



**Just a new truck is not enough,
we need entirely new eco-systems**

INTERNATIONAL HYDROGEN SYMPOSIUM

Session 2: 'Mobility' – Trucks, Room 'Elbe'

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From start to commercialization



Starting point and purpose of H2 Energy

First dedicated ecosystem in Switzerland

Commercialization throughout Europe

Fight global climate change by leveraging partnerships and hydrogen technology as much as we can

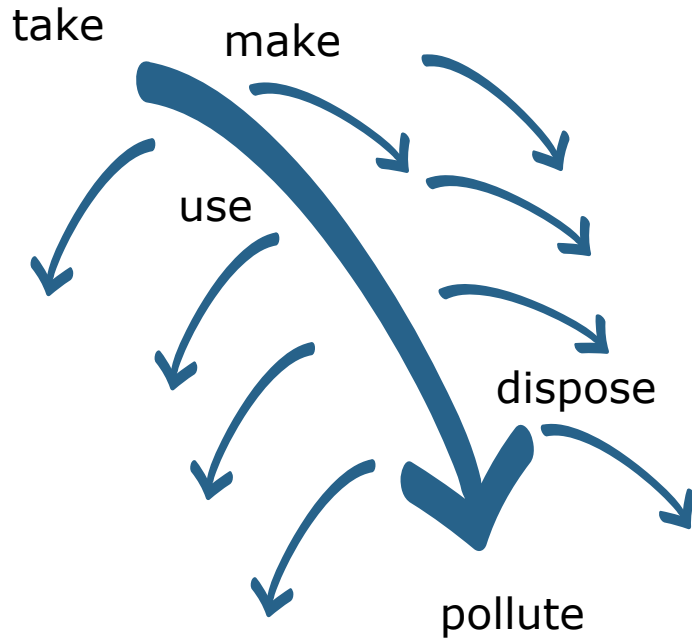
Earn enough to make the difference



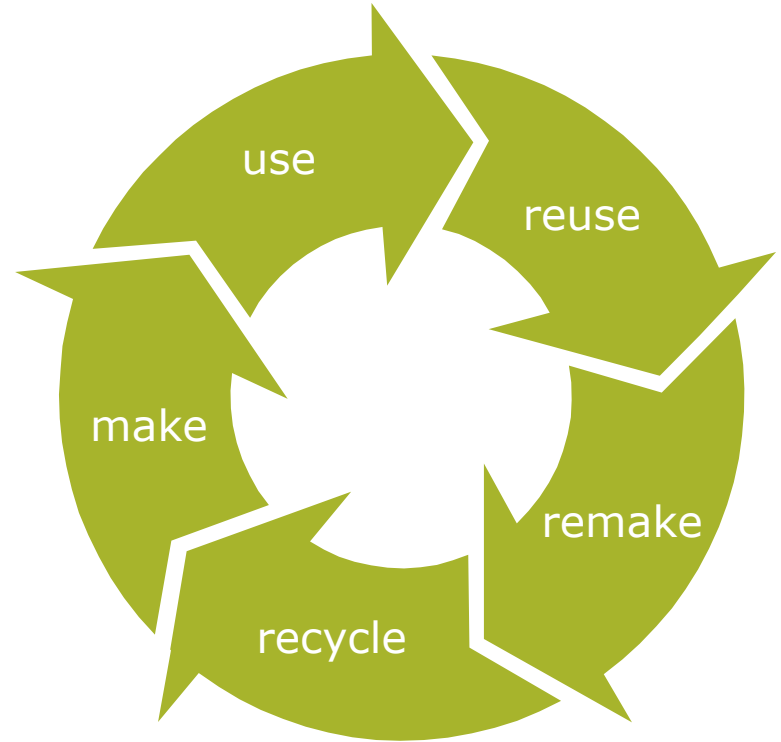
100% renewable energy with no subsidies!

'Advise' by Mother Nature

Choose circular economy



versus



Hydrogen is not just a 'mobility thing'

Serving many industries, examples



electricity industry

Hedging electricity price



automotive industry

CO2/GHG reduction



transport & logistic industry

Zero emission



gas industry

Leveraging gas infrastructure



fuel station industry

Only viable business model for electric engines



Financial institutions

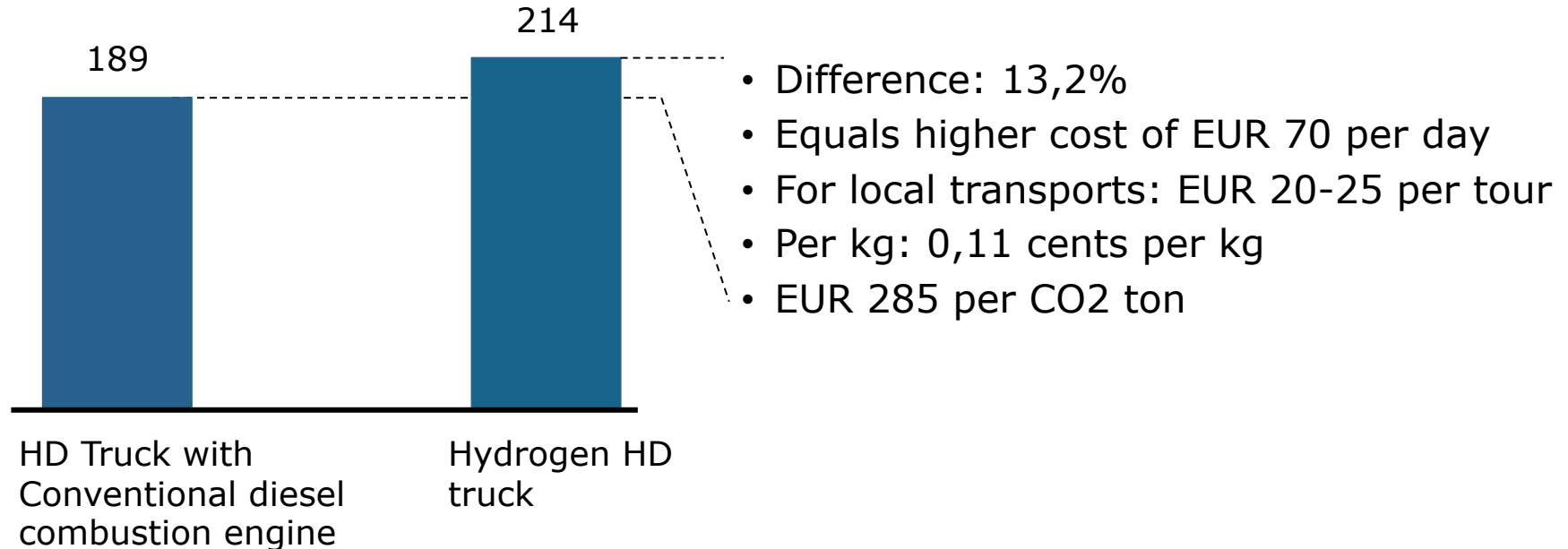
'Green' financial investment opportunities

Transition needs thinking beyond simple TCO comparison



TCO comparison diesel vs. 'green' hydrogen trucks, w/o subsidies nor incentives

Annual cost, 40ton, in '000 Euro, in France



Effect of 30 EUR carbon tax will be limited

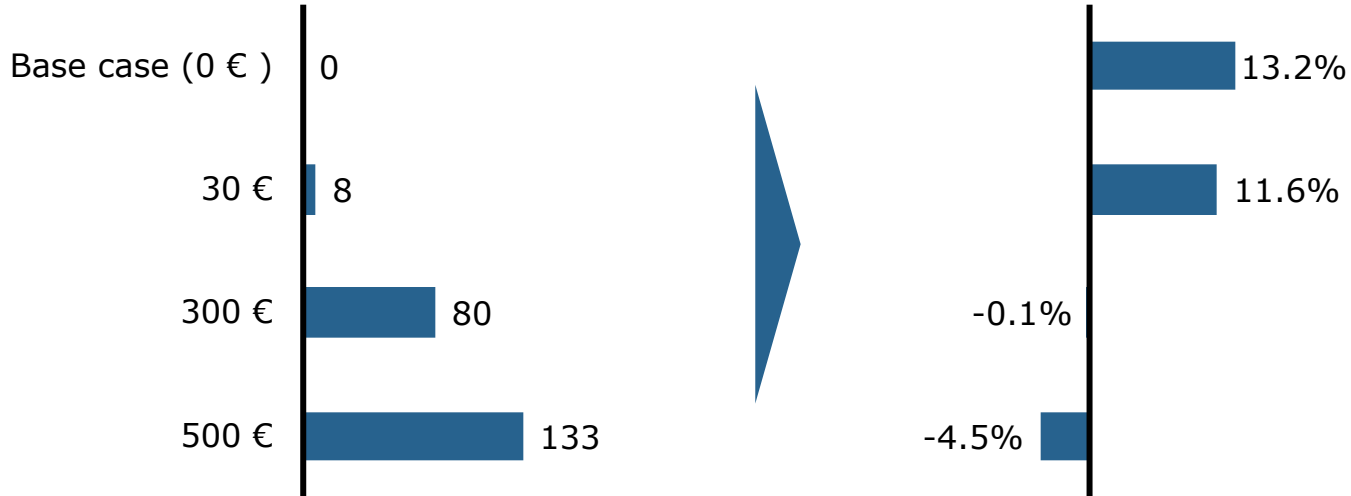
Model calculation for France



**CO2 price
per ton**

**Impact on
diesel price**
(Euro cents)

**Impact TCO effect
diesel vs. hydrogen**
(Percent)

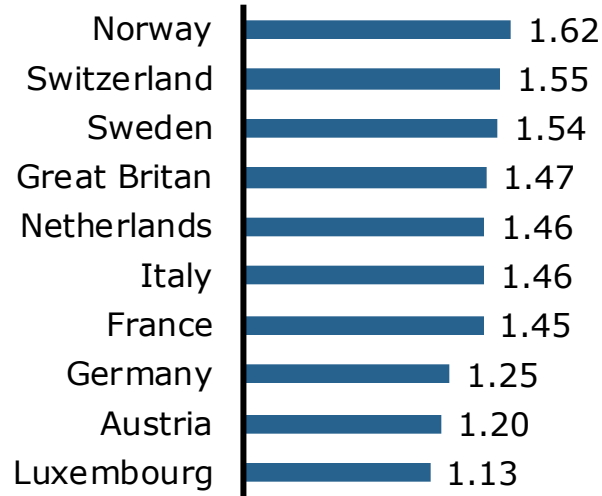


Assumptions: 2,91Kg CO2/liter diesel for entire chain,
2,65kg CO2/liter diesel for direct emissions

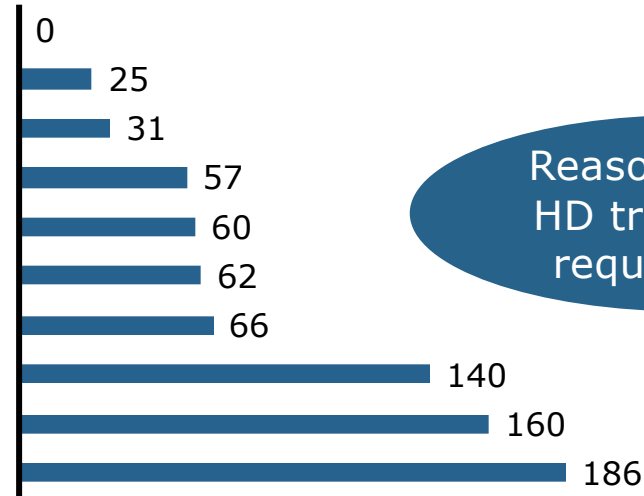
Compensation of enormous differences in diesel price would require high CO2 taxes



Diesel prices per country (in EUR per liter)



Needed carbon tax to compensate difference to Norway (in EUR per ton CO2)



Reason for high HD truck range requirements

Strategies to close the gap



Sector coupling

Optimizing financial situation by combining different sector needs to successfully master transition

Up-selling and marketing

Identify and market the value for emission-free transportation services to customers

Cost improvements

Applying new technologies, productivity increase and leveraging economies of scale effects

Politics

Internalization of external (hidden) costs via accountable incentives (**not** new subsidies, disabling competition)

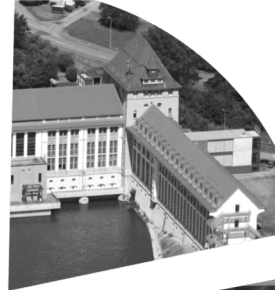
Circular economy for truck operators

Example: sector coupling in Switzerland



Hyundai

H2 Energy



Alpiq

H2 Energy

Linde



Independent station operators retail H2:
Avia, Agrola,
Coop/CMA, Migrol,
Shell, Socar, Tamoil

It's about coupling industries together – it's a fundamental change of mind-set



automotive industry

“tank to wheel”

transport & logistic industry

“TCO parity”

fuel station industry

“parking lots are cash”



electricity industry

“take or pay”

gas industry

“what's new? Selling molecules for ages”

Financial institutions

“risks and collaterals”

Our partners have a winner mentality and will master the change



automotive industry

“well to wheel”

transport & logistic industry

“More value to customers”

fuel station industry

“green fuel stations”



electricity industry

“hedging electricity prices”

gas industry

“green hydrogen”

Financial institutions

“green and sustainable investments”