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Natural gas and biomethane in the future fuel mix.

17 January 2011

Outline.

- Results of dena study “Natural gas and biomethane in the fuel mix of the future in Germany”.
- Areas for action.
- Recommendations.
- Next steps: Round Table and Road Map.

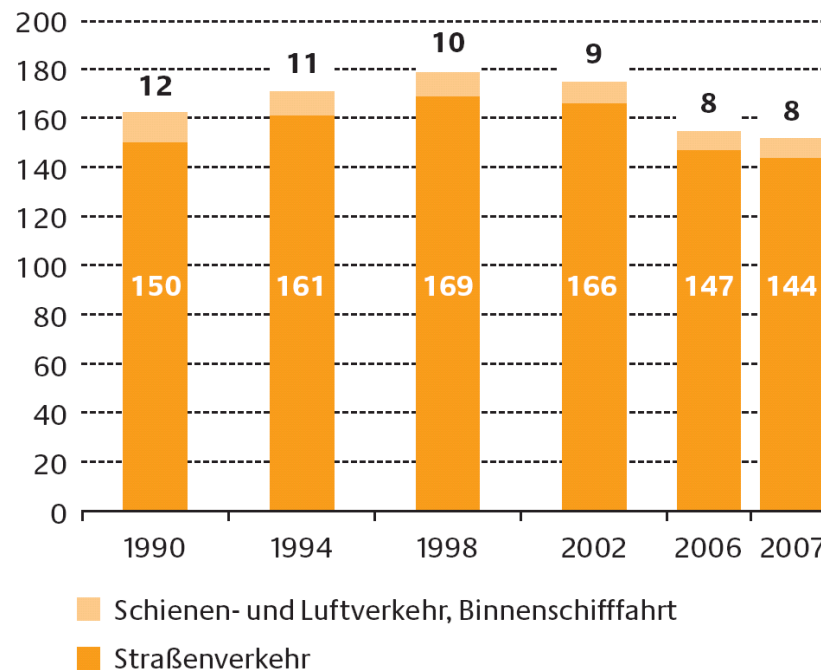
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dena study: Energy sources and CO₂ emissions in transport.

- Transport still over 90 % dependent on oil
- Rise in price of oil
- CO₂ emissions in transport sector only reduced by about 6 % since 1990
- Federal Government's CO₂ reduction goal across all sectors: - 40 % to 2020
- Possible approach: increase in energy efficiency and greater use of renewable energy
- Need to diversify fuel mix through alternative engines and fuels
- Contribution of natural gas and biomethane

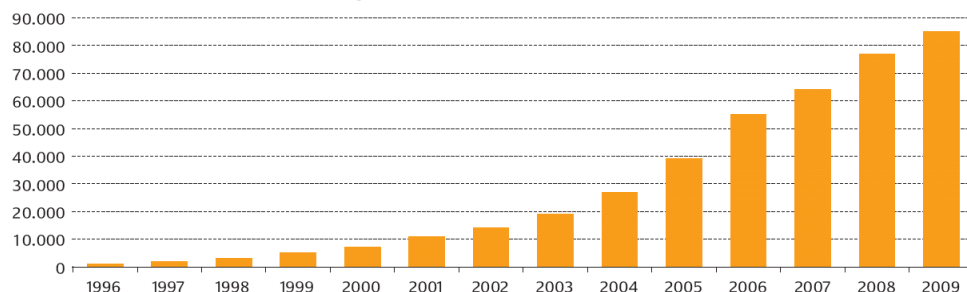
CO₂ emissions from transport in Germany (Mt):



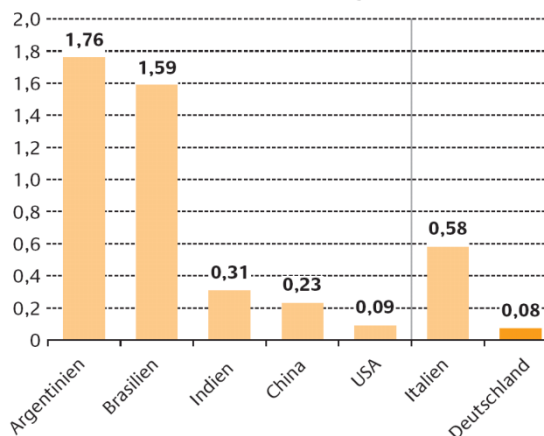
dena study: Natural gas as a fuel in Germany.

- For many years, steady growth of this technically established alternative – but at a low level
- Only 85,000 of the total of about 50m vehicles powered by natural gas (0.2 %)
- Of these, 80 % are cars and 20 % commercial vehicles
- Annual growth fell by half between 2008 and 2009
- Approx. 880,000 natural gas vehicles in Europe
- Italy is leader with 585,000 vehicles

Number of natural gas vehicles in Germany:



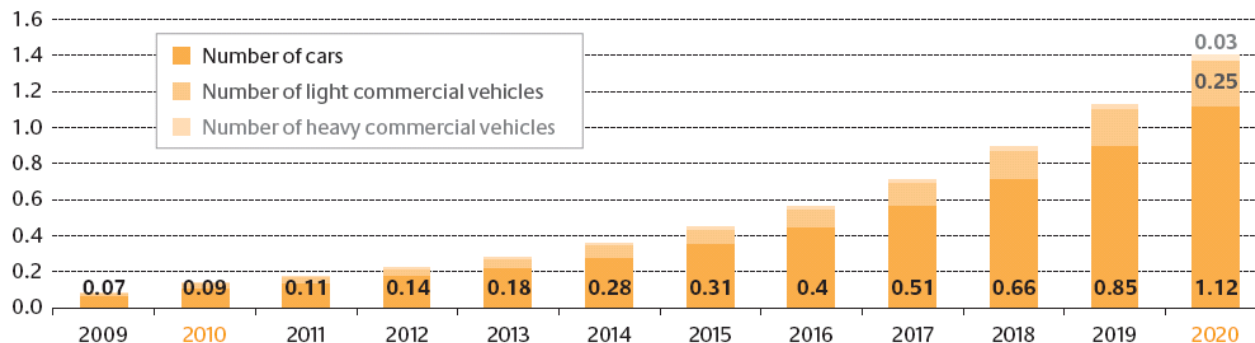
Number of natural gas vehicles worldwide (millions):



dena study: Federal Government's Fuel Strategy, 2004.

- Share of natural gas in German fuel market currently 0.3 %
- Goal of fuel strategy by 2010 not achieved: share of natural gas in the fuel market 0.5 to 2 %
- Assumption for 2020: 4 to 10 %
- Goal achievable, if sales figures increased sharply in next few years
- Annual growth needed in natural gas vehicles of 29 % to 1.4 m vehicles
- Potentially, increased market penetration of commercial vehicles

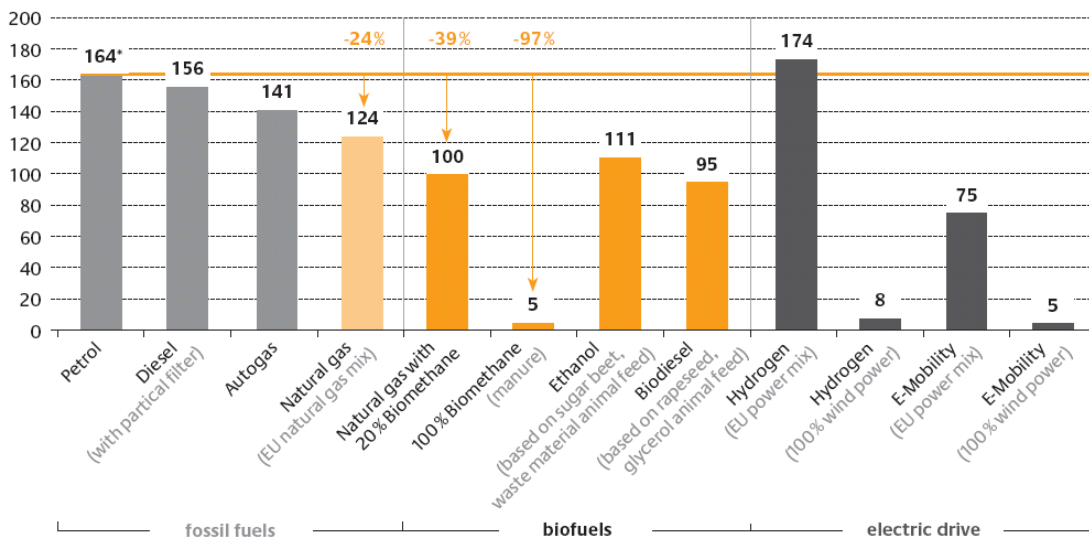
Increase in natural gas vehicle fleet required to reach goals for 2020 (million vehicles):



dena study: Greenhouse gas benefits of natural gas/ biomethane.

- Greenhouse gas reduction potential of natural gas compared to petrol up to - 24 %
- Further CO₂ reduction through addition of biomethane
- Reduction potentials of pure biomethane on same level as electric power/ hydrogen (assuming these come from renewable sources)

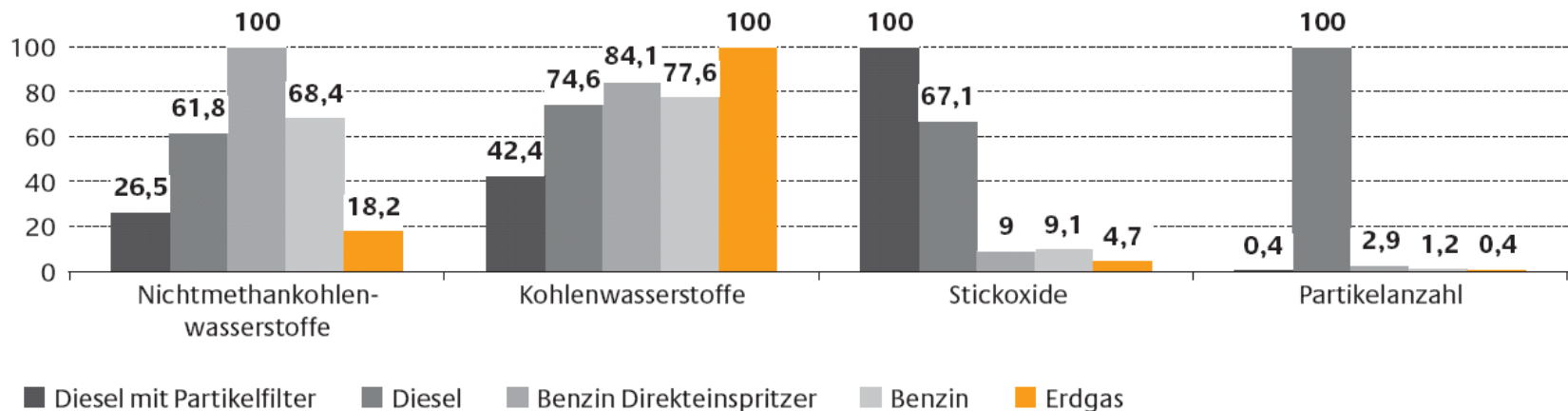
Greenhouse gas emissions, well-to-wheel (gCO₂ eq/km):



dena study: Pollution and noise level benefits of natural gas/ biomethane.

- Natural gas also has air pollution benefits compared to diesel or petrol vehicles
- Natural gas vehicles as a lever for noise reduction – especially compared to diesel-driven commercial vehicles in urban use

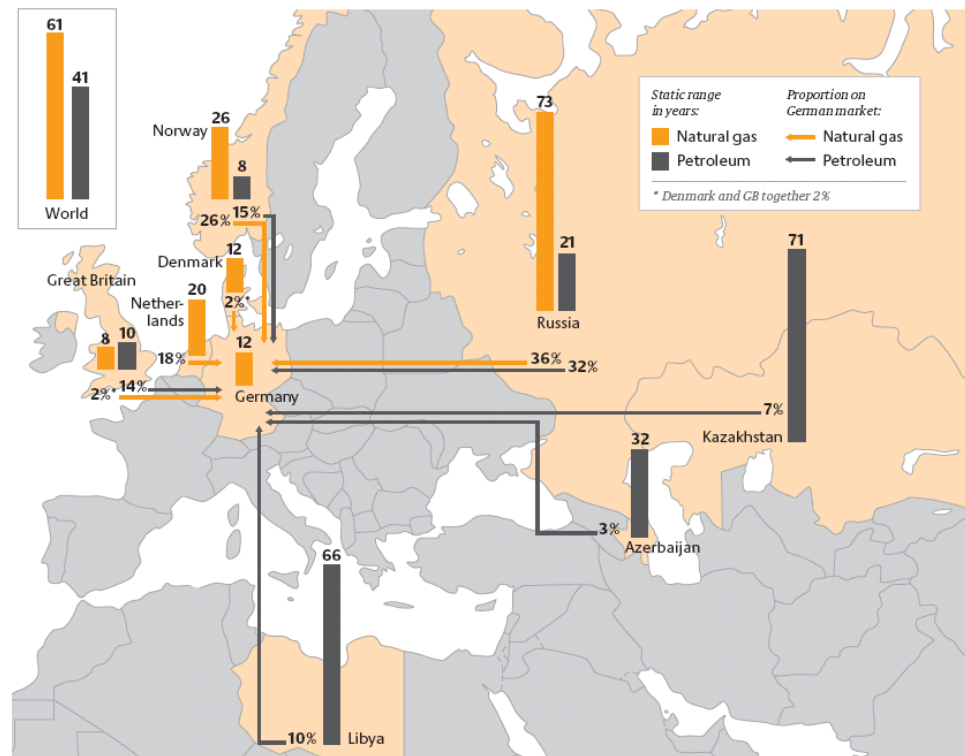
Relative pollutant emissions of selected fuels (%):



dena study: Raw material availability benefits of natural gas/ biomethane.

- Proportion of oil imported greater than 97 %
- Reserves of fossil fuels for transport extended by natural gas
- Portfolio of transport-relevant energy supply countries broadened by natural gas
- Possibility of gradually switching to renewable energy sources later, through input of domestically produced biomethane

Reserves-to-production ratios of Germany's main suppliers of natural gas and mineral oil:



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Area for action: Vehicle offer.

- Six of twelve largest car brands in Germany have no natural gas vehicles
- Hardly any mass-production vehicles in the lower or upper segments of car market
- Correspondingly limited offer of light or heavy commercial vehicles, buses or special vehicles

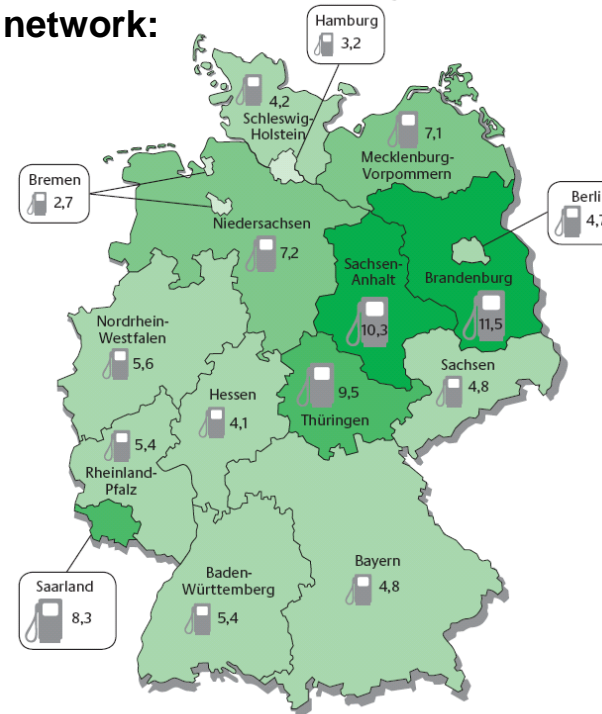
Natural gas vehicles from largest car brands:

Segment	Volkswagen	Daimler	BMW	Opel	Audi	Ford	Renault/Dacia	Skoda	Toyota	Fiat	Peugeot	Citroen
Mini	-			-		-	-		-	Panda	-	-
Kleinwagenklasse	-		-	-	-	-	-	-	-	Punto Evo	-	C3
Kompaktwagenklasse	-	B-Klasse	-	-	-	Focus	-	-	-	-	-	-
Kastenwagen	Caddy			Combo		-	-	-		Fiorino/Qubo	-	-
Van/Minivan	Touran	-	-	Zafira		C-Max	-		-	Doblo	-	-
Mittelklasse/Obere Mittelklasse	Passat	-	-	-	-	-	-	-	-	-	-	-
Oberklasse	-	E-Klasse *	-		-		-		-		-	-

Area for action: Fuel supply infrastructure.

- Approx. 860 of 14,500 fuel stations in total are natural gas stations
- Capacity utilisation too low, at approx. 90 vehicles per natural gas station
- Only two natural gas stations (of approx. 385 total) directly on autobahns
- Requirement for demand-oriented development of fuel station infrastructure

Proportion of natural gas stations in fuel station network:



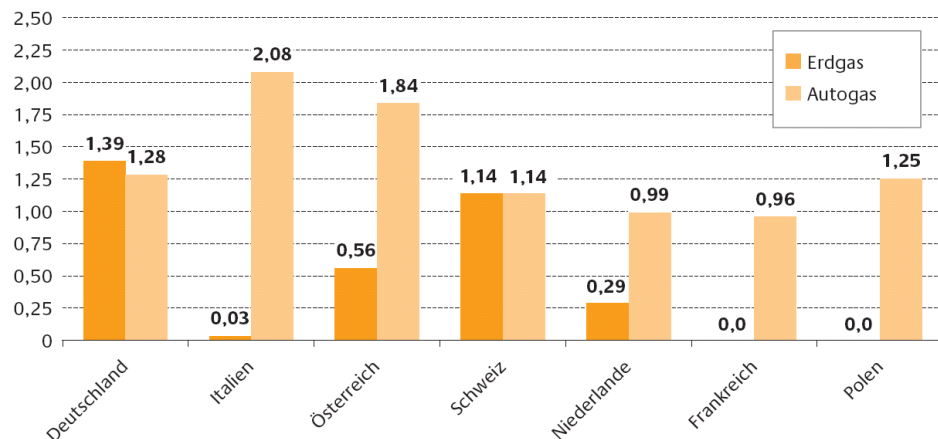
Anzahl Erdgastankstellen pro 100 Tankstellen



Area for action: Taxation.

- Reduced energy tax on natural gas until end of 2018
- Little differentiation from LPG based on CO₂ output – unlike e.g. in other European countries
- Need for continuation and differentiation of energy tax reduction

Energy taxes for CNG and LPG in Europe (cents/kWh):



Area for action: Price display.

- Different sales units currently used for petrol, diesel and LPG (litres) and natural gas (kilograms)
- In future, prices at fuel stations for electricity (kWh) and hydrogen
- Value-for-money of natural gas not immediately obvious
- Need to increase price transparency by consistent measurement basis (e.g. kWh)

Fuel prices by energy content (per 10 kWh):

Benzin	8	8	8
Diesel	8	8	8
Autogas	8	8	8
Erdgas	8	8	8
Strom	8	8	8
Wasserstoff	8	8	8

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Recommendations for action by actor group (I/II).



- Clear signals about continued relevance of natural gas and biomethane in fuel mix in future
- Updating of federal government's 2004 fuel strategy
- Continuation of energy tax reduction and differentiation by CO₂ output
- Introduction of “high efficiency vehicle” category for promotion of energy efficiency vehicles through regulatory and fiscal measures



- Demand-oriented development of network of natural gas stations
- Establishment of natural gas as a brand across all fuel stations
- Increased input of biomethane



- Development of a certification system for use of biomethane as a fuel

Recommendations for action by actor group (II/II).



- Coverage of main brands, segments and fields of application
- Intensification of marketing and sales for natural gas vehicles



- Improvement of cost structure of natural gas-relevant vehicle components



- Reduction of purchase costs of natural gas vehicles below level of diesel vehicles
- Increased information about natural gas as an alternative fuel
- Consistent introduction of natural gas vehicles into own fleets

- Establishment of a Round Table
- Agreement of concrete measures in a common Road Map
- Monitoring of implementation

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Compilation of study

- October 2009 to January 2010
- Benefits, Areas for action, Demands
- Language: German, plus summary in English



Publication

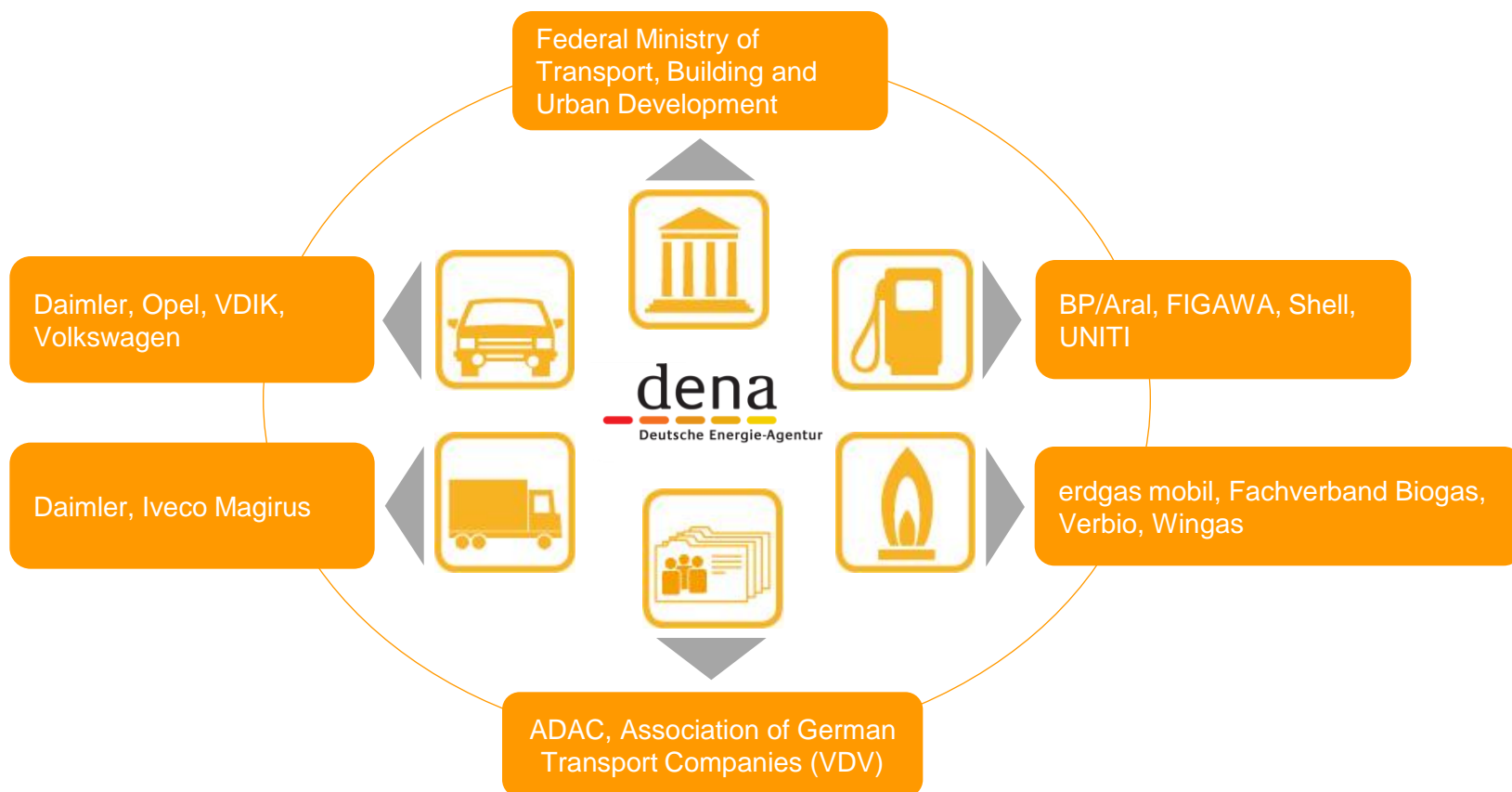
- January 2010
- Press conference
- Event with approx. 130 participants from politics, science, business
- Speakers: BMVBS, ADAC, DBV, Total, VDA



Round Table and Road Map

- Start in fourth quarter 2010
- Initiated by dena
- Supported by Federal Ministry of Transport (BMVBS)
- Participation of 15 well known companies
- Development of "Road Map" with concrete goals, measures, responsibilities
- First results by mid-2011
- Monitoring of implementation
- Takes account of federal government's mobility and fuel strategy, etc.

Next steps: Participants Round Table and Road Map.



Next steps: Contacts.

About dena

The Deutsche Energie-Agentur GmbH (dena) – the German Energy Agency – is the centre of expertise for energy efficiency and renewable energy sources. It focuses on the development of sustainable energy systems which make optimum use of energy and integrate renewable energy sources. dena's mission is to generate economic growth and maintain prosperity with ever lower energy inputs.

dena is developing energy efficiency and renewable energy markets in cooperation with stakeholders from the worlds of politics and business and from society at large. dena is working not only on consumption-side issues such as buildings, power and mobility, but also on issues of generation, networking and storage. dena encourages copybook projects, identifies and rewards pioneering work, advises politicians, manufacturers and service providers, cultivates opinion leaders, informs consumers, builds networks, evaluates technologies, analyses foreign markets and models future scenarios. dena primarily relies on market mechanisms and innovative energy services, backed up by appropriate regulatory policies and promotion programmes.

Shareholders in dena are the Federal Republic of Germany, KfW Bankengruppe, Allianz SE, Deutsche Bank AG and DZ BANK AG.

As a German limited company, dena's work is performance-based and cost-effective. It finances its projects primarily by means of Public Private Partnerships (PPP).

Contact

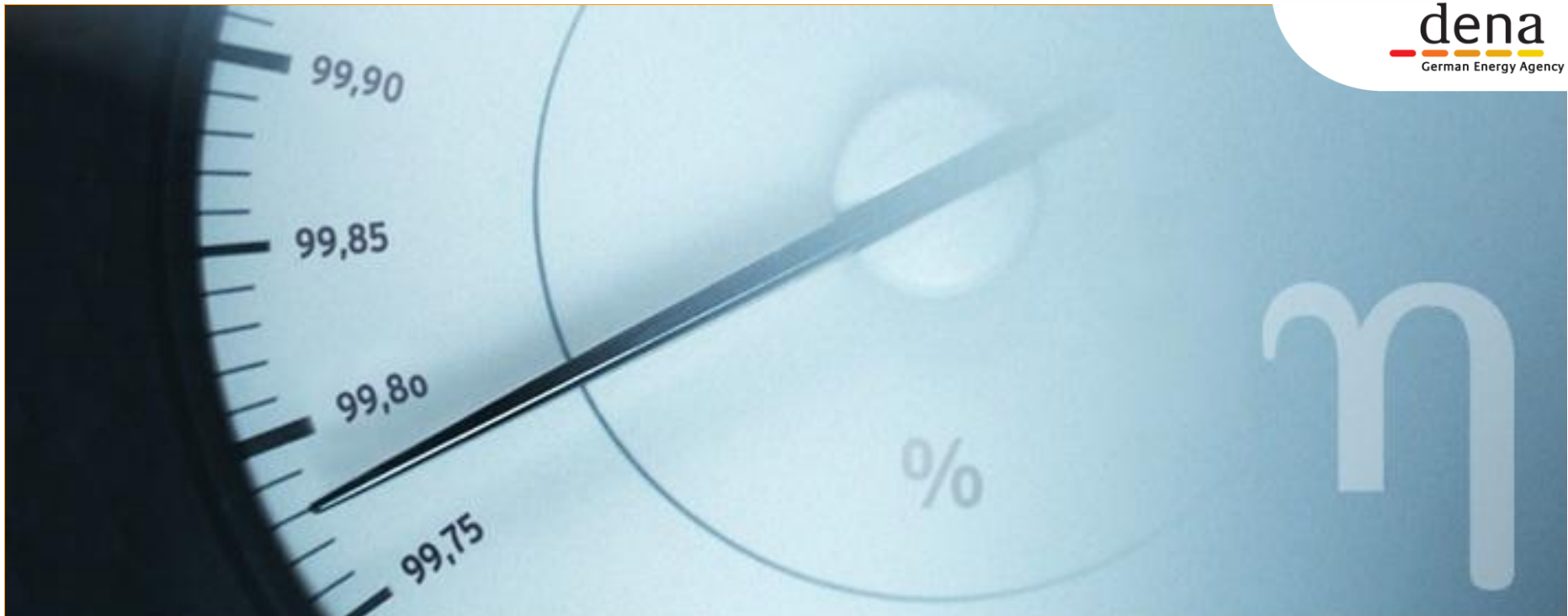
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Efficiency decides.