

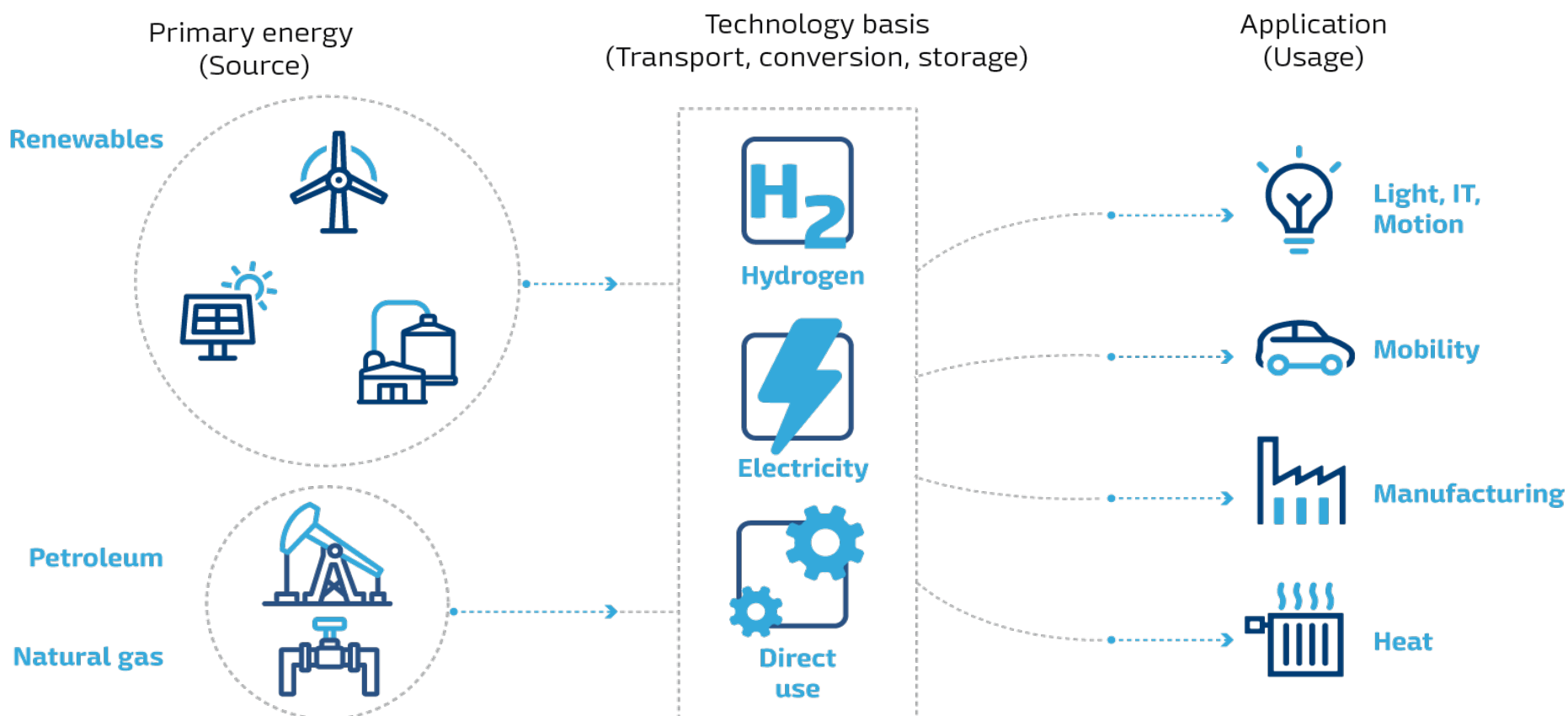


Hydrogen  
Europe

*GET H2*

# GET H2 – General project idea

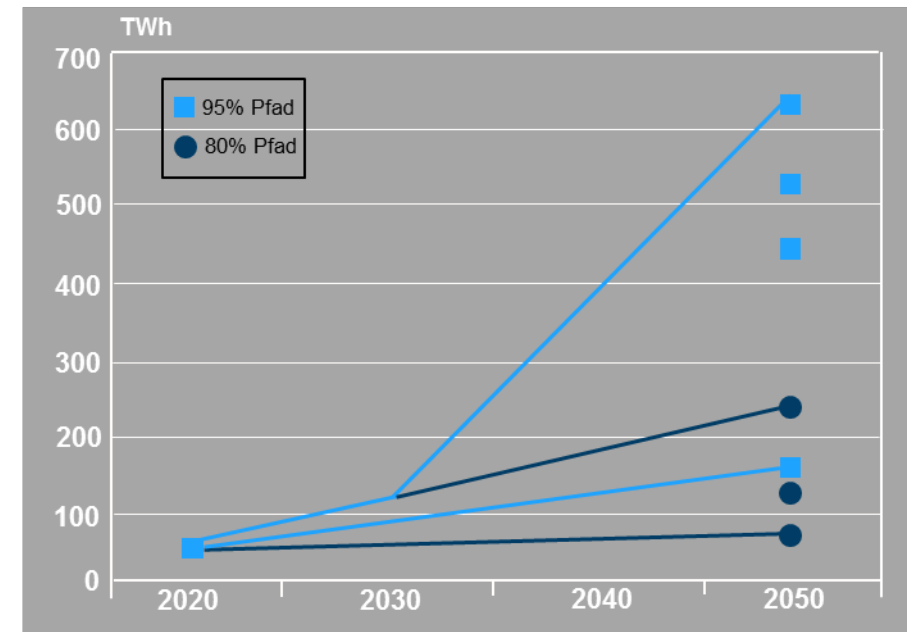
Our vision| Hydrogen as complementary technology base to transport and store renewable energy



# GET H2 – General project idea

**Demand** | In Europe the demand for CO<sub>2</sub>-neutral hydrogen is predicted to rise to 780 up to 2200 TWh in 2050

- With the transition from a natural gas based feedstock to a key element of the energy transition the demand for hydrogen will grow massively:
  - › Current European hydrogen demand of 249 TWh predicted to be three up to eight times higher in 2050
  - › Predicted European hydrogen demand would require electrolysis capacities of approx. 190 up to 550 GW
- Import of renewable hydrogen as CO<sub>2</sub>-neutral energy carrier from countries with higher renewable potential and less space restrictions necessary



Development of the hydrogen demand in Germany\*

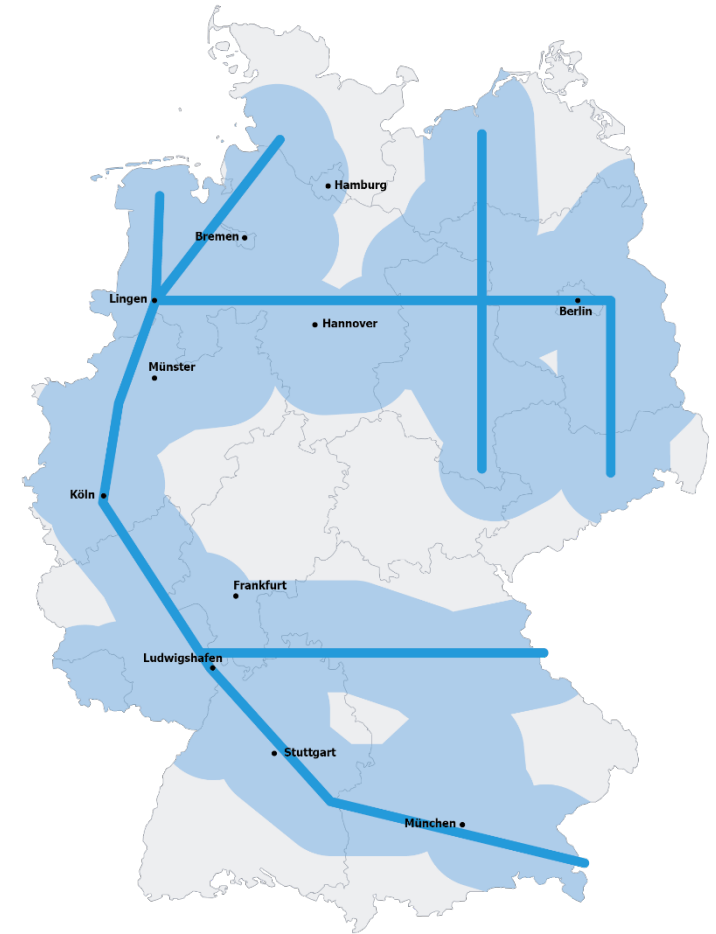
# GET H2 – General project idea



**Our target** | Facilitating a hydrogen market by establishing the core for a nation- and later on EU-wide infrastructure

## Key beliefs:

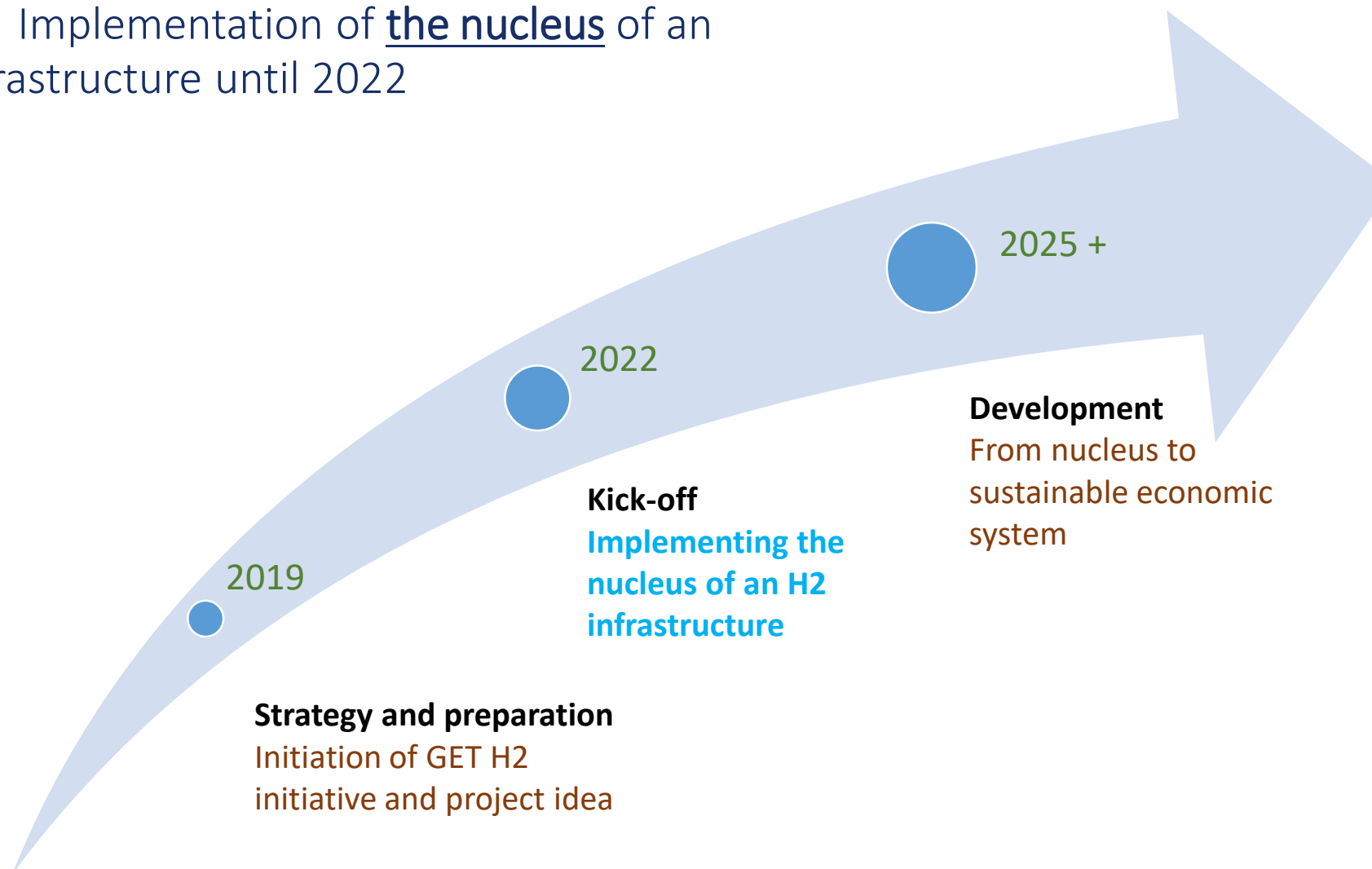
- First applications in the industry sector already require large amounts of pure hydrogen to implement CO2 reductions
- For these applications a reliable and secured production and supply is key
- For the reliable and secured supply a H2 infrastructure with non-discriminatory access and transparent charges is the best possible solution
- As hydrogen can be stored, transported and used in existing gas infrastructure, it should be used where ever possible
- Down the road a European wide hydrogen infrastructure is necessary; pipeline connection to neighbouring countries (e.g. Netherlands) therefore already under discussion



# GET H2 – General project idea



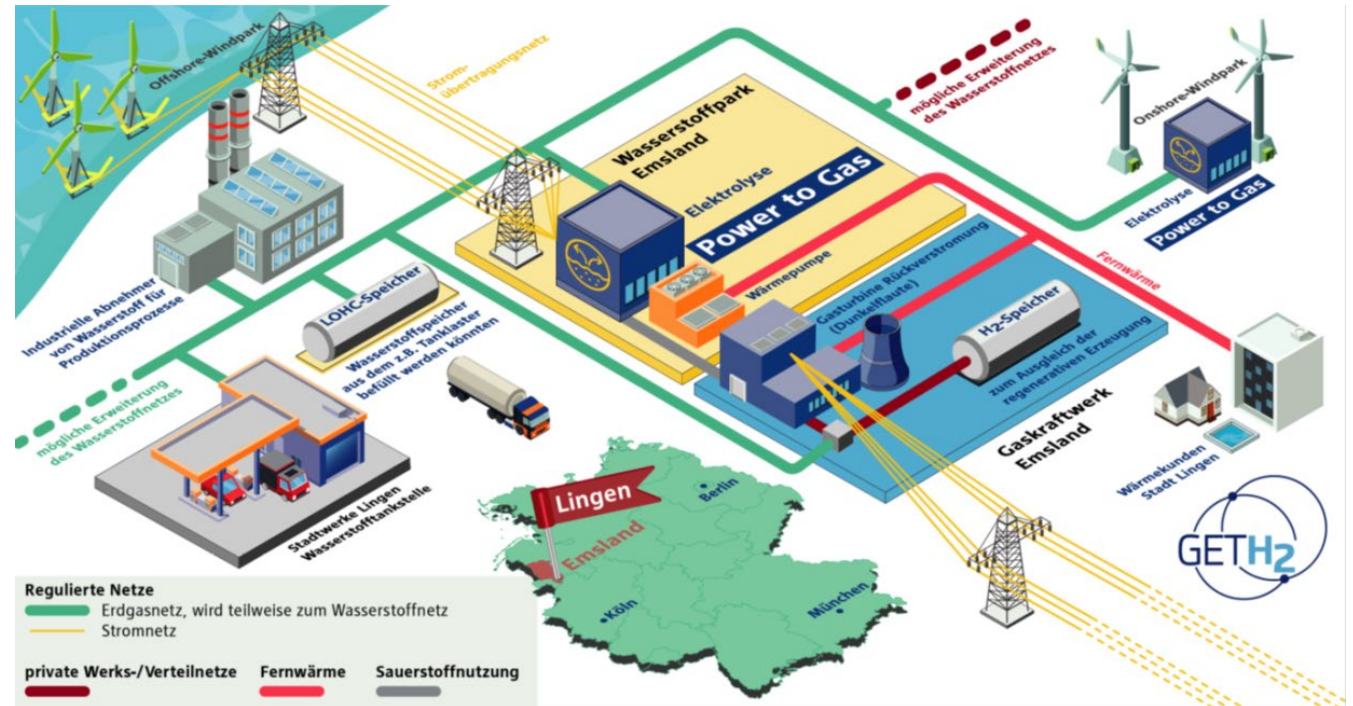
Our timeline | Implementation of the nucleus of an hydrogen infrastructure until 2022



## The Nucleus | Favourite location for introduction of large-scale water electrolysis

### Key elements

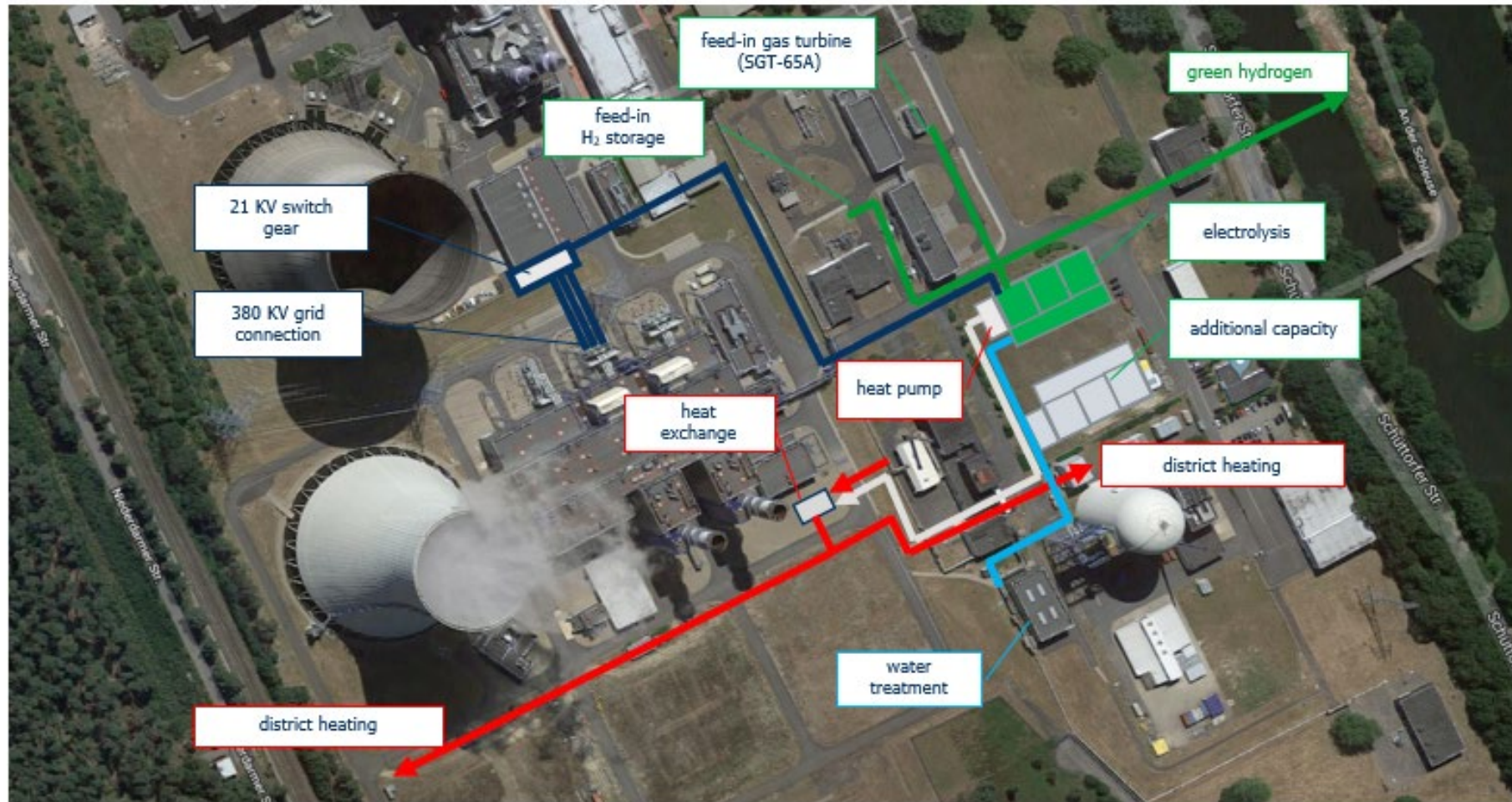
- Well suited existing infrastructure and offshore wind connection point
- 2 water electrolysis (one coupled with windfarm –decentral- and one large-scale 100MW –central-)
- High-temperature heat pump to use the electrolysis waste heat for district heating
- Hydrogen pipeline storage
- 60 MW class gas turbine to be tested flexible between 0 up to 100% hydrogen
- LOHC (liquid organic hydrogen carrier) hydration and dehydration for decentralized applications
- Hydrogen filling station for the city of Lingen





# GET H2 – Location

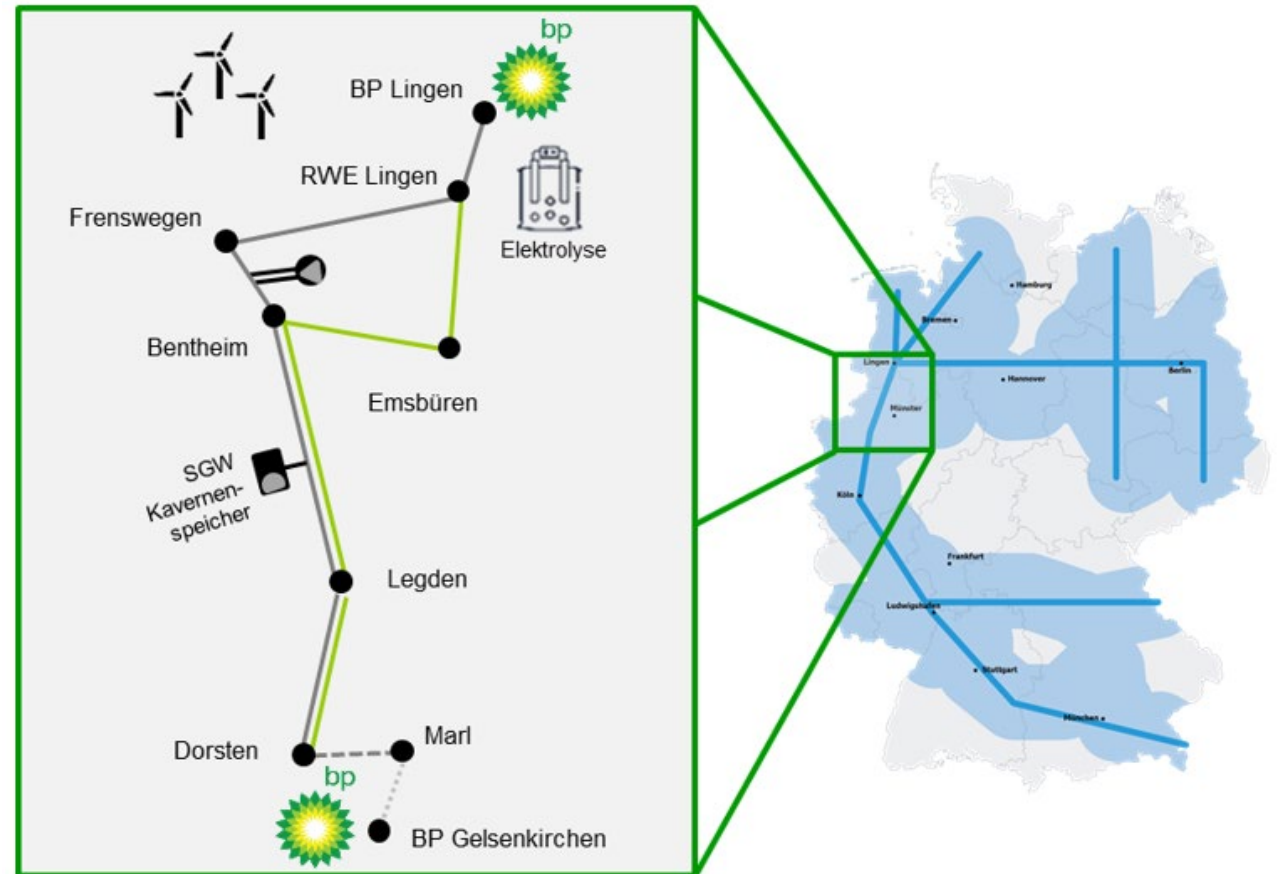
The Nucleus| Favourite location for introduction of large-scale water electrolysis



## The Nucleus| Test and demonstration of an hydrogen infrastructure

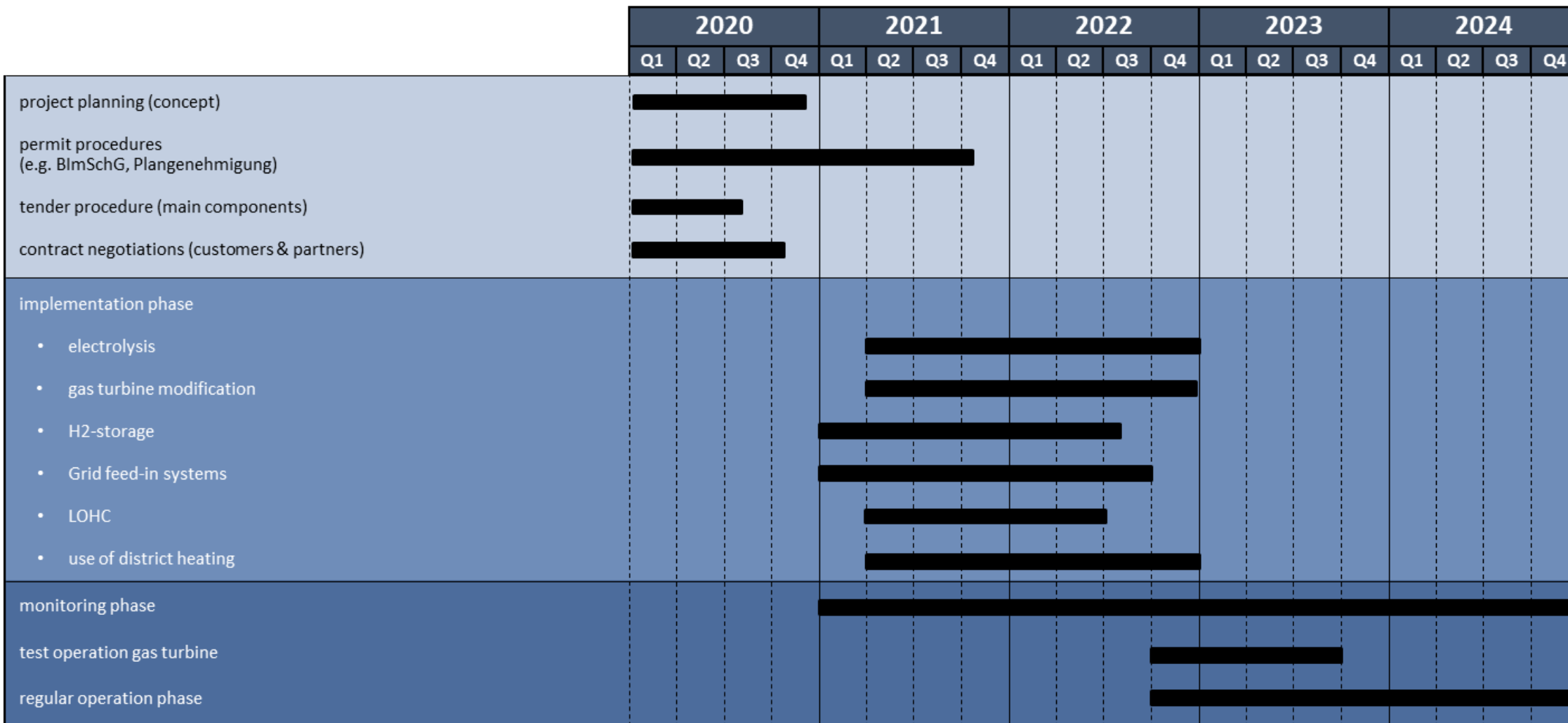
### Key elements

- 100% hydrogen grid based on existing gas infrastructure
- Construction of two H<sub>2</sub> feed-in systems and grid connection for LOHC
- Reassignment of two conveyor pipelines in Lingen as initial start
- Reassignment of 100km pipelines to connect the production in Lingen with the industry in North Rhine Westfalia
- Transport of renewable hydrogen to connected refineries (BP Lingen/ Gelsenkirchen) and nearby chemical industry
- Non-discriminatory access for further hydrogen producer and offtaker (e.g. steel production in NRW)

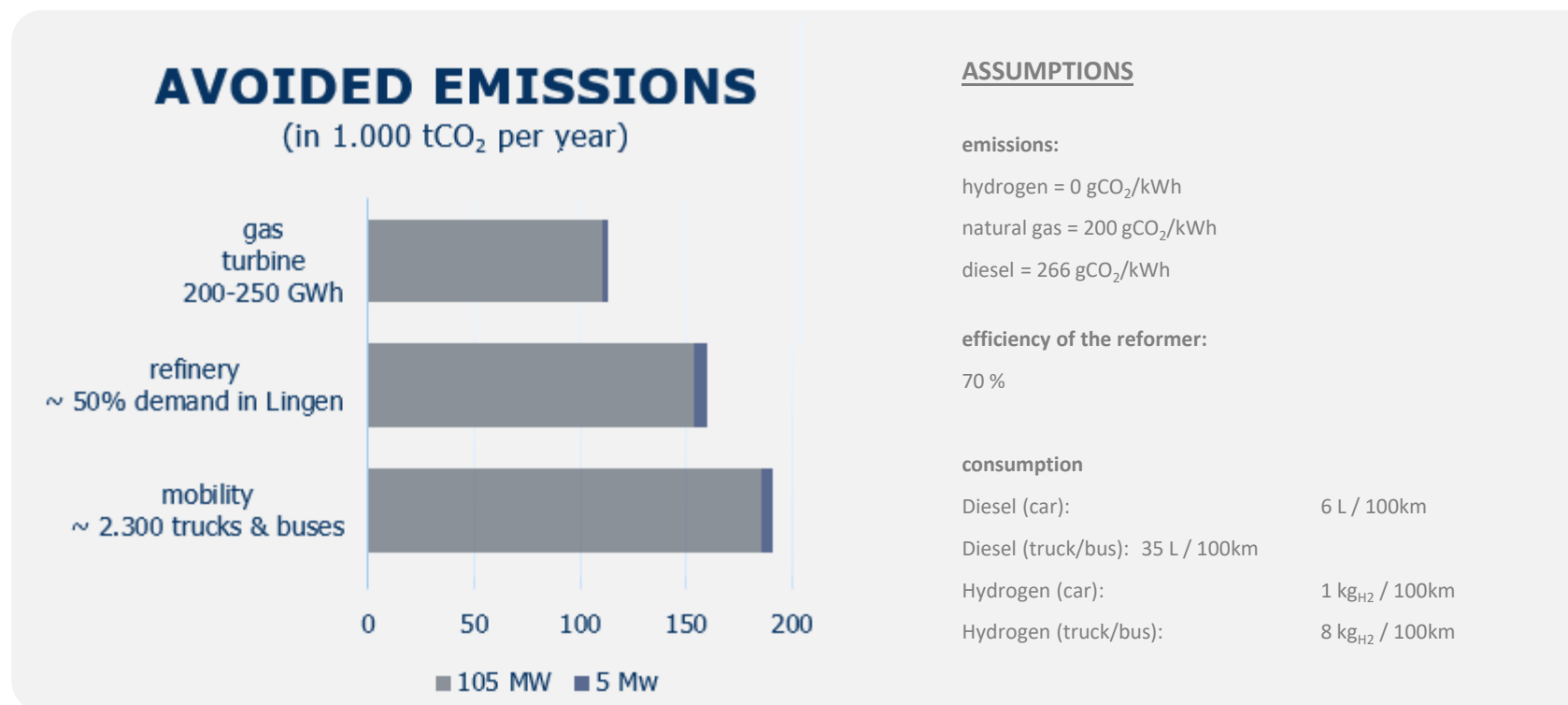




# GET H2 – Timeplan



# The Nucleus| CO<sub>2</sub> reduction potential



- Renewable hydrogen production of both water electrolysis approx. 17.000 t/a
- Much more as the current German mobility demand, but to less to supply the industrial demand of the regional refineries
- The CO<sub>2</sub> reduction potential varies between **162.000 t CO<sub>2</sub>/a** and **261.000 t CO<sub>2</sub>/a** depending on the mix of offtaking sectors

# GET H2 – The required framework



Beside appropriate funding a supportive regulatory framework is necessary

PRODUCTION	TRANSPORT	APPLICATION
<ul style="list-style-type: none"><li>• <b>Reliable framework</b> to assure security of investment</li><li>• Fast up-scaling to achieve necessary <b>technology cost reduction</b></li><li>• <b>Adaption of the tax and levy system</b> to sector coupling requirements</li></ul>	<ul style="list-style-type: none"><li>• <b>Consistent consideration of H2</b> within the gas market directives and regulations (in Germany: EnWG)</li><li>• <b>Supplement of the technical rules and regulations</b> (in Germany: DVGW) for an pure hydrogen infrastructure</li><li>• <b>Supplement of the Gas Network Development Plan</b> for transparent development of hydrogen infrastructure</li></ul>	<ul style="list-style-type: none"><li>• <b>Expanding incentives</b> for the usage of green hydrogen</li><li>• <b>Fast implementation of RED II*</b> to national Laws (e.g. BImSchG, BImSchV)</li><li>• Implementation of <b>tradeable guarantees of origin</b> that provide additional information on the decarbonisation contribution and can be offset against CO2 reduction targets</li></ul>

# GET H2 – Participants



Partners from all sectors actively support the initiative:

[www.get-h2.de/partner](http://www.get-h2.de/partner)