Aktiengesellschaft

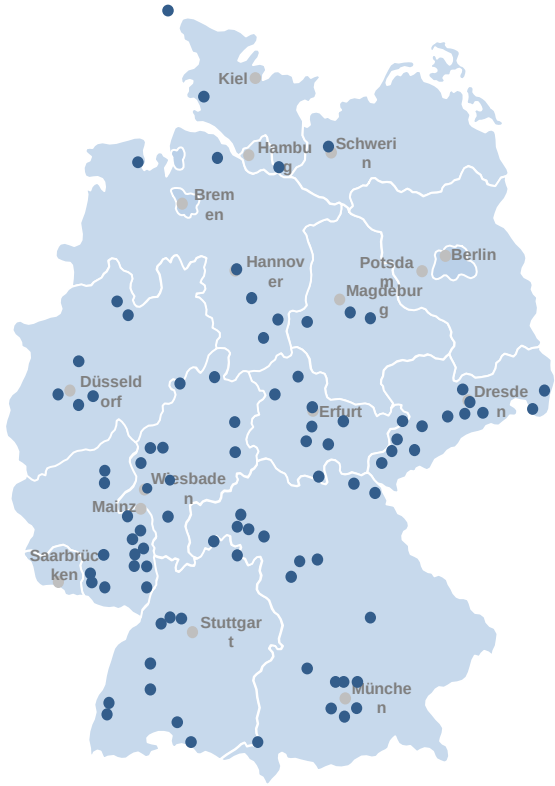
7th HIPS-NET Workshop

How to proof the importance of blending to the sceptics?

3./4. June 2020 Eva Hennig

THE THÜGA GROUP CONSTITUTES WITH NEARLY 100 COMPANIES THE LARGEST ALLIANCE OF MUNICIPAL UTILITIES SERVING REGIONS AND CITIES IN GERMANY

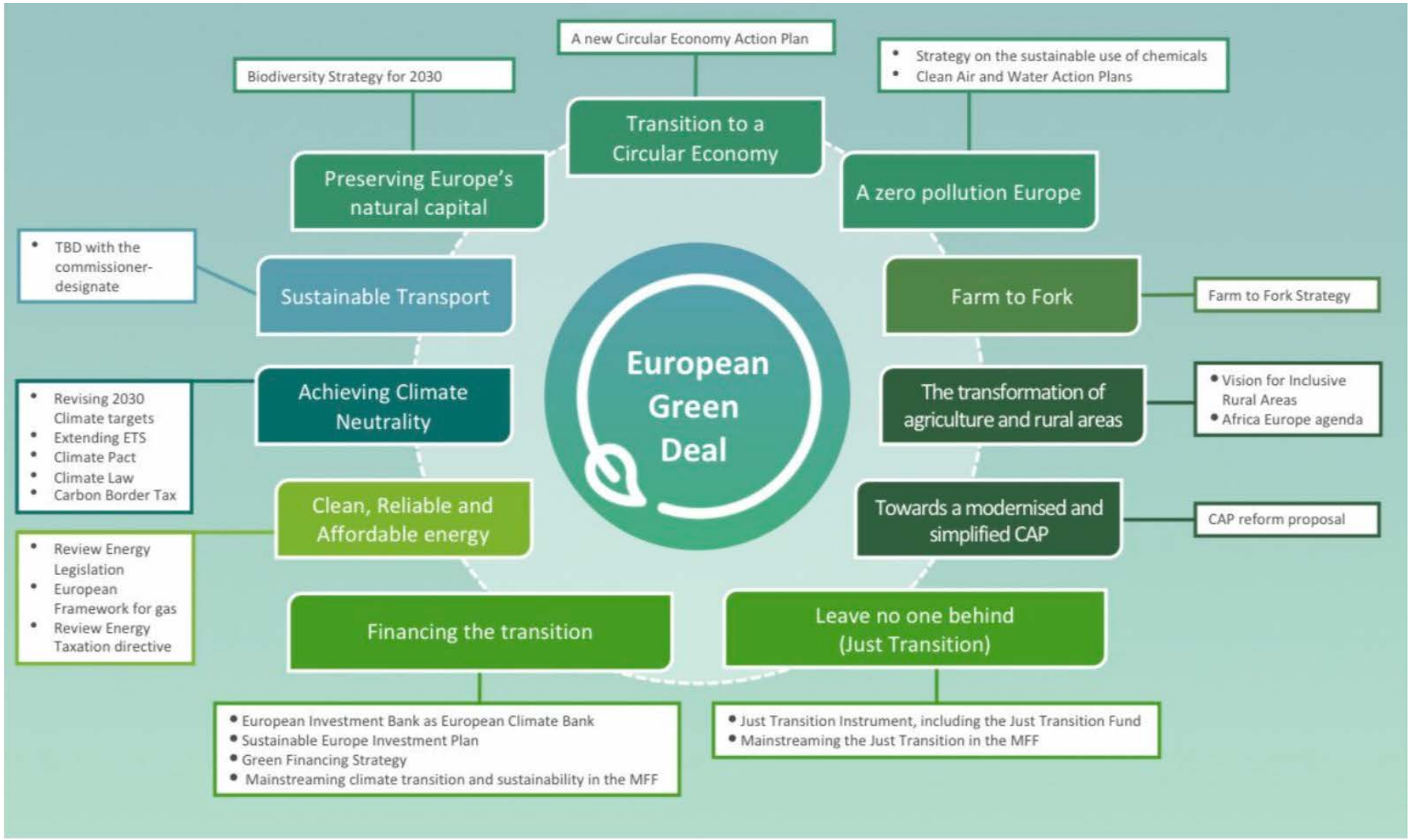
Turnover € 21.5 billion		Gas sales 118.8 billion kWh	Heating Sales 10.0 billion kWh
Investments € 1.3 billion		Electricity sale 57.5 billion kWh	Water sales 330.8 million m³
			Gas customers 2.0 million	Electricity customers 4.4 million
Employees 20.300			Heating customers 0.1 million	Water customers 1.0 million



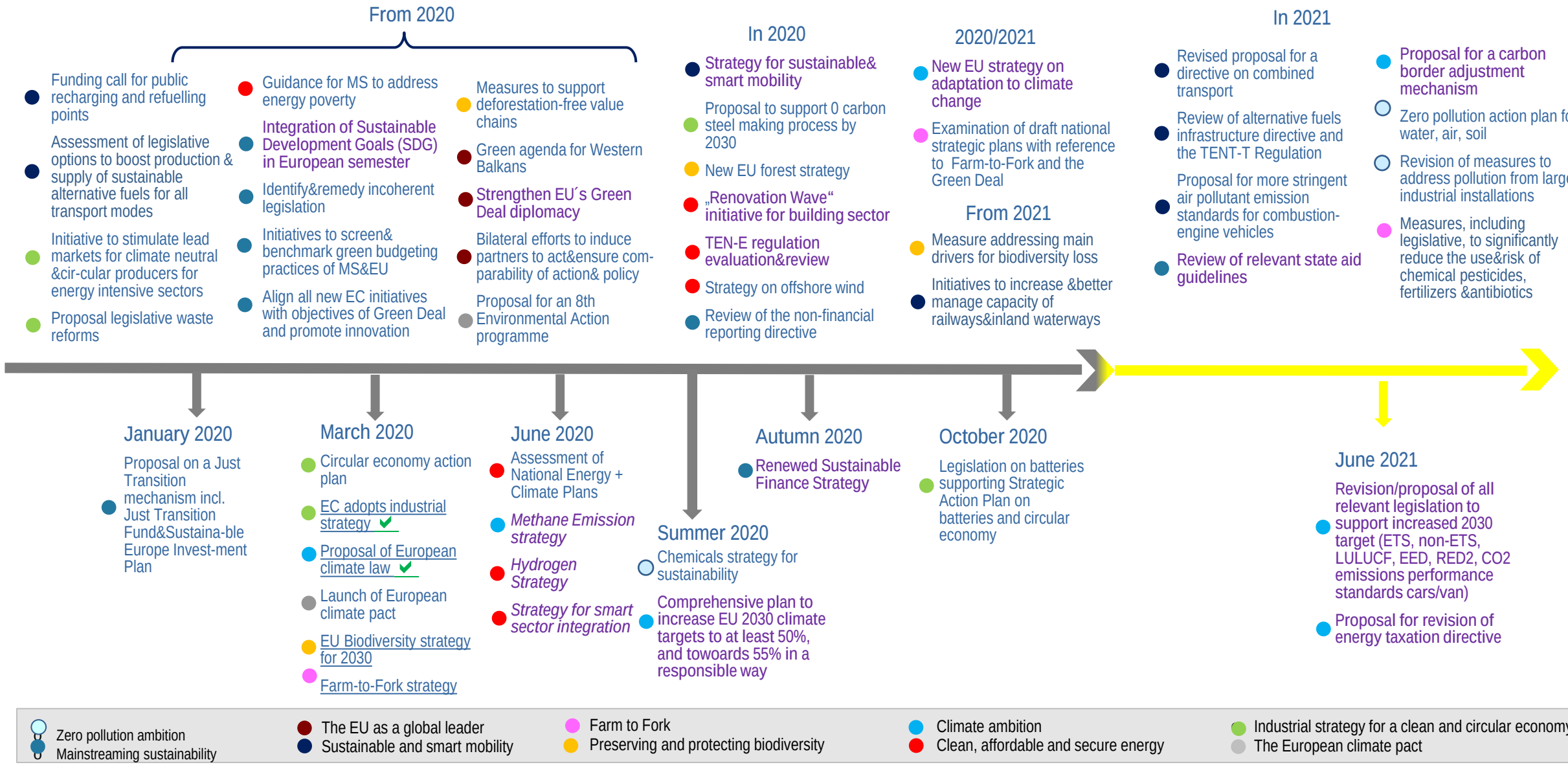
Hydrogen projects:

- Very large interest of the cities and regions for local hydrogen projects. Sector integration is deeply rooted within Thüga companies due to the multi-utility concept
- 2013 first PEM in Germany injecting H2 into the grid of DSO of Frankfurt
- Since 2018 continuous injection into DSO grid in Freiburg
- „Reallabor“ Heide, injection of 20 % H2 in the DSO grid as part of a complex project with refinery, TSO-grid, cement factory, underground storage, green kerosene for airport.
- „Reallabor“ North Germany with P2G from wind and usage of H2 in all sectors
- 100 % grid and methane pyrolysis in concrete planning
- Buy Hydrogen-Ready: project with associations from DE, A, CH and many German DSO to classify new/existing components on their H2-Readiness

THE GREEN DEAL IS SO MUCH BIGGER THAN THE CLEAN ENERGY PACKAGE. IN NEARLY ALL SECTORS CONSIDERABLE CHANGES ARE PLANNED TO REACH PARIS 1,5 °C TARGET.



THE TIMELINE IS CONTINUOUSLY CHANGING. COVID 19 HAS SLOWED IT ONLY A LITTLE.



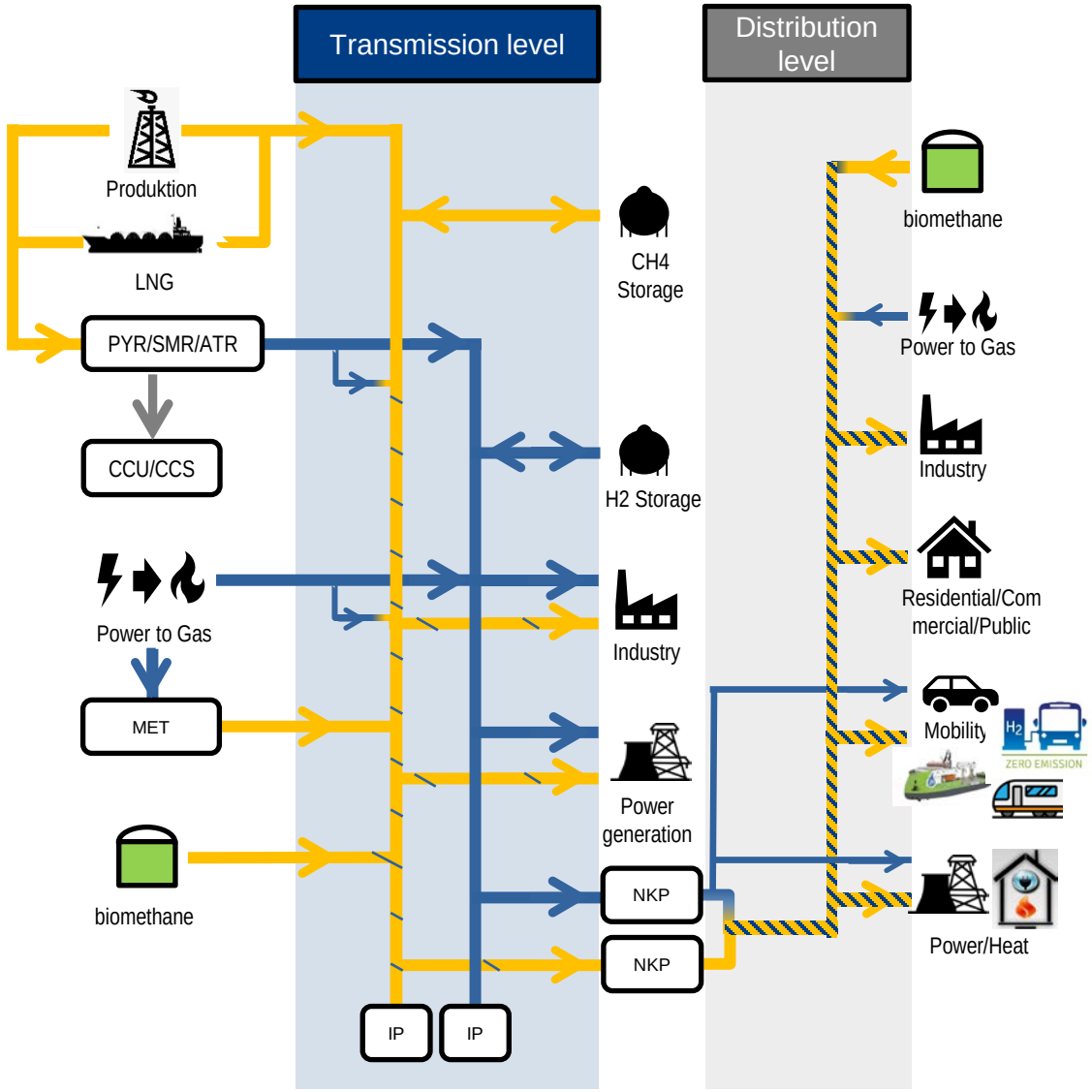
THE DRAFT (END APRIL!) ENERGY SYSTEM INTEGRATION STRATEGY IS DOMINATED BY PURE H2 IN TSO GRIDS FOR INDUSTRY AND LARGE VEHICLES. IT MIGHT HAVE CHANGED…….

- H2 in **the right place at the right time**. For the hardest to decarbonize sector which is presumed to be large industry and long haul transport
- Not technology neutral. Heating shall electrify 40 % in 2030, heat pumps are seen as much more efficient. The rest of heating shall be covered with district heating produced in CHP with large heat pumps or with waste heat. Only then hybrid heatings are mentioned.
- Local RES production is seen positive, pyrolysis not mentioned
- Biogas is seen as a positive local solution to use waste and residues.
- Resilience and seasonal storage is missing
- A lot about scaling up of electrolysers
- Concentrates on green hydrogen, blue hydrogen only if it meets the sustainability criteria
- Terminology and GO are needed
- Possibly a pure hydrogen regulation is planned
- Revise TEN-E, Revise TYNDP

*The case for blending hydrogen in the gas grid is less clear and will thus **deserve careful consideration** as regards its contribution to the decarbonisation of the energy system and its economic and technical implications. Blending hydrogen in the current gas grid to a limited degree[1] could enable decentralised hydrogen production and, to some extent, support the kick-start of renewable hydrogen in a transitional phase. **However**, blending hydrogen has intrinsic limitations which put this option at a disadvantage compared to other alternatives for supporting renewable hydrogen in the medium and long term. Blending reduces the value of hydrogen and prevents its use in higher-value industrial applications . In addition, beyond certain penetration levels, blending creates technical constraints at both injection and end-use appliances level which in turn would result into additional costs.*

[1]A blend of 5-20% by volume can be tolerated by most systems without the need for major infrastructure upgrades or end-use appliance retrofits or replacements (**BNEF, 2020**)➔ **this is the only reference! No projects, no Marcogaz, no GERG mentioned.**

TSO AND DSO DEPEND ON EACH OTHER. ONLY JOINT STRATEGIES IN EACH COUNTRY AND ON EU LEVEL CAN DELIVER A SUCCESSFUL HYDROGEN SYSTEM AND MARKET.



Possible developments on the transmission level

- Use of existing infrastructures
- Converting certain pipelines to 100 % **H2**
- Low H2 blending into the CH4 network. Level not harmful to large feedstock customers, storages, compressors, turbines
- Connect customers and DSO to **H2** and **CH4** grid according to their demand and individual situation

Distribution level

- **Use of existing infrastructure of the grid and the consumers**
- Individual solutions depending in the local situation possible as DSO are usually not interconnected
- Enables local injection of biomethane, hydrogen, blends, syngas
- Possibility for dedicated H2 delivery but also “deblending” with membranes for critical consumers

PYR = Pyrolysis	ATR=Autothermal Reformer
SMR = Steam Reformation	MET = Methanisation
CCU = Carbon Capture & Usage	IP = Interconnection point
CCS = Carbon Capture & Storage	NKP = TSO-DSO connection

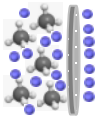
THE TEN-E REVISION PROCESS IS VERY IMPORTANT TO PROMOT GAS DSO SMART GRID PROJECTS. SO FAR ONLY ELECTRICITY DSO WERE ELIGIBLE, BUT IT WAS COMPLICATED:

Today tracking systems enable the calculation of calorific value for accurate bills to the end consumer and monitor the injection of biomethane plants. Linepack is used in some grids to optimize the system capacity.

In the **future** new elements will be added to the system. For the safe operation more flow measurements and sensors have to be installed to monitor the grid e.g. H2 content, Wobbe Index and calorific value to ensure that appliances/applications work safely and efficiently and that bills are accurate. To increase the injection of R/D-Gas reverse flow from DSO to TSO, increase of line pack or local storages might be needed. Data communication between the various actors has to be developed.


Elektrolyse

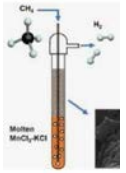

Storage/Linepack


Membrane

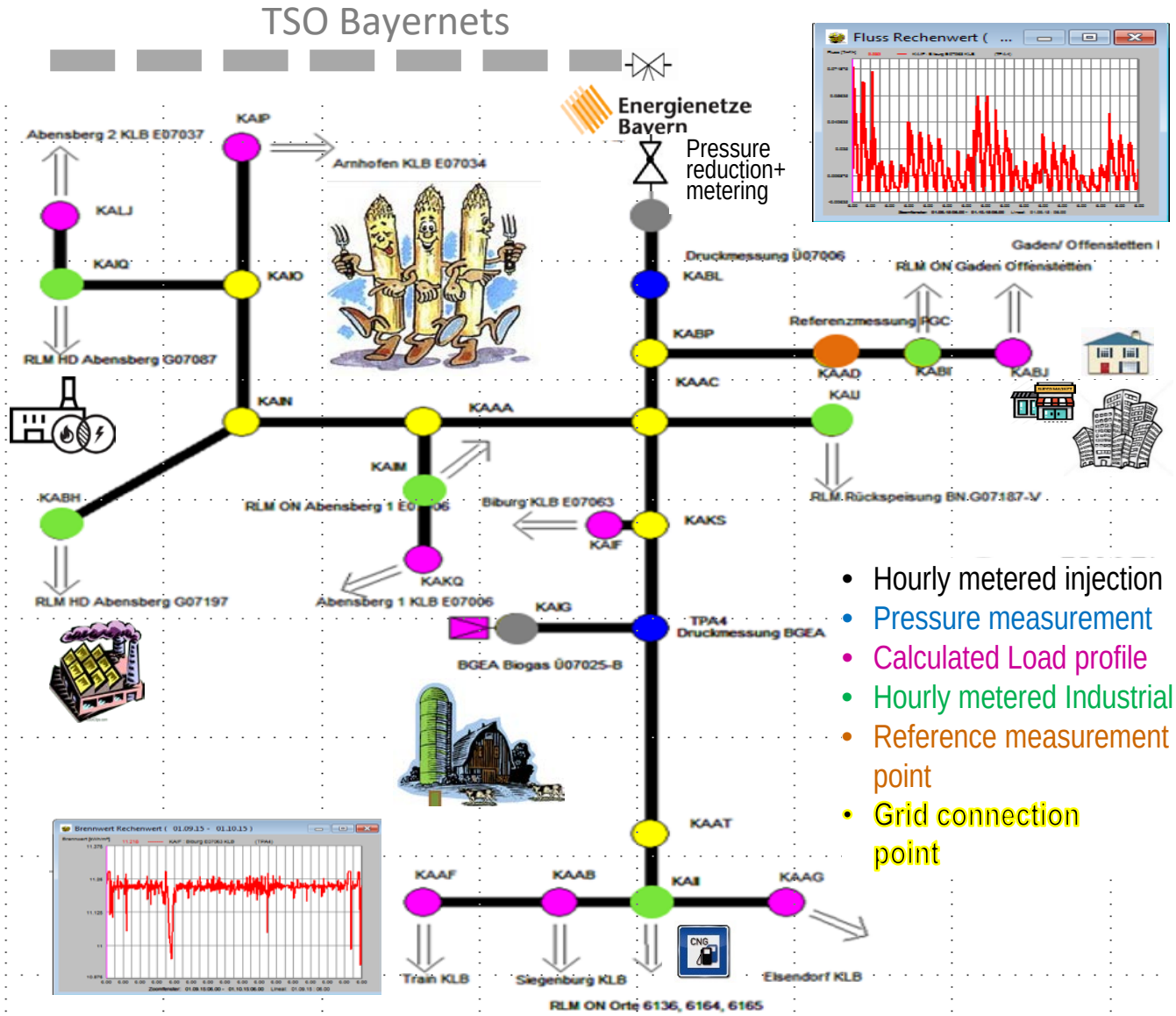
H2 Fuelling Station


Sensors


H2 Customers


Methane Pyrolysis


Compressor + Deodorization



- Hourly metered injection
- Pressure measurement
- Calculated Load profile
- Hourly metered Industrial
- Reference measurement point
- Grid connection point

SUSTAINABLE FINANCE IS NOT AGAINST H2 BUT EXPANSION OF THE GRID IS NOT CONIDERED SUSTAINABLE. NOT EVEN TO CONNECT BIOMETHANE OR H2 PLANTS:

4.14 Retrofit of Gas Transmission and Distribution Networks

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D35.21 H49.50
Description	Retrofit of gas networks for the distribution of gaseous fuels through a system of mains. Retrofit of gas networks for long-distance transportation of gases by pipelines. The **complete** system must have been in place and operating for a minimum of 5 years.
Mitigation criteria	
Principle	Significant GHG emissions reductions by reducing leakage and increasing the volume of hydrogen and other low-carbon gases used in the gas system
Metric & Threshold	Retrofit of gas transmission and distribution networks whose main purpose is the integration of hydrogen and other low-carbon gases is eligible: • Any gas transmission or distribution network activities which enable the network to increase the blend of hydrogen and/or other low carbon gasses in the gas system is eligible • The repair of existing gas pipelines for the reduction of methane leakage is eligible if the pipelines are hydrogen-ready and/or other low carbon gasses-ready. Retrofit of gas networks whose main purpose is the integration of captured CO2 is eligible, if the operation of the pipeline meets the criteria outlined for the transportation of captured CO2. **Gas network expansion is not eligible.**
Rationale	
Electrification of the energy sector will not be sufficient to fulfil the EU's net-zero by 2050 target. Molecule-based energy will continue to have a role to play in the future energy supply. This is particularly pertinent to supporting the uptake of hydrogen but one with an enormous capacity to decarbonise the electricity, transport and manufacturing sectors.	
Do no significant harm assessment	
The main potential significant harm to other environmental objectives from retrofit and operation of existing gas distribution and supply networks that allow for the use of hydrogen and other low- carbon gas systems are associated with: • Retrofitting phase of the network: all aspects have to be considered that are usually connected with construction like terrestrial habitat alteration, loss of valuable ecosystems, land consumption, overburden disposal, negative impacts on biodiversity, emissions of particles and NOx, noise and hazardous materials. For larger projects an ESIA should be done. • Operation phase: Leakages should be kept at a minimum. Underground networks can have an impact on ground water systems and on local ecosystems.	

(2) Adaptation	• → Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	• → Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • → In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Ensure appropriate measures are in place to minimize and manage waste and material use in construction and decommission phases. Thresholds: European Directives 2018/850, 2018/851, 2018/852 and BREF document[264]
(5) Pollution	A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented. For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that: • → a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • → all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • → a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

THERE IS A LOT OF TALK ABOUT HYDROGEN. HUGE NUMBERS FLOATING AROUND. BUT THIS IS ONLY FOR A VERY SPECIFIC MARKET AND NOT FOR DSO.

We are still in very deep water and 2020 is the year to act as all important decisions are taken.

- Don´t give in and don´t be intimidated
- Know your numbers and voice them prominently
- Speak up, oppose loudly against fake news
- Make projects and promote them with TamTam
- Talk to your customers, support appliance and application tests
- Test material, Test sensors, test membranes, test tracking systems
- Share your knowledge within your country and Europe and the world
- Team up with others, use national and European funds
- Involve you local, regional and national politicians
- Develop a strategy and promote it
- Listen and learn from those who are against hydrogen at DSO level, meet with NGO
- Engage in the process of the sustainable finance regulation and the details of taxonomy
- Be present, attend events, give presentations, raise your voice, take part in consultations
- Send a clear message as a company, association and industry.