

# Historical climate change worldwide



The CO<sub>2</sub> content in the atmosphere is increasing:  
- Highest CO<sub>2</sub> concentration in at least 800,000 years.



## The oceans are heating up:

- Ocean temperatures have risen 0.5 °C in 35 years.
- In 150 years, the acid content of the ocean surface has risen roughly 30 per cent.
- Sea levels are rising 3.4 mm per annum (± 0.4 mm).



## Atmospheric temperatures are rising:

- The air at the earth's surface has heated up significantly.
- Three consecutive record heat years, clusters of temperature records.
- Since the 1960s, every decade has been warmer than the previous one.



## The polar ice caps and glaciers are melting:

- Greenland is losing 250 to 300 billion tonnes of ice annually.
- 80 per cent of the mountain glaciers under observation are losing ice mass.
- The sea ice around the North Pole is diminishing constantly.




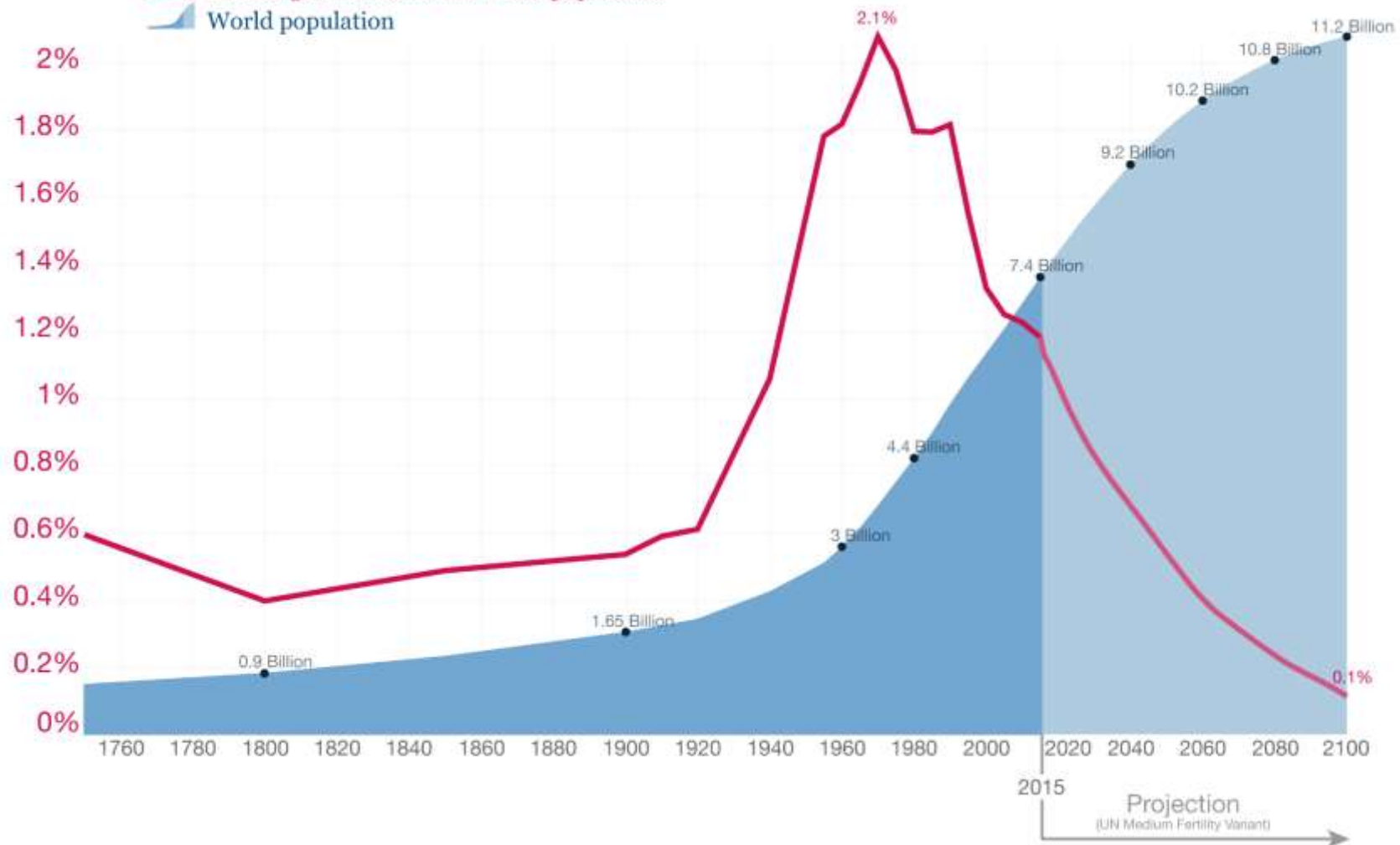
## Natural disasters are on the rise:

- Globally, natural events involving damage have tripled.

Our World  
in Data

## World population growth, 1750-2100

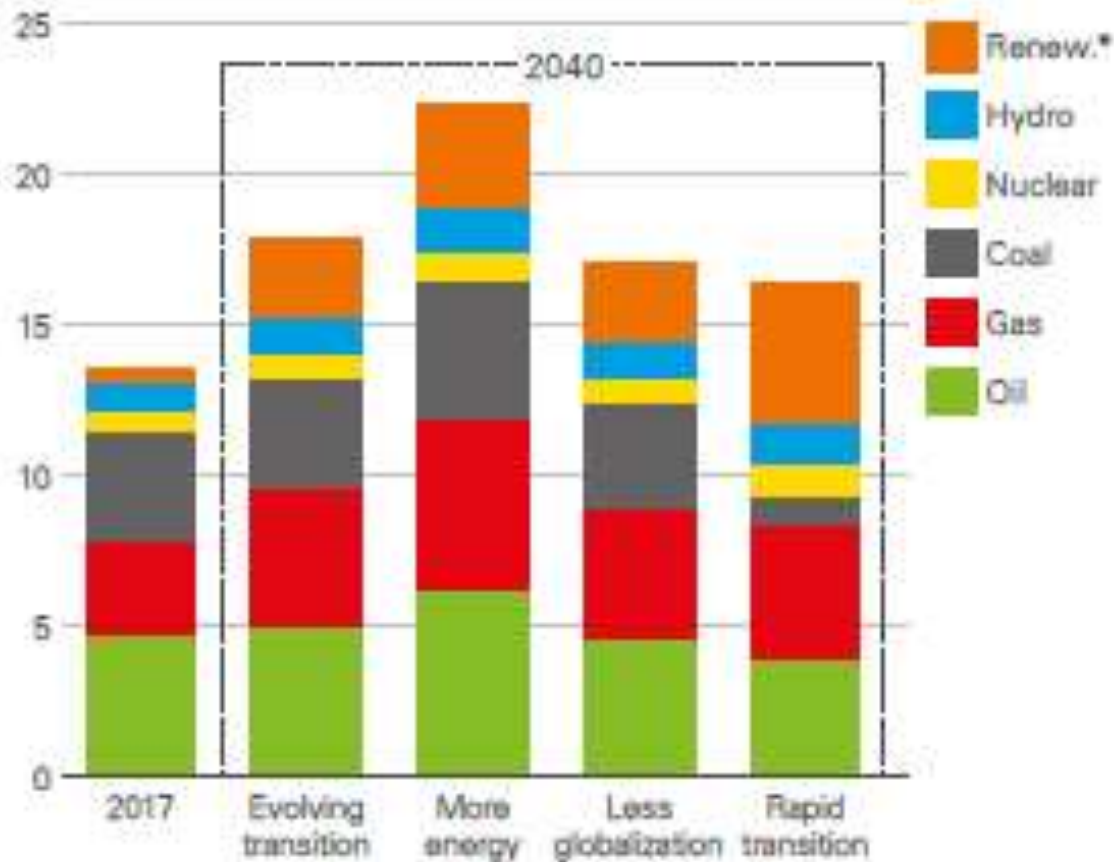
 Annual growth rate of the world population  
 World population



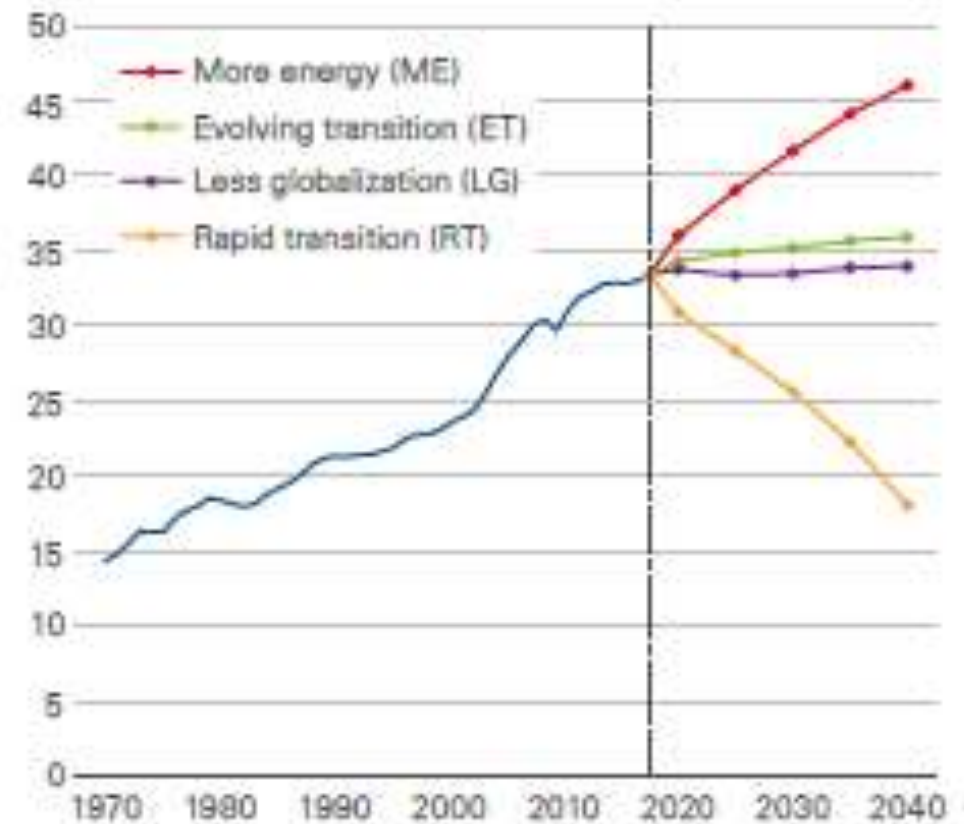
Data sources: Up to 2015 OurWorldInData series based on UN and HYDE. Projections for 2015 to 2100: UN Population Division (2015) – Medium Variant. The data visualization is taken from OurWorldInData.org. There you find the raw data and more visualizations on this topic.

# BP Energy Outlook (Feb 2019)

Primary energy consumption by fuel  
 Billion toe



CO<sub>2</sub> emissions  
 Gt of CO<sub>2</sub>



# International Contracts



## 1992: UNFCCC

United Nations Framework Convention on Climate Change

**Goal:** prevent dangerous anthropogenic interference with the climate system  
**2019:** 197 ratifiers



**United Nations**  
Framework Convention on  
Climate Change



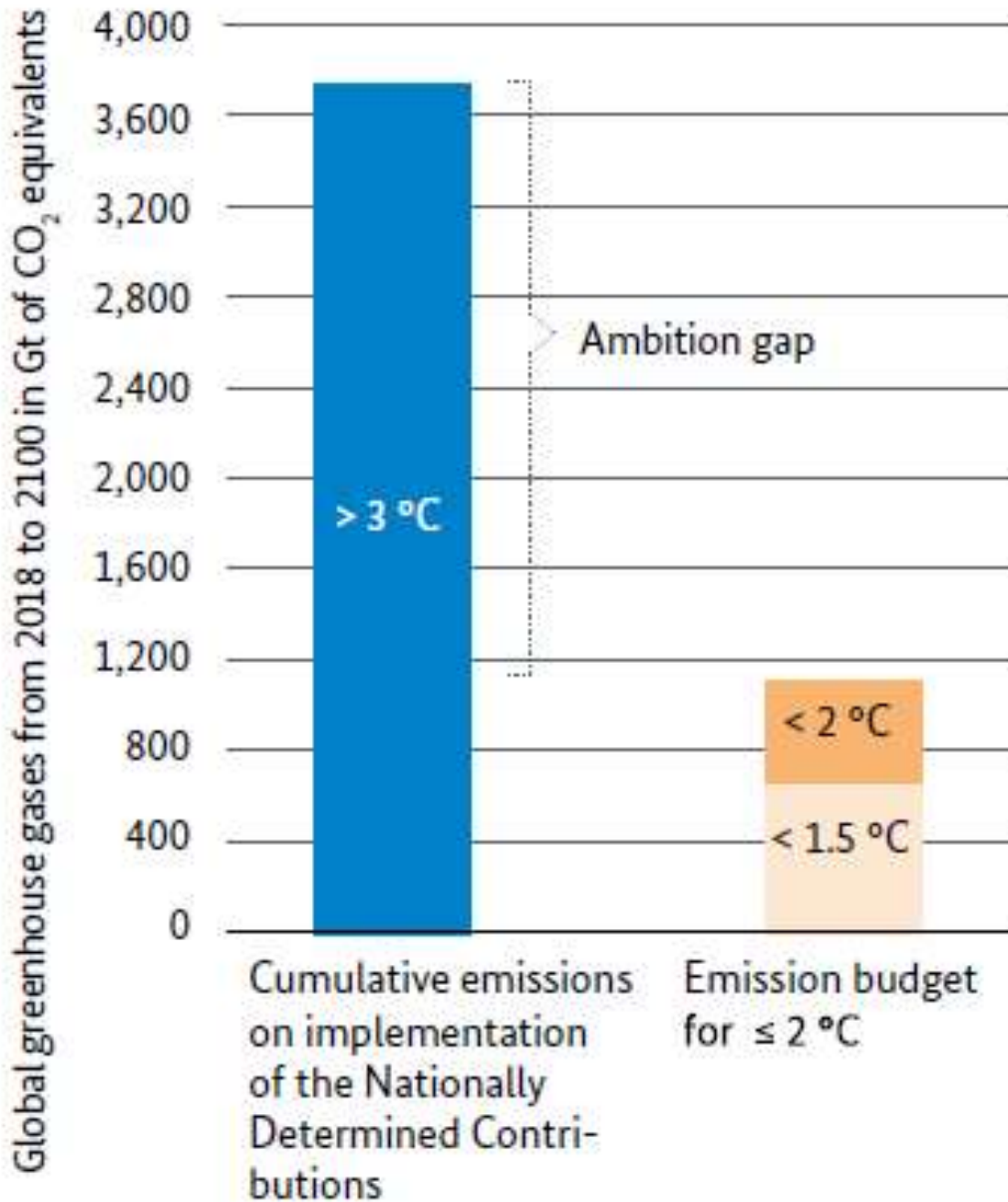
## 1997: Kyoto-Protokoll

**Goal:** decrease til 2020: GreenHouseGases -20% (1990 = 100%)  
**2005:** 141 nations signed

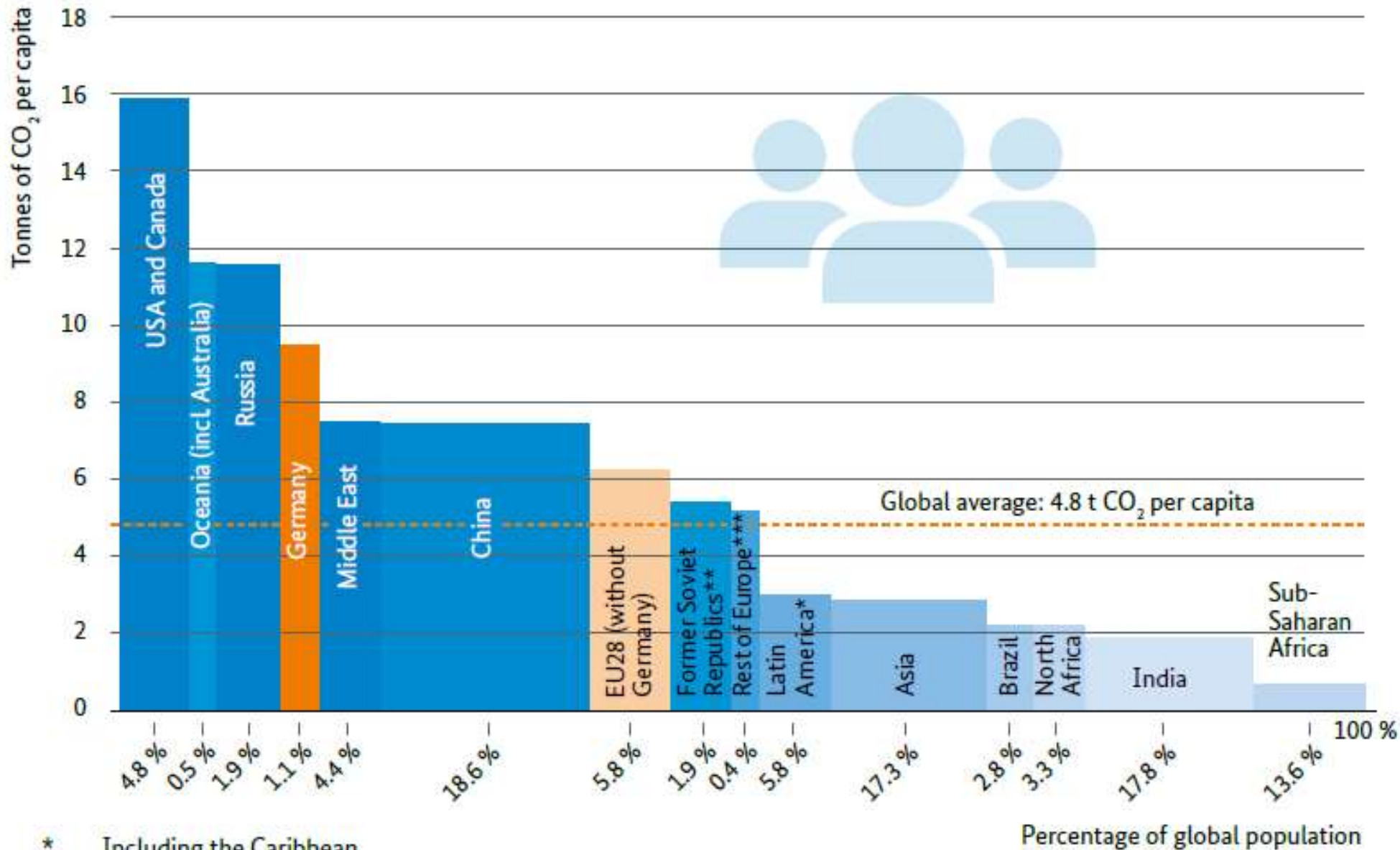
## 2015: Paris Agreement: 2015

**long-term goal:** keep global average temperature to well below 2 °C; and limit the increase to 1.5 °C (above pre-industrial levels)  
**2019:** 195 nations ratified





**Gap between planned Nationally Determined Contributions and remaining emissions budgets per the Paris Agreement**



International per capita CO<sub>2</sub> emissions by percentage of global population 2016

\* Including the Caribbean

\*\* Excluding Russia; Estonia, Latvia and Lithuania are included in EU28

\*\*\* The rest of Europe comprises Norway, Switzerland, Iceland and the Balkan States  
 Due to rounding, the percentages of the world population do not add up to 100 %.



# European Agreements, & Obligations



## Key EU targets for 2020 *(Climate and energy pact; 2008)*

- 20% cut in **greenhouse gas emissions** compared with 1990
- 20% of total energy consumption from **renewable energy**
- 20% increase in **energy efficiency**



# European Agreements, & Obligations



## Key EU targets for 2030

*(EU Obligation 2015)*

- At least 40% cut in **greenhouse gas emissions** compared with 1990
- At least 27% of total energy consumption from **renewable energy**
- At least 27% increase in **energy efficiency**

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EUROPEAN UNION

# European Agreements, & Obligations



Long-term goal      *(EU Obligation; 2015/2018)*

By 2050:      cut of emissions substantially –  
by 80-95% compared to 1990 levels;

## EU climate package 2020

-20 % emissions reduction compared with 1990

### Effort sharing:

Allocation of the effort-sharing target to the 28 Member States



## EU climate package 2030

-40 % emissions reduction compared with 1990

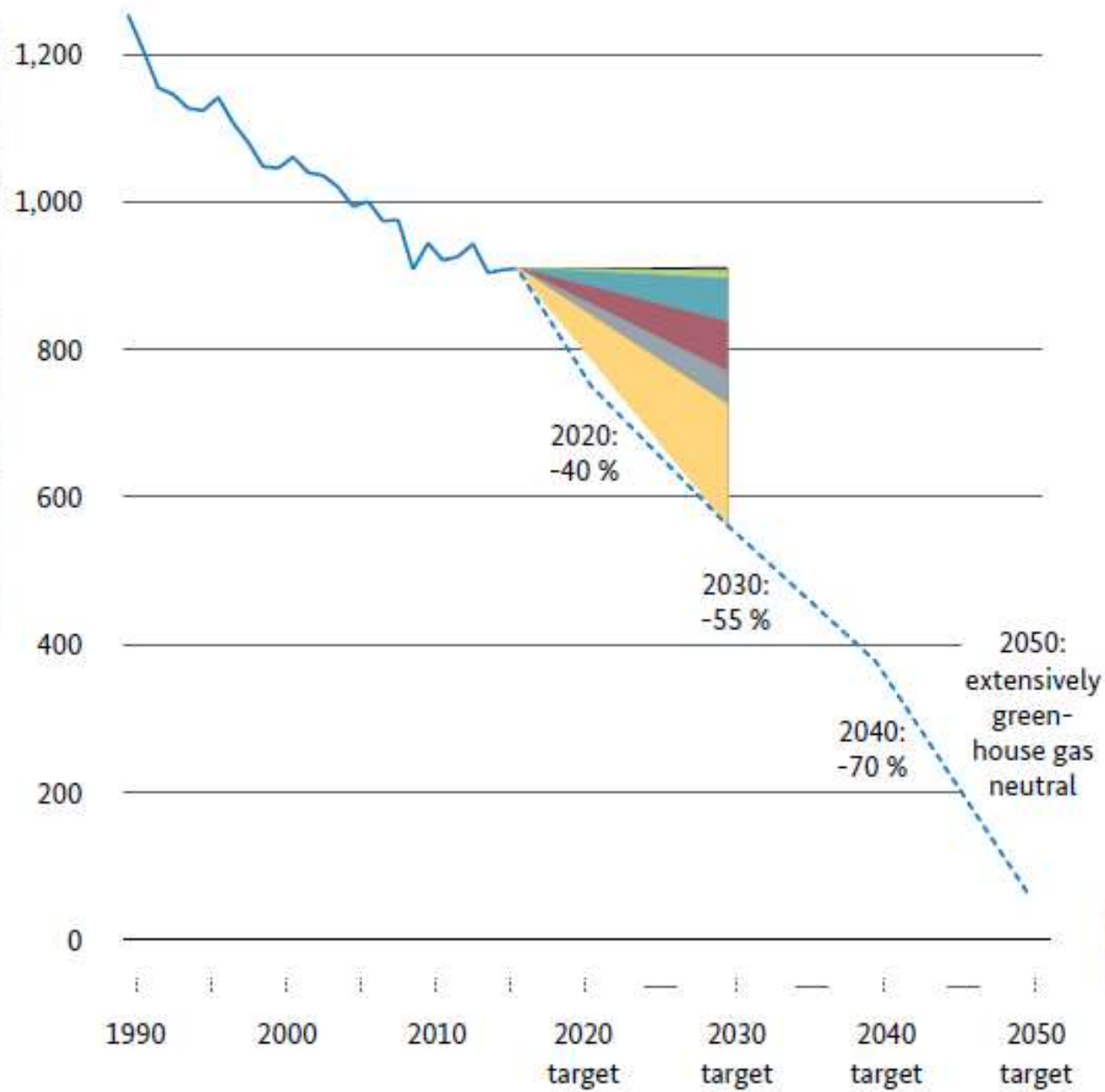
### Effort sharing:

Allocation of the effort-sharing target to the 28 Member States

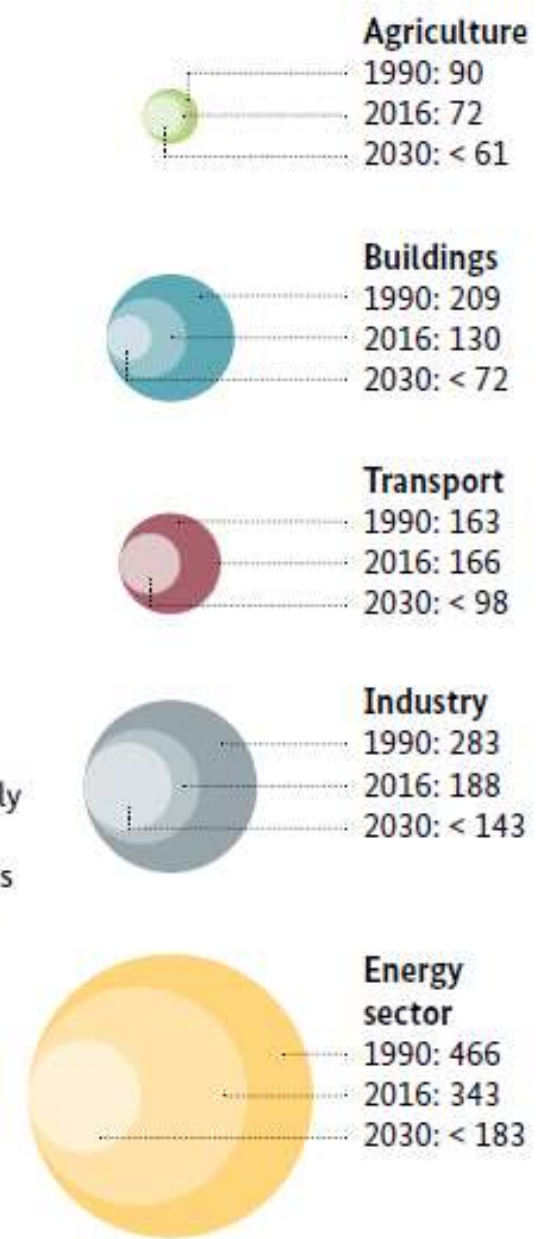


Breakdown of EU climate target

Greenhouse gas emissions (mill. t CO<sub>2</sub> equivalents)



--- Greenhouse gas emissions    --- Target path

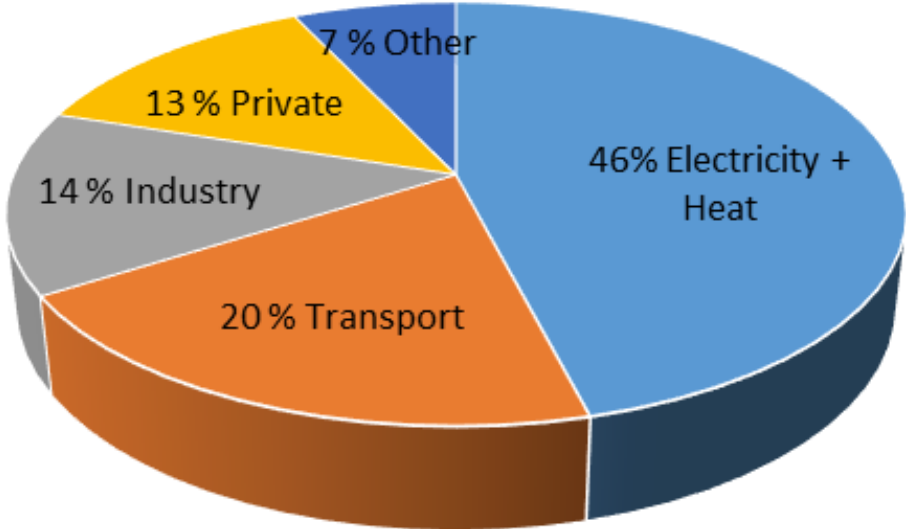


All figures in mill. t CO<sub>2</sub> equivalents

**Historic  
greenhouse gas  
emissions in  
Germany,  
with savings trends  
per Climate Action  
Plan in million  
tonnes of CO<sub>2</sub>  
equivalents**

# Status Quo Germany

CO2-Emissions Germany in % (2017)



Source:  
Ifeu-Institute

- Electricity + Heat
- Transport
- Industry
- Individual private
- others

# Status Quo Germany

## Data & rough estimations Germany 2018



14478 C-fuel stations



Example: 13.500 km / year ~ 820 kg fuel ~ 2.58 tons CO<sub>2</sub>

~ 46,5 Mio

6,0 – 8,5 l / 100 km Diesel / Gasoline



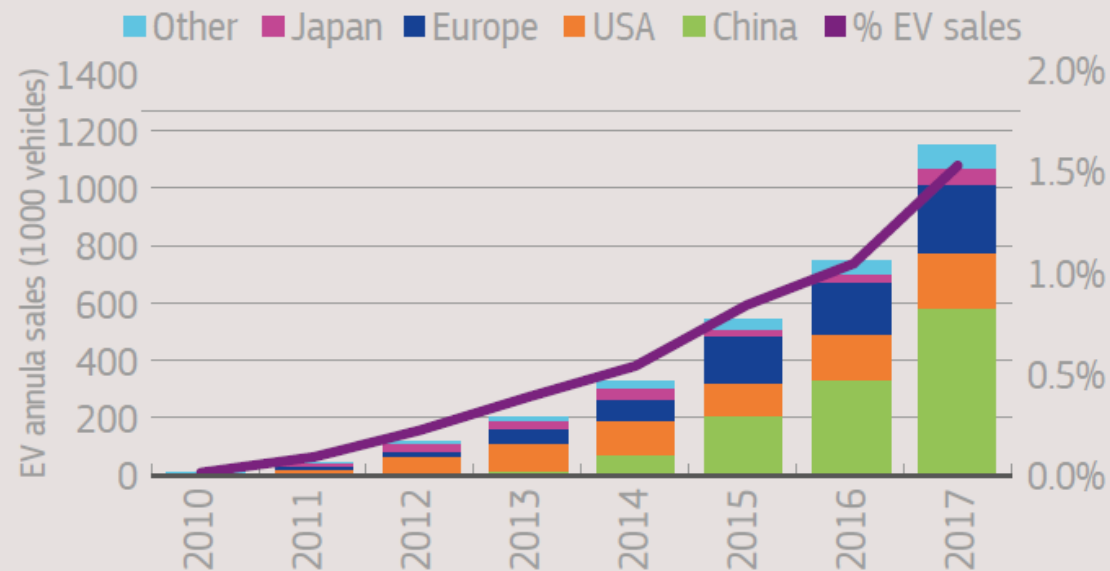
Example: 95.000 km / year ~ 38.450 kg fuel ~ 121.1 tons CO<sub>2</sub>

~ 2,2 Mio

32 - 40 l / 100 km Diesel

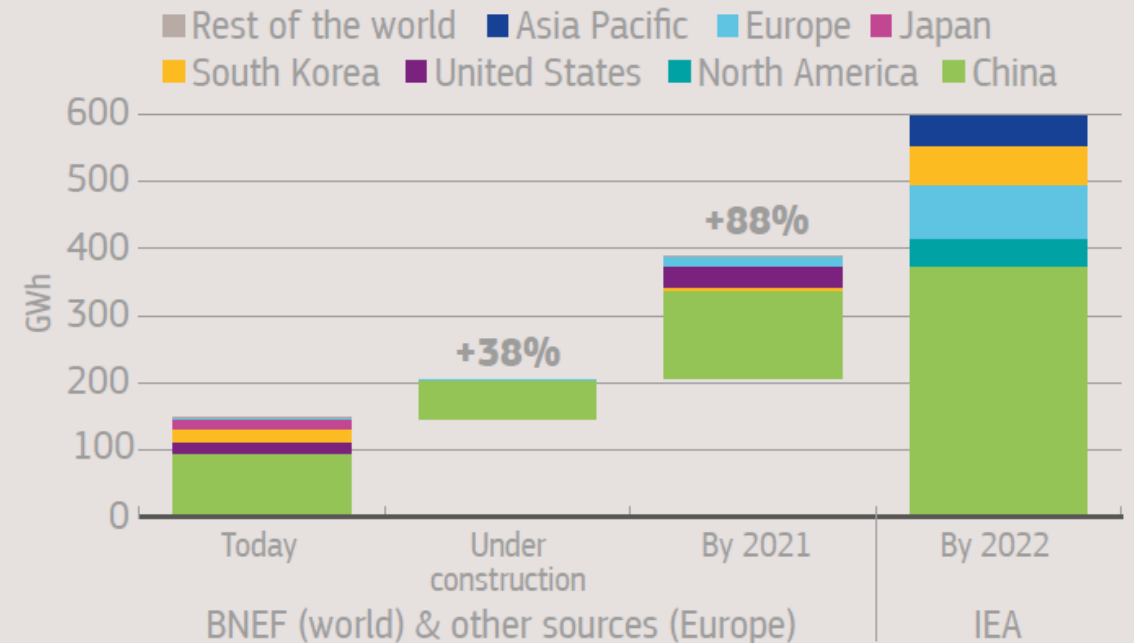
## Half of the world's electric vehicle sales in China

Annual sales of electric vehicles.



Source: Joint Research Centre, Bloomberg New Energy Finance

## China set to dominate global battery cell production



Source: Joint Research Centre (Compilation from various sources)

## Less than 15 years to take over the solar photovoltaic sector

Top 10 manufacturers of solar panels/cells, 2004 to 2018

### Production 2001

- 1  Sharp
- 2  Kyocera
- 3  Shell solar
- 4   BP solar
- 5  Astropower
- 6  Sanyo
- 7  Isofoton
- 8  RWE Solar
- 9  Mitsubishi
- 9  Photowatt

### Production 2004

- 1  Sharp
- 2  Kyocera
- 3   BP solar
- 4  Q-Cells
- 5  Mistubishi
- 6  Shell Solar
- 7  Sanyo
- 8  Schott Solar
- 9  Isofoton
- 10  Motech

### Production 2009

- 1  First Solar
- 2  Suntech
- 3  Sharp
- 4  Q-Cells
- 5  Yingli
- 6  JA Solar
- 7  Kyocera
- 8  Trina Solar
- 9   SunPower
- 10  Gintech

### Production 2010

- 1  Suntech
- 2  First Solar
- 3  Yingli Solar
- 4  JA Solar
- 5  Sharp
- 6  Q-Cells
- 7  Gintech
- 8  Motech
- 9  Trina Solar
- 10  Kyocera

### Production 2017-2018

- 1  Jinko Solar
- 2  Trina Solar
- 3  Canadian Solar
- 4  JA Solar
- 5  Hanwha Q Cells
- 6  GCL-SI
- 7  LONGi Solar
- 8  Risen Energy
- 9  Shunfeng
- 10  Yingli Green

### In 2018

8 out of 10 Global manufacturers did not exist in 2010

7 out of 10 Global manufacturers are Chinese companies

No  'Global' manufacturer of Solar Cells

# Conclusions for Germany



- Both the existing electricity and gas infrastructure will play a crucial role for the energy system of the future
- Although additional electricity storage will be available by 2050, gas storage can also provide a solution for seasonal storage
- Coupling the electricity and gas transport infrastructure with P2G installations gives the overall energy system additional flexibility
- Socially acceptable solutions for an integrated energy infrastructure require a new level of public and political support





# WHEN, IF NOT NOW

The Climate Action Program 2030  
 German civil society (Klima-Allianz-Deutschland)

***Thank you for your  
attention!***

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