Climate & Energy

Analysis: CEP - Germany's energy security

Study author	Morgan Stanley / Global Foundation
Client	-
Publication	April 2025
Date of analysis	27.05.2025
Keywords	Hydrogen
Viewing framework	USA & EU
Document type	Report
Source link	MS
Objective	Assessment of price trends for hydrogen in the USA and the EU

Core results

1. The global ramp-up of a hydrogen economy is progressing more slowly than was assumed just a few years ago.
2. Green hydrogen will not be able to compete economically with blue or gray hydrogen in the foreseeable future.
3. The USA and the EU will have to invest even larger sums in the necessary infrastructure if the expansion is to work. Both players have so far pursued inadequate strategies for this.

Brief description

For a possible emission-free economy of the future, emission-free hydrogen is an important source for chemical processes and the energy industry. Green hydrogen, which is produced from renewable energies using electrolyzers, has been identified as a promising source in recent years. However, expectations have not yet been confirmed and the costs have been underestimated. Europe and the USA have both launched programs to promote the expansion of green hydrogen.

However, the measures to support hydrogen capacities have so far not been able to make green hydrogen an economically viable alternative for end users. This report identifies barriers in both economies and shows that the support measures to date are insufficient to cover the necessary investments. At the same time, it is unlikely that green hydrogen can become an economic alternative for end users without subsidies.

USA

The Inflation Reduction Act (IRA), which was passed under the Biden administration, mainly provided for tax cuts for environmentally friendly industries. This promotes green hydrogen, but also blue hydrogen, which can be produced from natural gas with low emissions. In addition, subsidy payments for the construction of plants
that generate electricity from renewable energies and are able to use this electricity on site to produce hydrogen. Despite the financial support of around 2.9€ /kg, green hydrogen will not be able to compete with blue or gray hydrogen in the near future (see Fig. 1). Even without tax relief for blue hydrogen production, the prices for green production are usually many times higher.

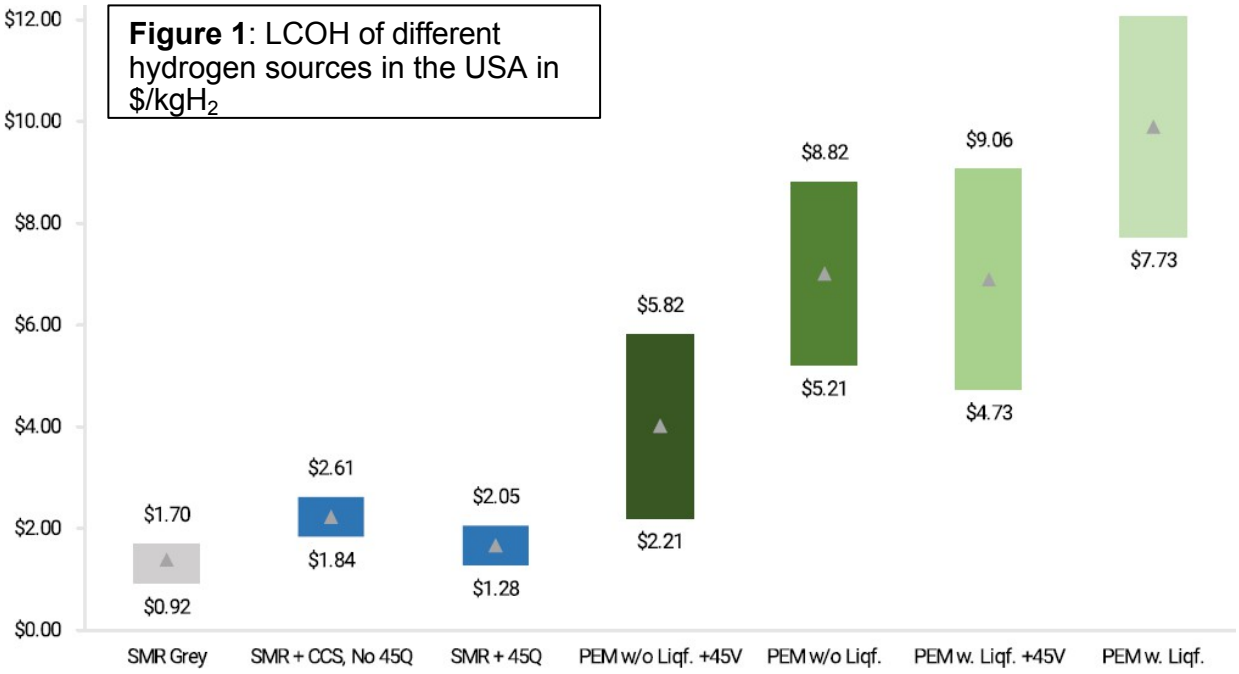

Figure 1: LCOH of different hydrogen sources in the USA in $\$/kgH_2$

In recent years, analyses had assumed that technical progress in the field of electrolysers and the growing supply of renewable electricity would lead to more favorable CAPEX for new plants. This has indeed happened, albeit to a lesser extent than expected. In the USA, the growing supply of renewable energies has also not led to the hoped-for reduction in electricity prices, as the digital economy has continued to grow at the same time.

Data centers for artificial intelligence and cloud storage represent a solvent clientele for the additional electrical energy, preventing electrolysers from gaining a foothold as an alternative at all. As the North American continent also offers less favorable areas for wind power plants than, for example, Europe or South-East Asia, the price of renewable energy in the USA has risen noticeably and exceeds the calculated threshold of 60$/MWh, which is considered the upper limit for green hydrogen production (Fig. 2).

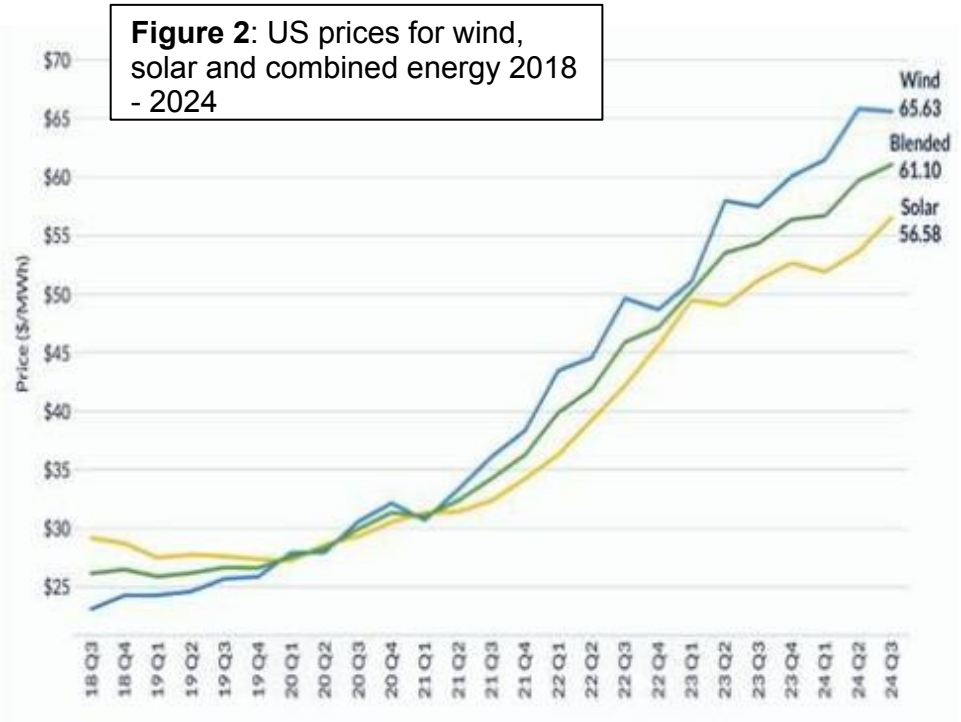

Figure 2: US prices for wind, solar and combined energy 2018 - 2024

Europe

Various projects to promote a hydrogen economy have been under discussion in the European Union for several years. For the continent, hydrogen is not only important as a potential energy storage medium and means of reducing emissions in industry, but is also seen as part of an energy import strategy. Following Russia's invasion of Ukraine and the use of gas shortages as a means of pressure by Russia, a reorientation of the energy supply of European countries became necessary. European support programs aim to stimulate market forces for investment, for example by distributing subsidies via auctions or by offering CO2 prices for emission-free technologies.
more attractive. This approach is intended to promote the innovative power of the market and thereby increase financial support from the public sector.

However, Morgan Stanley doubts the effectiveness of the approach in practice. Although the method is promising in principle, the aid payments made in Europe in the first bidding round were not very significant in financial terms. The report calculates that the money paid out is equivalent to support of just around 0.37€ - 0.48€ /kgH2. Compared to the 2.9€ /kgH2 envisaged in the IRA, this is a very low level of support. Skepticism is also warranted with regard to the conversion of green hydrogen into electricity, as the costs are expected to fall by 2030, but will still remain far above the costs of other energy generation in Europe (Fig. 3). The storage of electrical energy would therefore still be cheaper to achieve with battery storage by 2030 and the conversion of natural gas into electricity would make more economic sense, despite rising CO_2prices.

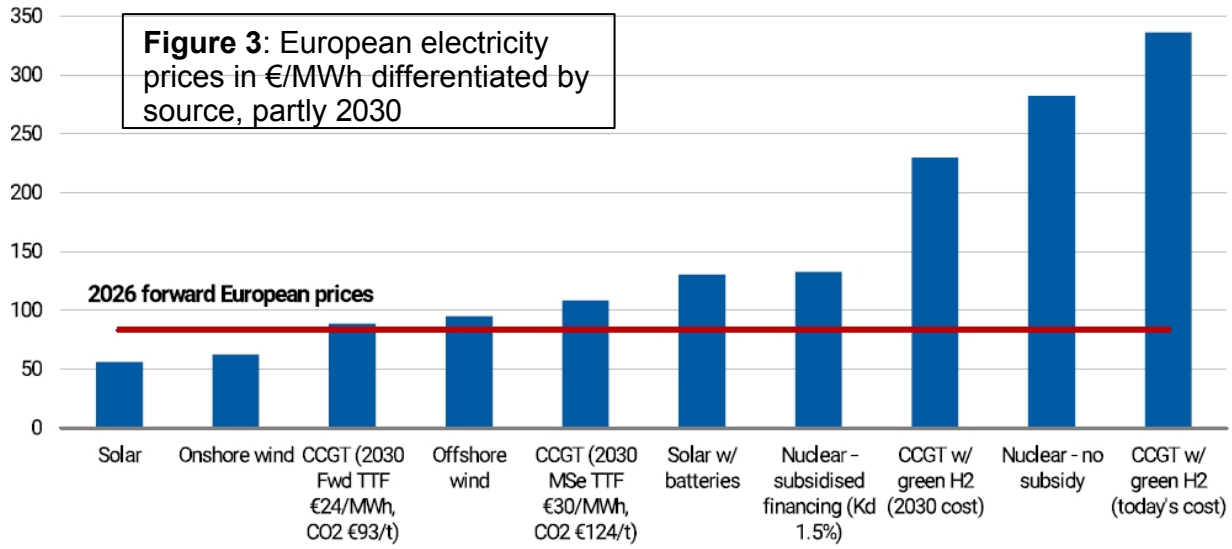

Figure 3: European electricity prices in €/MWh differentiated by source, partly 2030

On a positive note, the report notes that the European Commission's next funding auctions are set at EUR 1.2 billion, which is higher than the first round of EUR 800 million. The budget for the last auction round was about 15 times oversubscribed, so there is still interest in funded hydrogen projects. Especially because hydrogen represents a serious option for reducing emissions for some industries.

Forecast for global electrolyzers

With the slowdown in the expansion of the hydrogen economy, Morgan Stanley is also changing its estimates for the global expansion of electrolyser capacities. The assumptions have been significantly reduced compared to previous expectations. Instead of 80 GW, which originally expected by 2030, the assumption has been reduced to just 30 GW of total global capacity for the time being (Fig. 4). This includes all projects that have at least one positive feasibility study. Around 20.5 GW of plant capacity is in various stages of construction (Fig. 5).

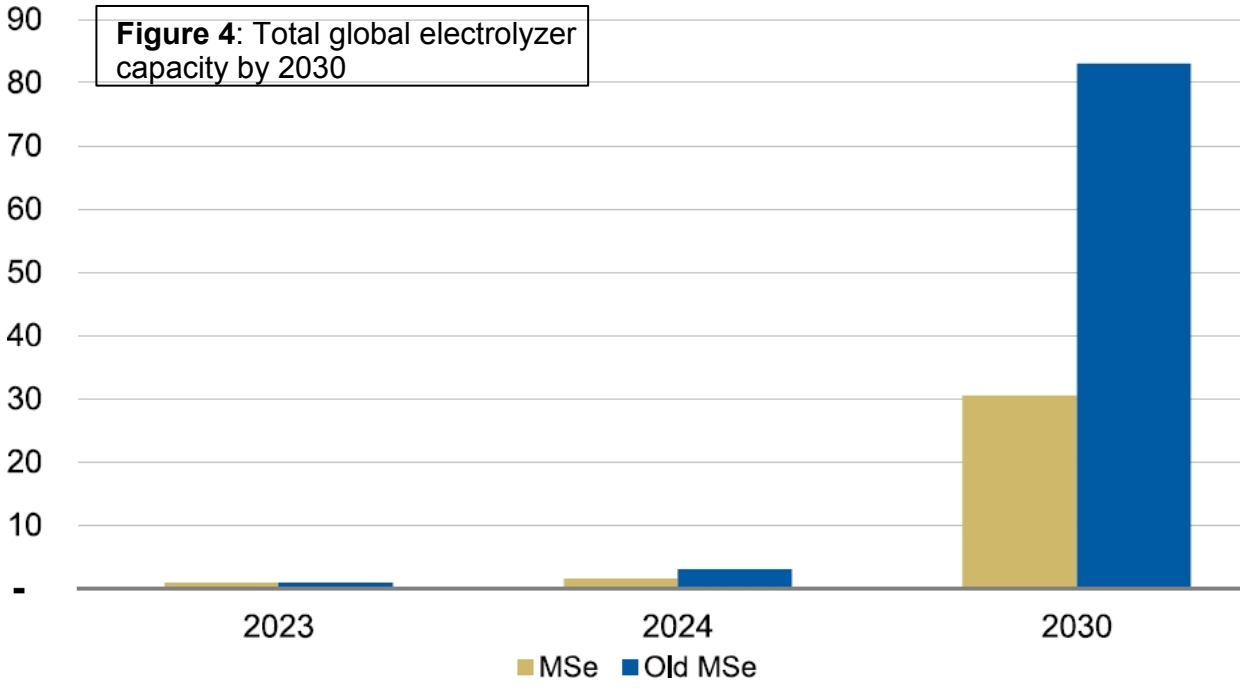

Figure 4: Total global electrolyzer capacity by 2030

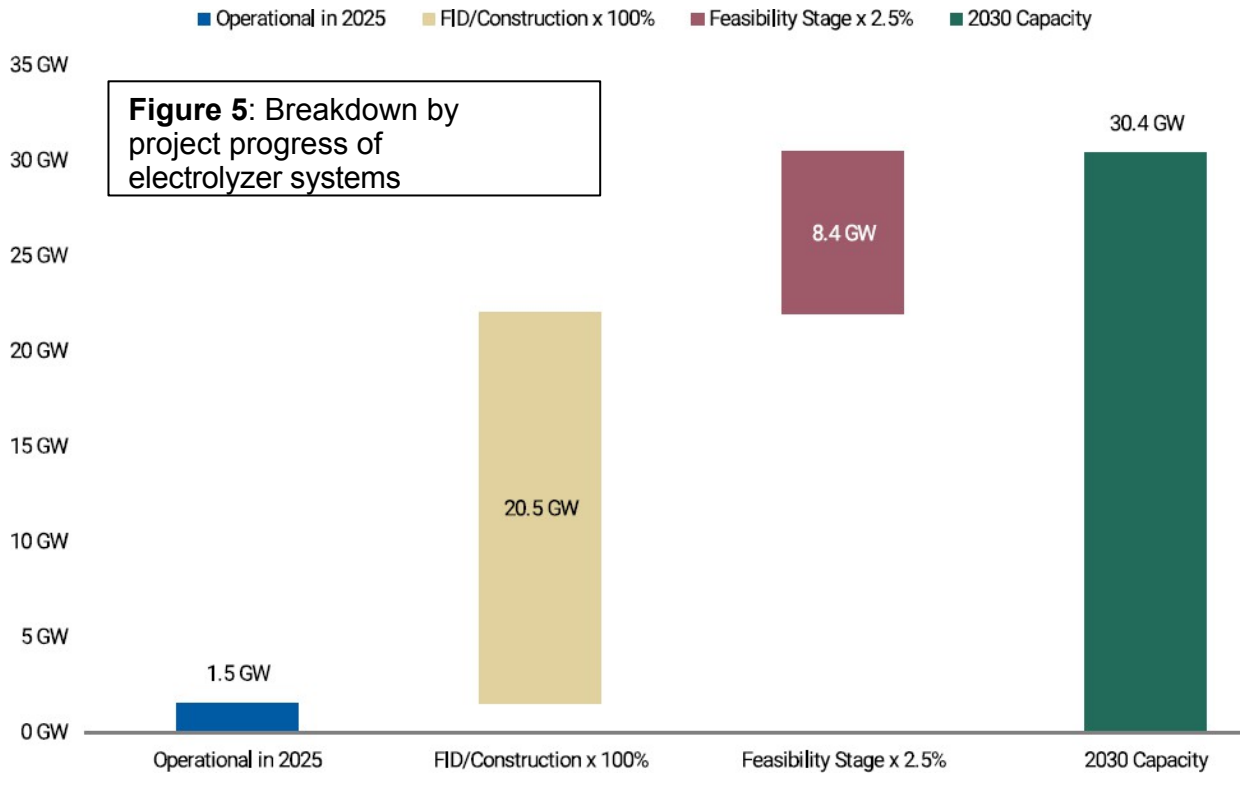

Figure 5: Breakdown by project progress of electrolyzer systems

VDMA CCKE evaluation

The hydrogen enthusiasm that was still evident in the media just a few years ago has died down again for the time being. The production of green hydrogen molecules remains costly for the foreseeable future and the infrastructure that would be necessary to generate the economies of scale for a price reduction still requires many hundreds of billions in public and private investment. In this report, Morgan Stanley therefore advises its clients to exercise caution when investing in the sector. A recommendation that other financial market players will certainly also make, which will increase the price of loans for hydrogen projects.

The importance of hydrogen for the development of a low-emission industry is undiminished and the consequences of climate change will continue to keep the topic on the agenda. But the fact remains that someone will have to bear the costs of the necessary infrastructure and that there are already problems with the lack of competitiveness of production, particularly in Germany. One possible response to this would be increased government investment in the industry to compensate for the caution of the global financial markets when it comes to investment. Manufacturers of electrolysers or future operators of electrolysis plants can also provide positive impetus through investment. The goal of a cheaper supply of green hydrogen molecules must be achieved so that the investments can ultimately be worthwhile for consumers.

On the government side, the necessary infrastructure expansion measures must also be implemented as quickly as possible. This requires targeted planning for the use and benefits of green hydrogen so that the available resources can be used in a more targeted manner. For all other potential players who want to become active as consumers or potential producers, the only thing that remains for the time being is to agree with Morgan Stanley's assessment. Be careful with investments in hydrogen, as individual commitment may not pay off. It would be up to politicians and interested cooperation networks to drive the technology forward and thereby make it clear that green hydrogen, despite the high entry costs, should be part of the future economy.

Your contact person

Thomas Dewitz
Consultant Study Analysis
Competence Center
Climate & Energy

VDMA e.V.
Climate & Energy
Lyoner Strasse 18
60528 Frankfurt am Main

Phone +49 69 6603-1732
E-mail thomas.dewitz@vdma.org