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RENEWABLES
EVERYWHERE

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INCREASING EFFICIENCY IN INTEGRATED STEEL WORKS

HYBRID ELECTROLYSIS FOR GREEN STEEL PRODUCTION

COMBINED USE OF HIGH- AND LOW-TEMPERATURE ELECTROLYSIS

Integrated steel works offer the possibility of highly efficient hydrogen production by utilizing process waste heat. The waste heat can be used to produce low-temperature steam, which can be efficiently utilized for producing hydrogen via high-temperature electrolysis (Solid Oxide Electrolysis (SOEC).

20 PERCENTAGE POINTS INCREASE OF ELECTRICAL EFFICIENCY

Compared to low-temperature electrolysis technologies (PEM and Alkaline electrolysis), high-temperature electrolysis achieves a 20 percentage point higher electrical efficiency by using low-temperature steam.

An integrated steel plant offers sufficient heat sources to produce up to 40 percent of the required hydrogen volume using high-temperature electrolysis; the remaining 60 percent need to be provided by low-temperature electrolysis.

This is advantageous, since low-temperature electrolysis can operate more flexible,and thus perfectly matches with the intermittent renewable energy supply. Hence, the different technologies' advantages can be optimally utilized for producing green steel.

CORE ADVANTAGES

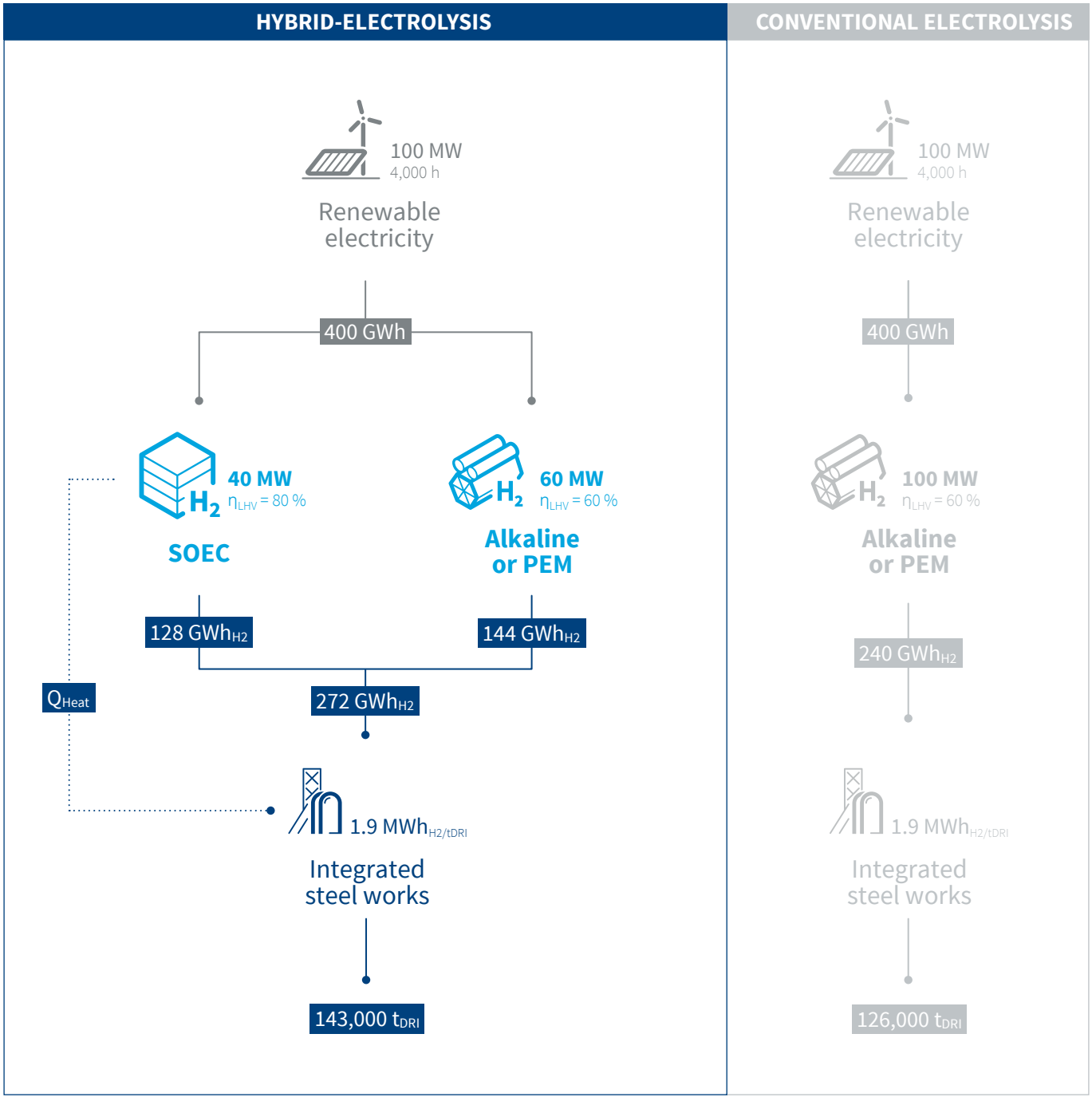
+ Significantly increased efficiency and flexibility of hydrogen production, either by reducing demand for renewable electricity or by increasing hydrogen production
+ High-temperature electrolysis can be operated with a higher number of full-load hours
+ Low-temperature electrolysis optimally balances load peaks resulting from intermittent renewable electricity production

DWV Deutscher Wasserstoff- und Brennstoffzellen-Verband

HySteel Deutscher Wasserstoff- und Brennstoffzellen-Verband

COMPARISON OF TECHNOLOGIES

With a hybrid-electrolysis approach, the different advantages of high- and low temperature electrolysis can be perfectly combined in order to produce green steel at an outstanding efficiency level.



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