Decarbonisation of Heavy Duty Vehicle Transport

Zero emission heavy goods vehicles

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JRC Workshop 28.10.2020

ONLINE WORKSHOP

Decarbonisation of Heavy Duty Vehicle Transport: Zero Emission Heavy Goods Vehicles

28.10.2020

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European Commission

JRC Mission

As the science and knowledge service of the Commission
our mission is to support EU policies with independent evidence
throughout the whole policy cycle.

JRC sites

Headquarters in **Brussels** and research facilities located in **5 Member States:**

Belgium (Geel)

Germany (Karlsruhe)

Italy (Ispra)

The Netherlands (Petten)

Spain (Seville)

European Commission

JRC role: facts and figures

JRC

Policy neutral: has no policy agenda of its own

More than **50 large scale research facilities**
More than **110 online databases**

About **2 800 staff,** nearly **70 %** of whom are **scientific/technical staff**

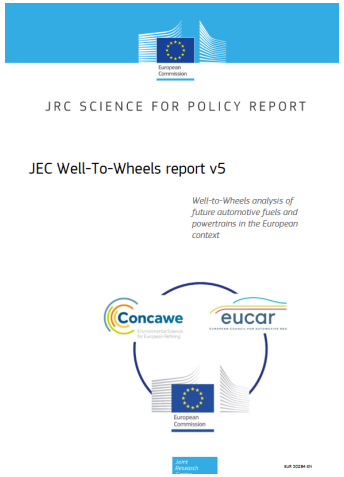
83 % of core **research staff have PhDs**

Over **1 400 scientific publications per year**

JRC – activities related to the scope of the workshop

Workshop	*The future role of trucks for energy and environment*, workshop organized with IEA/DG CLIMA 2016
VELA 7	Emission test facility for heavy duty vehicles
VECTO	Vehicle Energy Consumption Calculation Tool (VECTO) for Heavy Duty Vehicle CO2 certification purposes
JEC	JEC study WtW– *presentation this afternoon*
TMA/labs	Hydrogen technologies and batteries: laboratories, technology monitoring and assessment


Vehicle Emission Laboratory (VELA)



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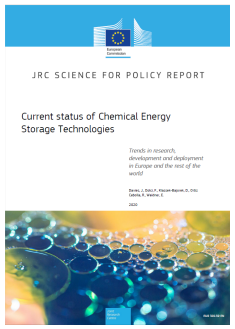
JRC activities on hydrogen

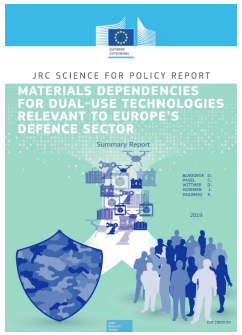
JRC's hydrogen work programme has two main goals:

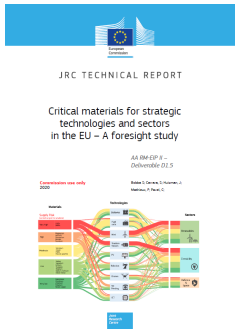
1. To facilitate the development and deployment of existing hydrogen applications;
    a) Pre-normative Research for Standardisation and Technical Regulations
    b) Technology Monitoring and Assessment
    c) Operative Support to the FCH 2 JU
    d) Support to regulation
2. To help resolve **emerging issues** regarding the future expanded role of hydrogen

JRC activities on hydrogen

Technology monitoring and assessment of hydrogen and fuel cell technologies, including critical raw materials and lifecycle impacts







Performance and safety of compressed hydrogen:

UN-ECE TR13

FCH 2 JU

European and international Standards

Access to European companies for the certification of hydrogen storage system

European Commission

Battery testing facilities in Petten

Battery cell/material performance testing

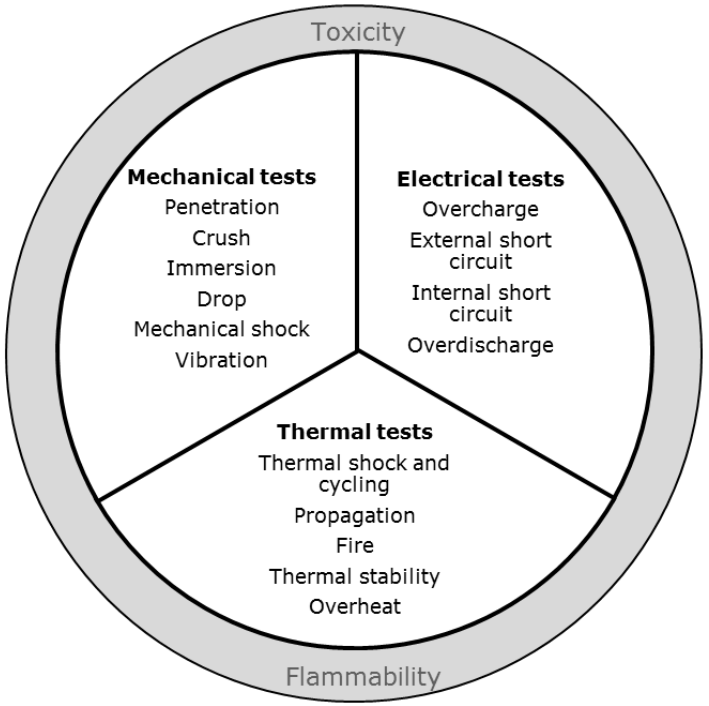
Battery pack performance testing

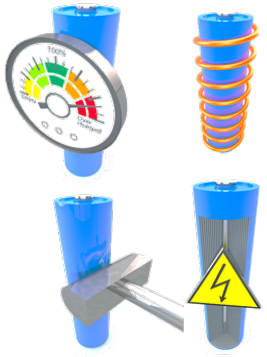
Battery cell safety testing

Dedicated facility

JRC activities on batteries

- Battery safety
- Battery performance
- Dependence on critical raw materials
  - Recycling / second use





Failure scenario

European Commission

Why JRC organised this event

- EU's commitment to net zero greenhouse gas emissions by 2050 means bringing emissions from inland freight transport down close to zero
- Today, 65% of EU inland freight is carried in diesel lorries
- Class of vehicles responsible for significant share of GHG emissions
- 40% of road freight tonne-km in trips over 500km

Why JRC organised this event

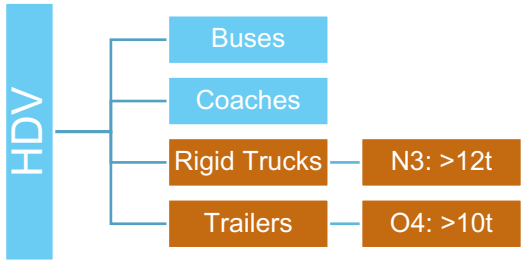
- For urban fleets and short range delivery hydrogen fuel cell and battery buses, trucks and similar have been deployed
- For longer journeys, modal shift will play a role, but it is assumed that significant demand for lorries will remain in 2050
- Biofuels may have some role to play but cannot be the main solution
- So renewable electricity, used directly or via renewable hydrogen, will have an essential role

Source: based on figures from https://www.isi.fraunhofer.de/content/dam/isi/dokumente/cce/2017/4-346-17_Gnann.pdf

Why JRC organised this event

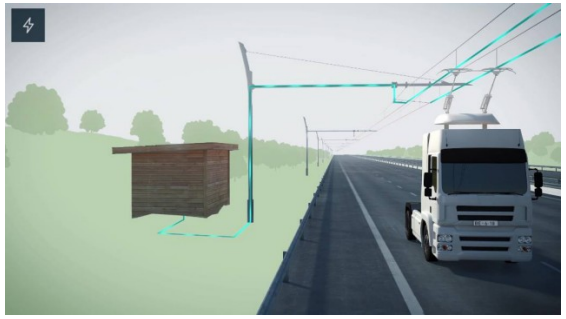
For longer distance transport we identified three candidate technologies: hydrogen fuel cells, batteries + catenaries and batteries alone, none of these has yet reached the deployment stage.

- **Vehicles**: Hydrogen Fuel Cells, Batteries
- **Infrastructure**: Recharging/hydrogen refuelling stations, electric road systems - Catenary/Pantograph



Classes N3 and O4 EU
~Class 7 and Class 8 vehicles US

https://www.ttnews.com/articles/class-8-sales-surpass-22000-march



https://www.mobility.siemens.com/global/en/portfolio/road/ehighway.html

European Commission

Why JRC organised this event

- For all three candidate technologies there are high costs for the vehicles and infrastructure, whether it be hydrogen filling stations, electric roads or fast charging points.
- Clearly, we can't have different solutions in each Member State (internal market)
- Can we really afford all three? If we have to choose, on what basis?
- The aim of the workshop is to get more clarity on the technical, cost and environmental factors that will need to underpin any such decision

Structure of the workshop

The structure of the workshop is given below. In total, four sessions are envisaged:

Session 1: Policy Context

Session 2: Technology options

Session 3: Comparison by LCA/Well-to-wheel studies

Session 4: Panel Discussion

Outcomes of workshop

Providing answers to these key questions:

- Which technologies are the most promising in terms of technical readiness and costs?
- What are the main challenges these options face for long-term implementation? (vehicles and infrastructure)
- Which have the greatest environmental benefit?
- Is there a clear winner?

Presentations and discussion to be summarised in a report

Thank you

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European Commission