Entering the next phase towards commercialization of hydrogen vehicles

Role and interests of various stakeholders

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Policy Studies

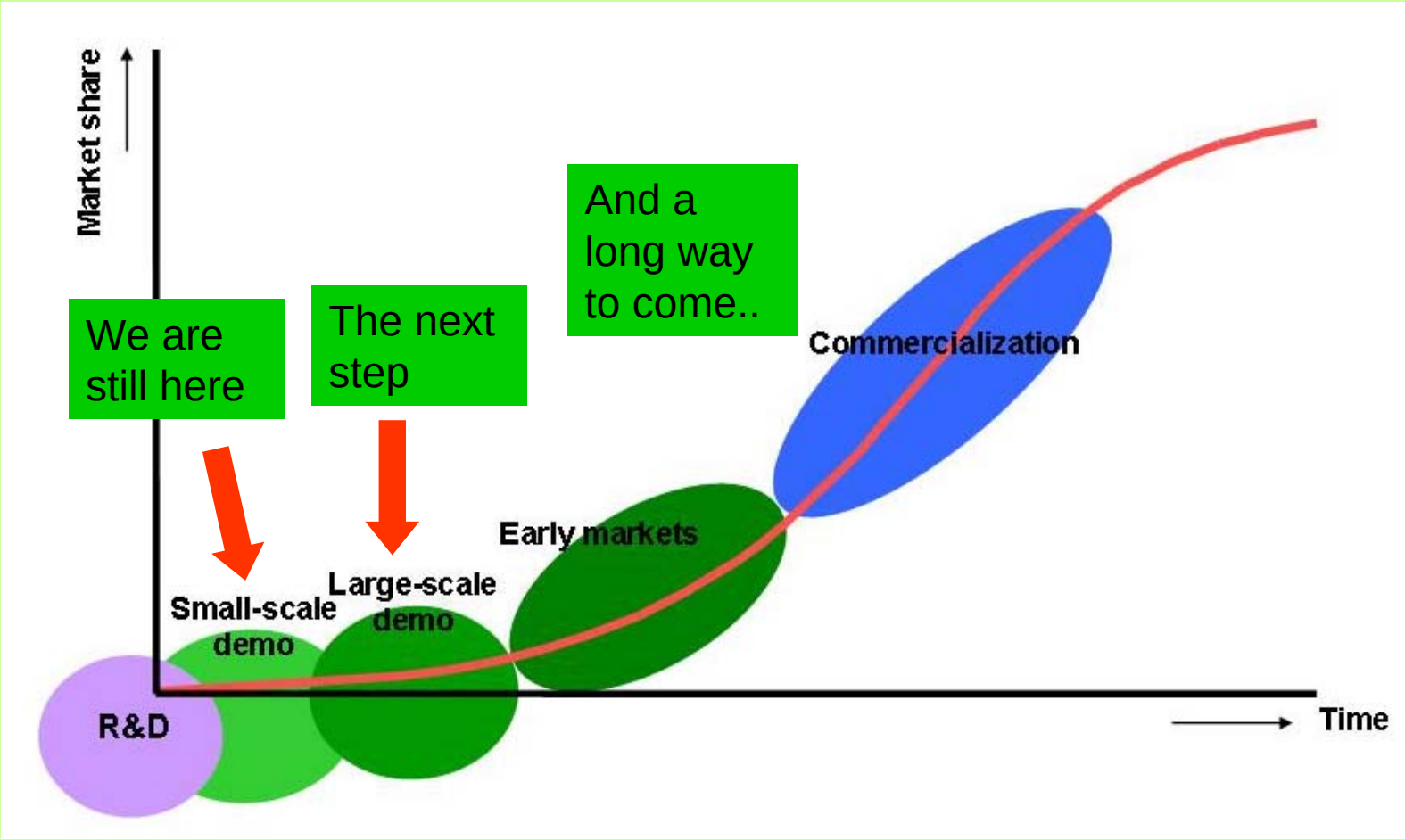
HyLights

- FP6 funded project
- Supports the planning and introduction of large-scale demonstration projects in hydrogen transport
- Broad consortium from automotive, oil&gas, infrastructure industry and institutes
- Tasks:
  - Regional funding analysis
  - Handbook for monitoring of future demonstrations
  - Legal/Management advice
  - Identification of early market potential
  - Technology specific policy support scheme
- www.HyLights.eu and www.H2moves.eu

Current status

- Hydrogen fuel cell technology in transport is demonstrated at different locations worldwide
  - CEP Berlin, JHFC, CaFCP
- Projects remain on small scale
  - Important phase for technology validation
  - But: Limited outreach/testing for future markets
- Large-scale demonstrations are necessary
  - Increased number of vehicles and large-scale infrastructure to test real-life behaviour
  - Convince policy makers about the prospects of the technology
    - Necessity to implement hydrogen specific support schemes

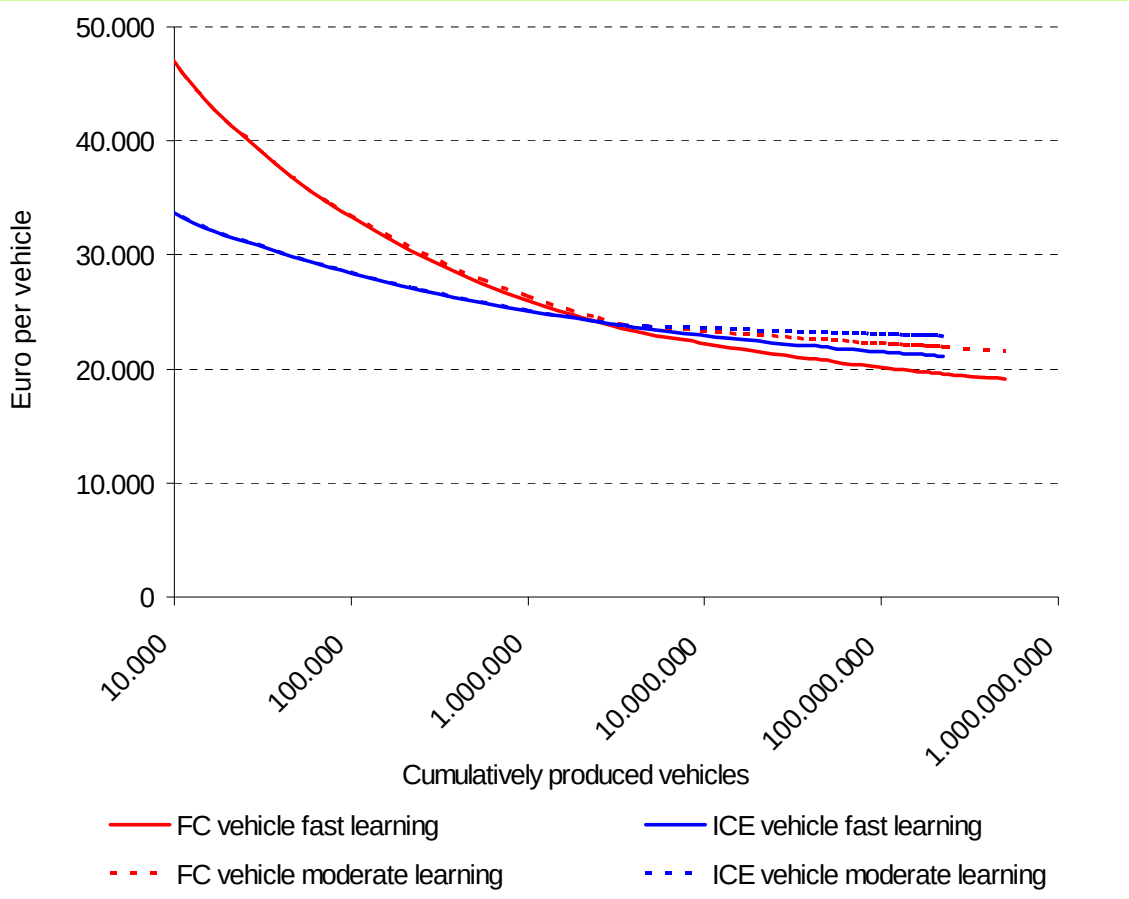
Development trajectory



From R&D to deployment

- Proposed Joint Technology Initiative (JTI) on hydrogen and fuel cells will accelerate market introduction
  - Large-scale demonstrations in Europe
- Vehicle production has to ramp up to provide vehicles
  - Initial production of several thousand vehicles
- Prices of hydrogen vehicles will go down fast
- But: additional costs will still be substantial in comparison to conventional vehicles
  - See e.g. HyWays (www.hyways.de)
  - Initial phase: vehicles about twice as expensive as conventional

Cost reduction



Based on progress ratios calculated on the component level

Source: www.HyWays.de, Prices for 100,000 units reflect the CONCAWE/JRC/EURCAR study

The different interests

Large-scale demonstrations:

- From an industry perspective
  - Maximise learning effects
  - Costs per vehicle are high
  - Duplication of the experiment at other locations will add little to learning effects, but will multiply costs
- From an regional/national perspective
  - High interest to host a high-technology project
  - Potential trap to feel excluded may (will?) lead to delayed implementation of required support schemes for next deployment phases

Possible scenarios

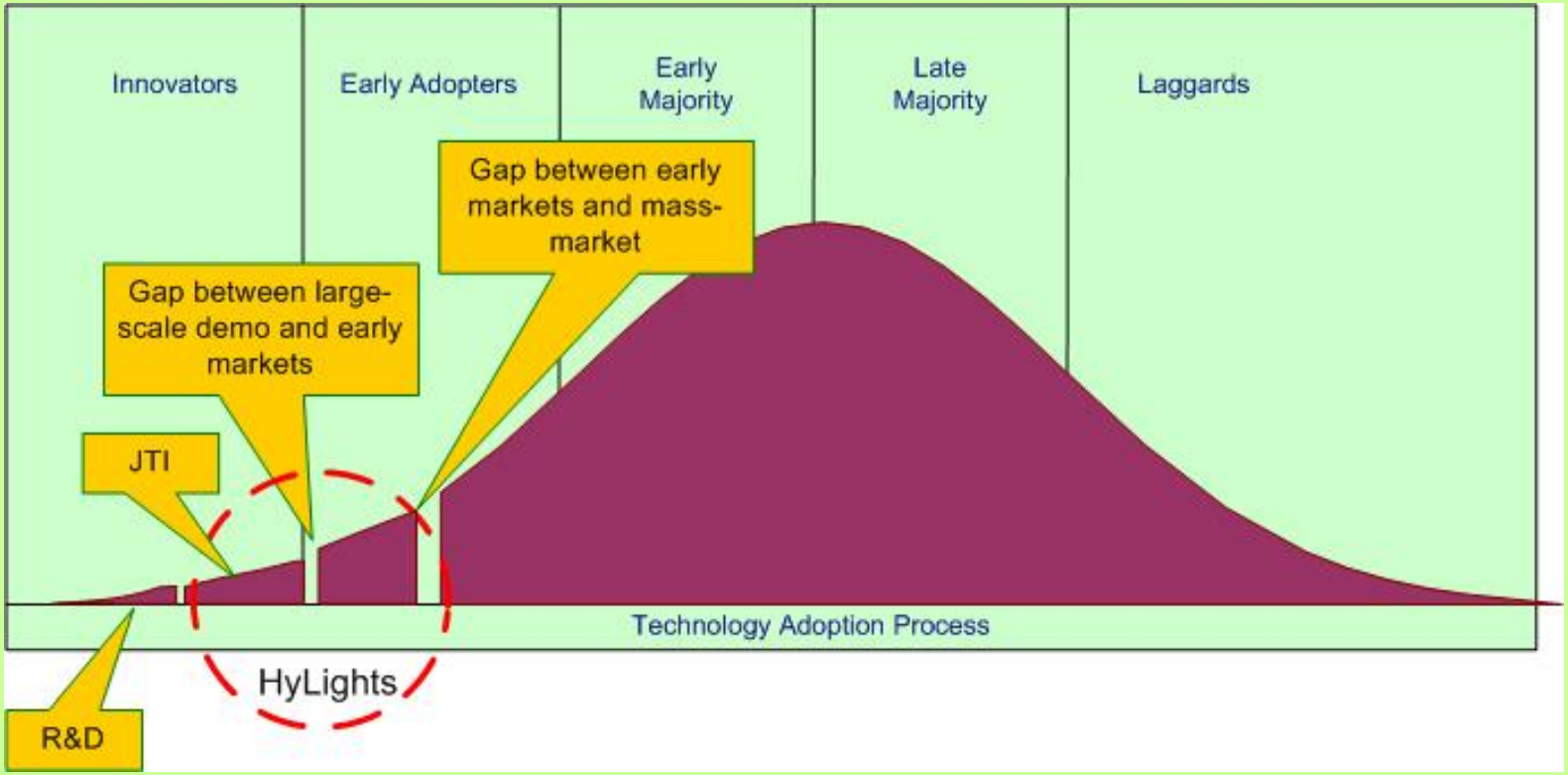
Two (extreme) options:

1. Automotive industry optimizes the innovation trajectory accordingly
   - High technological learning, widespread distribution more difficult afterwards
2. Large number of demonstrations
   - Everyone's interests are served, industry might loose interest

Trap: discontinuity in support level

- Funding for the JTI projects will end at one point
- Member states have to step in with substantial budget

Finance of early markets



The search for the optimal solution

- The theoretical optimum for large-scale demonstrations leads to:
  - a lot of barriers later on through a finance gap on the EC/Ms level OR
  - high start up cost for industry and slower learning
- Also: risk of disappointment in demonstrations is high
  - The vehicles demonstrated strongly resemble the final product, but it is still within the development process (costs and performance)
- Note: demonstrations are not cost effective (€ / tonne CO_2)
- Short term thinking: costs over the whole innovation trajectory needs to be considered, not costs of first step in a long term innovation trajectory
  - See e.g. the HyWays roadmap (www.HyWays.de)

Conclusion

Two things are crucial to be able to pass the various stages of the innovation trajectory:

- Hydrogen-specific support scheme on the member state level
  - Sense of urgency not present
  - Focus on emission reduction on the short term
- Series of early markets
  - Accumulation of regional vehicle demand and business-plan for financing
  - Evolution: increasing seize and requirements (costs, performance)

Conclusion cont'd

- Different interests need to be communicated
  - HyLights is working on the process
- Raise awareness for technological development
  - Hydrogen is not there yet were it probably appears to be (in the eyes of policy makers)
  - The implementation of hydrogen in transport takes decades before full maturity is reached
  - This requires a support for a long period of time, tailor made to the specific needs given the innovation phase of the technology
- What should be done in the meantime?
  - Create regional demand
  - Avoid discontinuation of support – smooth transition
  - Ensure timely implementation of support on MS level
  - Possible way to start with hydrogen

What do we see on this picture?

It may look like a ordinary bus,
it may ride like a ordinary bus, but it isn't!

Thanks for your attention

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