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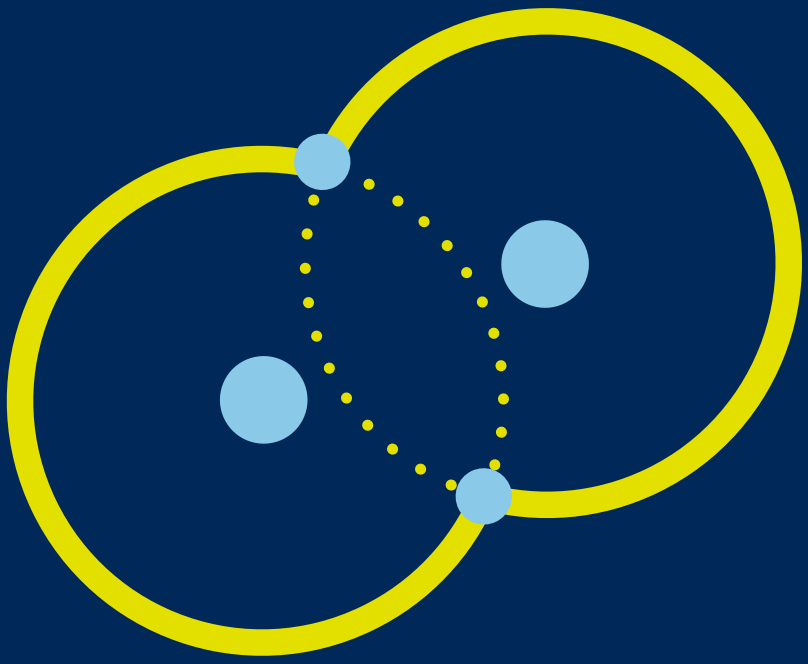
GAS CAN BE GREEN

ACHIEVING CLIMATE TARGETS WITH HYDROGEN



POSITION PAPER

AS OF: MAY 2019

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1. BACKGROUND

Hydrogen, the most common chemical element in the universe, is currently in the focus of attention as an energy source. The gas with the formula H2 was discovered in 1766. Today it **possibly holds the key to achieving climate change mitigation goals**. In this regard, the view is expanding from hydrogen's well-known and proven role in numerous industrial and technical processes (production of fertilizers and basic chemicals, petrochemical processes, smelting of ores, etc.) to the **role hydrogen can play in decarbonizing the energy sector**.

The interest in hydrogen unites a large number of stakeholders – both nationally and internationally. The IEA **World Energy Outlook** (WEO 2018) deals intensively with the topic and highlights the advantages of hydrogen's storability, its numerous application areas and its climate friendliness. The applications for hydrogen are manifold: as a fuel alternative in the mobility sector, for generating electricity with fuel cells or converted gas-fired power plants, and as a medium for storing excess renewable energy (power-to-gas).

At the European level, the **European Commission** is investigating the ways in which hydrogen can contribute to the decarbonization of the energy sector. Numerous countries are confirming their interest, for example by formulating their own hydrogen strategies (Iceland, Japan, France), by planning the establishment of a **hydrogen industry** (China) and, in some cases, by actually seeking the transition to a **hydrogen society** (Japan). The German government is also showing strong interest – currently in framework of the **Gas 2030 dialogue process**, which should ultimately lead to a gas strategy. Last but not least, numerous players from the energy industry are already accounting for hydrogen in the energy system of the future.

As great as the fundamental interest in hydrogen is, just as **varied are the details of positions and assessments on this subject**. An important reason for this: hydrogen occurs in nature almost exclusively as a compound, which means that **energy must first be invested in its production**. **This can be done in a variety of ways**.

Currently, most of hydrogen is produced from natural gas by **methane reforming** (steam reforming). Other methods include **hydrogen electrolysis** based on renewable energy or the use of **methane pyrolysis**. In this process, which is also mentioned in WEO 2018, natural gas is thermally decomposed in a high-temperature reactor into its components hydrogen and carbon – without CO_2 emissions.

However, the stakeholders have quite different assessments of the (future) costs, potentials and risks of the various hydrogen production methods and the role that hydrogen can play in a decarbonized energy system.

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2. POSITIONS

- The interest in hydrogen shows that we are now gaining a correct understanding at all levels: only a **„dual energy source world"** based on electricity and gas (in all its forms) ensures that energy can be supplied at all times in industrialized countries. **Fully electrifying** the energy system on the basis of renewable energies is the **wrong way to go** and is **neither technologically nor economically feasible**.

- A **„dual energy source world"** has the advantage that **climate protection is made possible at comparatively low costs**, and **social acceptance** is ensured by the continued use of existing infrastructure (gas and heating).

- Despite all the consideration given to the alternatives, the **role of natural gas** as a cost-effective **climate protection engine** with often the **lowest CO_2 abatement costs** and an enormous CO_2 abatement potential must not be neglected – including with a view to ensuring social justice in climate protection and **securing energy supplies following the coal phase out that has now been initiated**. A more recent study (Ecofys, October 2018) estimates that 188 million tons of CO_2/year could potentially be saved in Germany by switching to natural gas (with approx. 900 million tons of total CO_2 emissions in Germany).

- In order to also ensure an economically and socio-politically acceptable provision of energy in the future, **hydrogen** can **play an important role** alongside other green gases and natural gas even with the **further decarbonization of the energy sector** – and even if conventional natural gas serves as the raw material. One example highlighted in WEO 2018 is the increased admixture of hydrogen in the gas pipeline system.

3. DEMANDS

- **All types of hydrogen production** must be treated equally, whether they are from **renewable energy sources or from natural gas**. **That is why we need a technology-open approach**! It is absolutely essential to avoid different levels of subsidy – including in the research sector – or discriminatory regulatory treatment.

- The **definition of "green gas" should not be overly restrictive**. Hydrogen produced from natural gas, if it is produced without CO_2 emissions as in the methane pyrolysis process, must also be included along with hydrogen produced from renewable energies and, of course, renewable natural gas. An open view is also necessary because, in a long-term transition to a "hydrogen society", all sources are needed for producing hydrogen and downtime risks can also be minimised. Finally, the aim must be to minimise CO_2 emissions in the provision of energy while taking economic criteria and social acceptance into account.

- We demand that the **entire value chain be considered**. In addition to the producers and transporters, discussions must also be held with the consumers and users, as there must also be a market for the produced hydrogen.

- We welcome the **diverse approaches to using hydrogen**. This includes the promotion of **fuel cells** by the Credit Institute for Reconstruction (German: Kreditanstalt für Wiederaufbau – KfW), which grants a subsidy of up to 40 percent of the costs for procurement and installation. The fuel cell is an innovative and highly efficient technology that combines electricity and heat generation. Fuel cells still operated with natural gas today can easily be converted to hydrogen in the future.

- The commissioning of a **hydrogen-powered train** and the construction of a network of **hydrogen refuelling stations** are important steps in the development of a hydrogen infrastructure. **Politicians must also include the potential applications for hydrogen in their plans**. There are currently 62 hydrogen refuelling stations in Germany, and by 2023 the H_2-Mobility company network intends to open 400 hydrogen refuelling stations in Germany.

- Politicians must **set the course so that new and promising technologies can be further developed and attain market readiness**. It should be noted that some of the hydrogen production technologies are still at a more or less early research stage and are not yet available on the required scale.

- Before **setting a political target for green gas**, politicians and stakeholders should **rapidly and jointly clarify important preliminary aspects**, for example as part of the ongoing Gas 2030 dialogue process in Germany or with the European Commission at the European level. Issues here include clarifying demand potentials for green gas, energy balances, CO_2 abatement costs and import potentials or restrictions. We demand that the political green gas targets are set carefully and are open to revision, including in terms of supply security.

- All conceivable instruments for implementing such green gas targets must be designed in a **technology-open** way. The guiding principle must always be **non-discriminatory competition** in terms of costs and climate protection – regardless whether this ultimately means producing hydrogen from natural gas or from renewable energies.

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