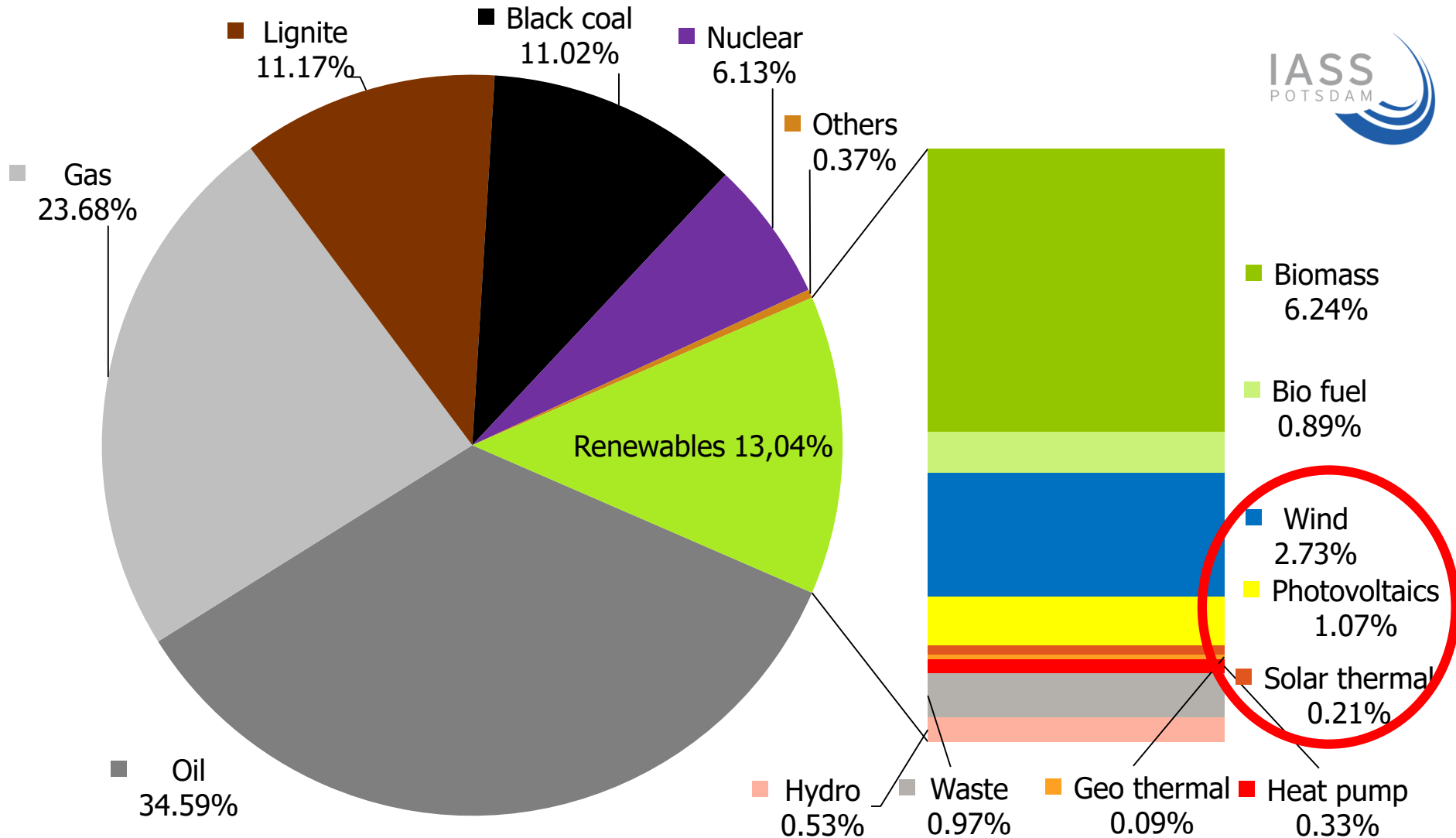


# Climate Policy Goals Germany

|   | 2017    | 2020           | 2050                   |
|---|---------|----------------|------------------------|
| Green house gas (GHG) - Emissions reduction |         |                |                        |
| GHG-Emissions compared to 1990              | -31,7 % | min.<br>- 40 % | min.<br>- 80 bis -95 % |

2020 GHG reduction goals will foreseeable not be reached, backsliding  
on the climate goals by government  
(focus on goal 2030 -55%)

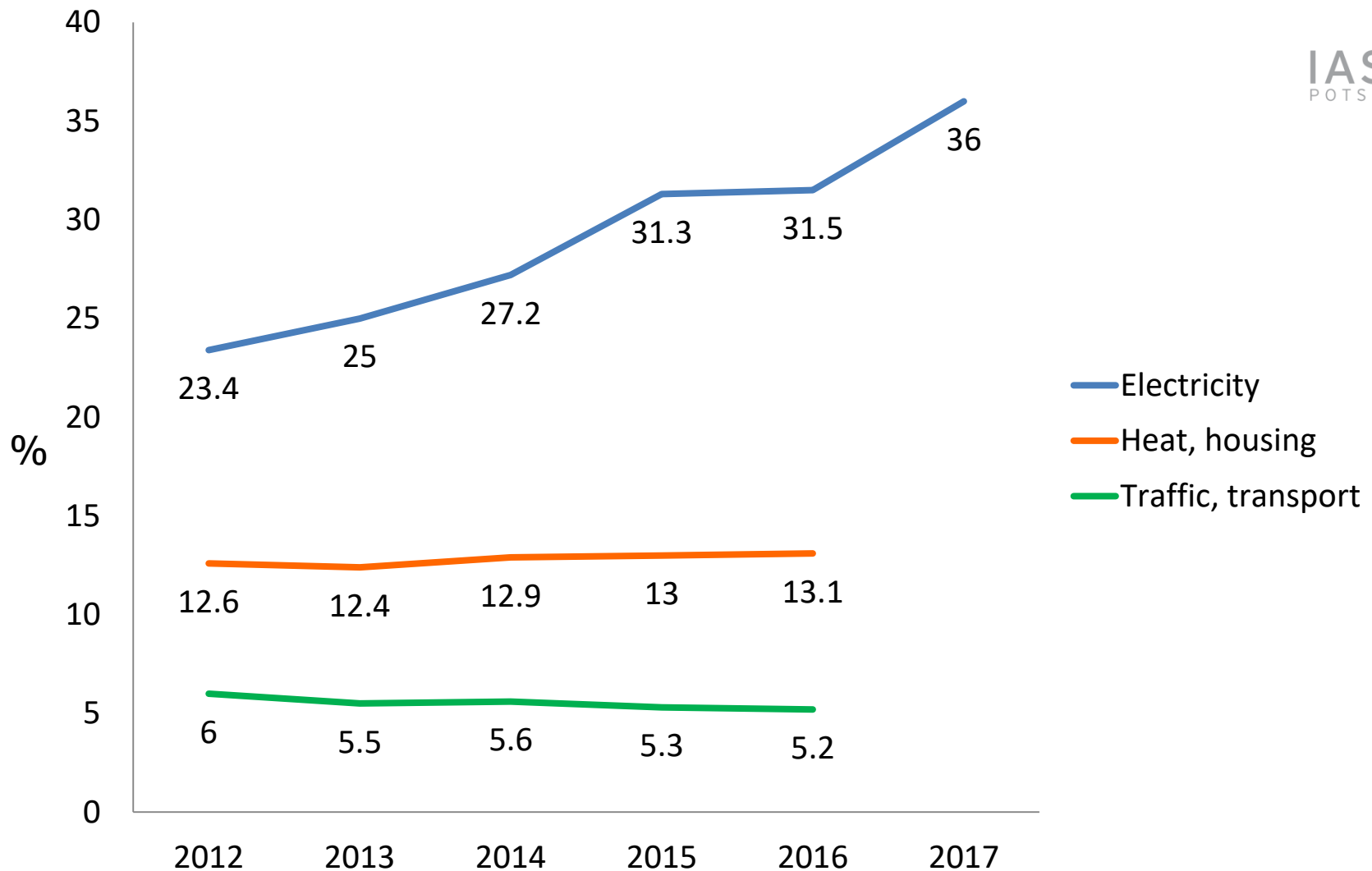
# Primary Energy Consumption Mix



# Renewable Energy Share Goals

|  | 2017    | 2020             | 2050      |
|--|---------|------------------|-----------|
| Renewable energy goals - SHARE in energy consumption |         |                  |           |
| Total  | < 15 %  | 18 %             | 60 %      |
| Electricity  | 37%     | min. 35 %        | min. 80 % |
| Heat   | 13%     | 14 %             | -         |
| Transport  | 5,2 %   | -                | -         |
|  | < 60000 | 1 Million e-cars | -         |

# Renewable Energy by Sector



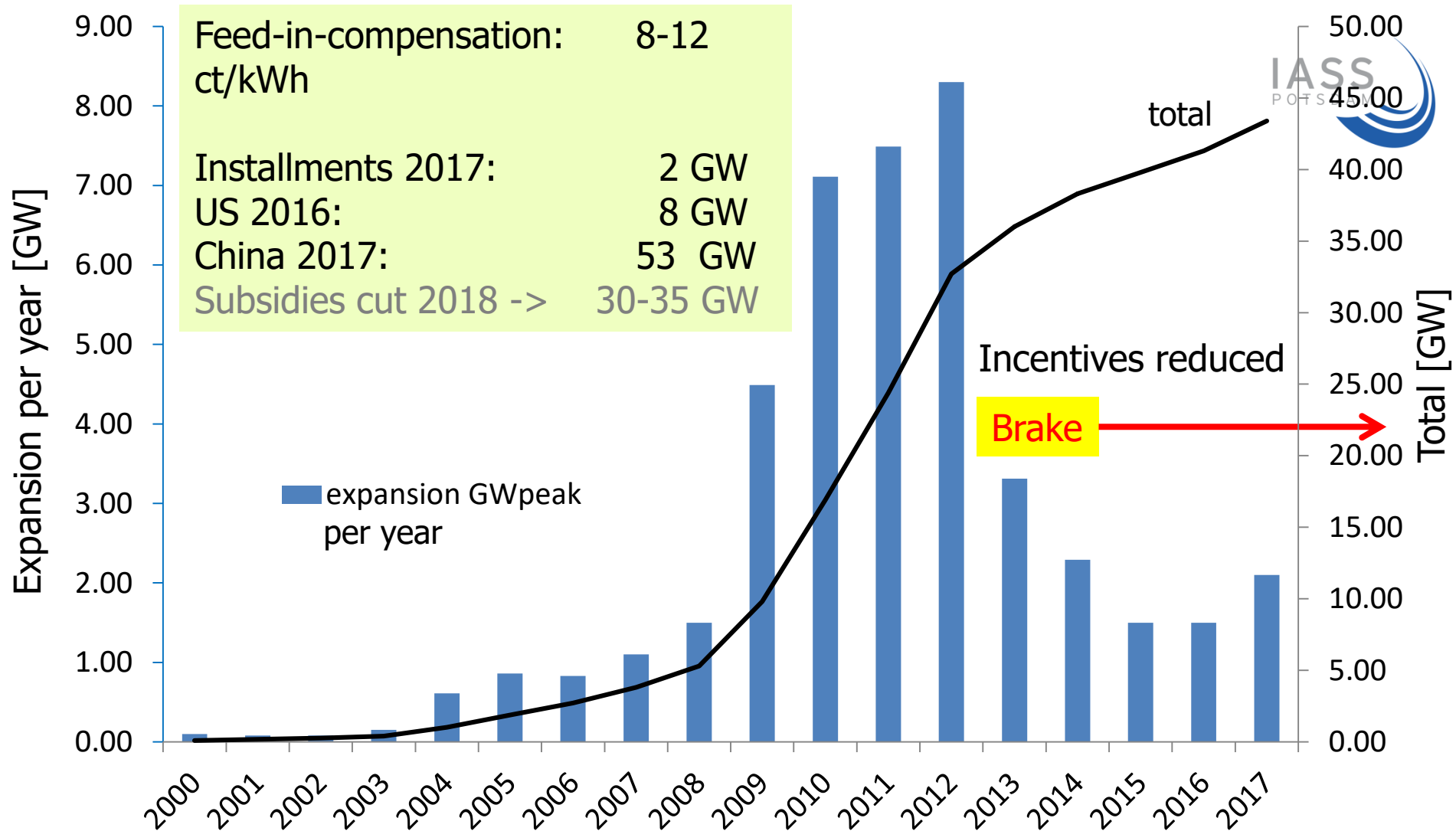
# Efficiency Goals

|   | 2017         | 2020   | 2050   |
|---|--------------|--------|--------|
| Energy consumption reduction compared to 2008 |              |        |        |
| Total   | - 6 %        | - 20 % | - 50 % |
| Electricity                                   | + 6 %        | - 10 % | - 25 % |
| Heat  | - 7 % (2015) | - 20 % | - 80 % |
| Transport (compared to 2005)                  | + 1 % (2016) | - 10 % | - 40 % |

# Feasibility to achieve GHG goals

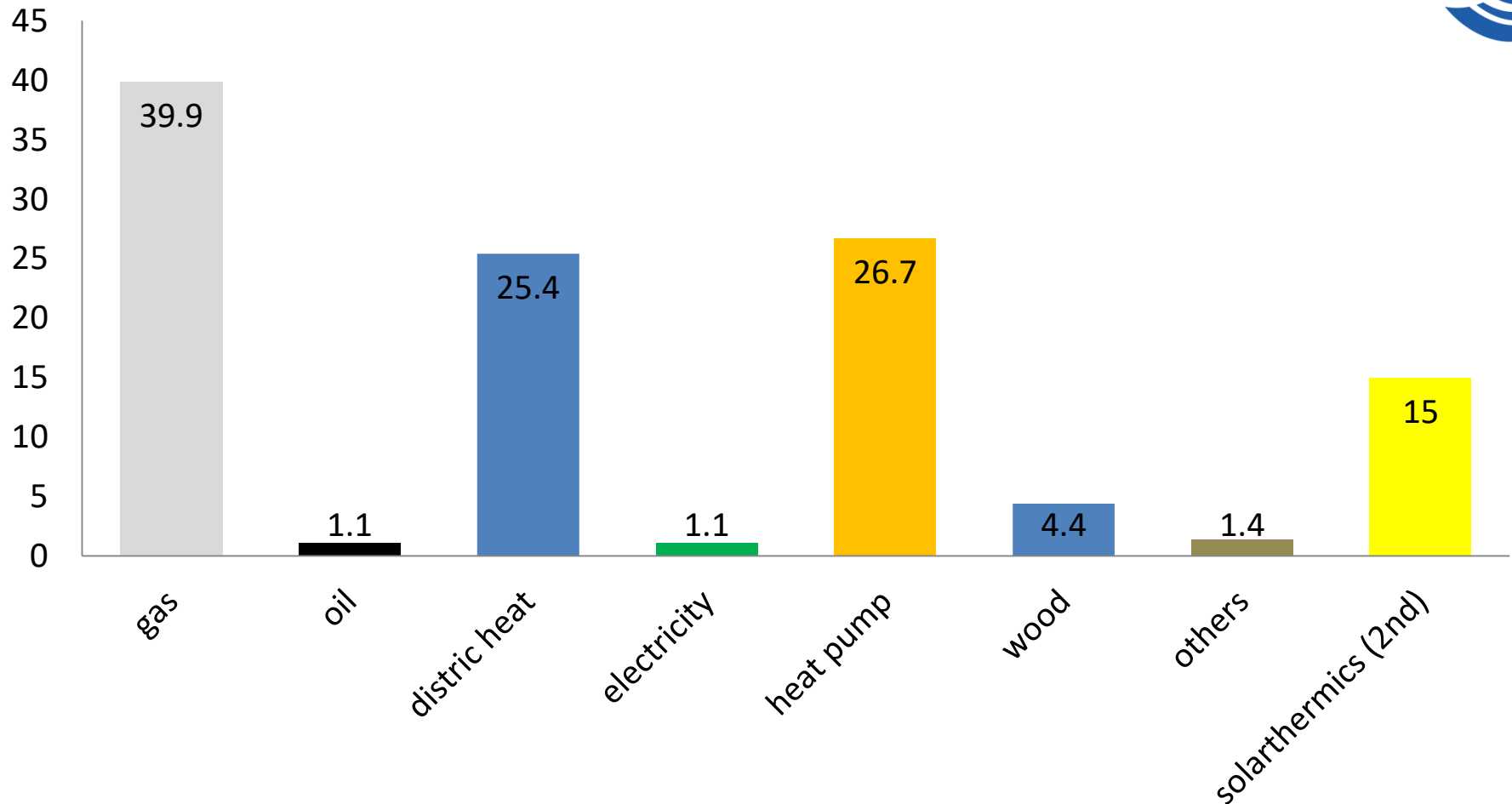
| Energy source                       | Target systems 80-100 %<br>Renewables capacity [GW] | Total installed capacity<br>[GW]                                      |
|-------------------------------------|---|---|
|                                     | 2050  | 2017  |
| Wind onshore                        | 170-200   | 50<br>(installments limited to +2.8<br>per year including repowering) |
| Wind offshore                       | 33-85   | 5   |
| Photovoltaics                       | 150-250   | 43<br>(limited to +2.5 per year)                                      |
| Hydro                               | 5   | 5.6   |
| Solar thermal                       | 130-180   | 14.5  |
| Biomass                             | 50 TWh  | 47 TWh (installments limited<br>to 150MW per year)                    |
| Synthetic fuels<br>(supplied by RE) | 80-180  | 0   |

# Photovoltaics installments



# New Construction Heating Systems

still > 60 % fossil based heating systems



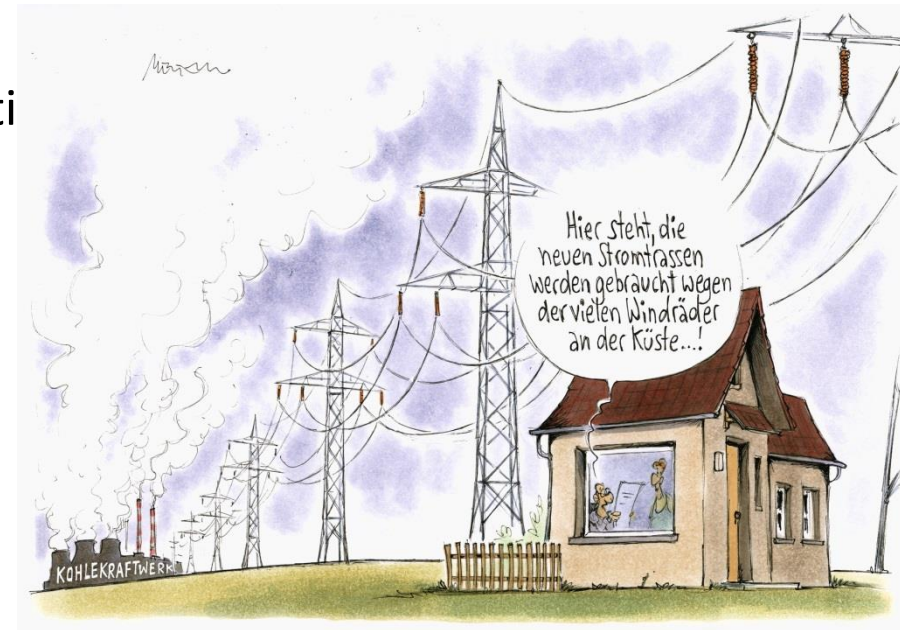


# German Energy Transition 2018

- 37% renewables share in electricity net consumption mix 2017 (US 15 %) (42% Oct-Dez 2017) , however just 13 % renewables share in total
- Robust energy systems with no blackouts
- Phase-out of all nuclear power plants until 2022
- Coal phase out to be determined

Tenders for RE installations:  
highest winning bid  
(Nov 2017 – be built  
until 2021)

onshore wind 3.8 €/kWh  
offshore wind 1.9 €/kWh  
photovoltaics 4.9 €/kWh



# Socio-structural change in the coal sector test for mobility sector ?

› 800'000 Employees in German car industry (2017), only 20'000 in coal

- Innovationcity Ruhr
- Zukunftswerkstatt Lausitz (Lusetia)





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Thank you

