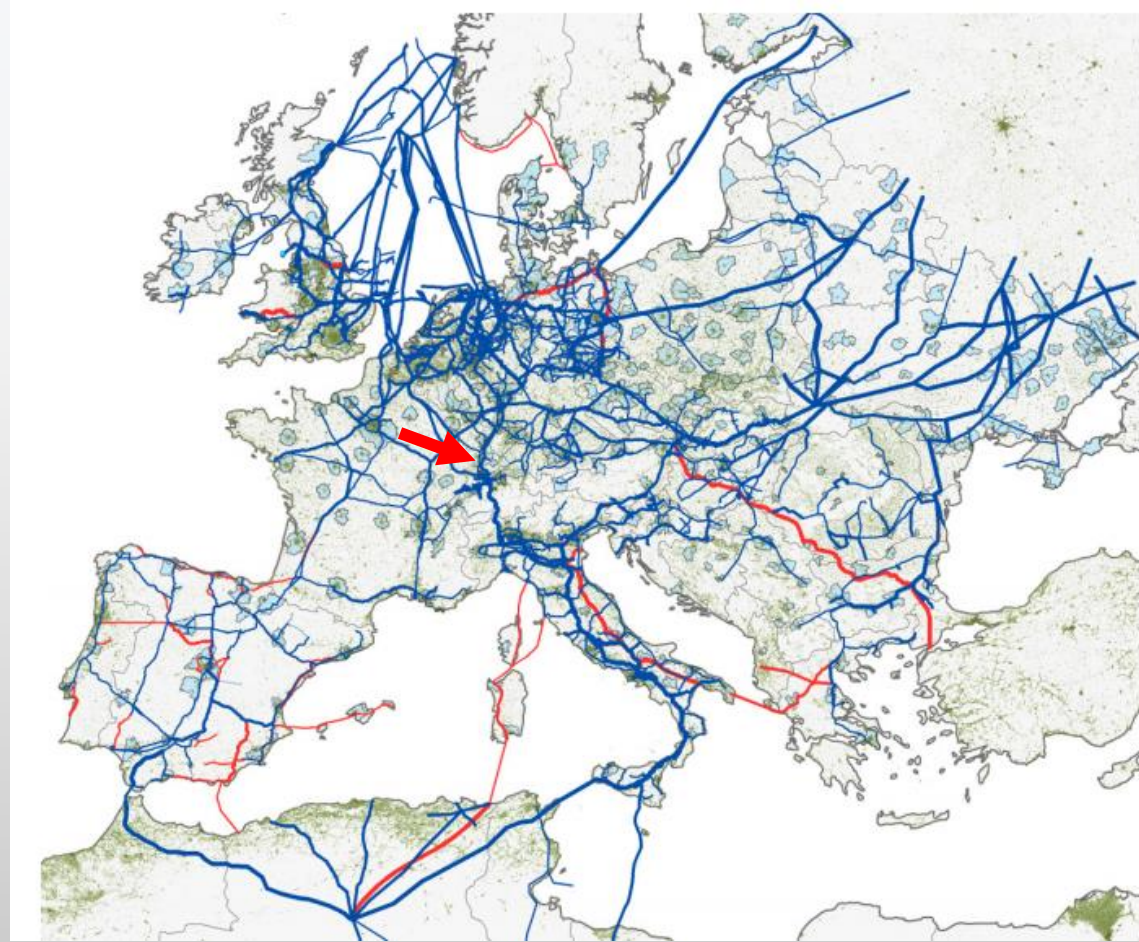


# European transport corridors



<https://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html>

# European pipe transmission



Energy post by Karel Beckmann 2015

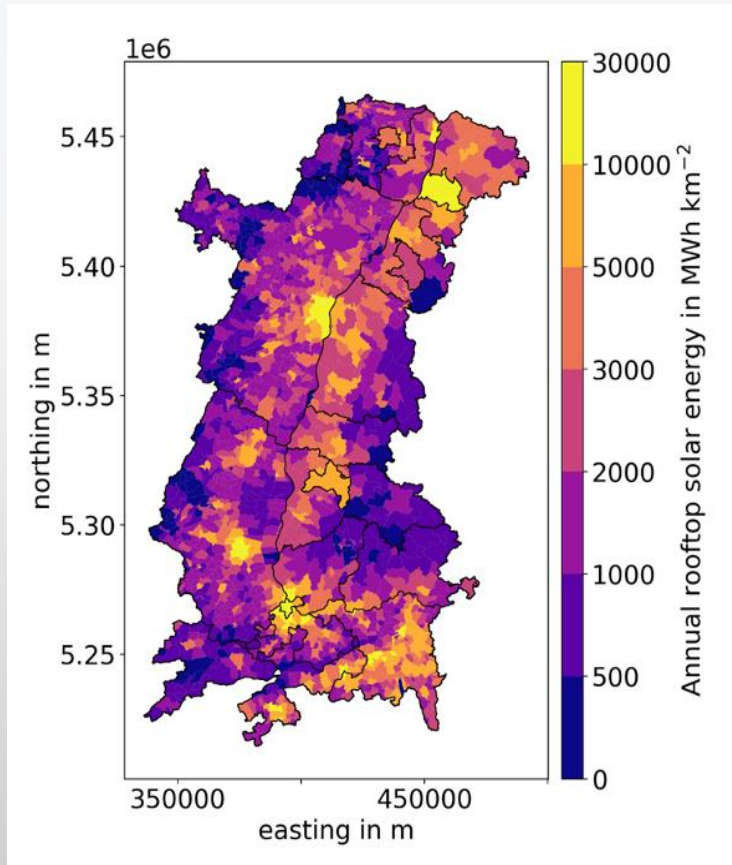
# Technical potential for RE production

URR	Population in 2019*	Final Energy Demand in 2016 in MWh/capita**	Energy Demand in URR in MWh/yr***	Energy Demand in URR in TWh/yr***
Switzerland	1.507.718	49	73.878.182	73,88
Germany	2.858.606	26	74.323.756	74,32
France	1.888.480	34	64.208.320	64,21
Total	6.254.804		212.410.258	212,41

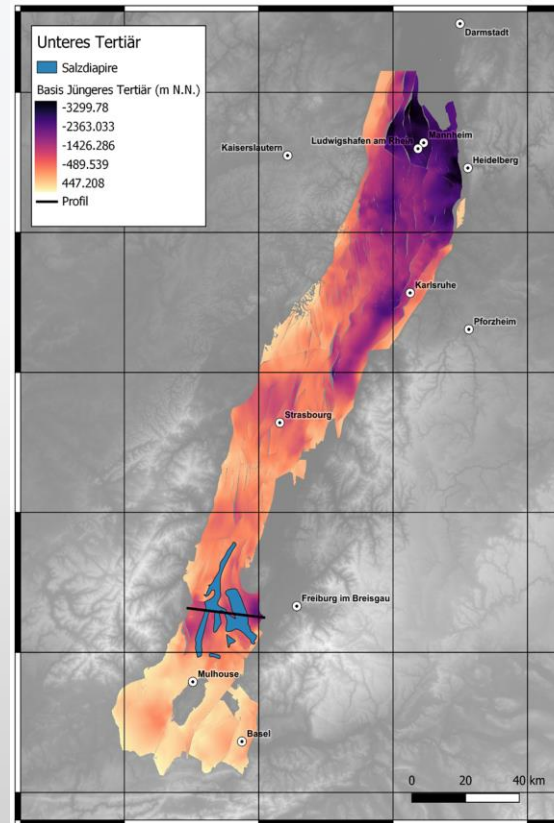
RE Source	Annual Potential (in TWh/yr)
Wind	128,0
Solar PV Rooftops	52,2
Solar PV Agro	91,5
Solar PV GM	68,0
Biomass	5,2
Hydropower	13,6

~358TWh /year

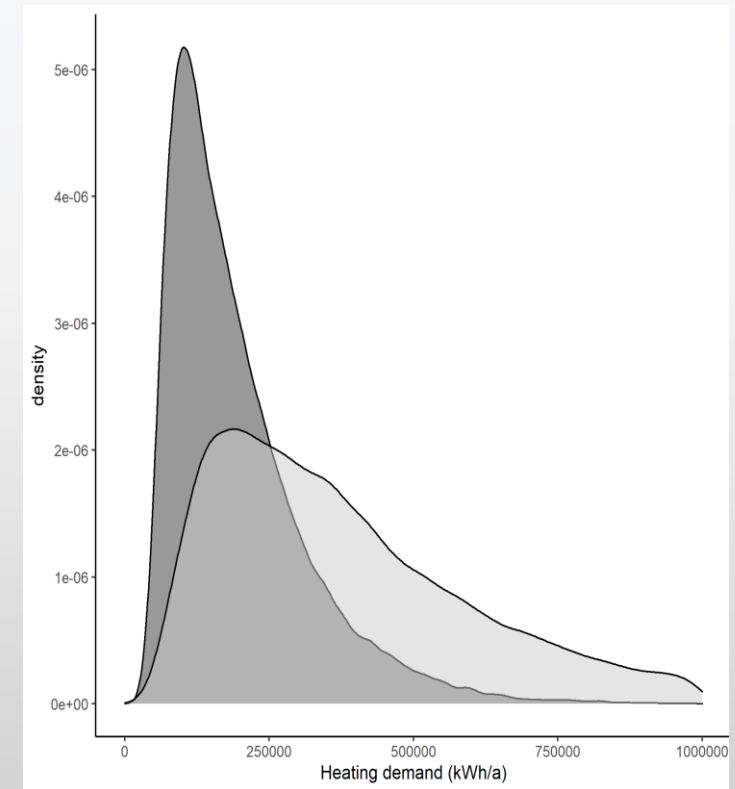
# Potential for RE production and storage



Distribution of the roof area potential

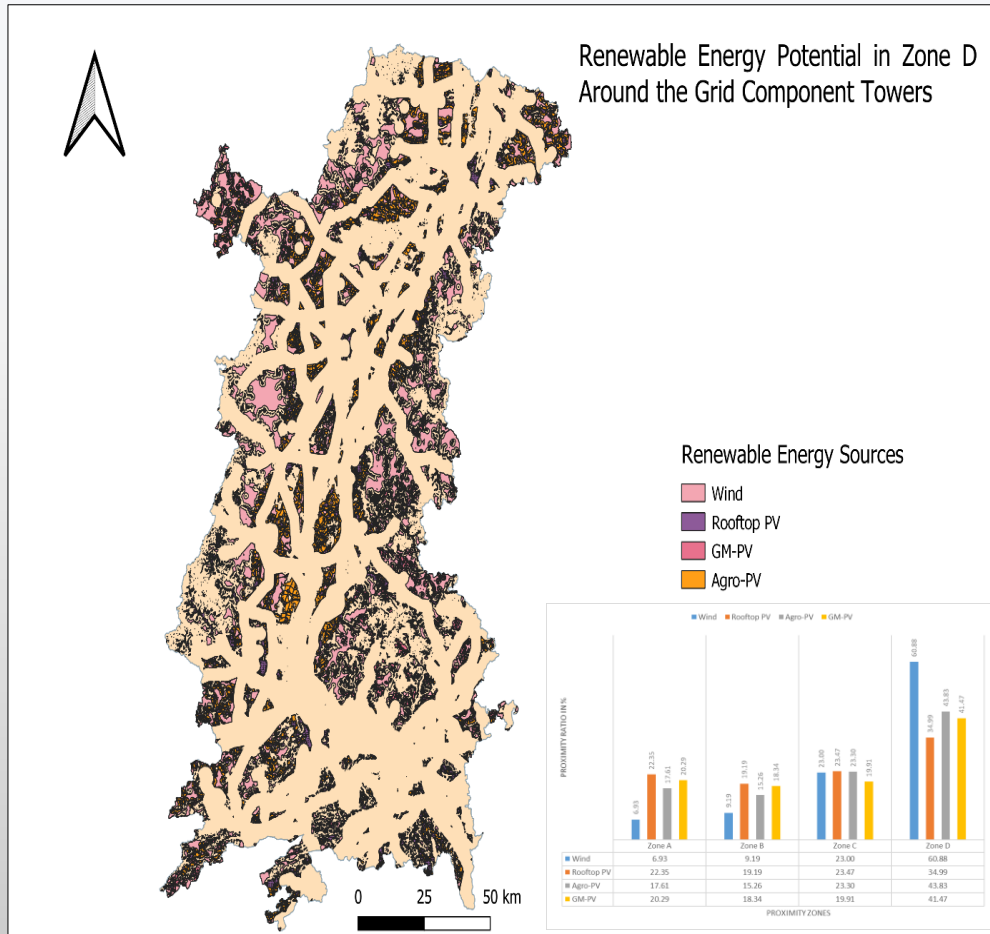


Geological storage capacity  
11 TWh on the Upper Rhine.

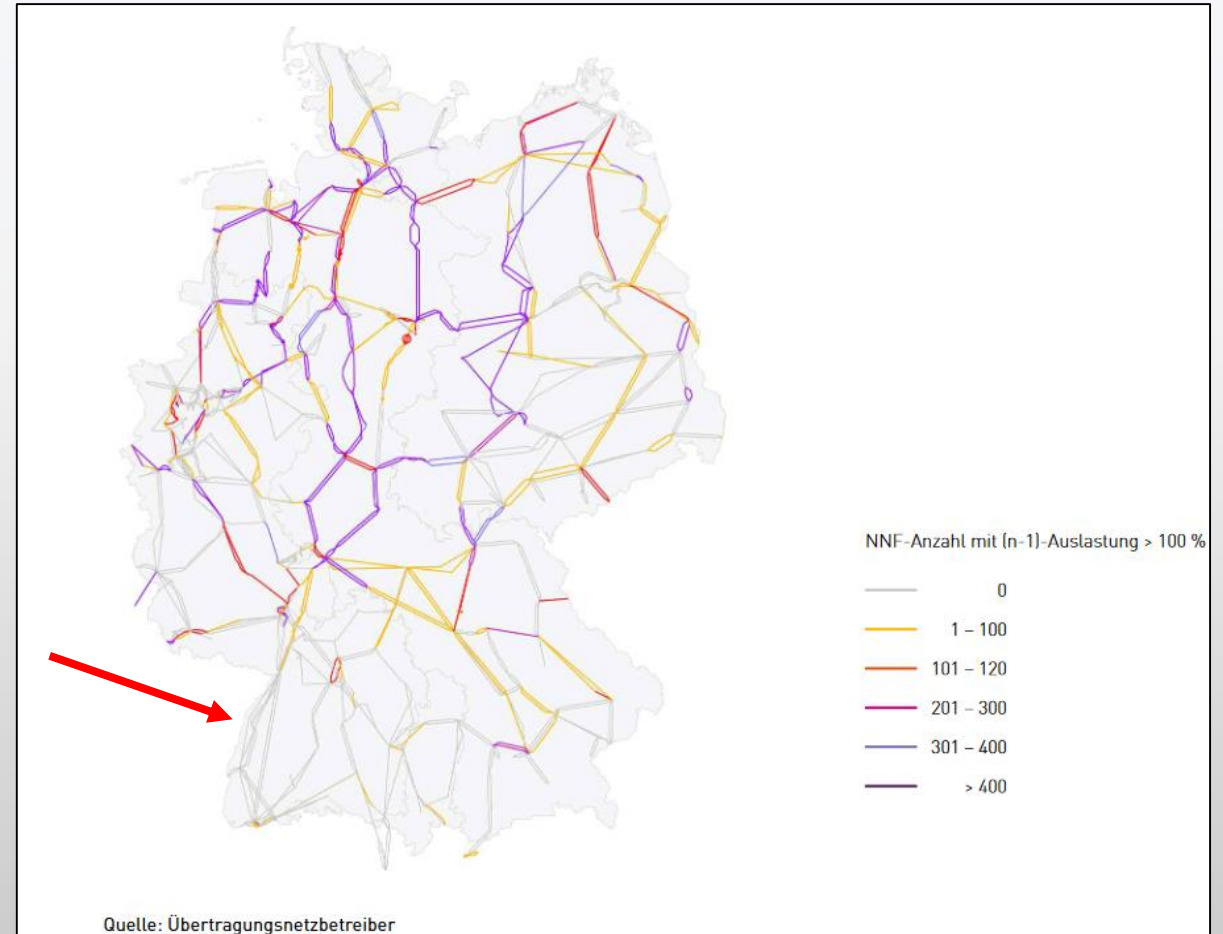


Half of the heat demand  
can be achieved through near-surface  
Geothermal energy

# Net capacities for RE production



2 km distance to the nearest connector



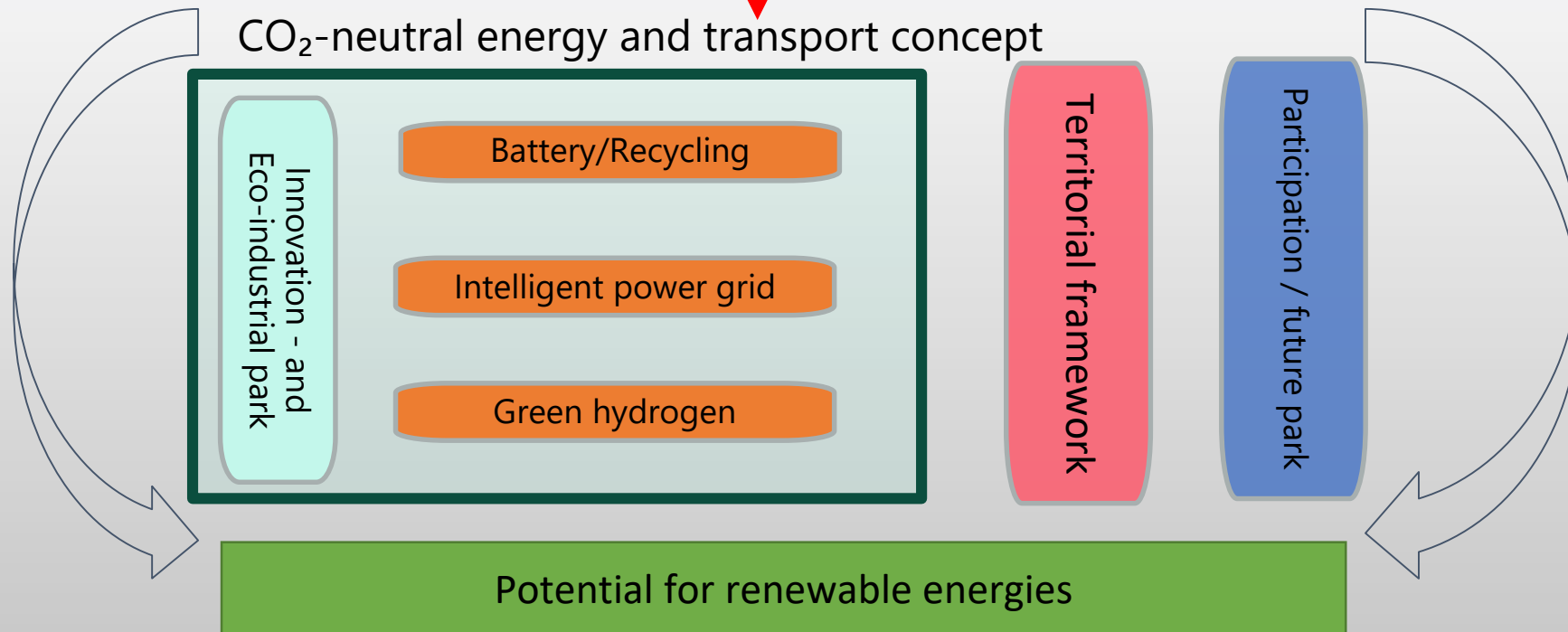
Frequency of the maximum load in the start network in case of failure of a network element

# Concept: Fessenheim Innovation Region

Projet de Territoire and potential analyses

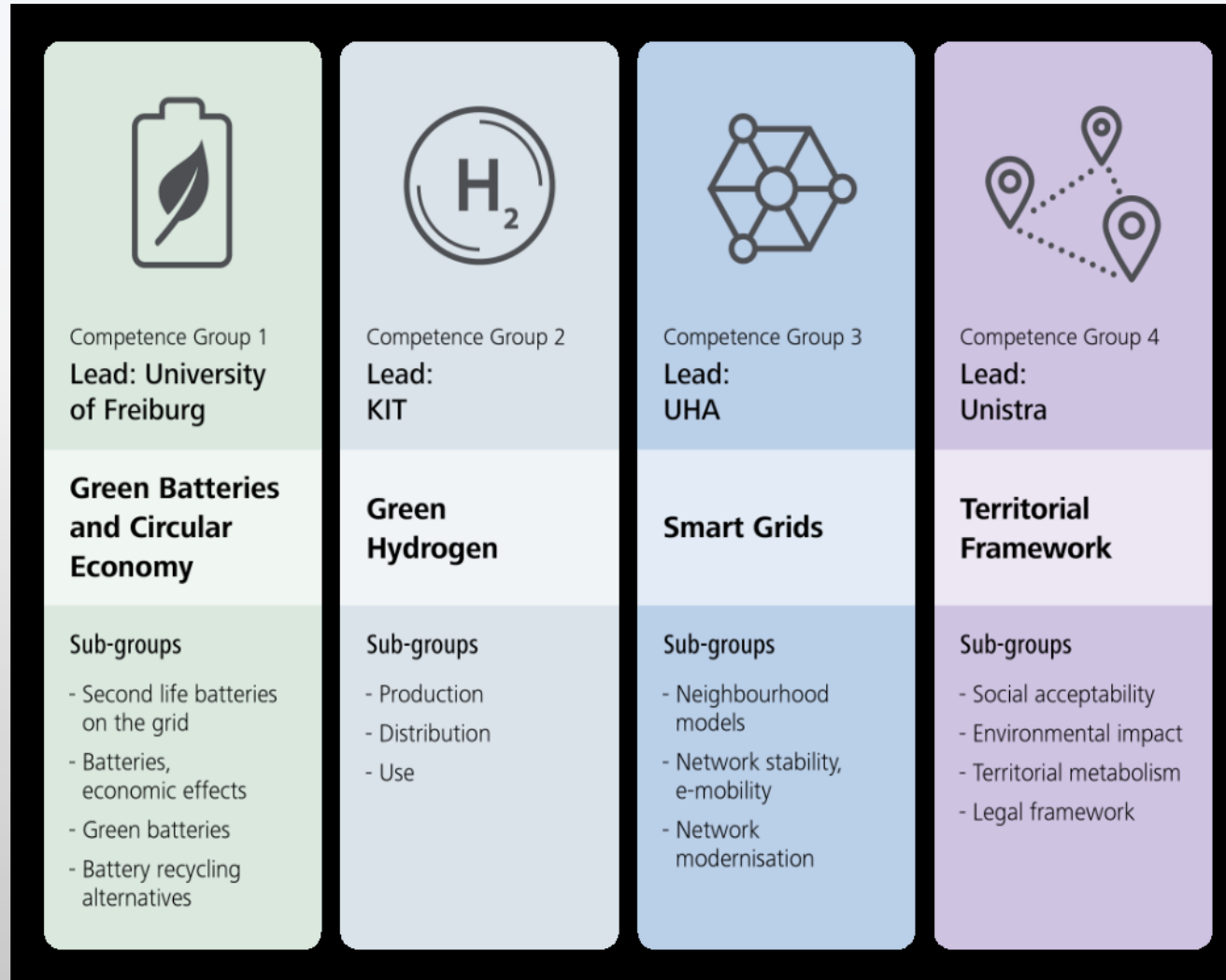
European demonstration model (Living Lab) for social and technological change towards sustainability

CO<sub>2</sub>-neutral energy and transport concept



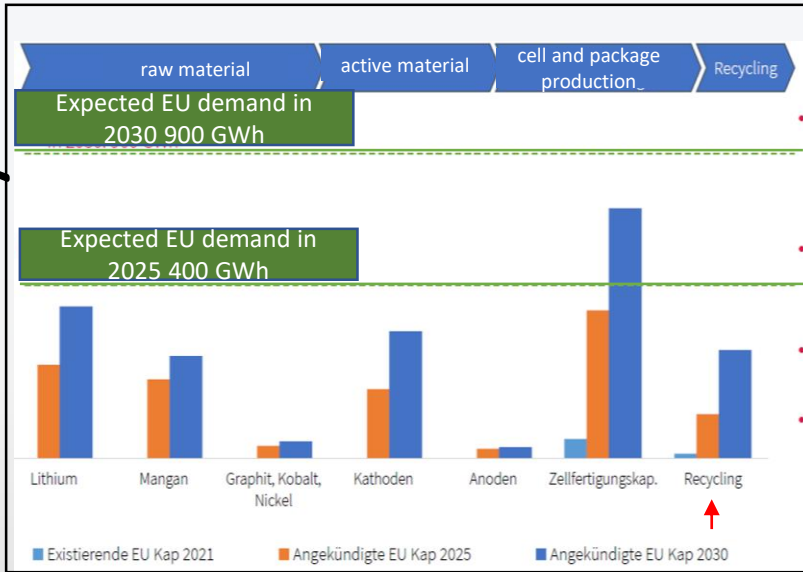


# Structure of the study



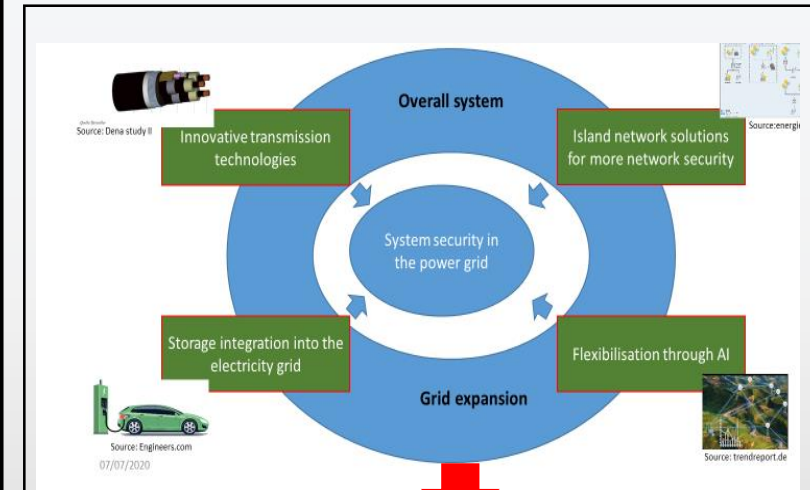
# Proposal: Pilotproject for 3 Innovation hubs

Battery

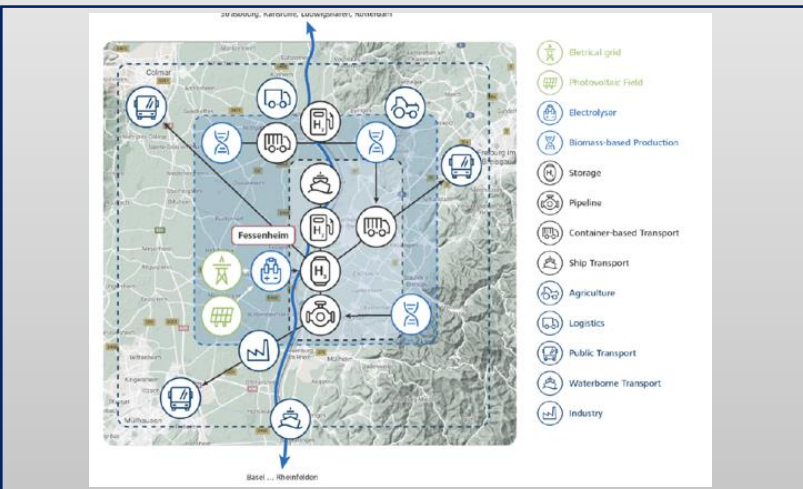


- Second life EV Batteries
- Qualification Utility
- Facility for Batterie Recycling
- Battery Materials Factory

## Smart Grid



Green H<sub>2</sub>



- Elektrolyser > 20 MW
- Storage/Virtual pipeline
- Defilling- and Refilling station
- H<sub>2</sub> Prosumer Farm/Biomass

- Smart city quarters Muhlhouse/Karlsruhe
- Electricity net simulation regional to european
- E-mobility charging concept

# Territorial framework

## Begleitforschung



Wienerzeitung.at

Stand und Entwicklung  
Vergleich  
Aachener Vertrag  
Smart legal systems



Europa.eu

Vorsorgende Umweltstudien  
LCA  
CO<sub>2</sub> und  
Ressourceneinsparung



BMI.de

Ethik  
Gerechtigkeit  
Partizipation  
Akzeptanz



BMU.de

Modelle  
Analysen  
Prognosen

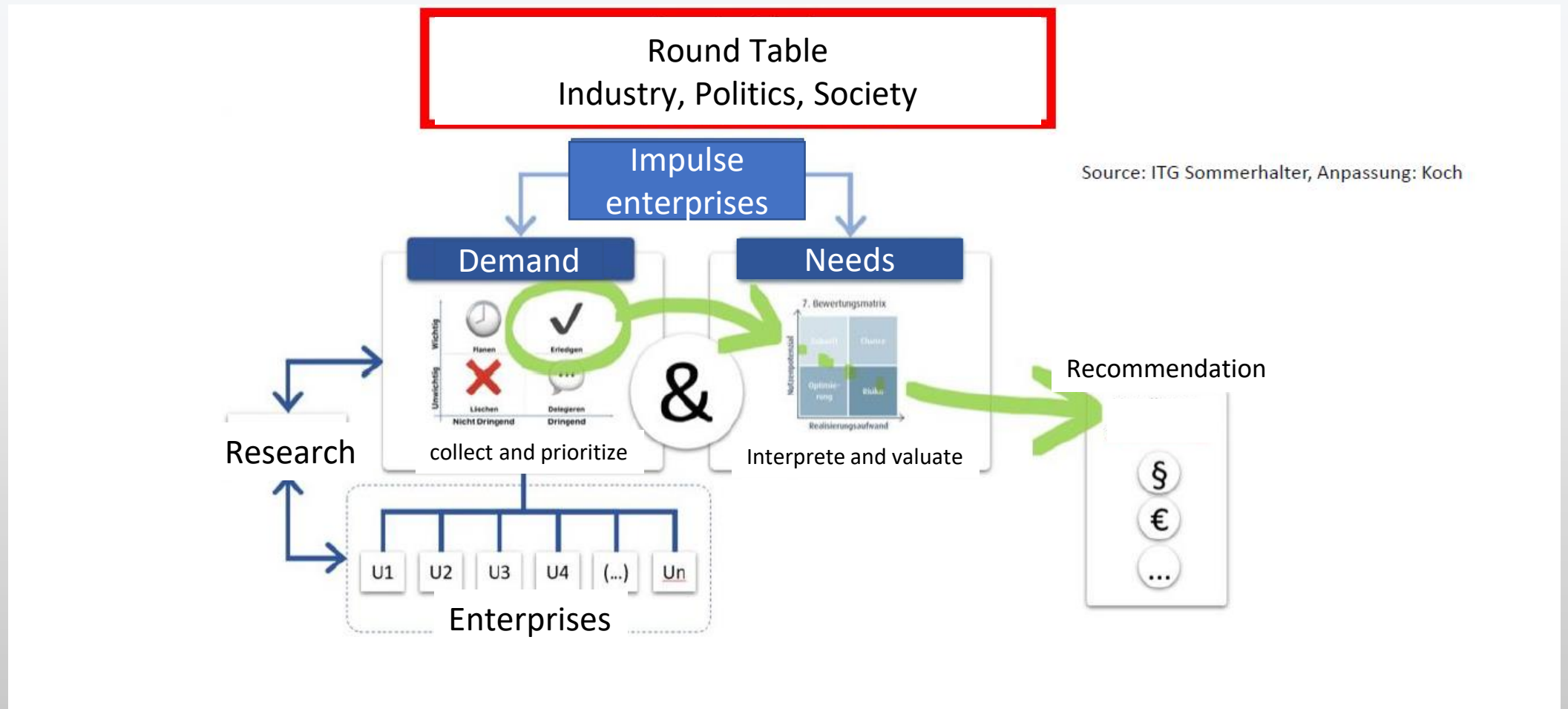


Réseaux intelligents / Smart Grid	
<p><b>STRENGTHS</b></p> <p>Acceptability linked to intelligent management of energy consumption:</p> <ul style="list-style-type: none"> <li>• Control of the bill</li> <li>• Energy savings: positive environmental impact</li> </ul>	<p><b>WEAKNESSES</b></p> <p>Individual perception of risk related to :</p> <ul style="list-style-type: none"> <li>• Radiation / waves</li> <li>• <b>Tracking of users and uses</b></li> <li>• Computer hacking</li> <li>• Fear of bugs</li> <li>• Electricity theft</li> <li>• Control of personal data (e.g. of their home)</li> </ul> <p>Lack of intelligibility in the data use charter</p>
<p><b>OPPORTUNITIES</b></p> <p>Level of confidence</p> <ul style="list-style-type: none"> <li>• Depends on level of information</li> <li>• Need for a data use charter</li> </ul> <p>Appropriateness :</p> <ul style="list-style-type: none"> <li>• Comfort of use / ergonomics ("intuitiveness" of use)</li> <li>• Human/machine interface</li> </ul>	<p><b>THREATS</b></p> <p>Perception of the risk related to</p> <ul style="list-style-type: none"> <li>• Cybersecurity</li> <li>• Industrial espionage</li> </ul> <p>Increased energy needs</p>

Synthese und Übertragbarkeit auf andere Regionen

Koch 2022

# Strategy of Implementation



# Reference Interreg funding

## Framing by Interreg Projects

### Examples:

- Demand studies?
- Which areas or industrial sites are available for the pilots?
- Traffic connections at loading and unloading stations?
- How can hydrogen producers and consumers find each other?
- How expensive will it be to switch to hydrogen at consumer and distributor site?
- What are the legal hurdles for cross-border battery recycling facilities?
- How can the population be involved in the planning process?
- What are the possibilities for complementary funding?
- Promotion of large-scale applications to the EC?

# Reports on Innovationregion Upper Rhine



<https://www.sustainability-upperhine.info>

→ Media – News

<https://www.eucor-uni.org>

→ Feasibility Study

