

Market opportunities of water electrolyser in future power systems

A report from the FCH ELYntegration research project

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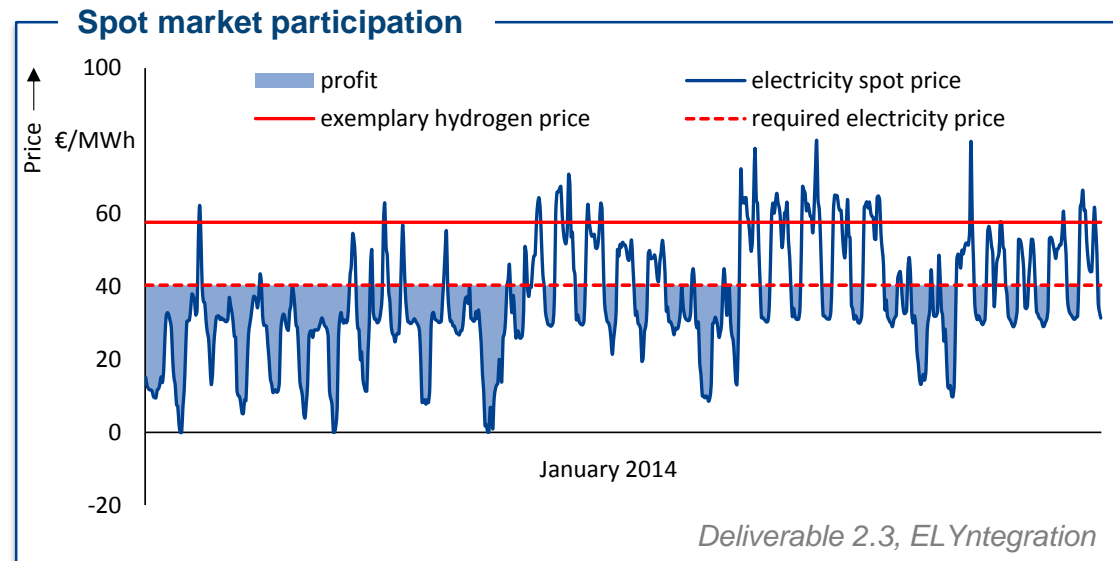
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New business models for electrolyser

- fluctuating renewable energy feed-in lead to higher volatility in the market for electric power
- ➔ new market opportunities for electrolysers with dynamic operation capabilities

Potential Business Models

- spot market participation
- provision of control reserve
- provision of grid services



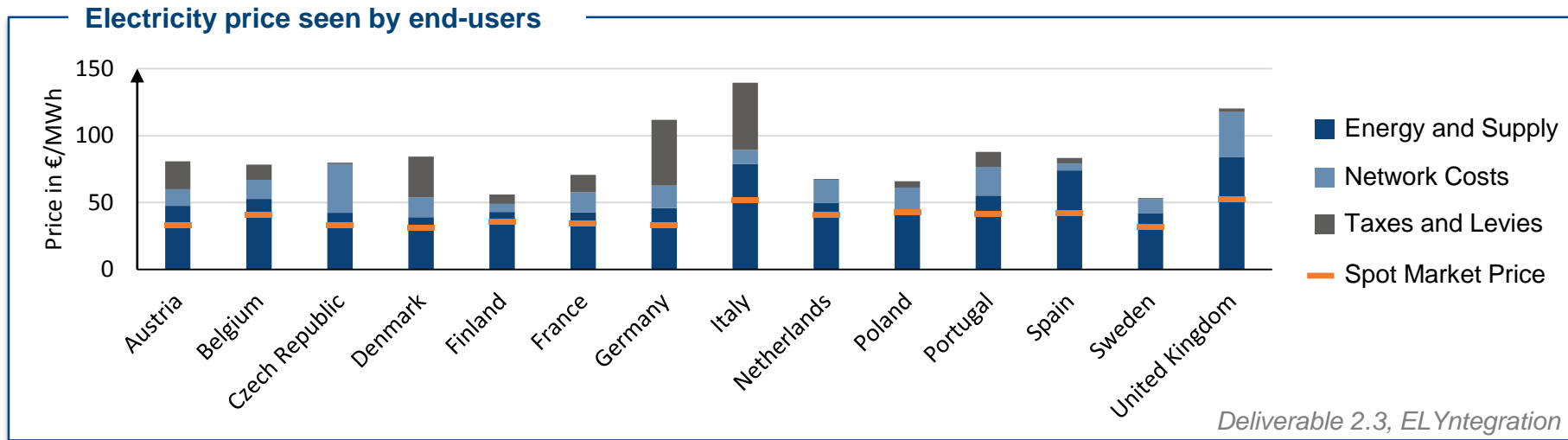
- ➔ Which business models show highest net margins and are therefore most profitable?



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End-user price for electricity



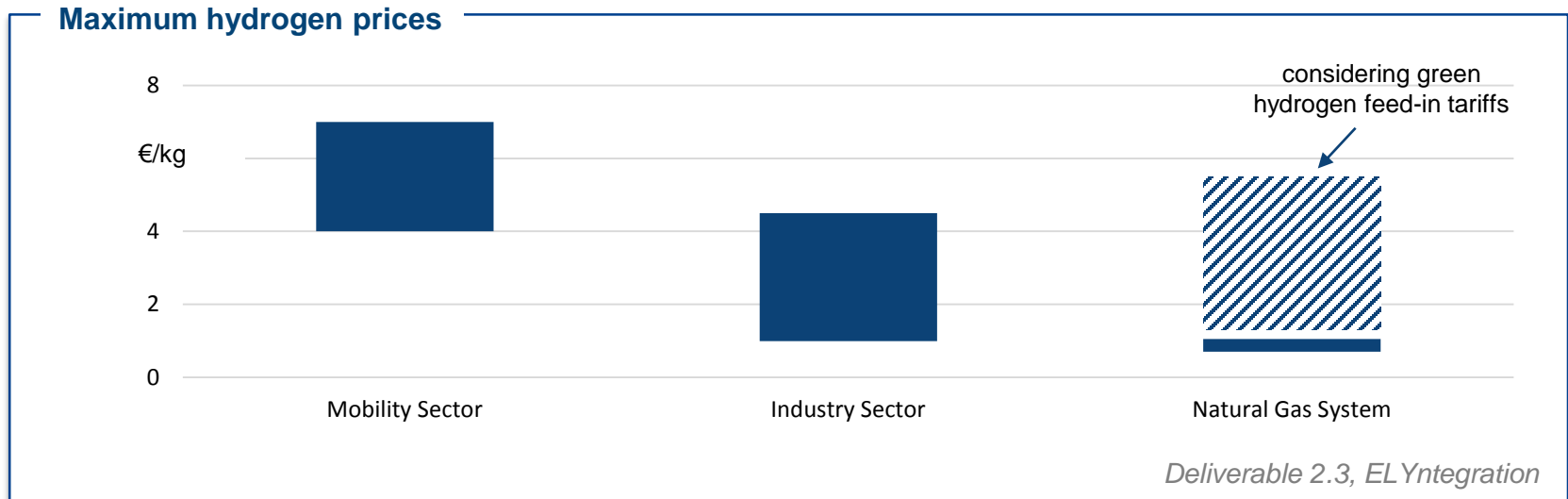
- end-users of electricity pay additional fees on top of wholesale price for electricity
- exemptions from specific fees currently discussed for electrolyser applications
- ➔ **exemption additional fees crucial for profitable electrolyser operation**



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Hydrogen price



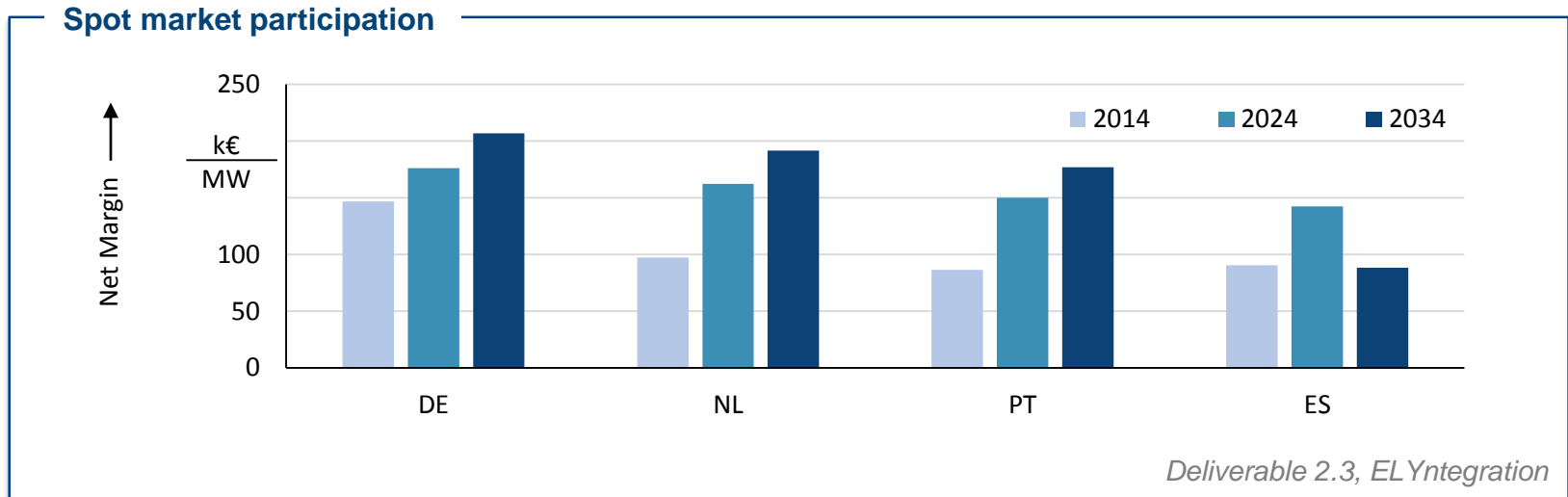
- ➔ mobility sector most promising due to high hydrogen prices, however amount of hydrogen demand uncertain
- ➔ natural gas system especially promising in case of high green feed-in tariffs, potentially high hydrogen demand in the long run



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Exemplary results for spot market participation



- method: simulation of European spot markets for electricity
 - assumption: application for mobility sector (hydrogen price of 6 €/kg)
 - higher RES shares contribute to more hours with low electricity prices
- ➔ **increasing net margins in future due to rising share of renewable energy sources**

Summary of project results

- promising applications in power systems
 - spot market participation and provision of positive control reserve most promising
 - provision of grid services promising, however subjected to high uncertainty
- promising scenarios and countries for application in power systems
 - high shares of renewable energies, especially wind power, most promising
 - countries with exemptions for specific fees within end-user price for electricity
- promising hydrogen demand sectors
 - mobility and industry sector most promising due to high hydrogen prices
 - natural gas system promising, however high green hydrogen feed-in tariffs necessary



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