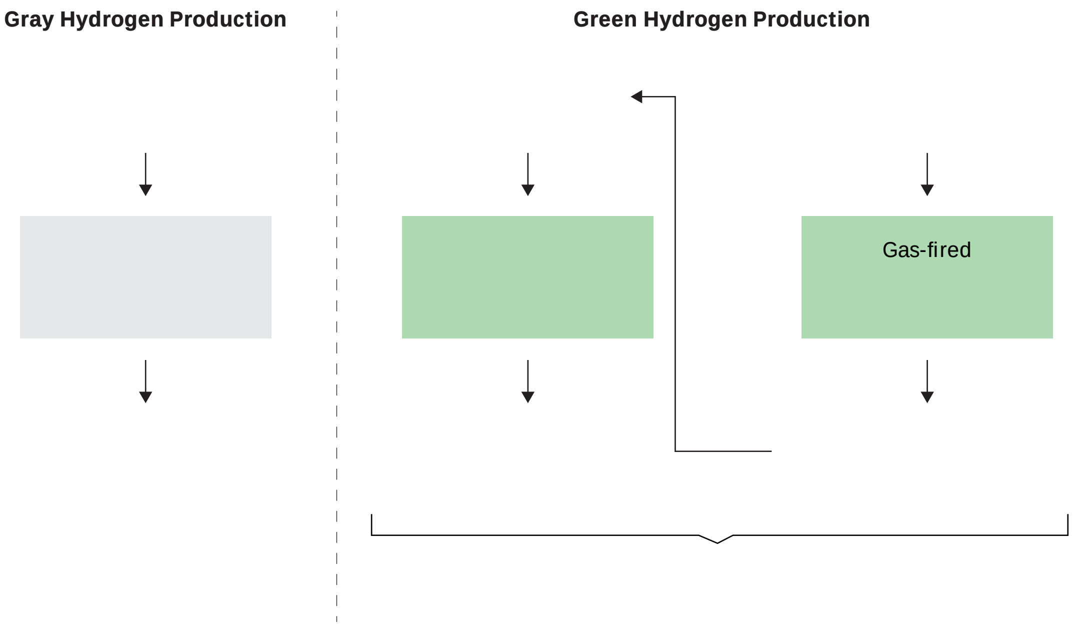
OliverWyman

GREEN VS. BLUE HYDROGEN

GREEN HYDROGEN

THE FULL-SYSTEM CARBON FOOTPRINT AND ECONOMICS

Exhibit 1: Schematic — why green hydrogen can be more carbon intensive than gray



Source: Oliver Wyman Analysis

Green hydrogen appears to be economically inefficient, since its production requires

example, markets currently indicate prices of around $170 per MWh for electricity and $70 per MWh for natural gas in Europe in 2025. Once the cost of the electrolyzer conversion

around $245 per MWh (Exhibit 2), compared to gray hydrogen at around $120 per MWh. Using green hydrogen at $245 per MWh to replace natural gas (at $70 per MWh) is even less efficient. This is also the case when looking at prices that prevailed before the current

A standalone green hydrogen plant taking electricity from an offshore wind farm can produce green hydrogen for a total cost of around $130 per MWh, considerably cheaper than green hydrogen from the grid. However, this effectively relies on the windfarm selling the electricity to the electrolyzer at around $60 per MWh, which is not a logical choice when the

MWh.

Exhibit 2:

More battery storage. The growth in lithium-ion batteries offers a far more economical

of oversupply, with only about a 15% efficiency loss and a lower capital cost per megawatt

Battery research and development. Alternative battery technology is receiving significant

batteries, such as flow batteries, and creating competition with green hydrogen for excess

seriously at blue hydrogen to fill the gap in the

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gas, creating a secondary, more dilute CO2 stream. A capture efficiency for both streams of differing fugitive emission level assumptions. The 3.4% appears a rather high estimate as to

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