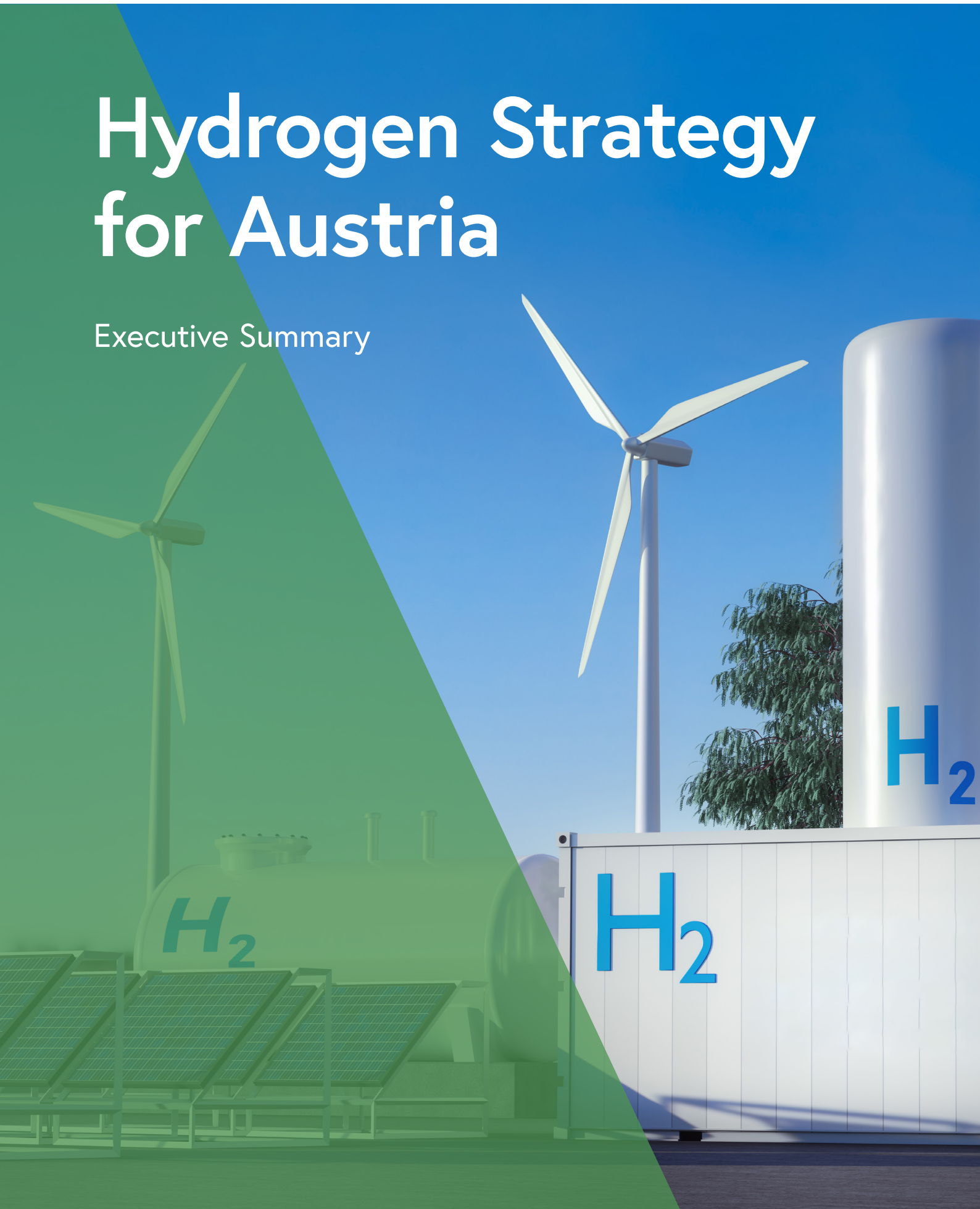
Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

Federal Ministry
Republic of Austria
Labour and Economy

Hydrogen Strategy for Austria

Executive Summary



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Guiding principles of the hydrogen strategy for Austria

Target: Climate neutrality 2040

The use of hydrogen contributes to the decarbonisation of the energy system and to achieving climate neutrality in Austria in 2040.

Climate neutral hydrogen

Compatibility with the goal of achieving climate neutrality is only ensured through the use of climate neutral hydrogen.

Hydrogen use in strategic priority sectors

The contribution of hydrogen to reach climate neutrality is maximised by focusing on sectors, which are otherwise hard to decarbonise.

Efficiency and Cost-Effectiveness

Energy efficiency and cost-effectiveness are essential guiding principles regarding the transformation of the energy system.

Hydrogen Infrastructure

On the way to climate neutrality the gas infrastructure is gradually converted into a targeted hydrogen infrastructure.

Figure 1: Guiding principles of the hydrogen strategy for Austria

Targets of the hydrogen strategy for Austria

Replacing fossil-based hydrogen with climate neutral hydrogen in energy intensive industries: 80 % until 2030

Installation of **1 GW electrolyser capacity by 2030**

Creation of a **supporting framework** for the production of renewable hydrogen

Establishing the production of hydrogen as an **integral part of the energy system**

Development of a targeted **hydrogen infrastructure**

Enhancing international partnerships for climate neutral hydrogen

Strengthening the **innovation and technology potential** in Austria through focused development of hydrogen-technologies

Figure 2: Targets of the hydrogen strategy for Austria

Target: Climate neutrality 2040

The Austrian Federal Government has set the target of achieving climate neutrality in Austria in 2040. One of the key challenges in meeting this target is the transformation of the energy system towards renewable, efficient and safe energy supplies throughout all sectors. Sector-specific requirements call for differentiated solutions to efficiently decarbonise the energy system.

In combination with an extensive increase in the use of renewable energies – and the goal of the Austrian Government to provide 100% of the national electricity consumption from renewable sources by 2030 – decarbonisation through direct electrification is the most efficient option for various applications. Additional measures to enhance energy efficiency and promote a circular economy shall further increase the decarbonisation potential of electrification.

At the same time, climate-neutral hydrogen can be an important sustainable option for a secure energy supply in Austria in the future. It can contribute to ensure the medium to long-term phase-out of the use of fossil gas and in doing so, lead to an important reduction of dependency on imported fossil energy.

Climate-neutral hydrogen can provide the key for decarbonisation especially in those sectors, for which (direct) electrification is not a viable decarbonisation path due to technical and economical limitations or in which hydrogen is needed as feedstock.

Furthermore, functioning as an energy storage option, hydrogen plays a fundamental role in enabling a completely renewable energy system.

Climate-neutral hydrogen

Compatibility with the goal of achieving climate neutrality is only ensured through the use of climate-neutral hydrogen. In the intermediate term, it will remain a scarce and high-quality energy carrier and must therefore be used efficiently through focused deployment.

Apart from renewable hydrogen, climate-neutral hydrogen also includes hydrogen, which, as soon as the corresponding technology is ready to be applied, is produced from fossil gas through complete CO_2-separation (“blue hydrogen”) or through pyrolysis (“turquoise hydrogen”). When using hydrogen from fossil gas, it has to be ensured, that CO_2-separation occurs without any emissions of greenhouse gases, as well as no greenhouse gas emissions occur along the supply chain. In this context it has to be emphasised that “pink hydrogen” from nuclear energy and “blue hydrogen”, where the CO_2-separation is done by means of nuclear energy, are not sustainable and therefore do not constitute as “climate-neutral hydrogen”.

Currently, and for the decisive years of the market ramp-up, two production pathways are especially relevant for the commercial production of renewable hydrogen: electrolysis and the biogenic hydrogen production through biomass-gasification-

processes. The costs for those production technologies lie – in the short and intermediate term – well above the costs for fossil hydrogen. Therefore, it is important to enable early investment decisions, especially through the creation of a level playing field. Electrolysis will also play an important role in the future energy system through its sector coupling function. By connecting the electricity and the gas-sector, renewable electricity can be stored in gaseous form and brought to non-electrified sectors. In the long run, the recirculation into the electricity system presents an option to seasonally shift renewable energy production. Electrolyser facilities can thus support grid stability, and provide a balancing input to the electricity system. However, the operation of electrolysers during singular production peaks cannot be regarded as an economically feasible business model in the foreseeable future, especially when considering the predicted high future hydrogen demand.

Efficient and focused use of hydrogen

Hydrogen has wide technical application potential as for example emissions-free fuel in fuel cells and combustion processes as well as important feedstock in various industrial processes. However, this broad applicability is in contrast to the limited supply and production potential of hydrogen at present. Furthermore, hydrogen should be viewed in the systemic context of alternative decarbonisation strategies, in terms of the most efficient use of energy.

For selected applications in industry and in certain areas of mobility, for which electrification is not a viable option, climate-neutral hydrogen as a gaseous energy carrier and feedstock is indispensable and offers the most direct path to decarbonisation. Hydrogen is able to close important decarbonisation gaps, especially in the iron and steel industry, the chemical industry and generally in high-temperature processes. In the area of mobility, especially on long-haul routes as well as for air- and waterborne transport, hydrogen and energy carriers made from hydrogen (e-fuels) can fully substitute fossil fuels.

Those hard-to-decarbonise sectors are all characterised by their considerable energy demand. Through the targeted and focused use of climate-neutral hydrogen, its contribution to reaching climate neutrality is maximised. In addition, the use of hydrogen can further support Austria as attractive and climate-neutral industry location with a high level of supply security and international competitiveness.

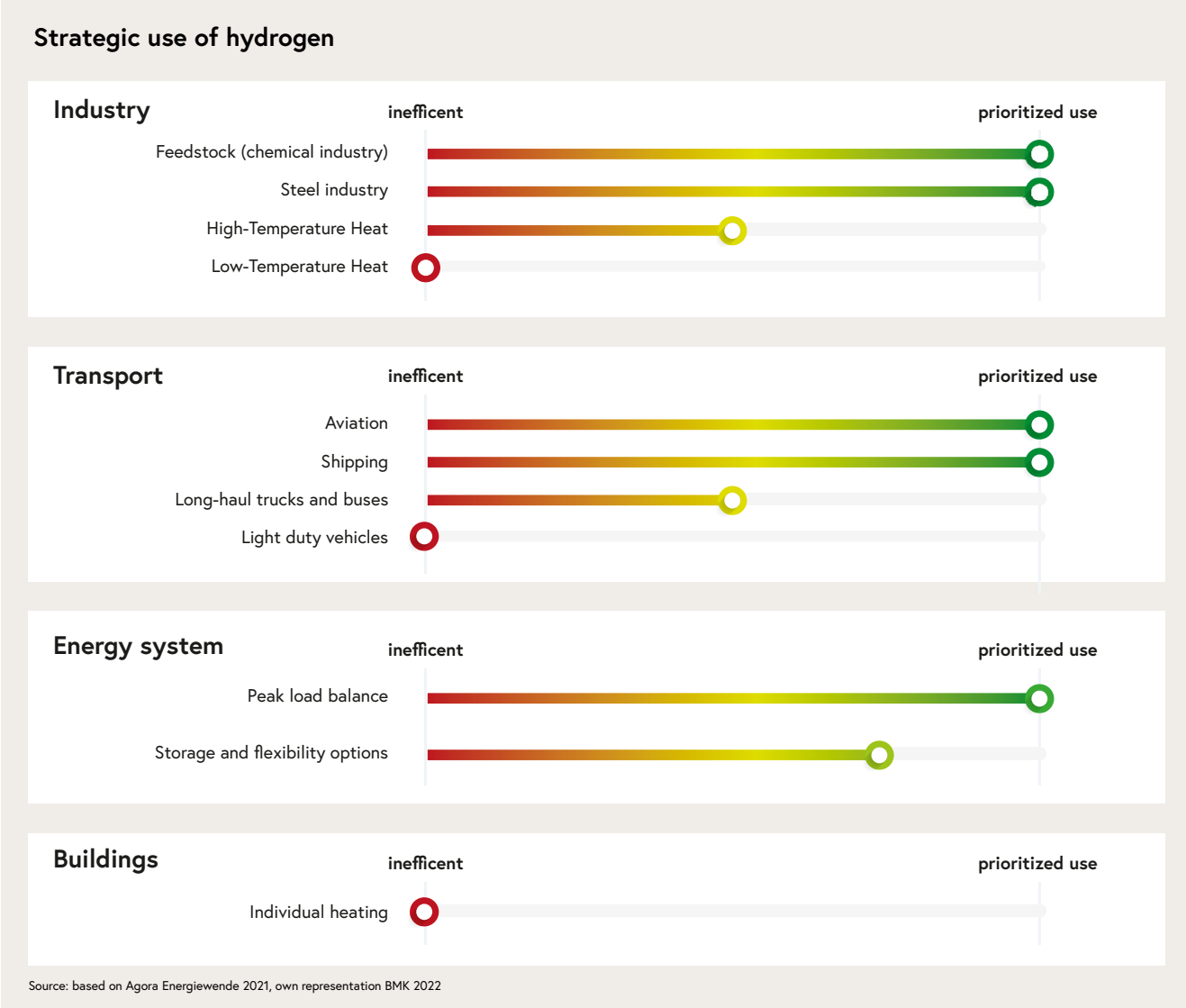

Figure 3: Strategic use of hydrogen

Hydrogen infrastructure

The key to an efficient and economic use of hydrogen is a targeted, purpose-appropriate transport of hydrogen to its respective applications. Due to the demand for pure hydrogen in key application sectors, blending hydrogen and natural gas is not a preferred and viable option. Rather, the transport of hydrogen in the gas grid will be enabled through the conversion of existing natural gas infrastructure into hydrogen infrastructure. The deployment of new hydrogen infrastructure needs to be assessed on a case-by-case basis, especially where such infrastructure is indispensable for decarbonisation. In this context, also the pan-European development of infrastructure has to be taken into account. At the same time, the local development of targeted hydrogen infrastructure is important to supply industrial clusters and other large-scale consumers.

International dimension

In a climate-neutral Austria 2040 it is expected that the demand for renewable gases will exceed the national production potential. Therefore, embedding the Austrian hydrogen strategy into a European and international hydrogen economy plays an important role. The goal is to enable supply of climate-neutral hydrogen and its derivatives through international markets, which requires close cooperation with international partners. In this context, a developing European and global market for hydrogen creates a range of opportunities for Austria: From the diversification of gas imports to the export of domestic technology development and production technologies. In addition, Austria's strategic role as infrastructure hub presents further opportunities on a European level.

Therefore, strategic cooperation and partnerships with countries in- and outside the European Union will be enhanced. To achieve this in a timely and efficient manner and provide opportunities as well as planning security for Austrian companies, a concept for cooperation partnerships for the import of climate-neutral hydrogen and its derivatives will be developed.

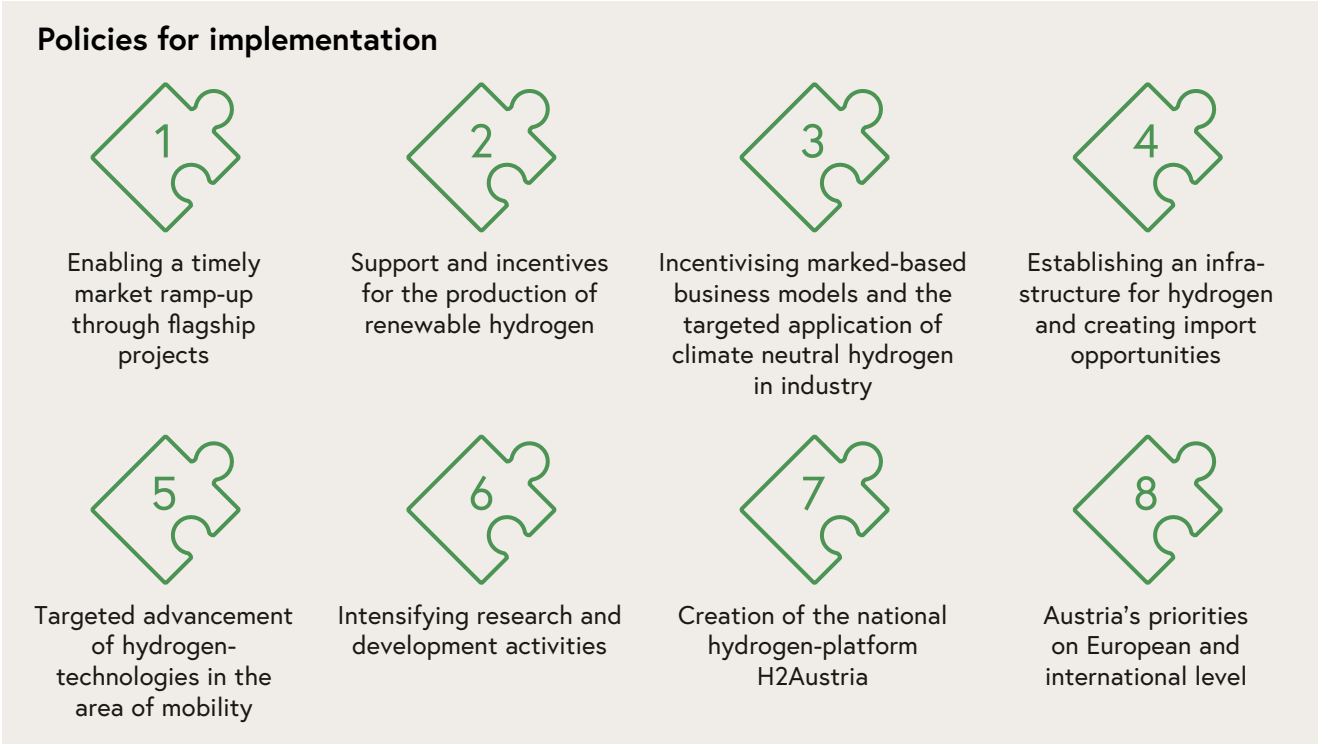

Figure 4: Policies for implementation