



**FUEL CELLS AND HYDROGEN**  
JOINT UNDERTAKING

# Hydrogen buses Their time is... now?

Lionel BOILLOT

14<sup>th</sup> October 2021

**Sustainable  
BUS**

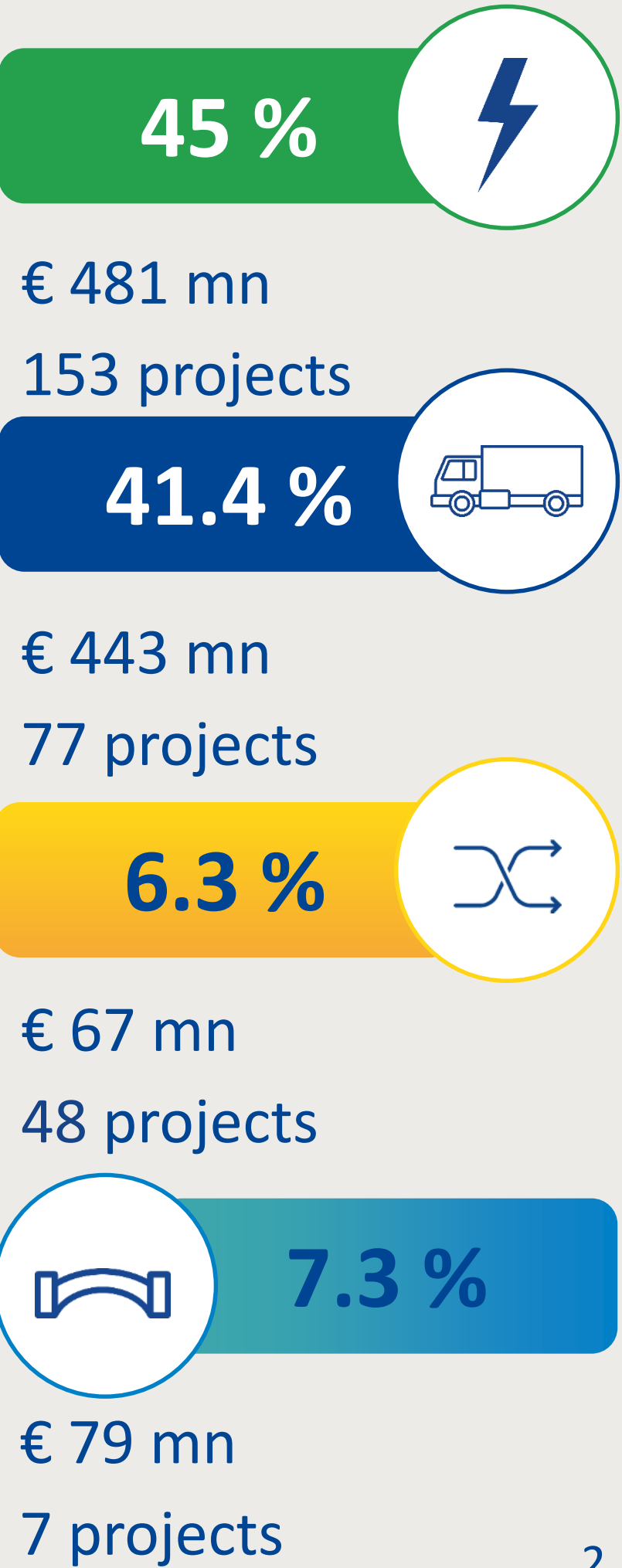
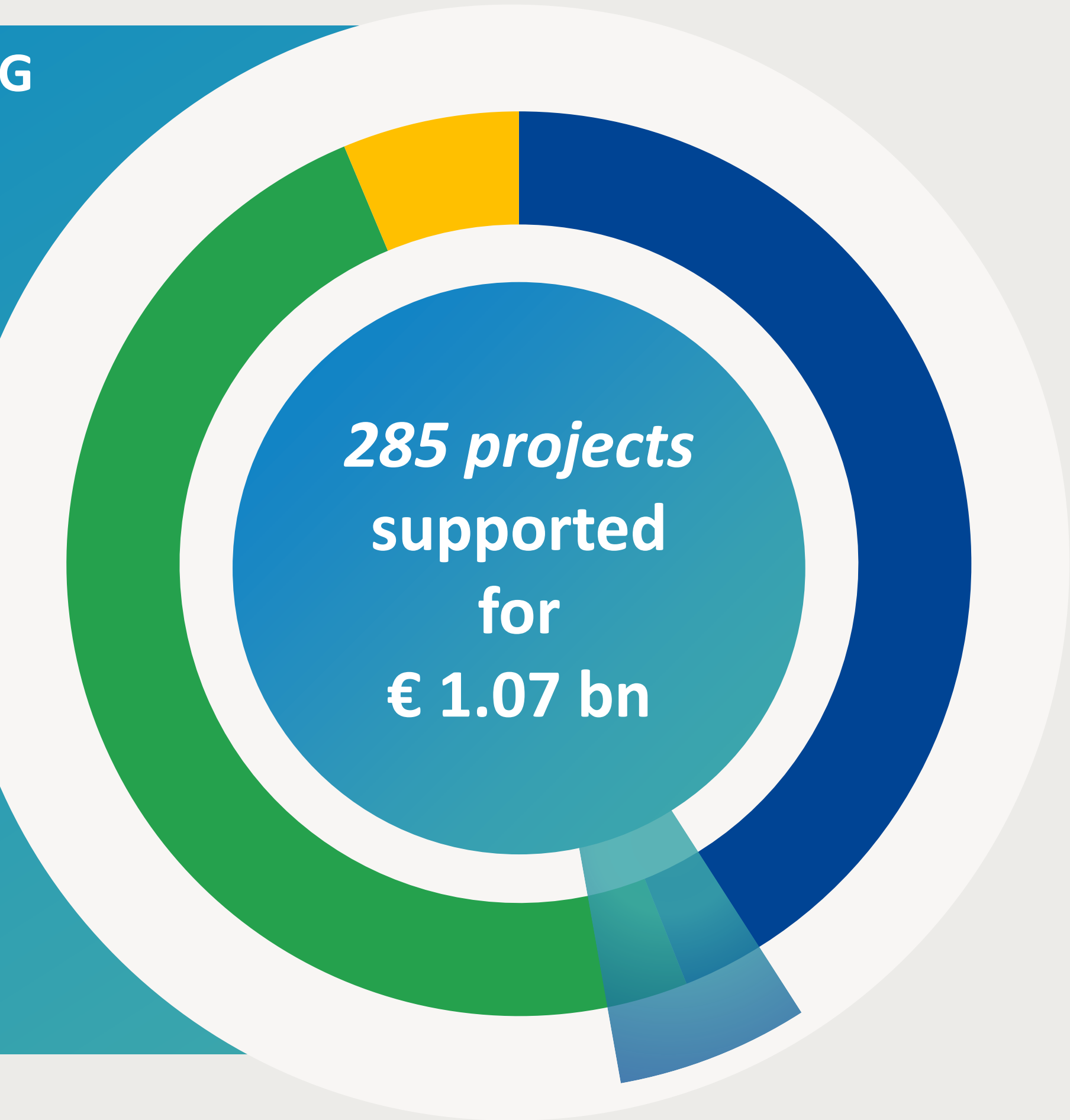
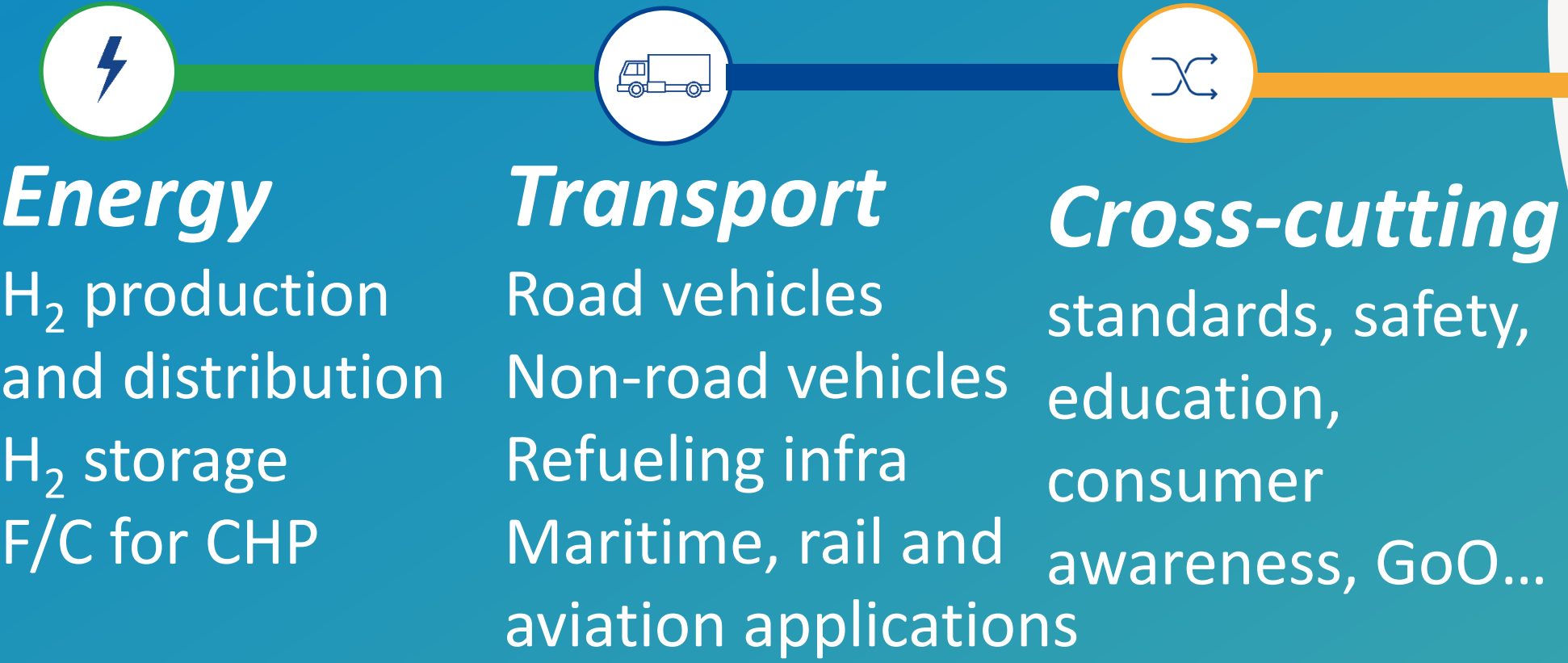


# Strong public-private partnership with a focused objective

Combined public-private investment of above EUR 2 billion to bring products to market readiness by 2020



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Similar leverage of other sources of funding: € 1.08 bn

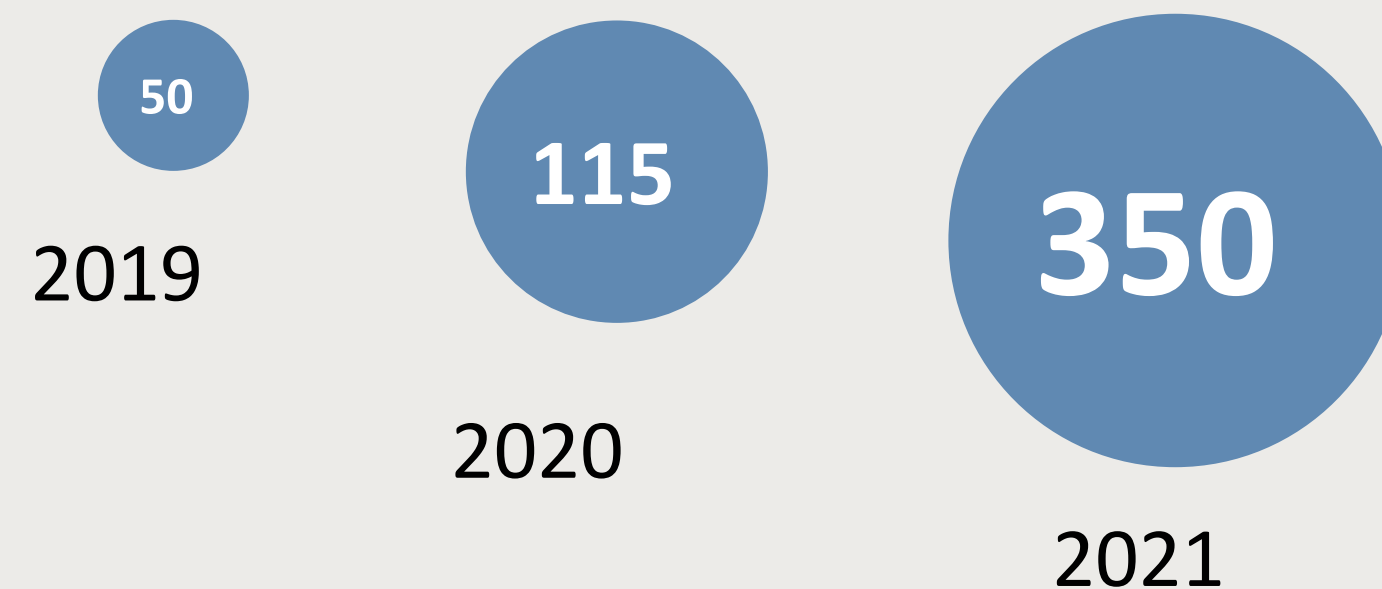


# Fuel Cell Buses

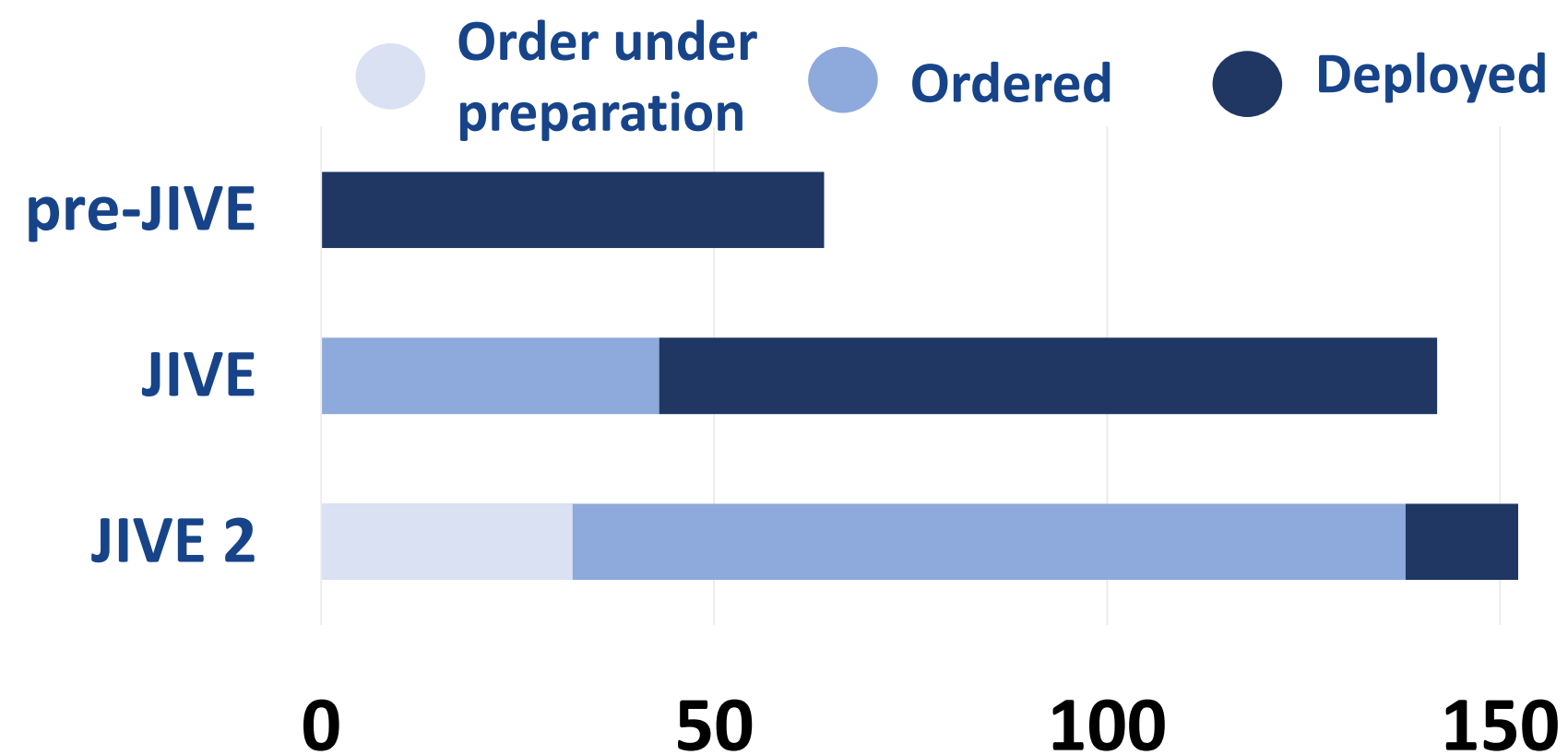
Prepare for your next ride on-board a hydrogen bus



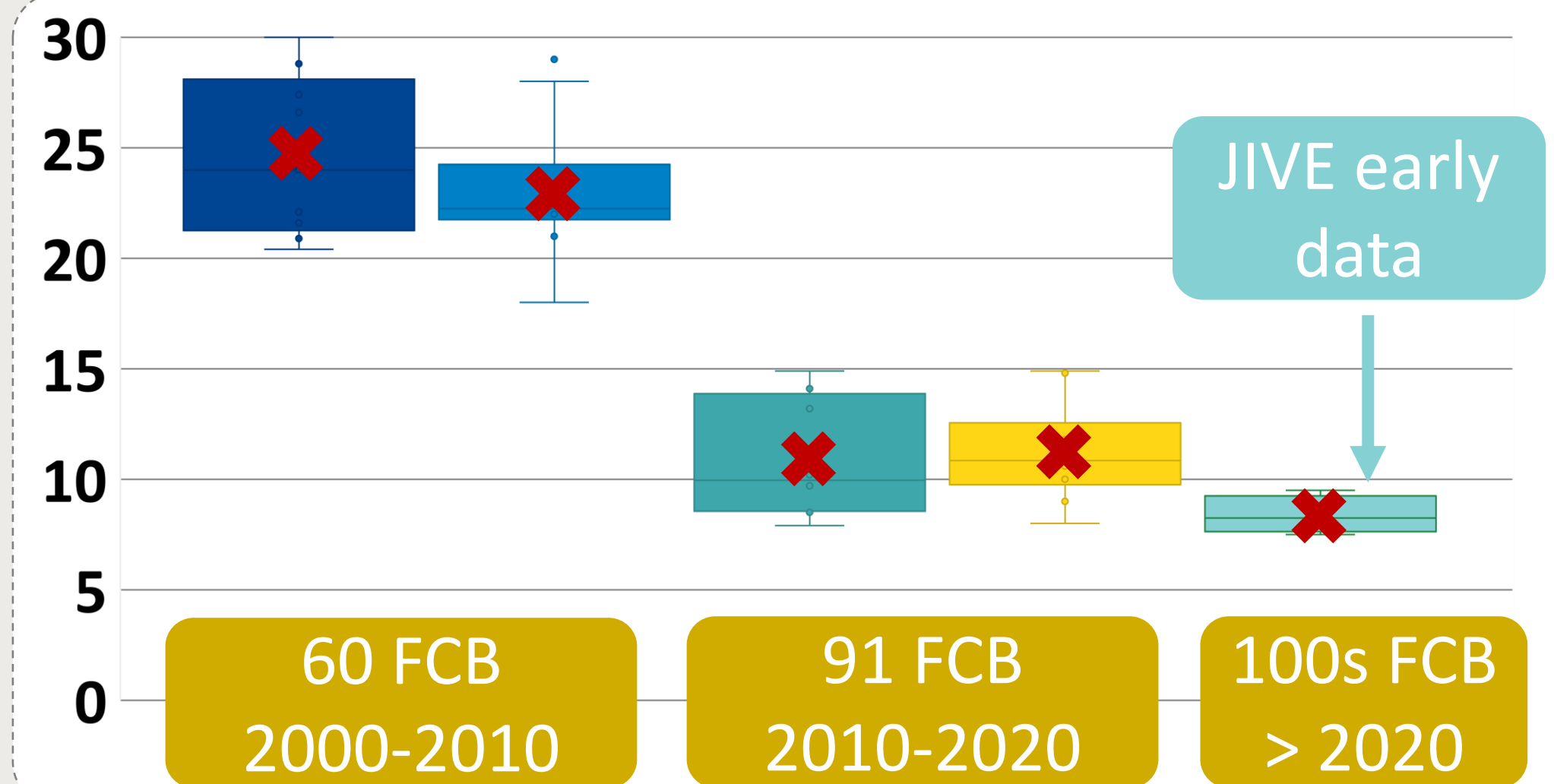
## Evolution of FCB in operation in EU



## Buses deployment status



## FCB consumption (kgH<sub>2</sub>/100km)



## Challenges

- FCB operational data continuum (JIVE and JIVE will report from 2021)
- Secure robust plans for FCB support



# A flexible competitive clean solution

Europe is world leader



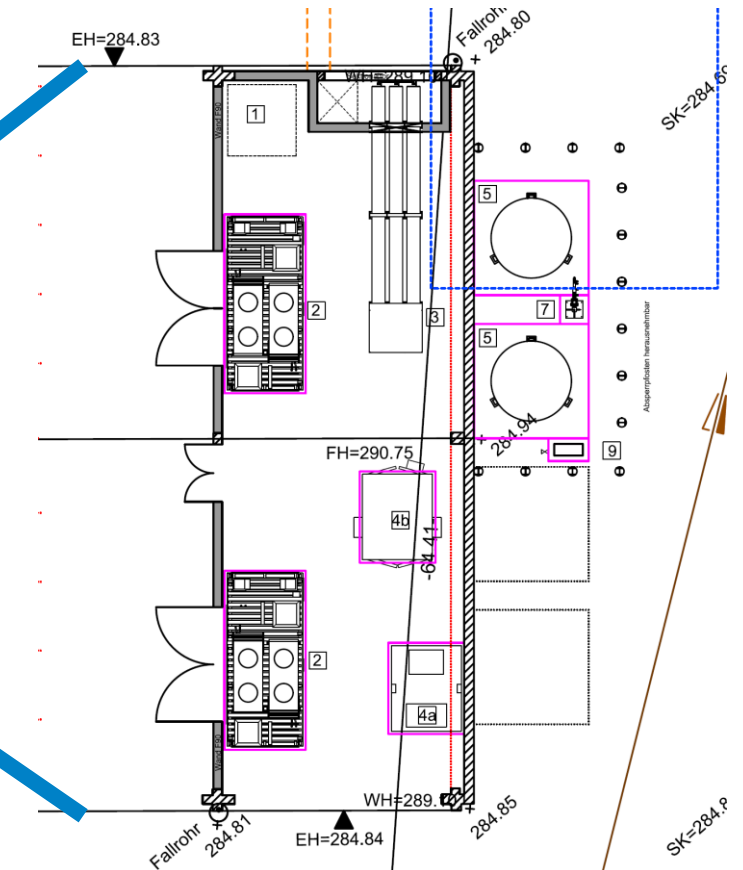
## FCB Achievements

- > 15,000,000 km since projects started
- > 35,000 h lifetime reached
- < 625,000 €/bus offered
- 40.000km/year per bus on average

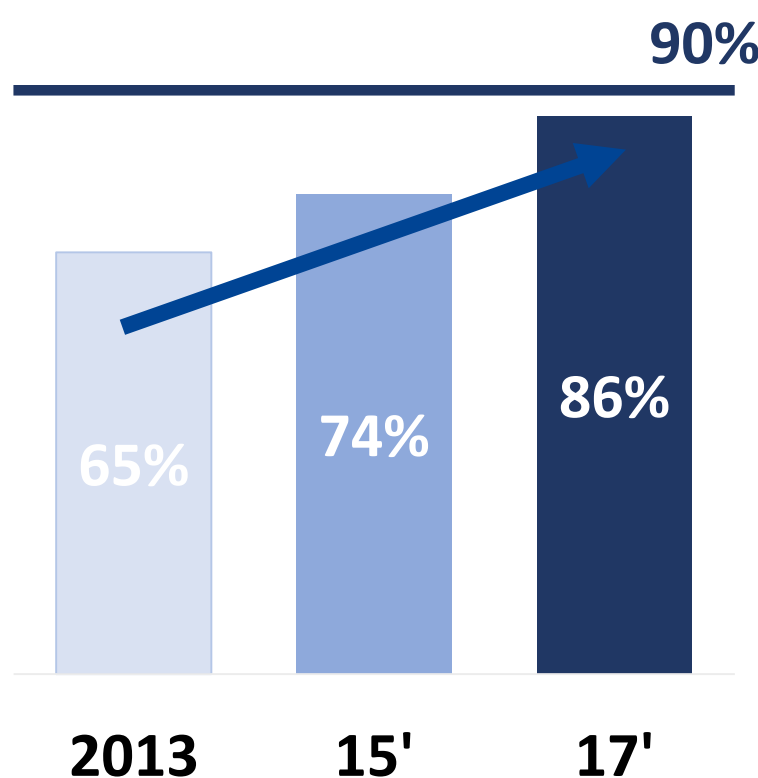


HRS availability > 95%

**Wermelskirchen:**  
in-door HRS for  
800kgH<sub>2</sub>/d



## Average availability



## Reduction of downtime by:

- Easier access to spare parts
- Integration of FC maintenance in bus preventative schedule
- Dedicated pits at bus depots
- Presence of OEM staff on-site

## Challenges

- Full service for H<sub>2</sub> management (production, distribution and maintenance)
- HRS standardisation





# OEMs in Europe are responding to the growing demand for FC buses and preparing to offer new solutions



Yet Non European OEMs are also active in the sector

## European bus OEMs with fuel cell buses demonstrators / offering fuel cell buses for sale



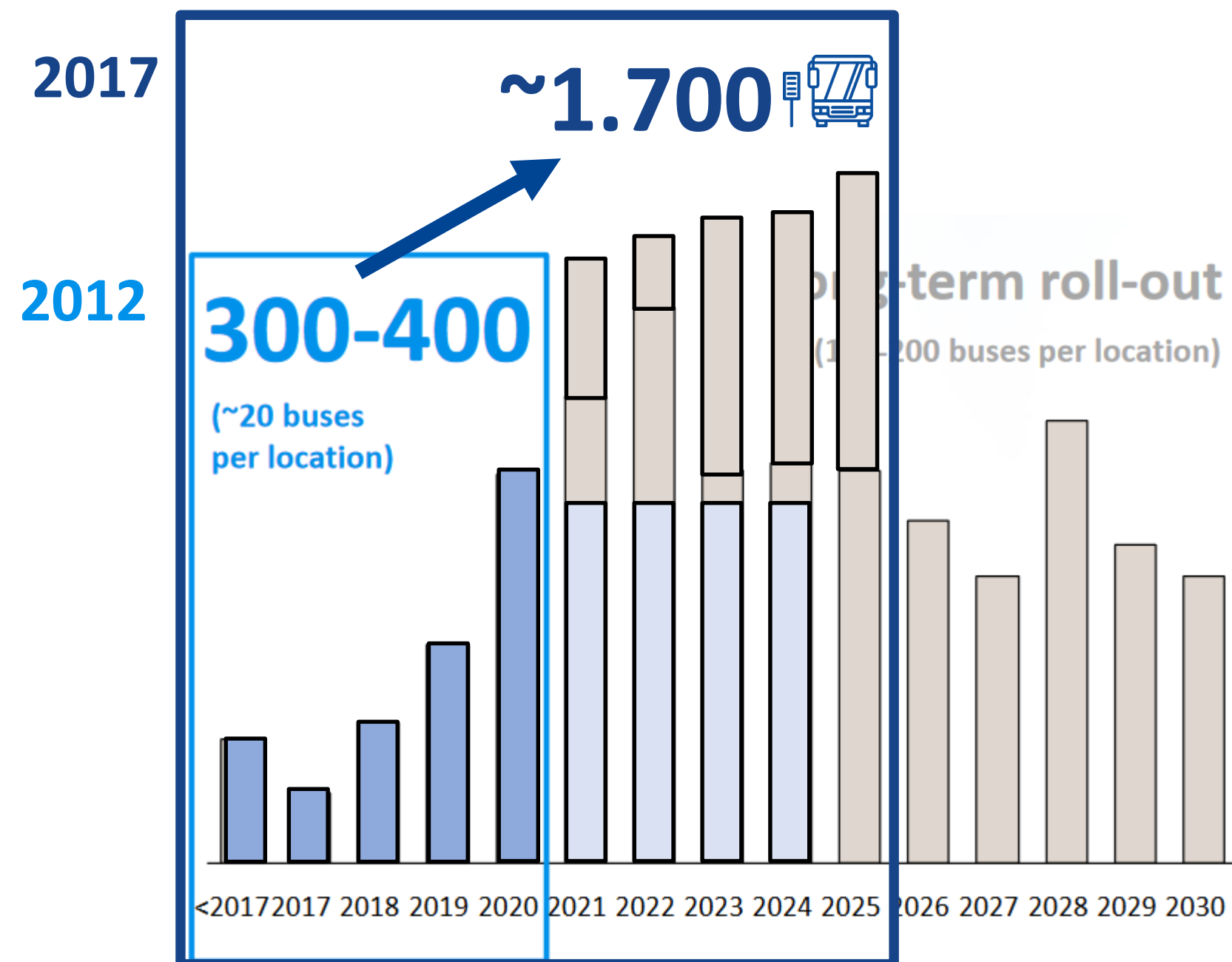


# Not only projects but a full strategic development

Results of study support since 2012 and strategy forward



Clockwise implementation of the identified deployment potential



## Commercialisation of hydrogen fuel cell buses

Discussion paper

October 2017



Policy for funding mechanisms  
- Discussion paper for policy purpose

## Dissemination

- Workshops and conferences
- Zero Emission Bus conference



# Conclusions

Innovative financing models for zero emission tenders



## New business and financing models



- **Joint procurements:** several cities ordering 10 FCB + 10 FCB + ... = 10s FCB
- **Central purchase office:** UGAP in France, where FCB are available on catalogue, no need for a tender
- **Special Purpose Vehicle (SPV):** all stakeholders (PTO, OEMs, H2 supplier, etc.) share the investment risks
- **FCB leasing:** reduction of CAPEX and uncertainties at end of the concession in absence of a 2<sup>nd</sup> hand market

## Trends

- Cities order fleet of 10-40 buses
- **Zero-emission tenders**
- **Coaches and long distance suburban buses**
- Zero-emission transport integrated in larger **hydrogen ecosystems:**
  - Waste to wheel
  - Hydrogen valleys



## CEF: Connecting Europe Facility

- Opportunities for funding from EU Green Deal calls
- Loans by European Investment Bank





Thanks for your attention



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**Lionel Boillot**

Project Manager

[Lionel.boillot@fch.europa.eu](mailto:Lionel.boillot@fch.europa.eu)

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**For further information**

[www.fch.europa.eu](http://www.fch.europa.eu)

[www.hydrogeneurope.eu](http://www.hydrogeneurope.eu)



@fch\_ju



Fch-ju@fch.europa.eu



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