



# HyTechCycling

Environmental and Economical Benefits of FCH technologies  
and potential penetration



# What's up with the Climate Change?

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By Euronews • last updated: 17/12/2018

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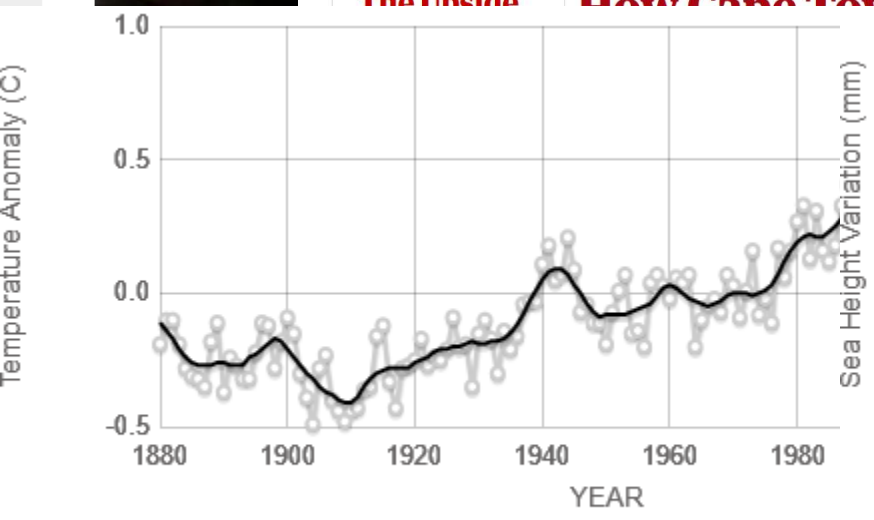
# The Guardian

International edition

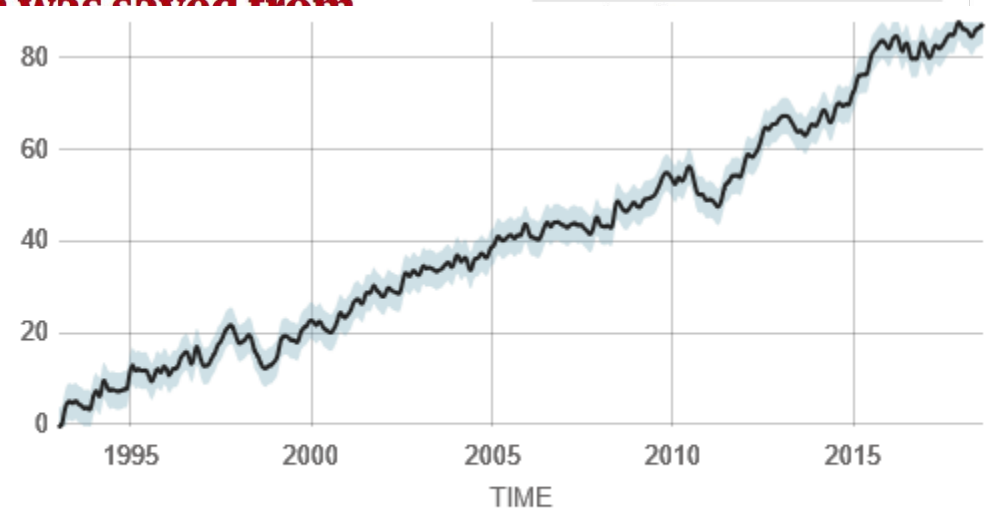
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The Inside How Cop24 was saved from



Source: climate.nasa.gov



Source: climate.nasa.gov



# Why Hydrogen?

Enable the renewable energy system

Decarbonize end uses

Enable large-scale renewables integration and power generation

Distribute energy across sectors and regions



Act as a **buffer** to increase system resilience



Decarbonize transportation



Decarbonize industry energy use



Help decarbonize building heating and power



Serve as **feedstock**, using captured carbon

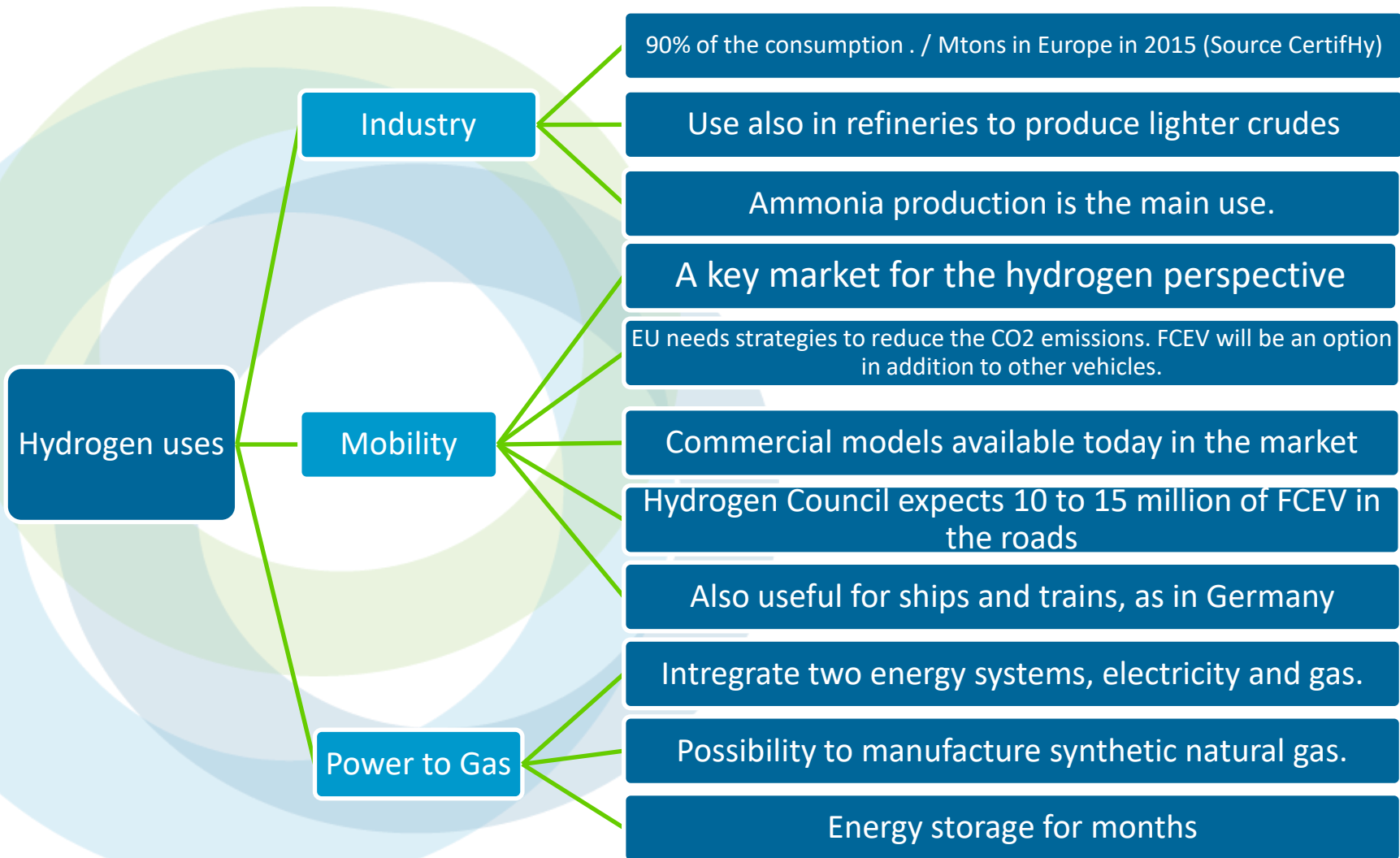
Source: Hydrogen Council



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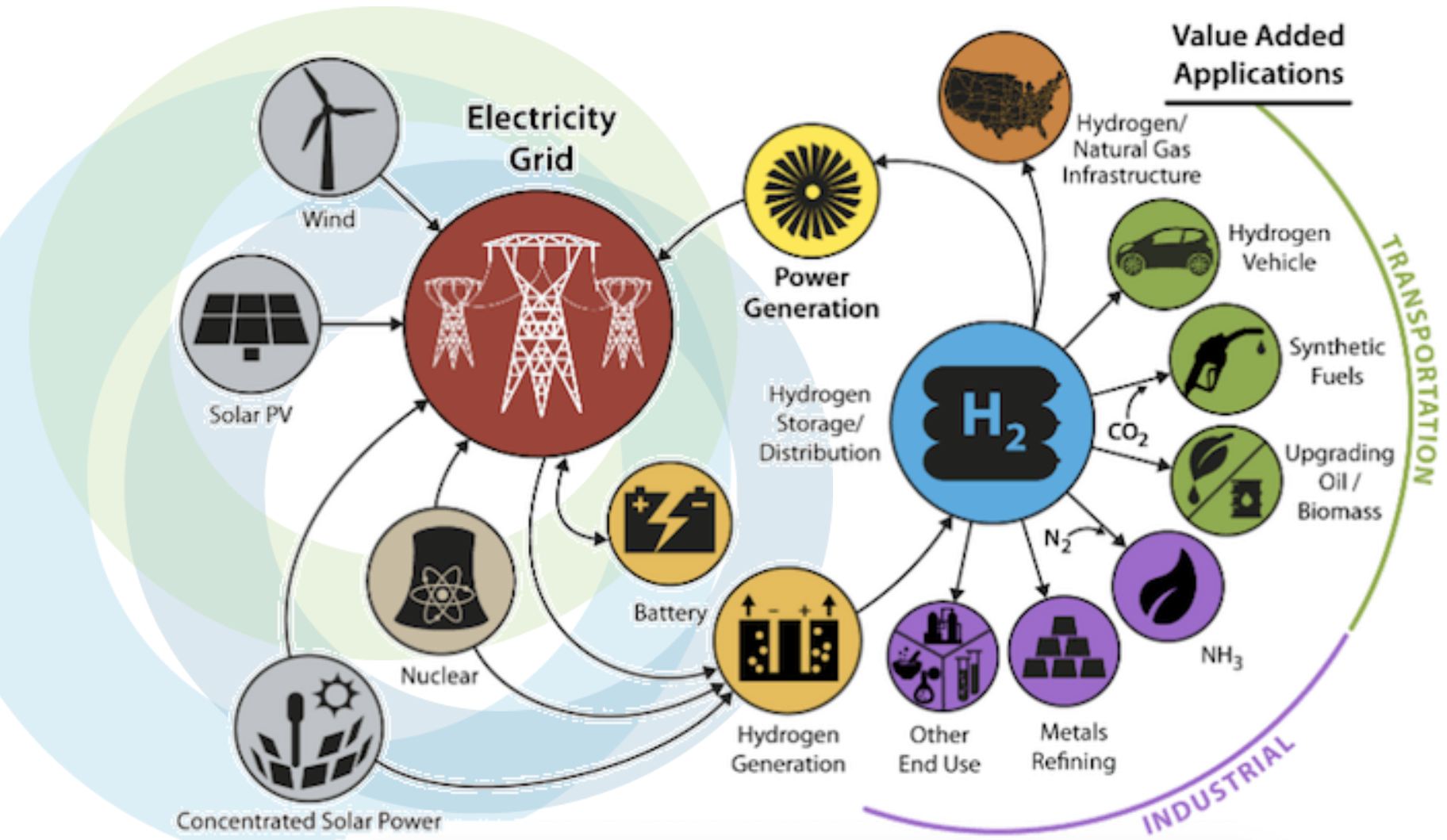
# Current hydrogen uses



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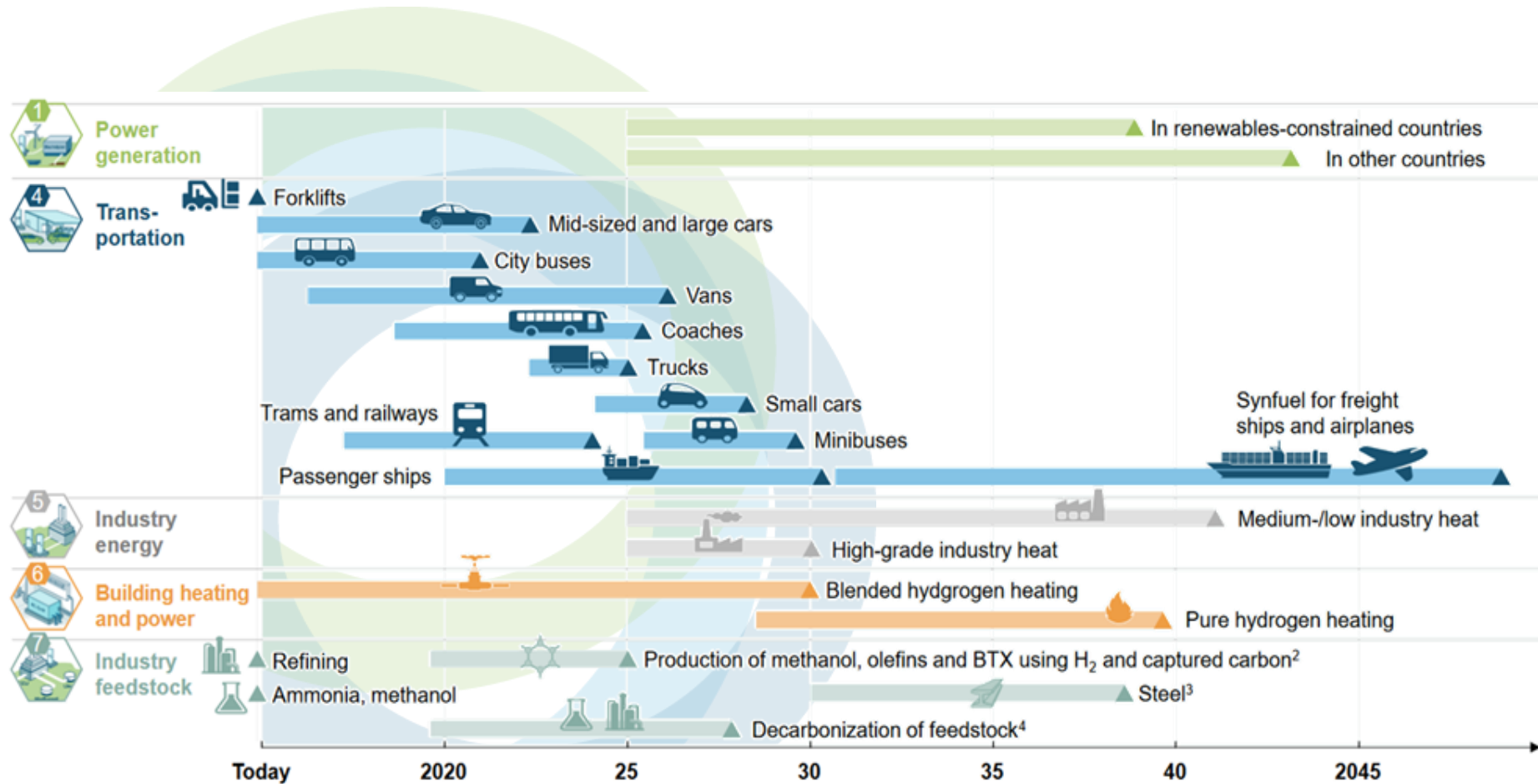


# Hydrogen uses





# What will be done with H2 in the future



Source: Hydrogen Council



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# Environmental benefits



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## Air pollution

Air pollution

▾ Ambient air pollution

Health impacts

Pollutants

Interventions and tools

Policy and progress

Outreach and advocacy

▸ Household air pollution

### Ambient air pollution - a major threat to health and climate



Ambient air pollution accounts for an estimated 4.2 million deaths per year due to stroke, heart disease, lung cancer and chronic respiratory diseases. Around 91% of the world's population lives in places where air quality levels exceed WHO limits. While ambient air pollution affects developed and developing countries alike, low- and middle-income countries experience the highest burden, with the greatest toll in the WHO Western Pacific and South-East Asia regions.

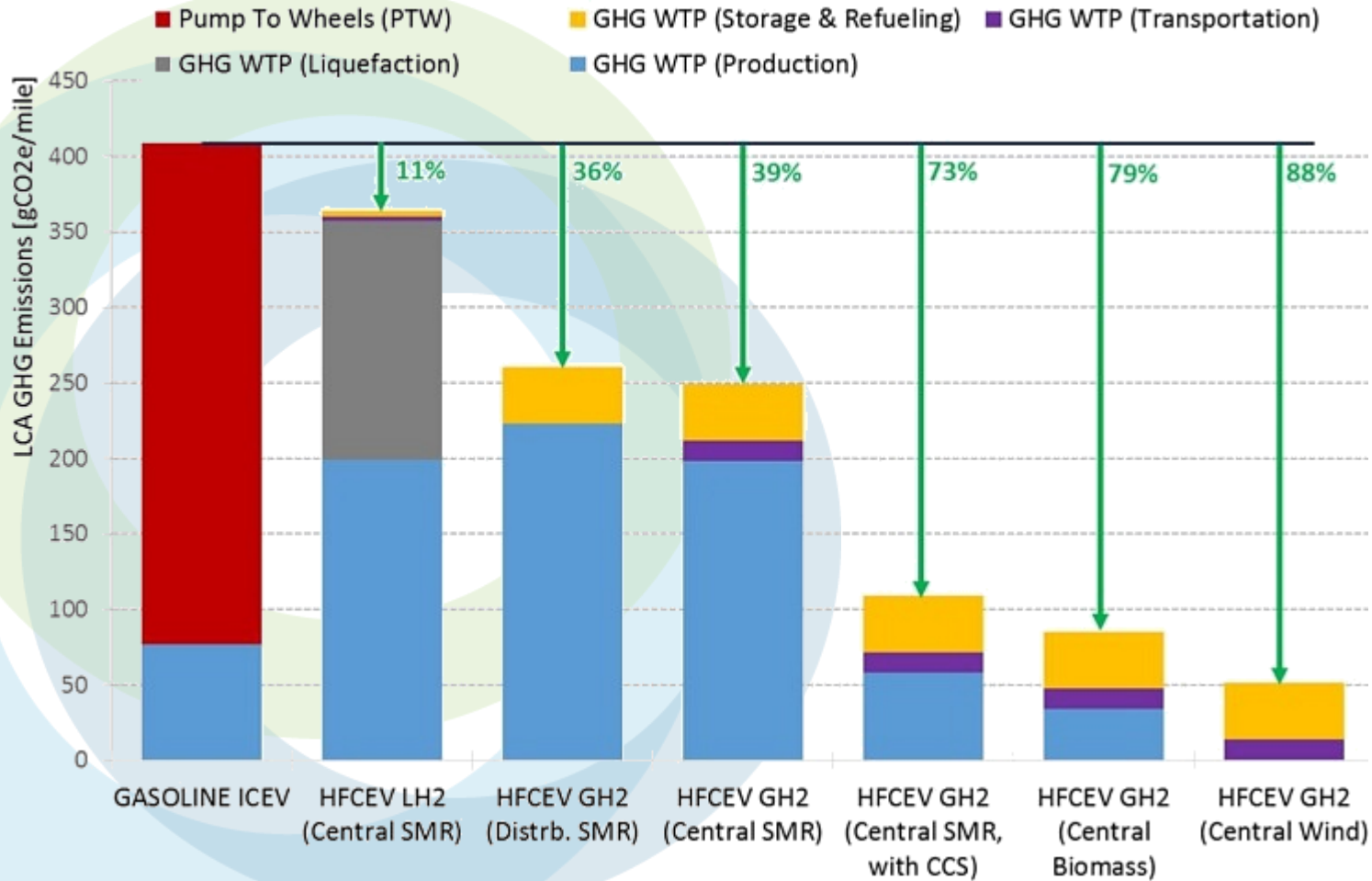
Policies and investments supporting cleaner transport, energy-efficient housing, power generation, industry and better municipal waste management can effectively reduce key sources of ambient air pollution.



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# Environmental benefits



Source: <https://greet.es.anl.gov/publication-c2g-2016-report>



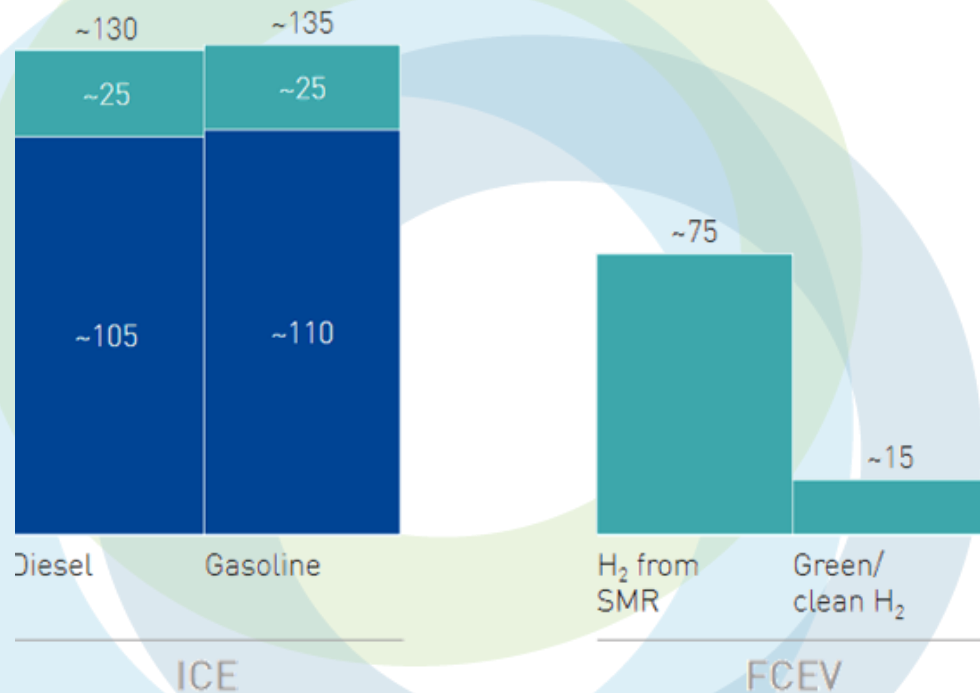
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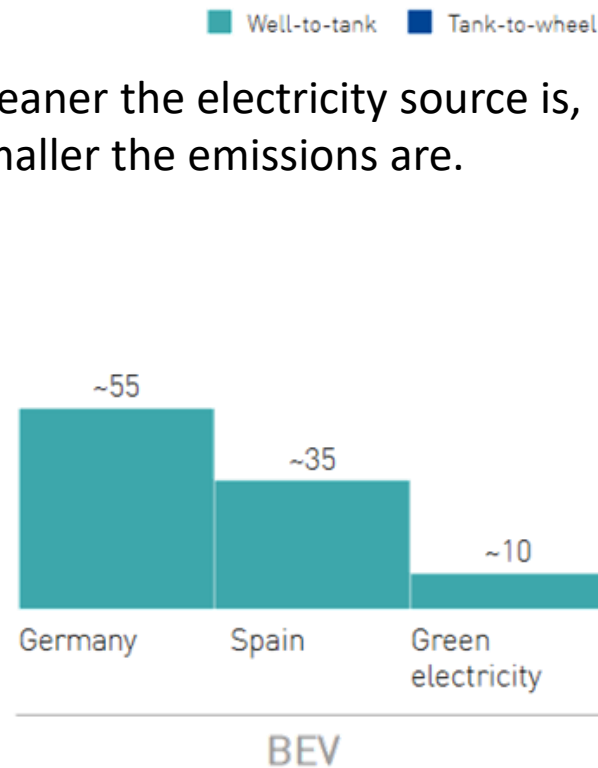




CO<sub>2</sub> emissions, g/km



The cleaner the electricity source is, the smaller the emissions are.



Source: Hydrogen Roadmap Europe (FCH JU)



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# Environmental benefits

Not only reduction of the emissions.

Also purifies the air.



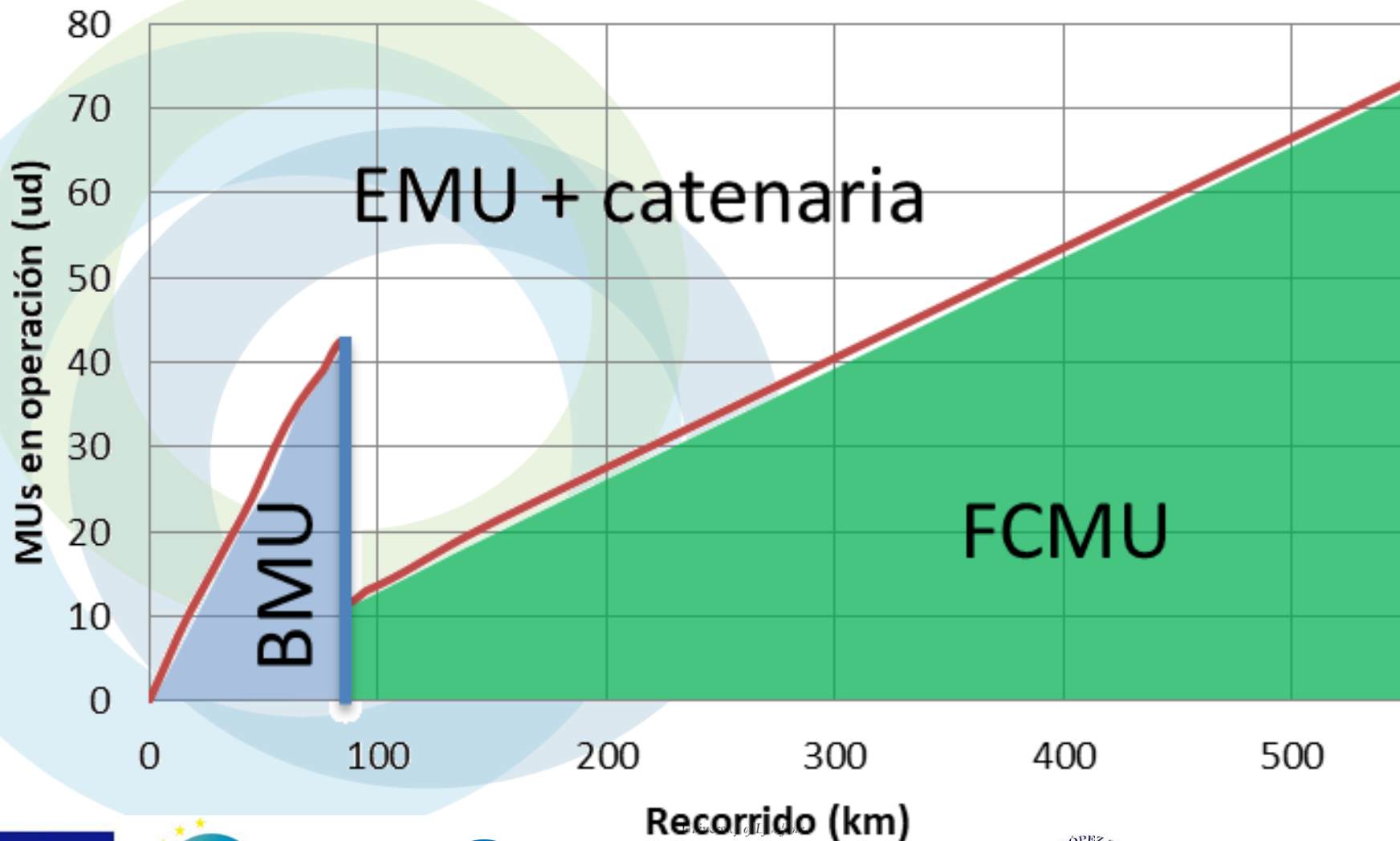
Source: Hyundai



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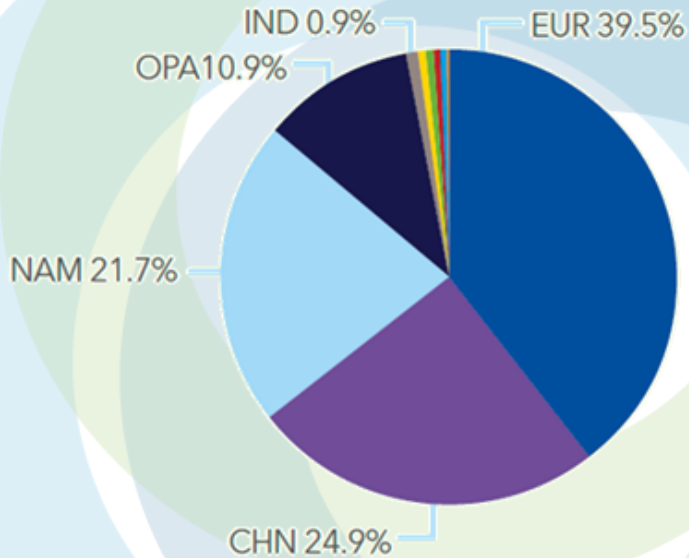
# Economical benefits



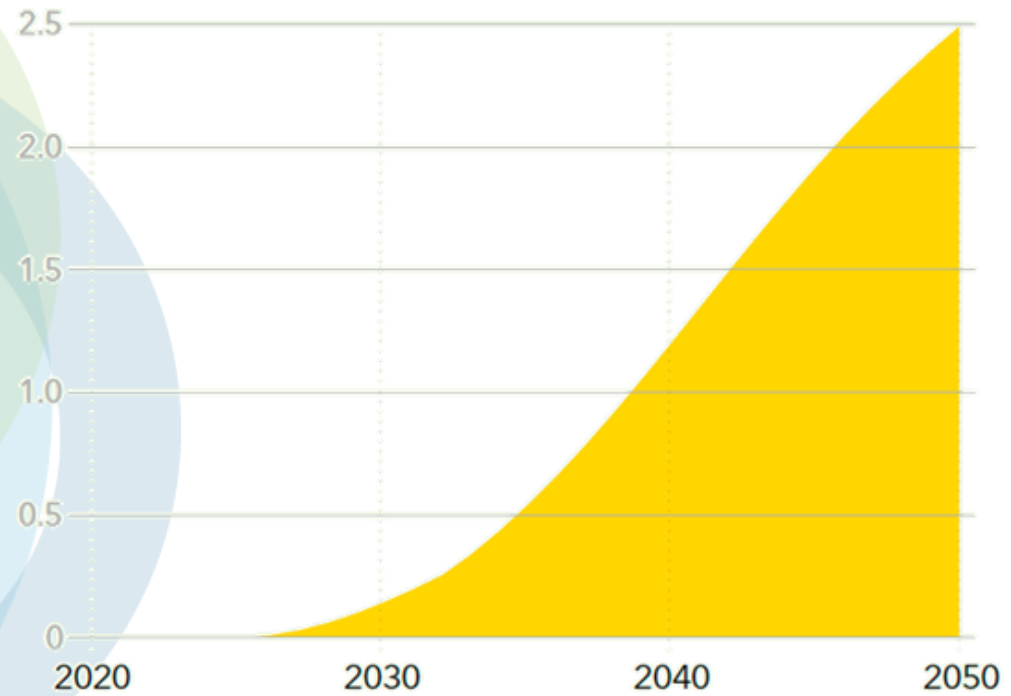
# Perspectives

## World hydrogen energy demand

### Regional share in 2050



Units: EJ/yr



Source: DNV GL Energy Transition Outlook 2018



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# Future worldwide vision

In 2050



SOURCE: Hydrogen Council; IEA ETP Hydrogen and Fuel Cells CBS; National Energy Outlook 2016



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# Future European vision

**Ambitious scenario**  
2050 hydrogen vision



**~24%**

of final energy demand<sup>1</sup>



**~560 Mt**

annual CO<sub>2</sub> abatement<sup>2</sup>



**~EUR 820 bn**

annual revenue (hydrogen and equipment)



**~15%**

reduction of local emissions (No<sub>x</sub>) relative to road transport



**~5.4 m**

jobs (hydrogen, equipment, supplier industries)<sup>3</sup>

1 Incl. feedstock

2 Compared to the Reference Technology Scenario

3 Excl. indirect effects

Source: Hydrogen Roadmap Europe (FCH JU)

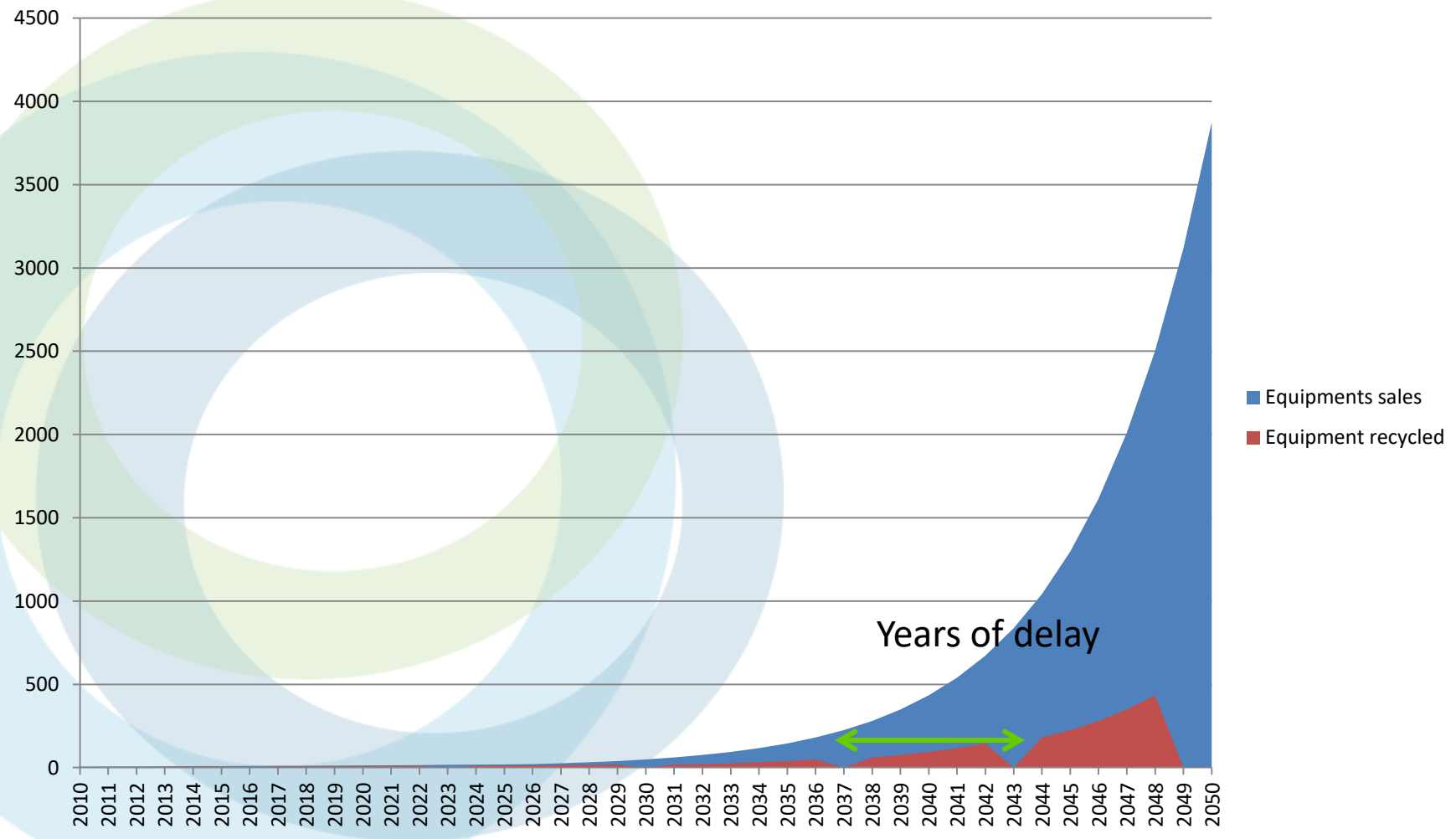


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# Nevertheless, the recycling will come later



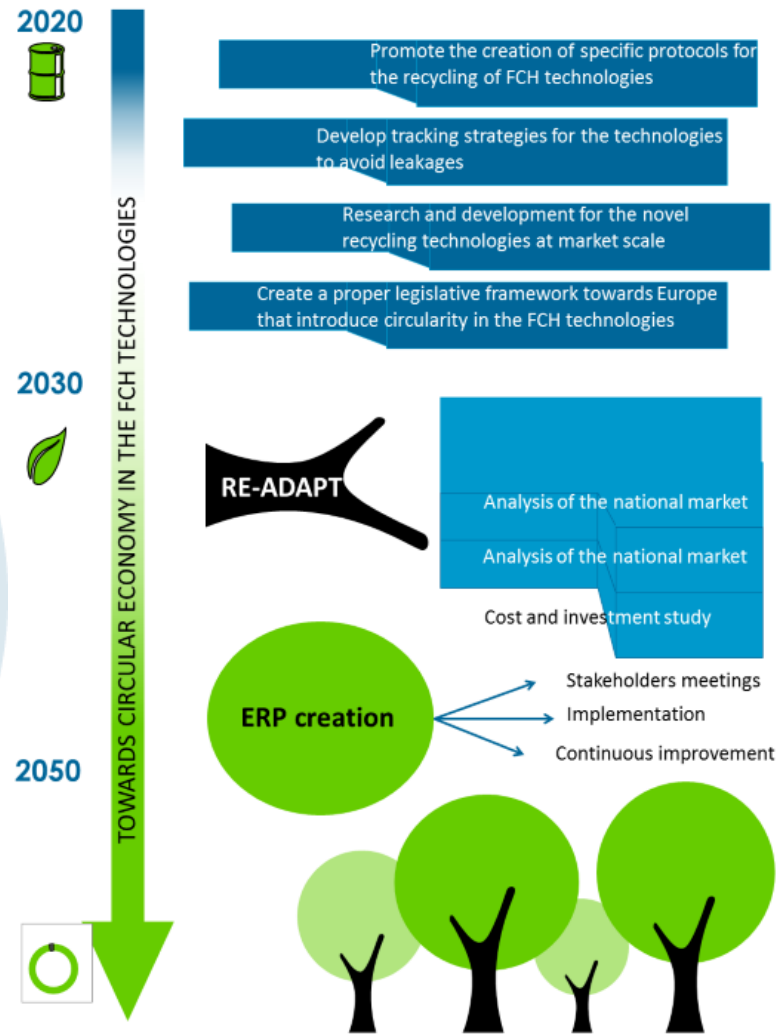
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# Towards circular economy in the FCH technologies roadmap

The future must become greener and greener if the society expects to leave a better world for the future generations. This movement should be promoted with technologies as hydrogen, which is a key component for the future playing a role in the balance of the grids, as industrial feedstock and being a way to promote a real and efficient decarbonisation of the transport sector.



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