



# How to place natural gas solutions in climate neutral energy systems of the future

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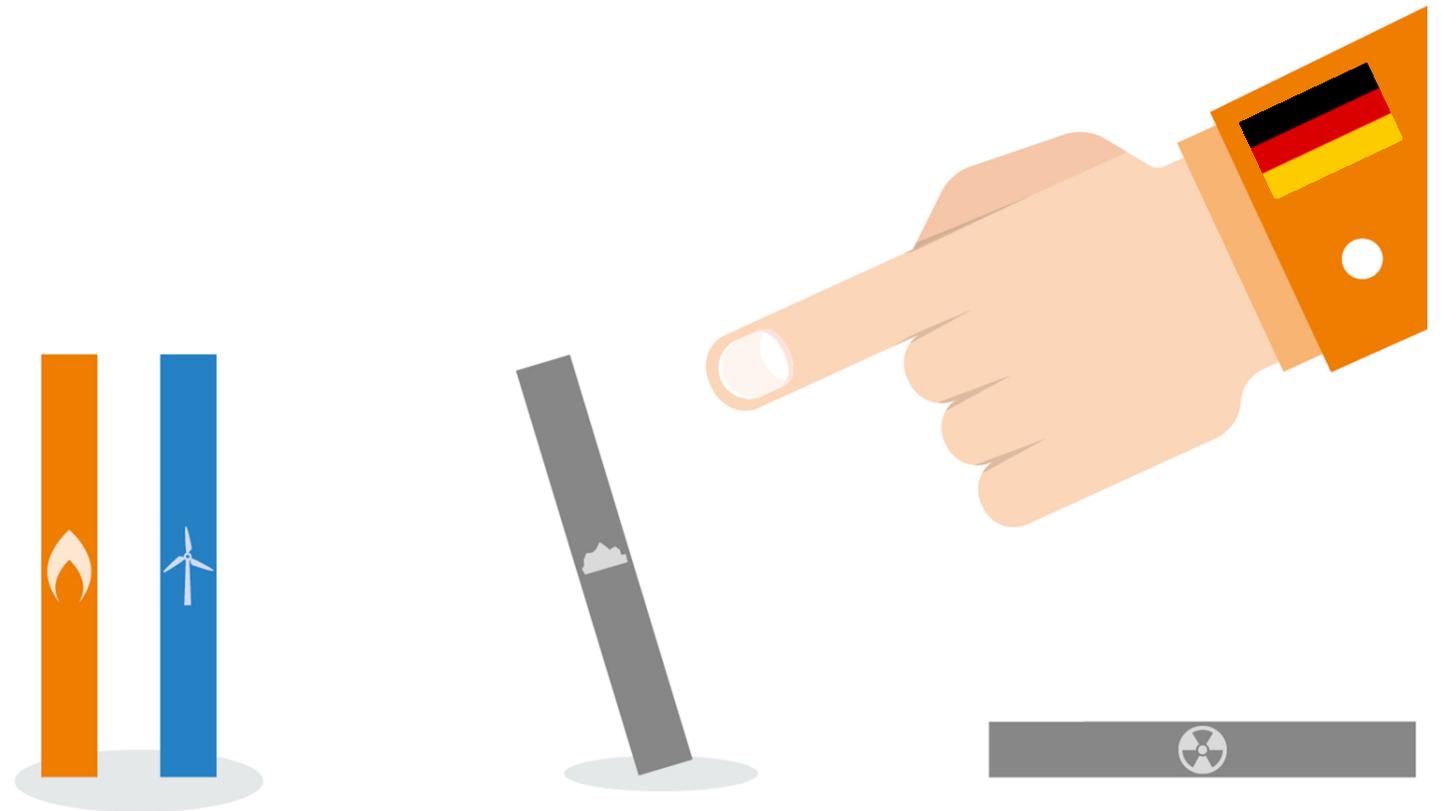


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## Background: Germany is a laboratory for future energy systems

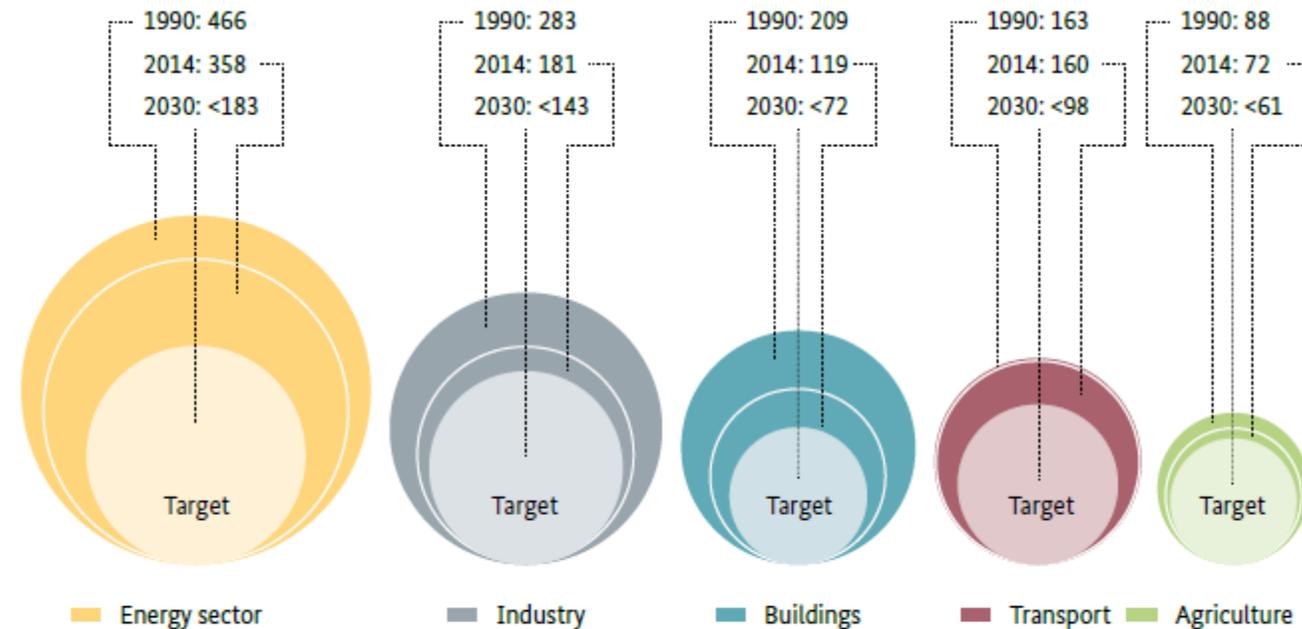
- With the „Energiewende“ (energy transition), Germany has opted for a fundamental transformation of its energy system.



# In German politics natural gas was **NOT** part of the solution!

- Focus only on renewable electricity (solar/wind)
- “Natural gas is a fossil fuel”
- Environmental impacts
- „efficiency first“
- „electrical solutions“ only

Sector targets of greenhouse gas emission will not be reached!



These values are taken from the Climate Action Plan 2050 (Section 5). Values in Section 4 of this brochure are based on current inventory data and may deviate. The field of action “buildings” in the Climate Action Plan comprises the sectors “private households” and “CTS”, which are presented individually in this brochure.

Source: BMUB 2016

## How to work on it?

- DVGW developed a set of more than 50 energy studies.
- DVGW take the excerpts from the scientific work and bring it to an **integrated new storyline**.
- Brochure (60 pages)
- 9 fact sheets with short and simple messages.
- professional website: [www.dvgw-energie-impuls.de](http://www.dvgw-energie-impuls.de)
- dialogue process with
  - public events
  - expert forums
  - More than 180 Experts from more than 50 institutions,
  - Government and NGOs, Journalists and Politicians.
- very important: DVGW is a neutral, technical and scientific organisation.



# Integrated new storyline – simple and effective



## Fuel Switch



Fuel Switch means the replacement of CO<sub>2</sub> intensive energy sources like coal and oil by renewable gases and energy sources with less CO<sub>2</sub> emissions like natural gas.



## Content Switch



Content Switch means the continuous increase of CO<sub>2</sub> free gases within the electricity-, mobility- industry- and heating sector.

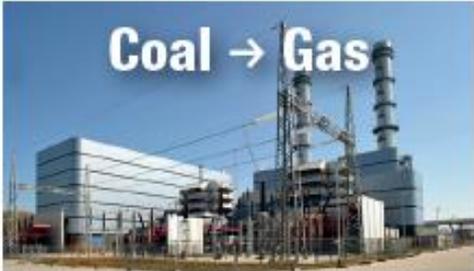
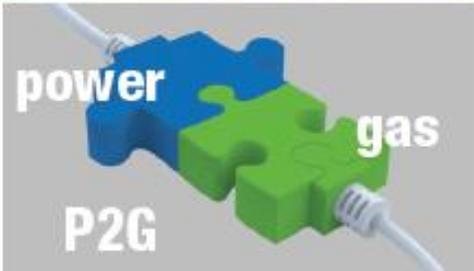


## Modal Switch



Modal Switch means the lineal sectoral interconnection of the existing infrastructure as a basis for an efficiently working integrated energy system.

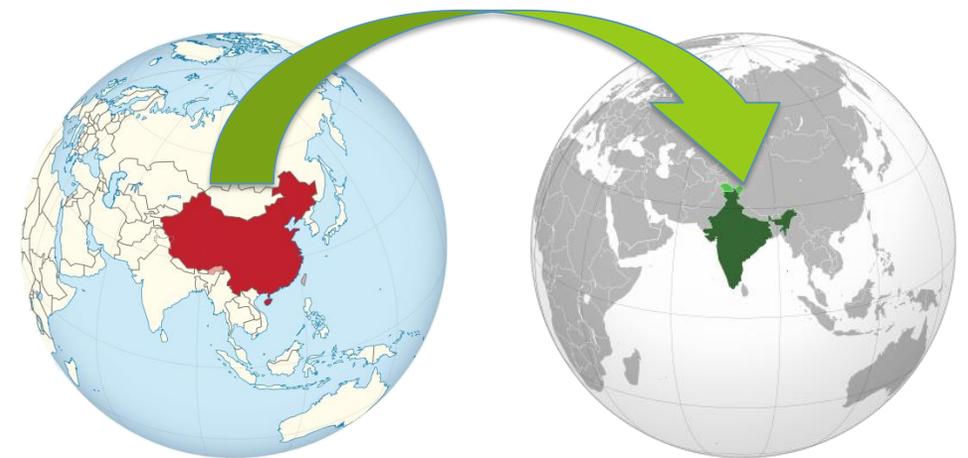
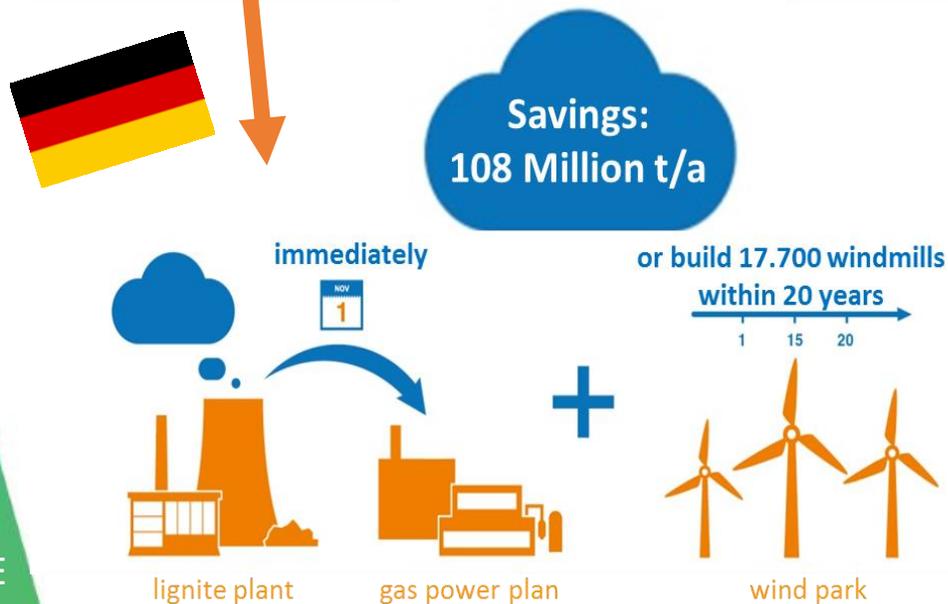
# How the three switches look in all three sectors

	Power sector	Heat sector	Mobility sector
Fuel-Switch	Coal → Gas 	Oil → Gas 	Diesel → CNG / LNG 
Content-Switch	Biogas 	Greening of gas 	Biogas for transport 
Modal-Switch	power gas P2G 	CHP FC 	e-fuels 

# Fuel switch in the power sector

	Power sector	Heat sector	Mobility sector
Fuel-Switch	Coal → Gas	Oil → Gas	Diesel → CNG/LNG
Content-Switch	E-gas S-gas B-gas	Greening of gas	Biogas for transport
Modal-Switch	power P2G	CHP FC	e-fuels

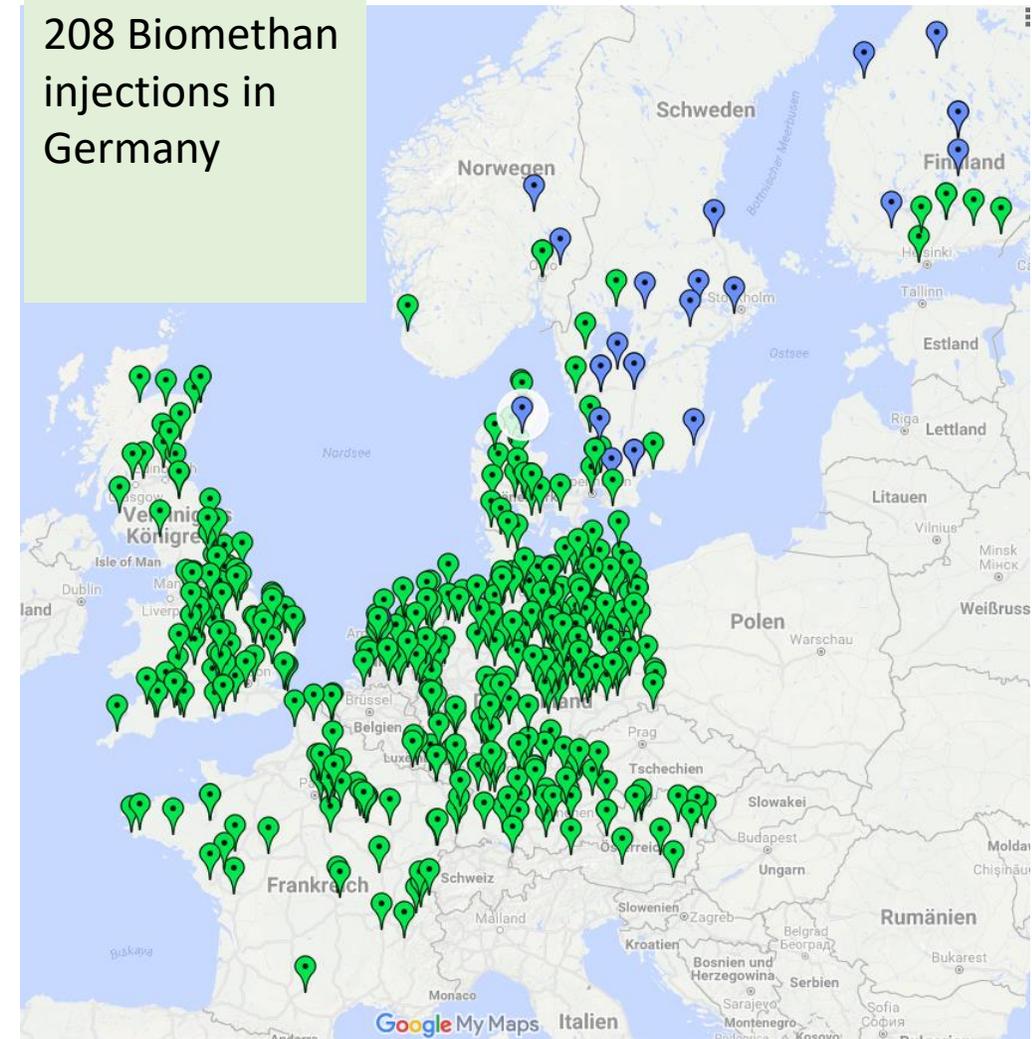
- Scenario: Replacement of only 5% of coal-fired power stations currently on the grid in China with modern gas-fired power plants every year over next 10 years
- Effect: **3,200 Million tons of CO<sub>2</sub>** within this 10-year period
- By comparison: GHG that entire economy of India emits within approx 1.5 years



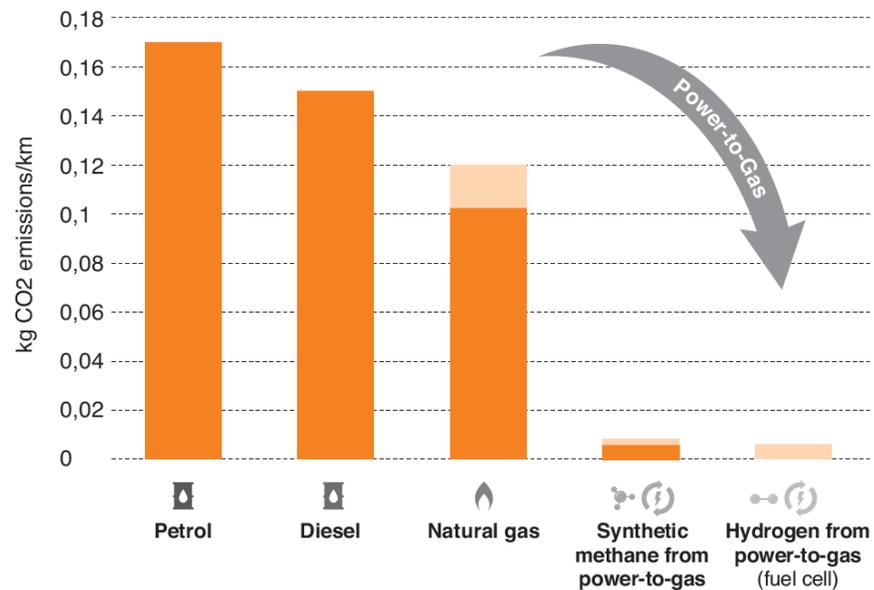
# Content switch in the mobility sector

	Power sector	Heat sector	Mobility sector
Fuel-Switch	Coal → Gas	Oil → Gas	Diesel → CNG / LNG
Content-Switch	Biogas	Greening of gas	Biogas for transport
Modal-Switch	P2G	CHP FC	e-fuels

208 Biomethan injections in Germany



Specific CO<sub>2</sub> emissions well-to-wheel passenger car (motorised private transportation)





# Conclusion: DVGW has delivered a consistent and effective emission reduction concept for all sectors



## IMPLEMENTATION EXAMPLE GERMANY

	Power sector	Heat sector	Mobility sector
Fuel switch	Coal → Gas <b>110 million t CO<sub>2</sub></b> per year	Oil → Gas <b>18,4 mio. t CO<sub>2</sub></b> (buildings) <b>12 mio. t CO<sub>2</sub></b> (commercial) per year	Diesel → CNG/LNG <b>25% CO<sub>2</sub></b> reduction
Content switch	Greening of base-load power	Reduction of more than 80% in greenhouse gas emissions in 2015 – savings in terms of direct greenhouse gas emissions of <b>642 million t</b> in the period up to 2050	With bio-LNG, <b>50%</b> of truck traffic can be zero-emission traffic by 2030
Modal switch	Less power grid expansion More energy storage more decentralized approach		Follow-up strategy with e-fuels

## Thanks for being interested!

Visit us at the exhibition: stand 2257

Learn more about  
**Fuel, Content, Modal Switches**

[www.dvgw.de](http://www.dvgw.de)

- 2600 honorary independent Experts
- 280 technical committees
- 159 years setting global Standards for Gas and Water

