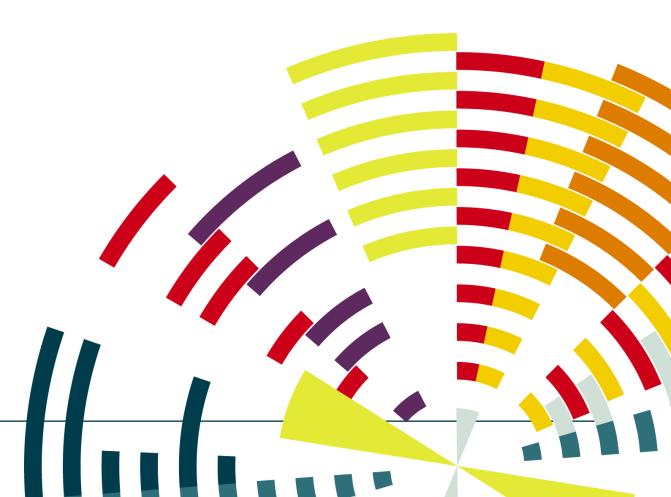


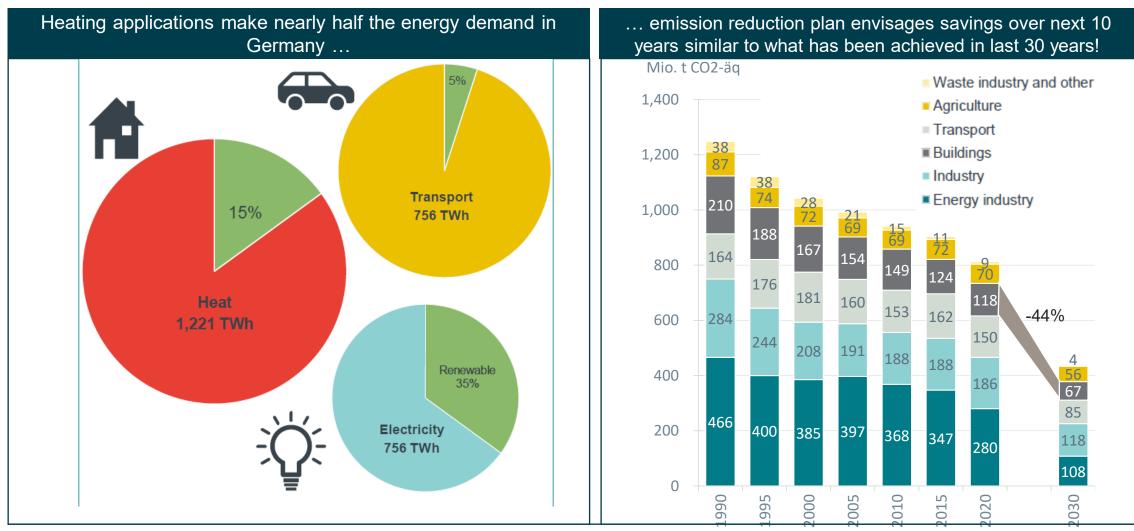
frontier

B2B Forum – H2 Flagship Expo Brussels

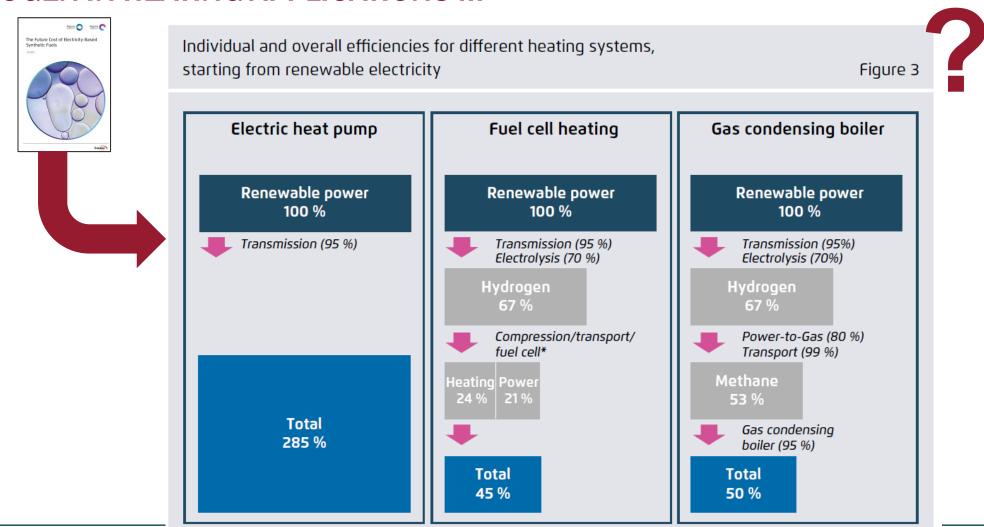
26 October 2022



# THE HEATING SECTOR IS ONE OF THE MAJOR FIELDS OF ACTION ON THE JOURNEY TO A DEFOSSILIZED SOCIETY

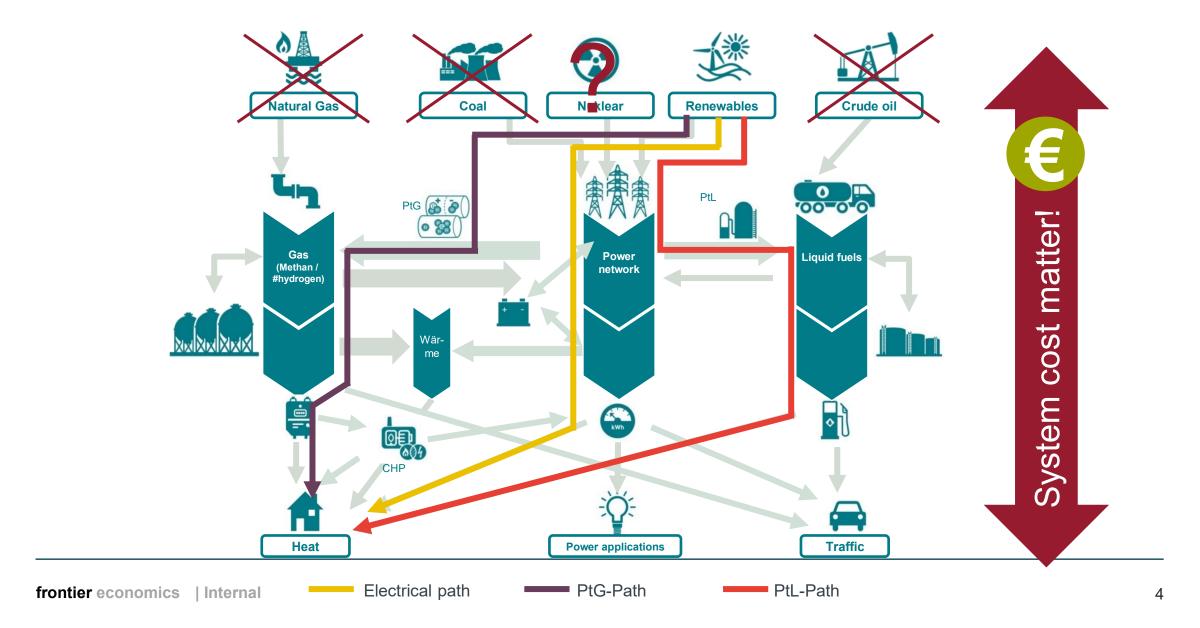


## PHYSICAL CONVERSION LOSSES ARE OFTEN SEEN AS A SHOWSTOPPER FOR HYDROGEN IN HEATING APPLICATIONS ...

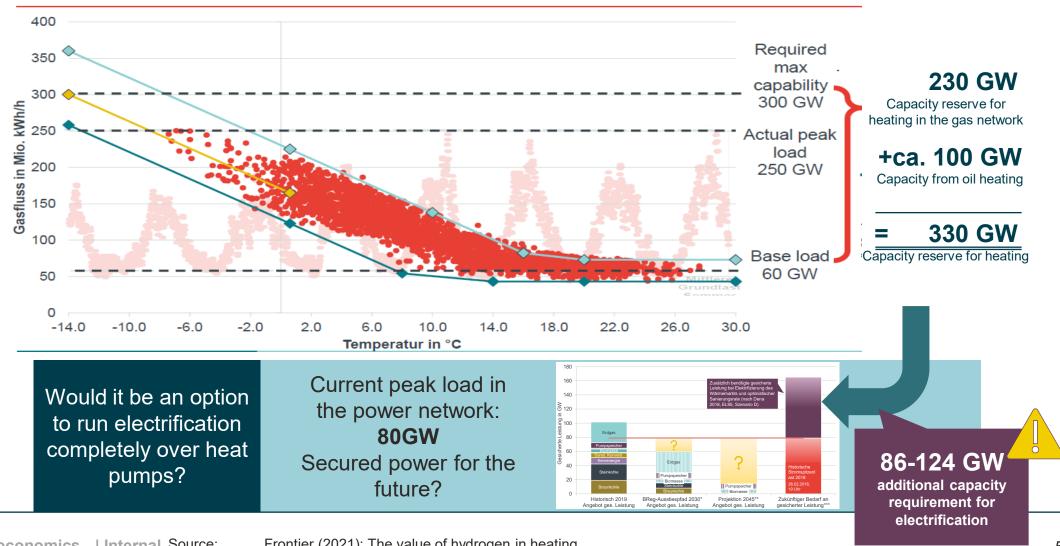


frontier economics | Internal 3

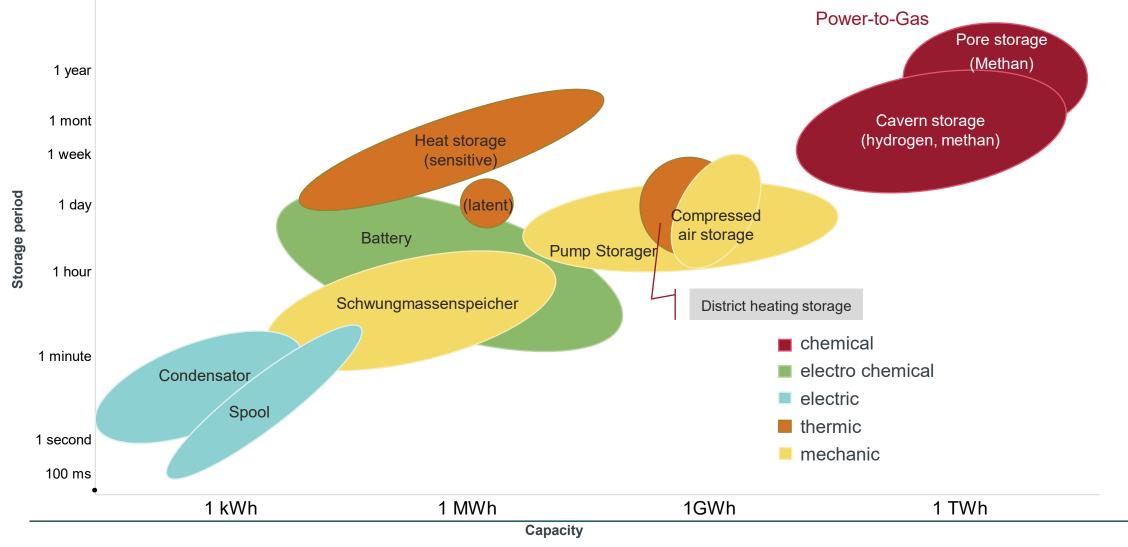
#### ... BUT FROM AN ECONOMIC PERSPECTIVE ONLY SYSTEM COSTS MATTER!



#### RELIABLE CAPACITY IS THE KEY CHALLENGE IN THE HEATING SECTOR **(EXAMPLE GERMANY)**



### MOLECULES AS ENERGY CARRIERS FOR SEASONAL DEMAND COVERAGE WITHOUT ALTERNATIVES FROM TECHNICAL PERSPECTIVE

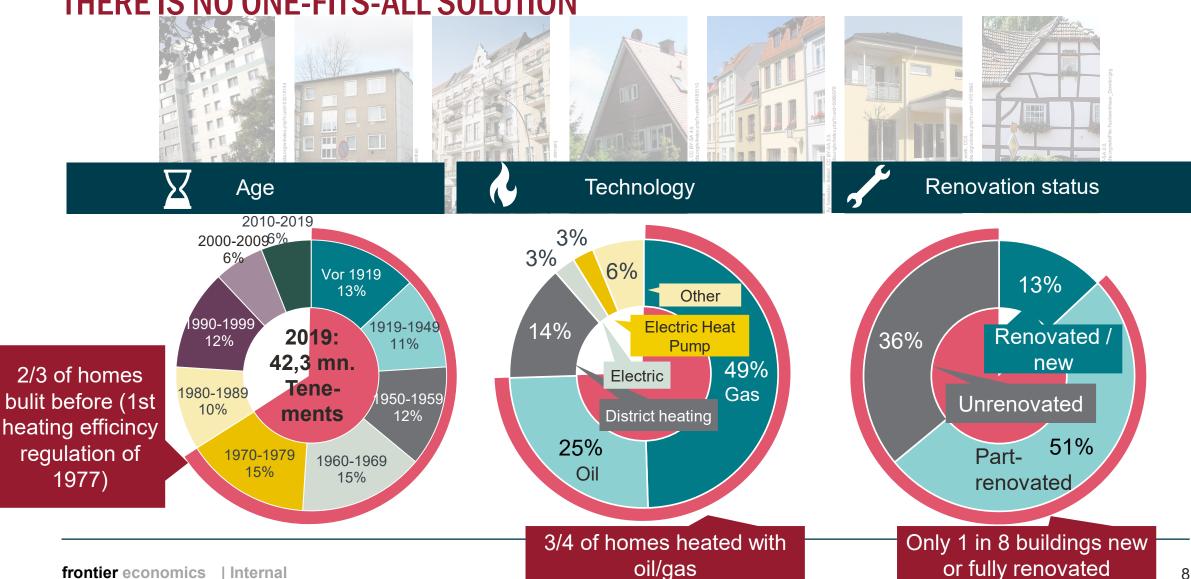


MOLECULES AS ENERGY CARRIERS FOR SEASONAL DEMAND COVERAGE WITHOUT

**ALTERNATIVES FROM TECHNICAL PERSPECTIVE** Power-to-Gas 4500 chemical 4000 thermic mechanic 3500 Pore storage electro chemical (Methan) Storage time (hours) 3000 2500 2000 1500 Cavern Storage 1000 (Hydrogen, Methan) 500 0 600000 800000 1000000 200000 400000 1200000 1400000 1600000 1800000 Capacity (MWh)

HETEROGENITY OF EXISTING BUILDINGS REQUIRES A BROAD TECHNOLOGY MIX,

THERE IS NO ONE-FITS-ALL SOLUTION



### HYDROGEN CAN CONTRIBUTE TO THE DEFOSSILIZATION OF THE HEATING MARKET AND SHOULD BE PART OF THE TECHNOLOGY MIX!

#### Hydrogen

can significantly contribute considerably to decarbonising the heat market as part of the technology mix

Heterogeneity in the heat sector

Energy
efficiency
measures and
the direct use of
renewable
energy sources
(RES) can be
usefully
supplemented
by hydrogen.

Seasonality in the heat sector

Hydrogen
offers the
possibility to
serve the
considerable
seasonality of
heat demand.



**H2 transport** infrastructure

The existing gas infrastructure can support the transport of renewable energy to the heat via hydrogen.



H2 production quantities

Hydrogen in the heating market can help to meet the challenge of limited RES potential in EU and potentially supports the market ramp-up of hydrogen in other sectors.

Lower system costs with H2

The use of hydrogen can reduce the overall system costs of defossilization and relieve the burden on households.



Climate target: CO2 emissions in the heating market are to be reduced by around 40% by 2030 compared to today. Currently, the heating market accounts for about a quarter of all direct and indirect CO2 emissions (in Germany).





#### Dr. David Bothe



+49 221 337 13 106



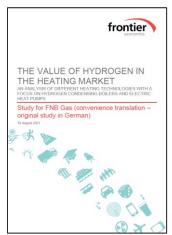
+49 176 641 00 11 3



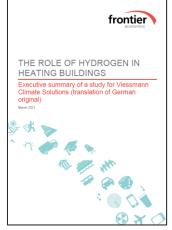
david.bothe@frontier-economics.com

Frontier Economics Ltd is a member of the Frontier Economics network, which consists of two separate companies based in Europe (Frontier Economics Ltd) and Australia (Frontier Economics Pty Ltd). Both companies are independently owned, and legal commitments entered into by one company do not impose any obligations on the other company in the network. All views expressed in this document are the views of Frontier Economics Ltd.

https://www.frontiereconomics.com/media/4835/th e-value-of-hydrogen-in-theheating-market.pdf



https://www.frontiereconomics.com/uk/en/new s-and-articles/news/newsarticle-i8293-hydrogen-inthe-heat-market/



A COMBINATION OF ELECTRICITY AND GAS (OR LIQUID) BASED HEAT SUPPLY IS MOST ECONOMICAL **Heat pumps** are Conversion of on average a of significant Need more Conversion of very efficient significant electricity to of H2 to power end application expansion of gas for (with energy in suitable power seasonal loss) circumstances infrastructure storage (with energy loss) rmediate Secondary energy nsmission / Conversion Distribution End appliances generation Transport convers Electric heat generation Gas-based heat generation\* Conversion of Continue to use power to H2 existing end Can repurpose existing gas infrastructure through appliances

\*Other potential routes of low carbon gas based heat supply include H2 from natural gas ("blue hydrogen) and use of green H2 in district heating

electrolysis (with

frontier economics

**I** Internal