Energy transformation

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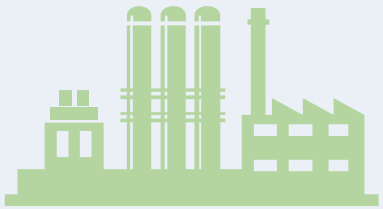
We want to make the Ludwigshafen site the leading location for sustainable chemical production in Europe

Energy

- Renewable energy
- CO_2-free hydrogen
- Fossil raw materials
- Bio-based raw materials
- Recycled raw materials

Raw materials

Verbund site Ludwigshafen



Upstream

Downstream

Products

- Basic Chemicals
- Downstream Products

remaining CO_2

CO_2

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Where do we stand today?

[2019]

CO2- Emissions, Mio. t/a

- **GHG Emissionen LU Scope 1+2** — 7,3
  - **Infrastructure** — 3,8
    - **Energy supply** — 2,9
      - Electricity: 6,2 TWh
      - Steam: 18,3 Mio.t
    - **Disposal** — 0,9
  - **Chemical production**[1] — 3,5
    - **Upstream** — 2,8
    - **Downstream** — 0,7

Electricity & steam from cogen

Steam from chemical production

[1] Includes emissions from process energy

2019: Deutschland: 810 Mio tCO2/a

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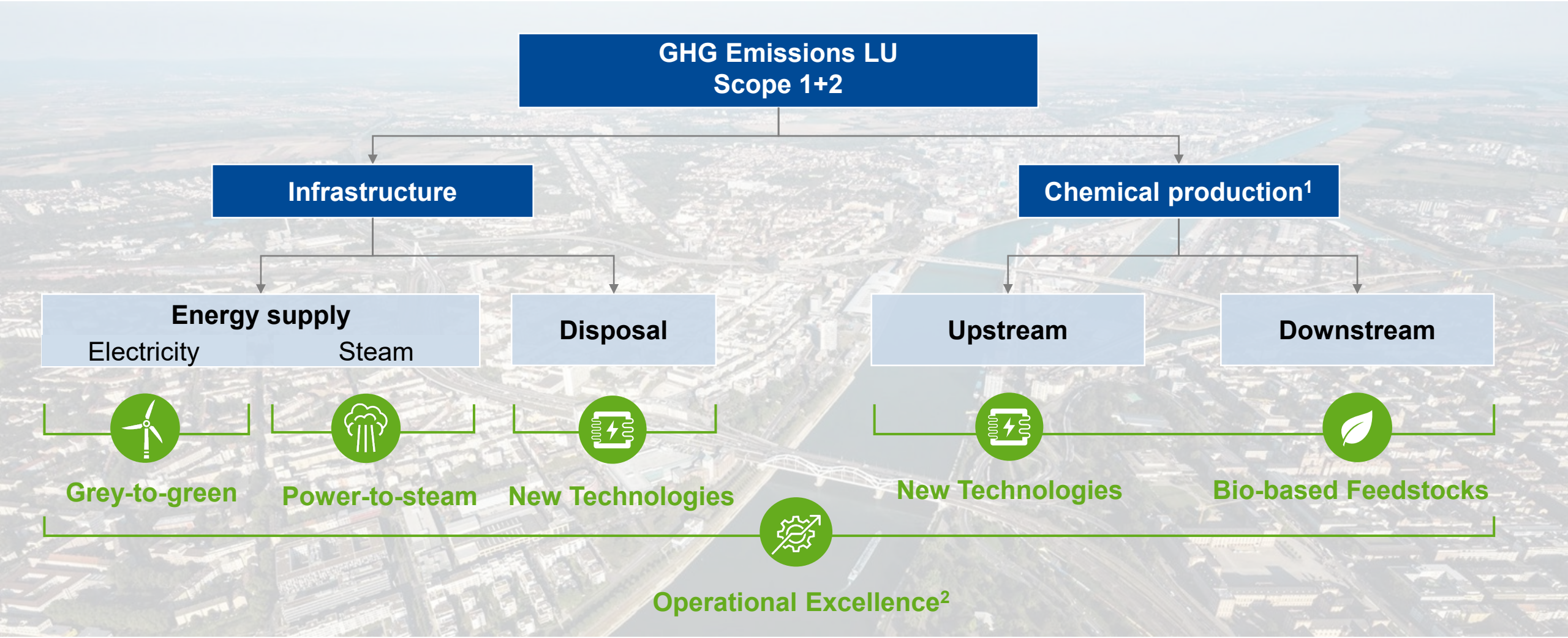
What options do we have on our way to climate neutrality?



[1] Includes emissions from process energy

[2] = continuous improvement

2019: Deutschland: 810 Mio tCO2/a

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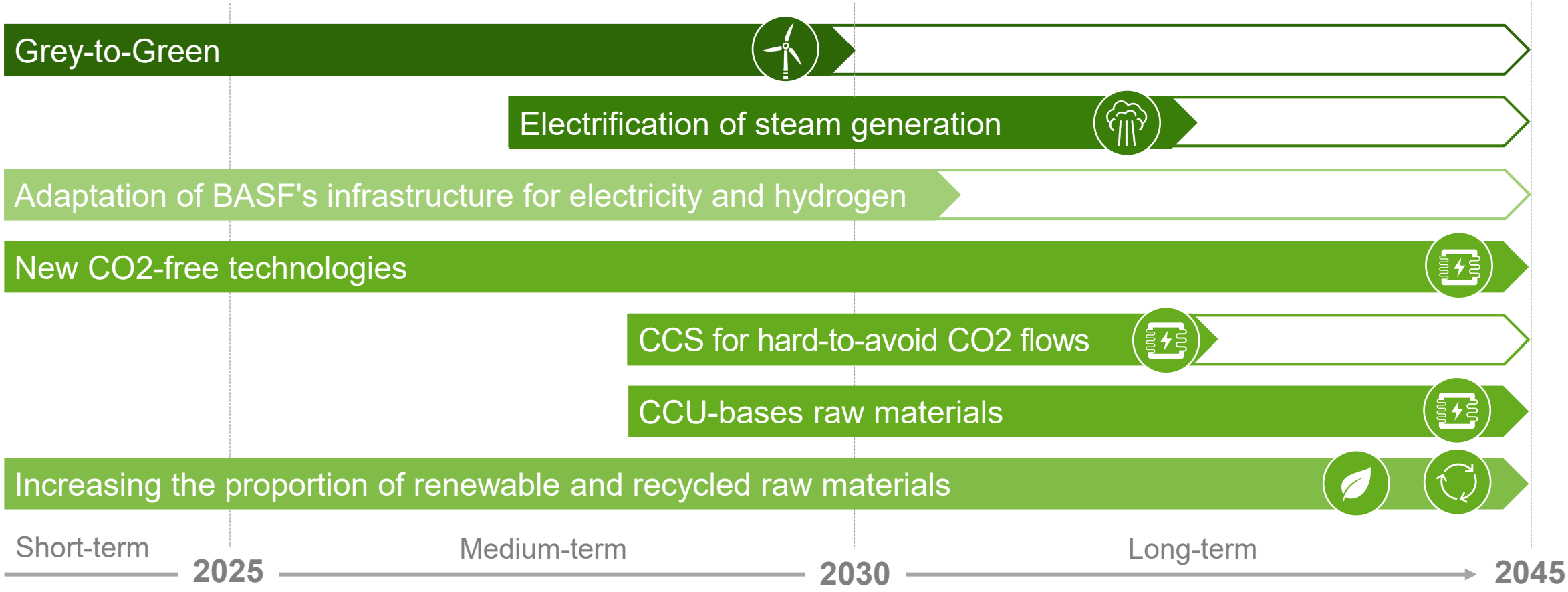
Cornerstones for the transformation of the Verbund site in Ludwigshafen towards net zero by 2045



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Electrification with renewable energies is of central importance for CO2 reduction.

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Increasing importance of renewable energy

- Replacing grey energy with green energy will have the biggest impact on reducing our emissions in the coming years by 2025
- Due to the electrification of our processes, our electricity demand will increase significantly in the coming years

We will efficiently reduce waste heat at the site and in our production facilities to generate steam.

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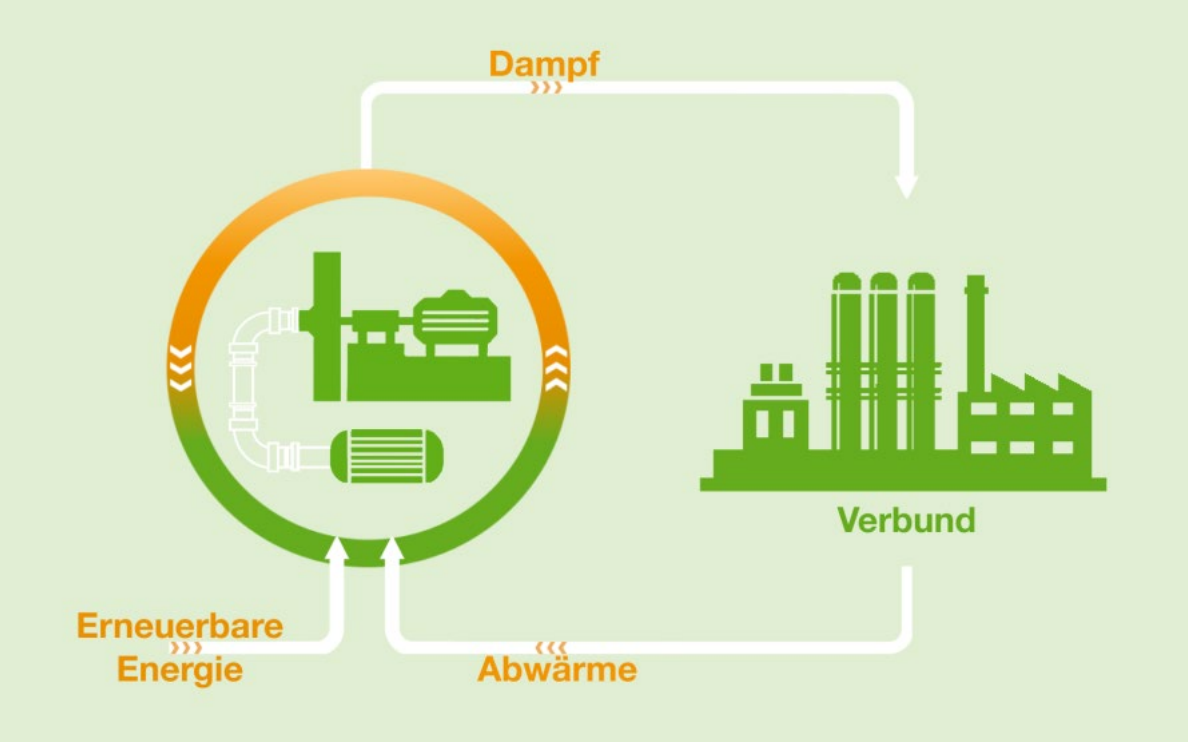
Electrify steam generation to reduce emissions

CO2-free steam generation with heat pump technology



- New ways of generating steam play an important role in achieving our climate goals
- With technologies such as industrial heat pumps, electric boilers and heat storage systems, fossil-generated steam from today's power plants can be replaced and the energetic potential of waste heat can be exploited

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Electricity demand at the Ludwigshafen site will double or triple by 2040.

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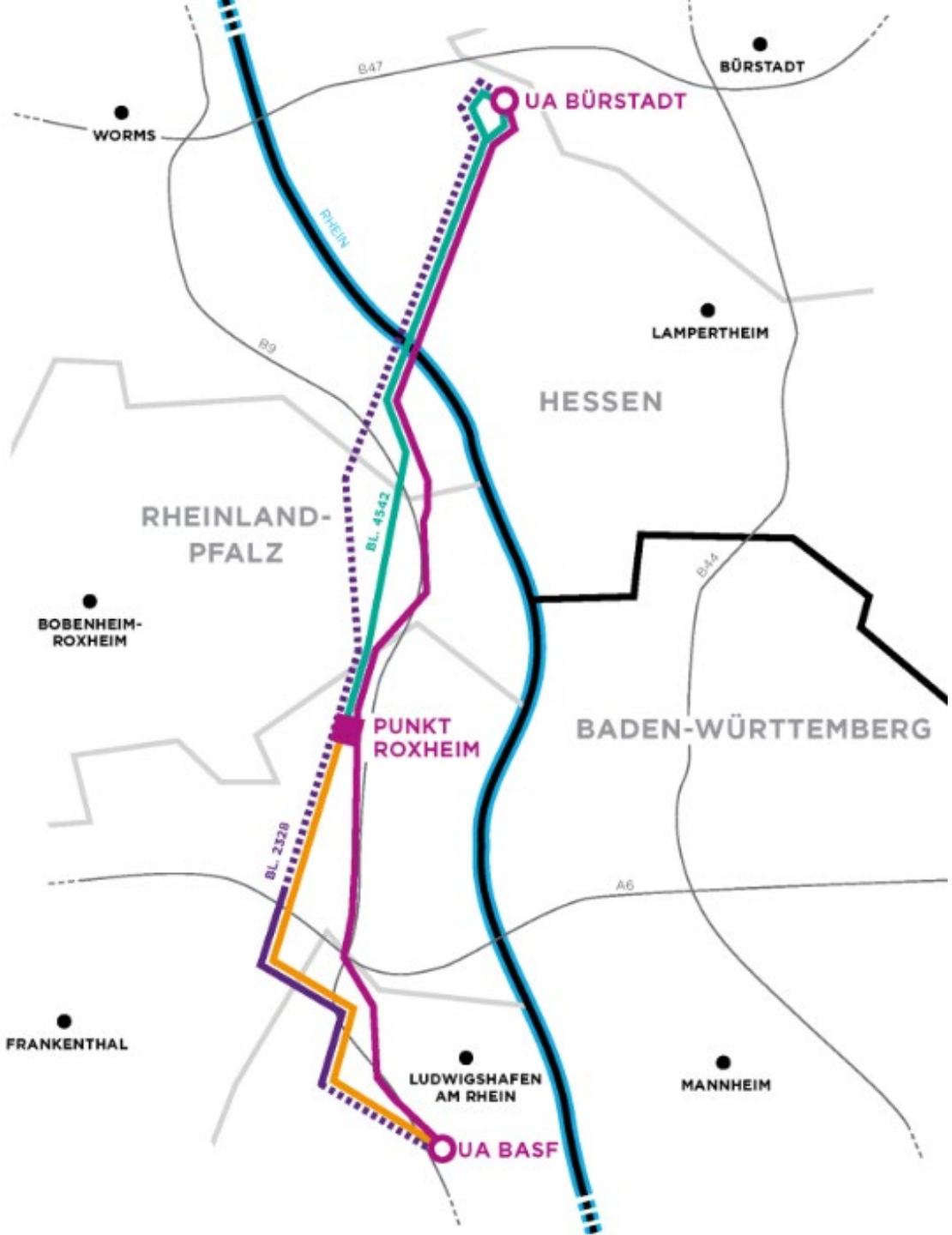

Growing electricity demand BASF site Ludwigshafen

- Expansion of power grids is essential

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BASF is driving innovative solutions in many areas to reduce CO2 emissions

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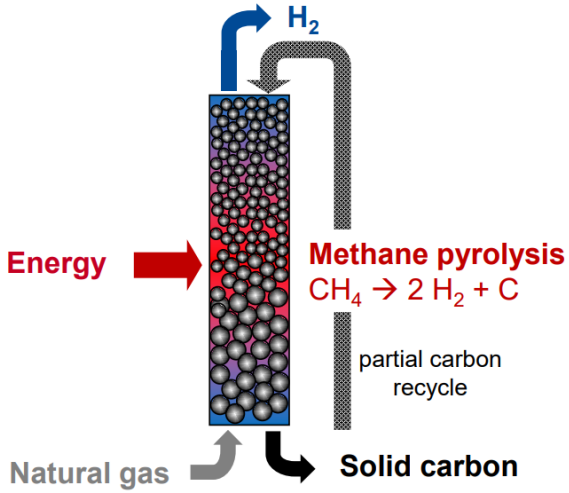
Other innovative projects of the energy transformation

- BASF OASE® for Flue Gas and Post Combustion CO2 Capture
- Green hydrogen for chemical production and cogen power plants
- Innovative technologies like:
  - Methane pyrolysis
  - Eletrical cracker (E-Furnance)
  - …



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