



# Synthetic fuels

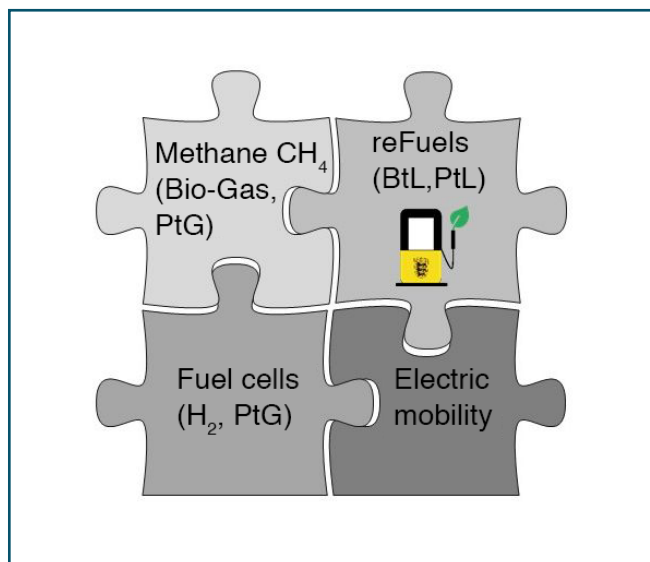
## reFuels (Regeneratively produced fuels)

In addition to the energy sector, industry and households, individual and freight transport powered by fossil fuels contributes to man-made CO<sub>2</sub> emissions and thus to climate change. Especially shipping, aviation or rail transport, where long distances are covered or large loads are transported, will continue to require liquid fuels in the future, taking into account the climate protection goals of the Federal Government.

Renewably produced fuels - so-called reFuels have the same energy density as fossil fuels and are therefore a promising path towards CO<sub>2</sub>-neutral mobility, alongside other measures such as the expansion of electromobility. ReFuels can be produced from carbonaceous residues from agriculture and forestry, from industrial and municipal waste, as well as through the direct conversion of CO<sub>2</sub> and sustainably produced hydrogen.

In order to make a positive and significant contribution to the goals of energy system transformation in the mobility sector, both the production processes for renewable energy sources and the drive technology itself must be significantly further developed. Energy system transformation scenarios for the transport sector show that electromobility alone will not enable a complete energy transformation in transport by 2050.

The switch to CO<sub>2</sub>-neutral mobility is not a decision between the various powertrain approaches (electric mobility, fuel cell mobility, regenerative gaseous mobility and regenerative fuel mobility). Therefore, **the different ways of regenerative energy production** must be considered in parallel and the respective efficiencies, availabilities and possibilities must be summarized. **Only the interaction of different paths can ensure a sufficient amount of CO<sub>2</sub>-neutral fuels.**



reFuels as a building block of CO<sub>2</sub>-neutral mobility

Source: Karlsruhe Institute of Technology  
<http://www.refuels.de>

### Advantages:

- ReFuels are **free of undesirable secondary components** such as sulphur or nitrogen compounds.
- The **structure and composition** of the refuels **can be adjusted and optimized** for the specific application, particularly with regard to combustion efficiency and the formation of local emissions.
- Due to the project's focus on hydrocarbon components, reFuels can be **integrated into currently used fuels**.
- The **high energy density** of liquid fuels and their **easy storage and transportability** are retained with reFuels.
- The **existing transport infrastructure and logistics** as well as application technologies **can be used** as long as the fuels remain within the existing standards.
- The **use of existing infrastructures** and renewable energies for the production process of reFuels reduces CO<sub>2</sub> emissions in the existing fleet with **CO<sub>2</sub> neutrality** as a clear goal.