



BP Statistical Review  
of World Energy  
68<sup>th</sup> edition



## Energy in 2018: An Unsustainable Path

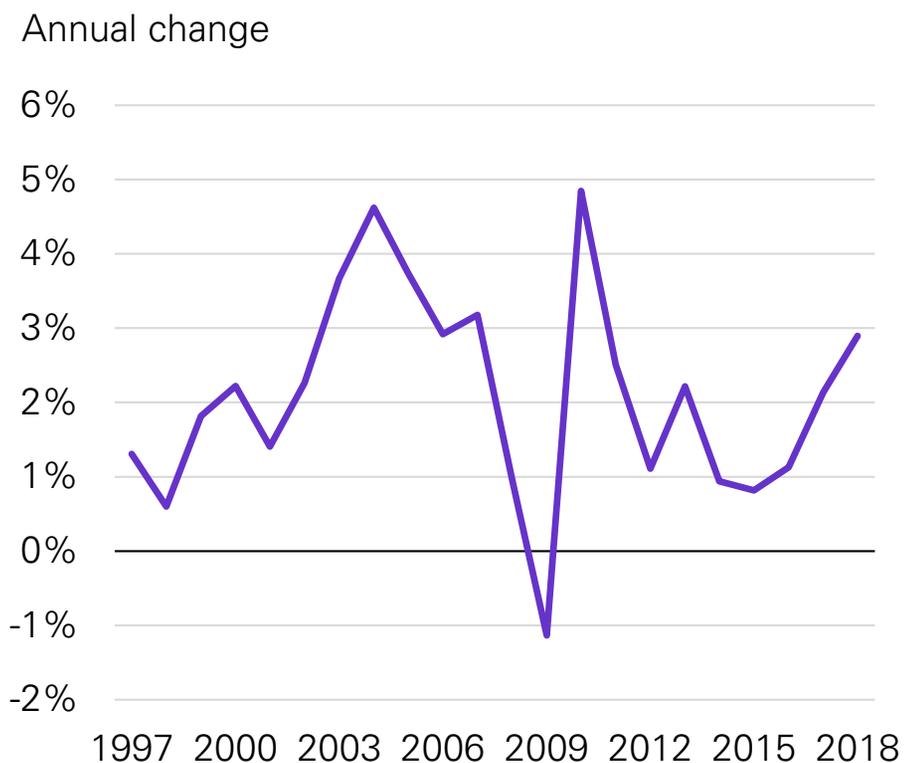
**Michael Cohen**  
Chief US Economist &  
Head of Oil Analysis

#BPstats

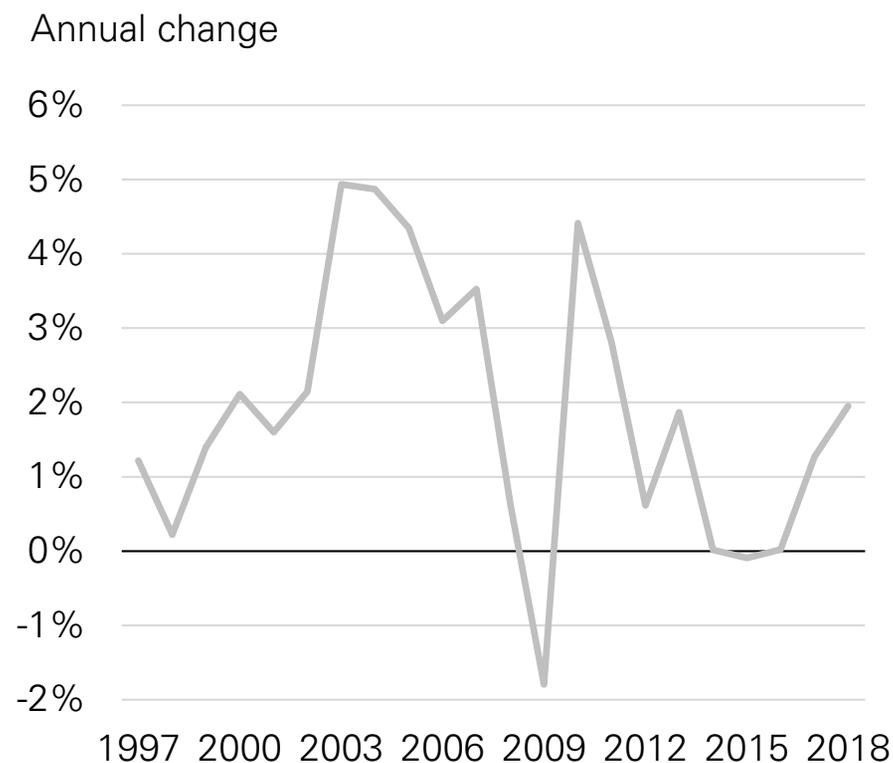
# 2018: Primary energy, CO<sub>2</sub> emissions grew in tandem and at strongest rate in many years



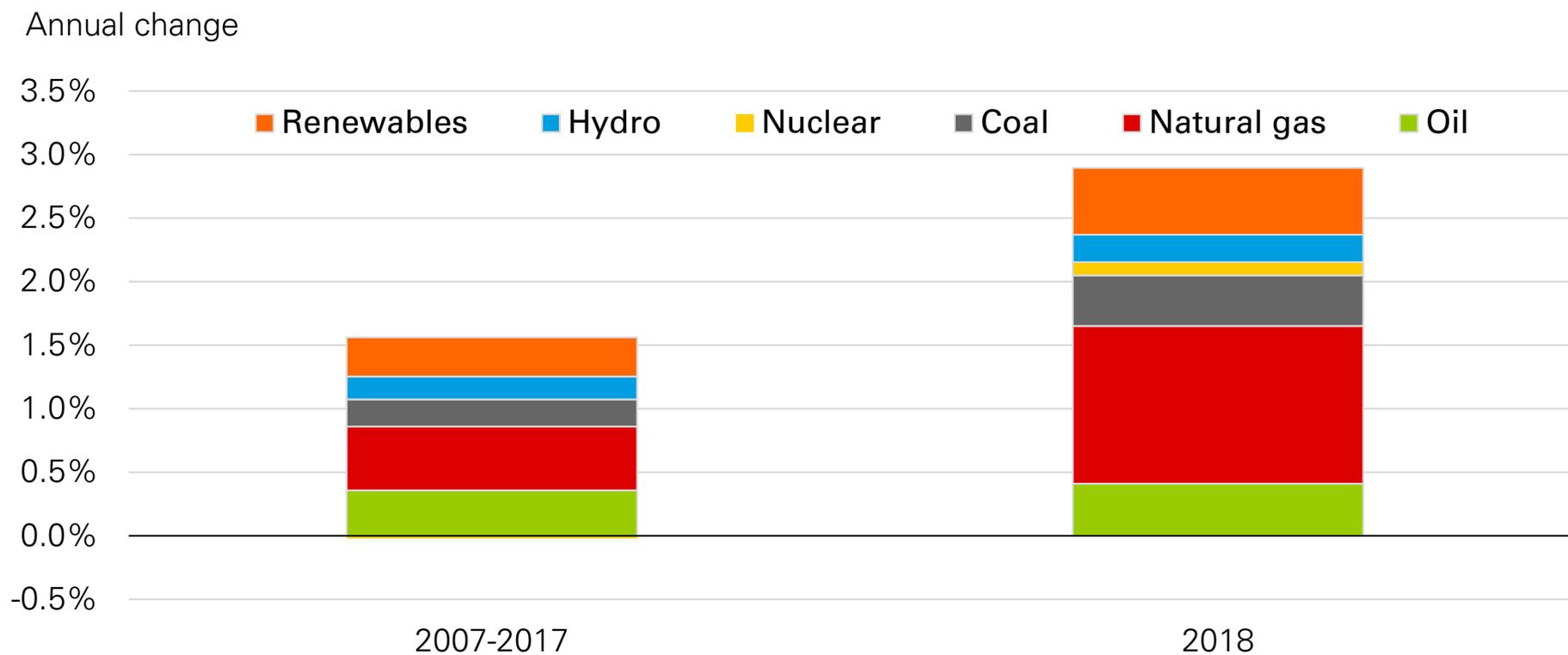
## Primary energy growth



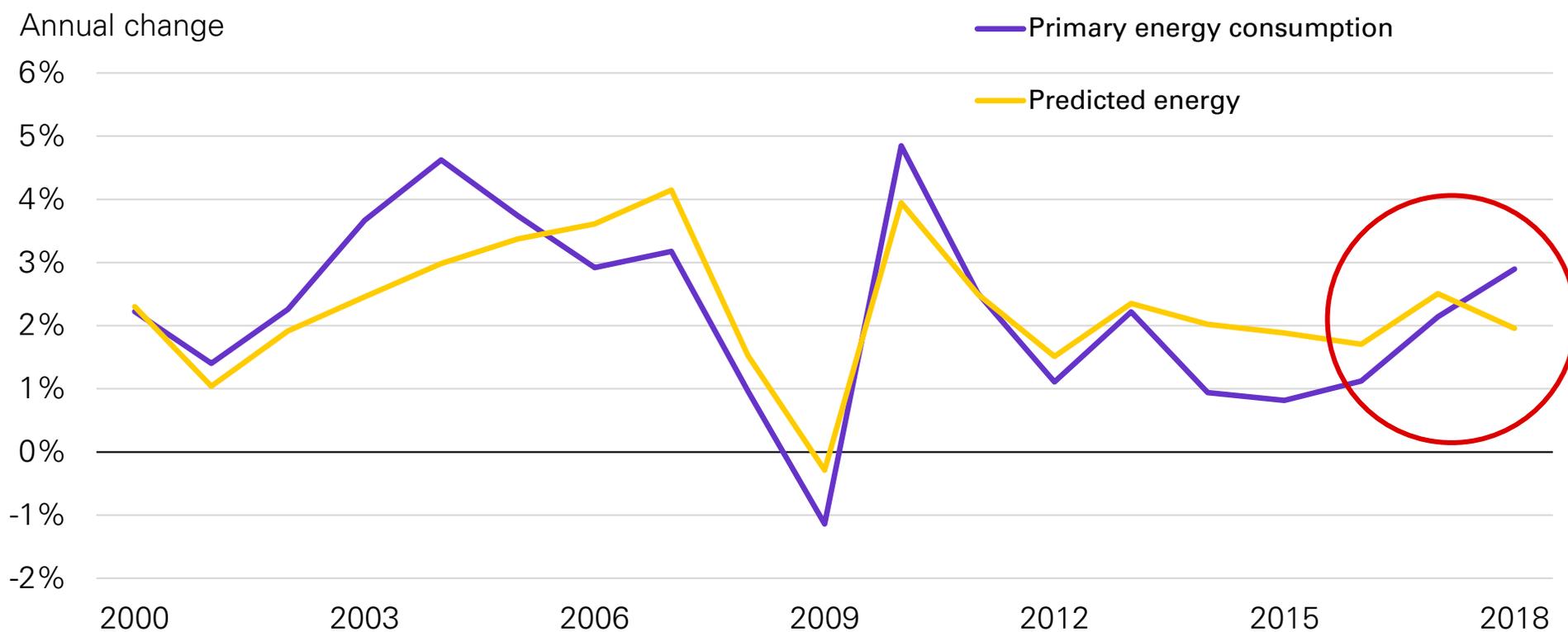
## CO<sub>2</sub> emissions from energy use



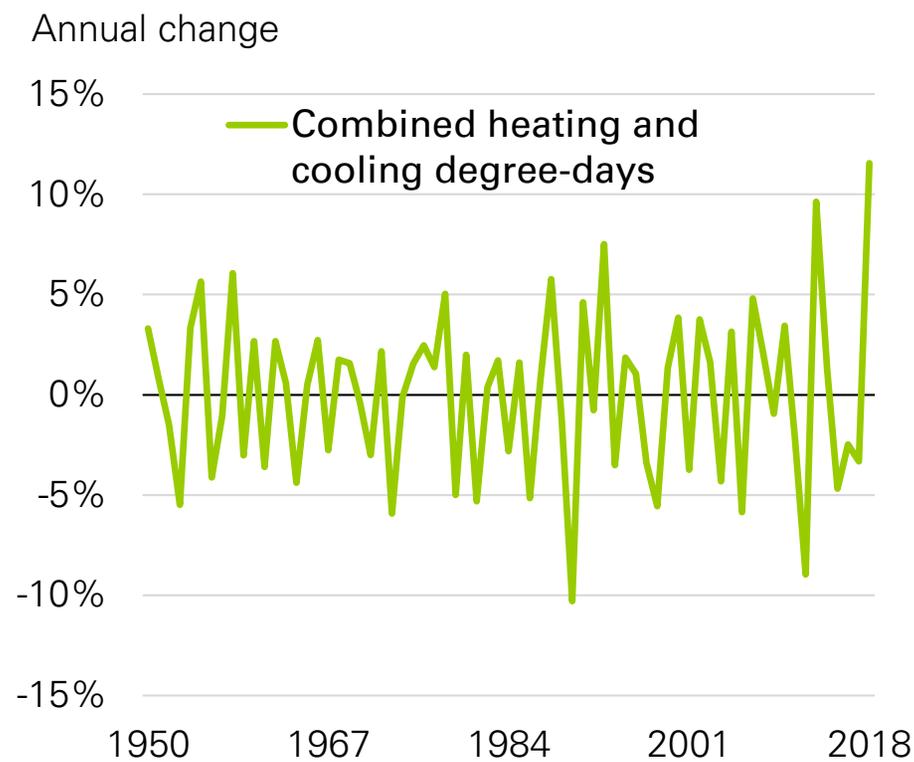
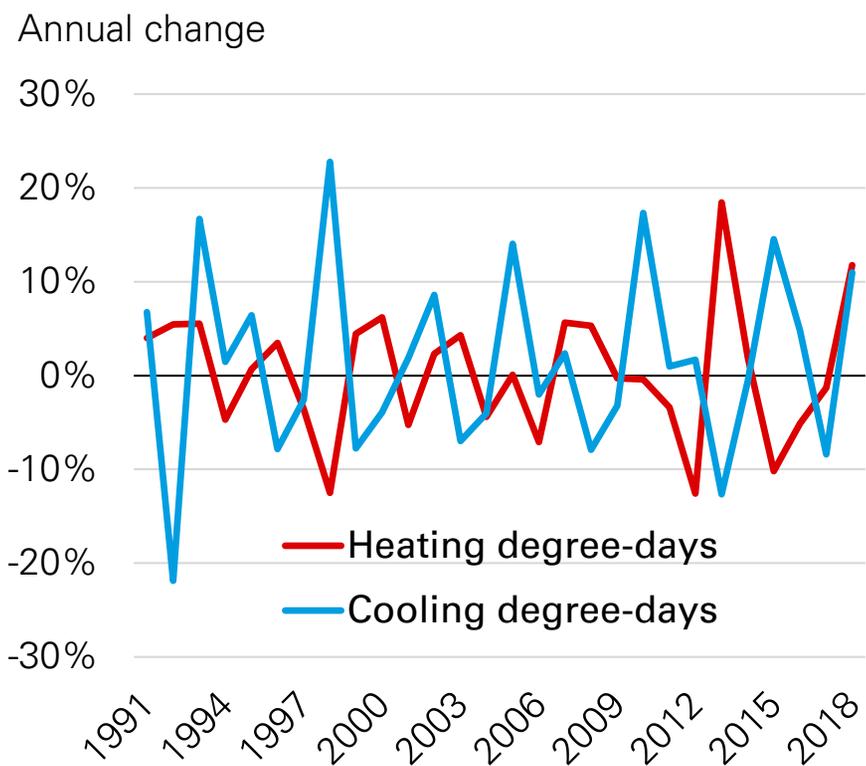
# Gas and renewables grew strongest vs trend



# Price, GDP growth fail to explain increase

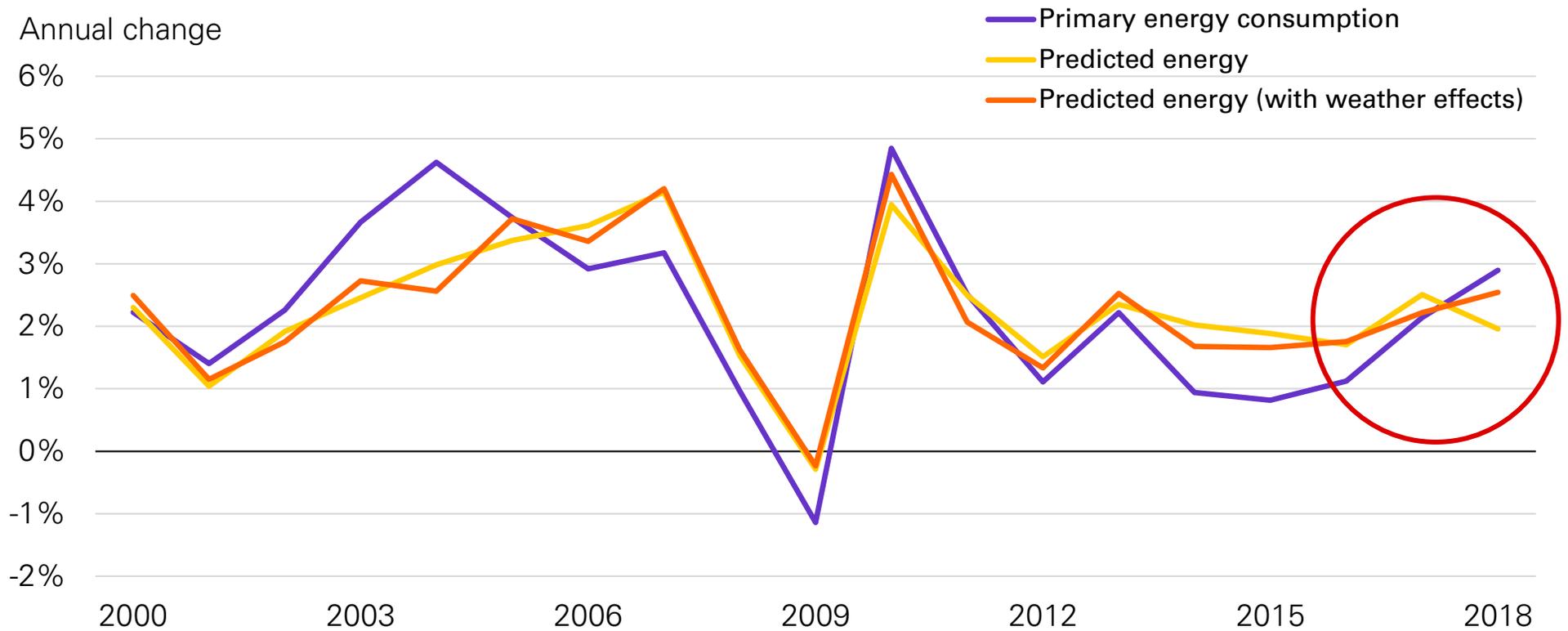


# But 2018's weather effects partially explain the trend





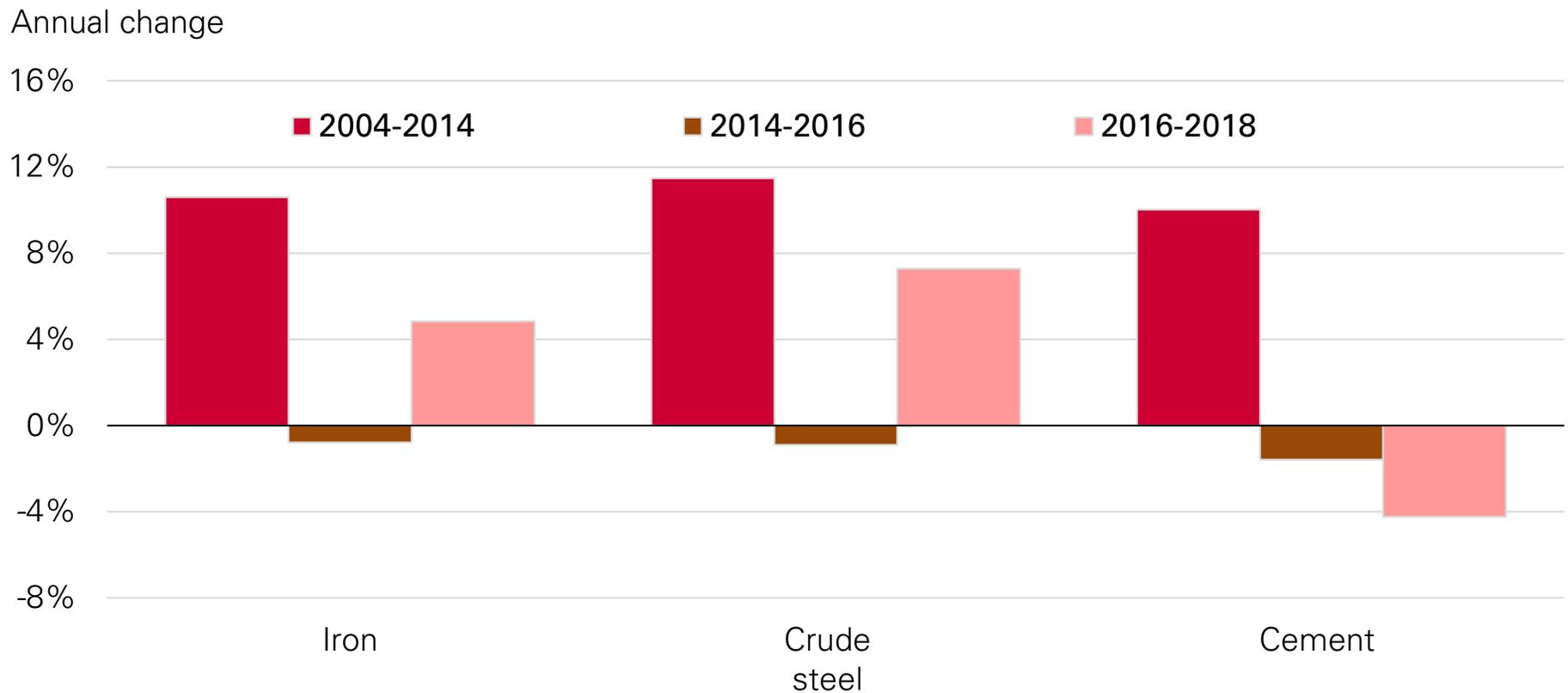
# Model can account for some of the variation



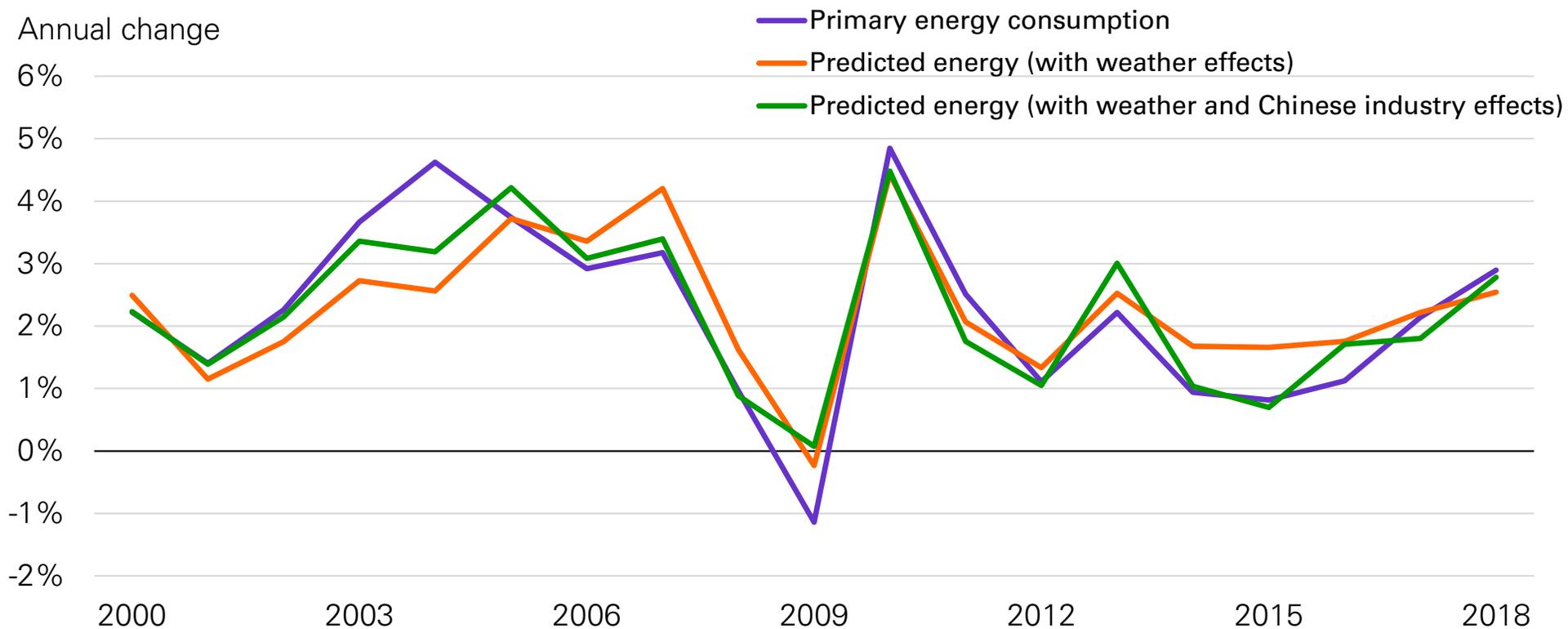


# China's energy intensive sectors slowed in '14-16

## Outputs of iron, steel and cement

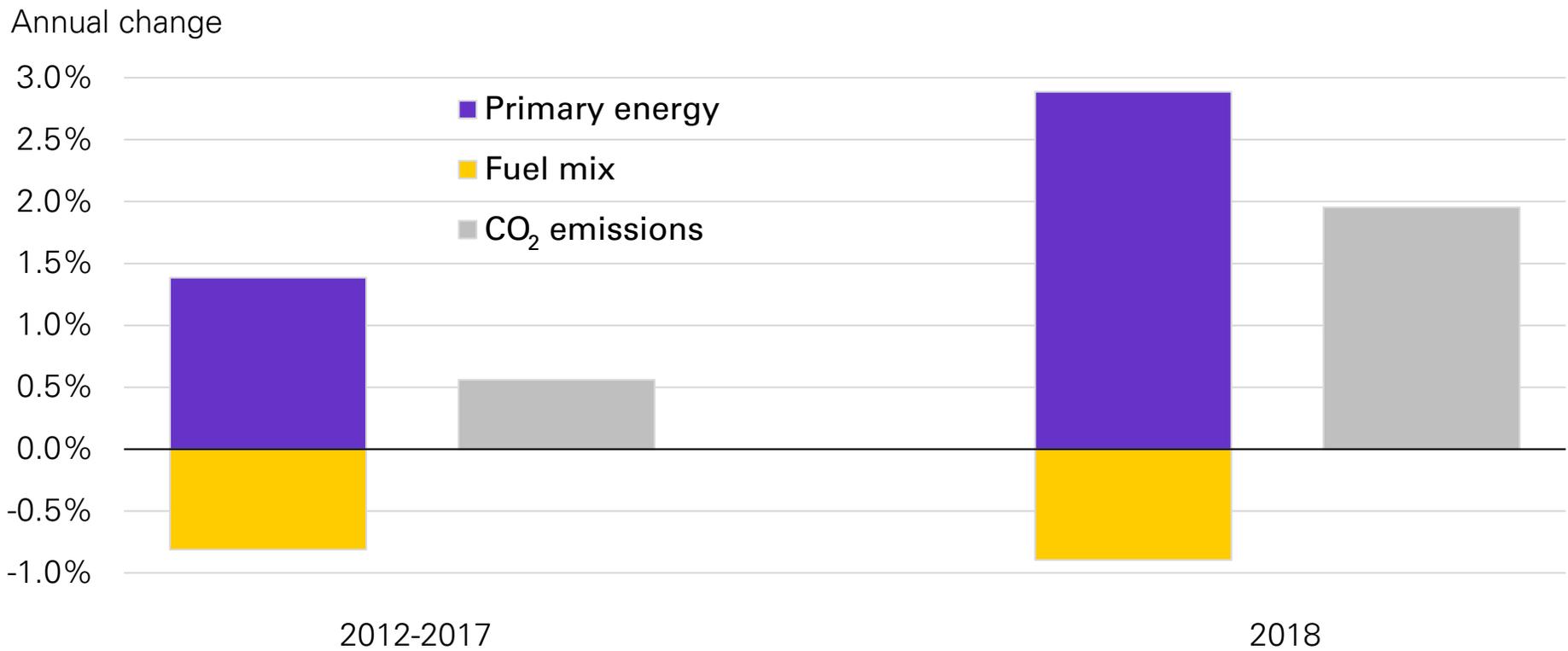


# Chinese cyclical decline, rebound explains the rest





# A vicious cycle? Emissions grew because energy demand grew

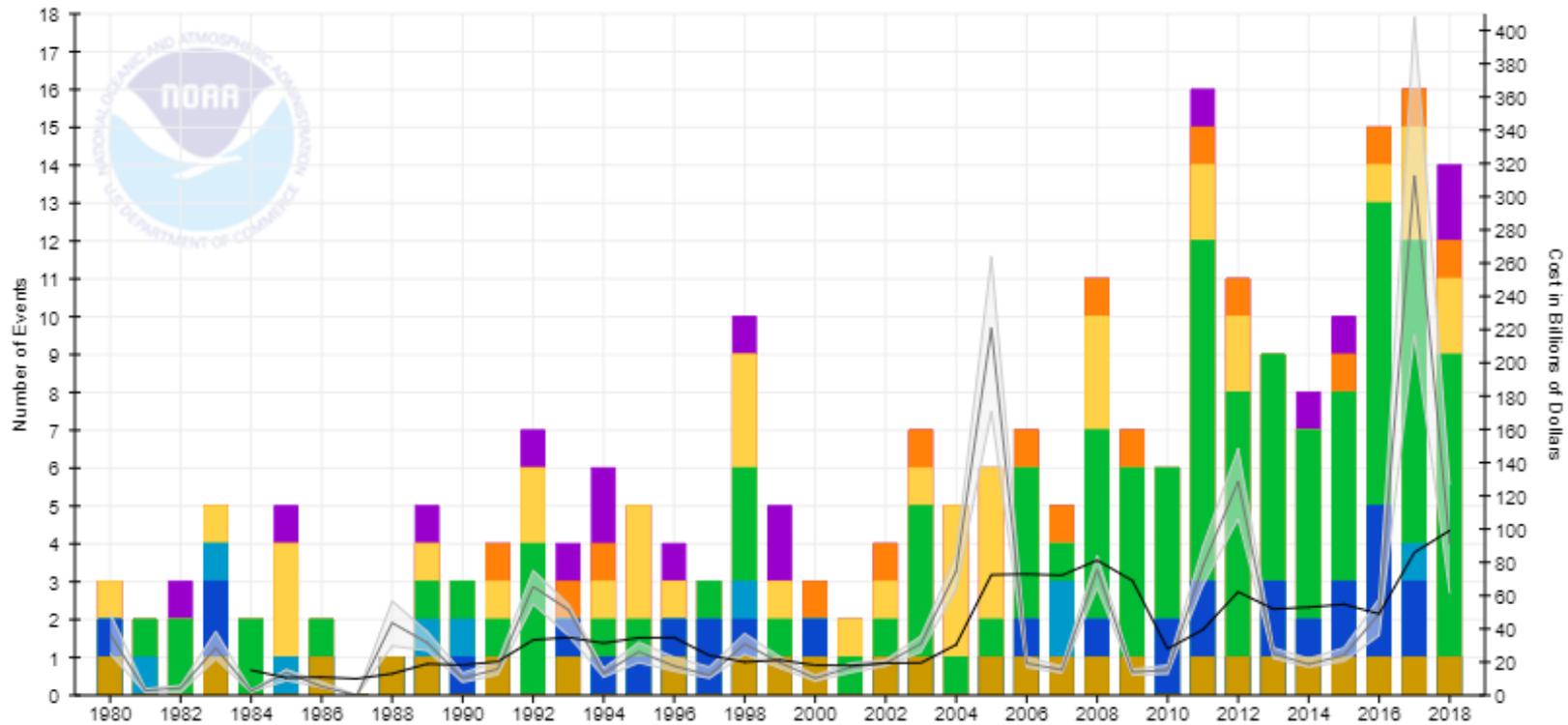




# Weather events 1980-2019 and their implications

Billion-Dollar Disaster Event Types by Year (CPI-Adjusted)

- Winter Storm
- Wildfire
- Trop Cycl
- Severe Storm
- Freeze
- Flooding
- Drought
- Cost w/ 95% CI
- 5-Year Mean



Source: climate.gov

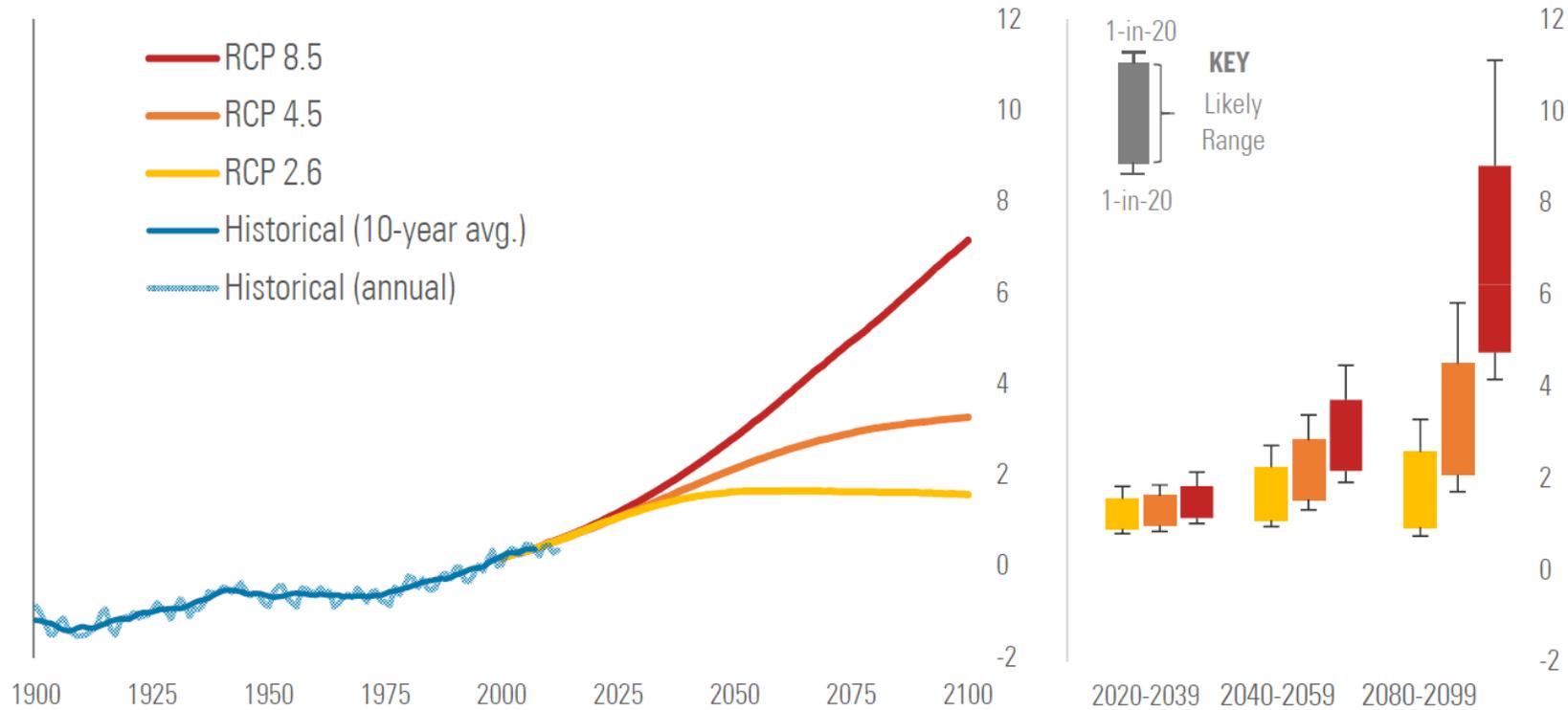
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# Three pathways for temperature projections

Change (°F) relative to 1981-2010 average, median projections (left), confidence intervals (right)



Source: Houser, T., S. M. Hsiang, R. E. Kopp, K. Larsen, M. Delgado, A. S. Jina, M. D. Mastrandrea, S. Mohan, R. Muir-Wood, D. J. Rasmussen, J. Rising, and P. Wilson. Economic Risks of Climate Change: An American Prospectus (New York: Columbia University Press, 2015), 24

Source: Rhodium Group. "Power sector impacts of Climate Change," 2017.

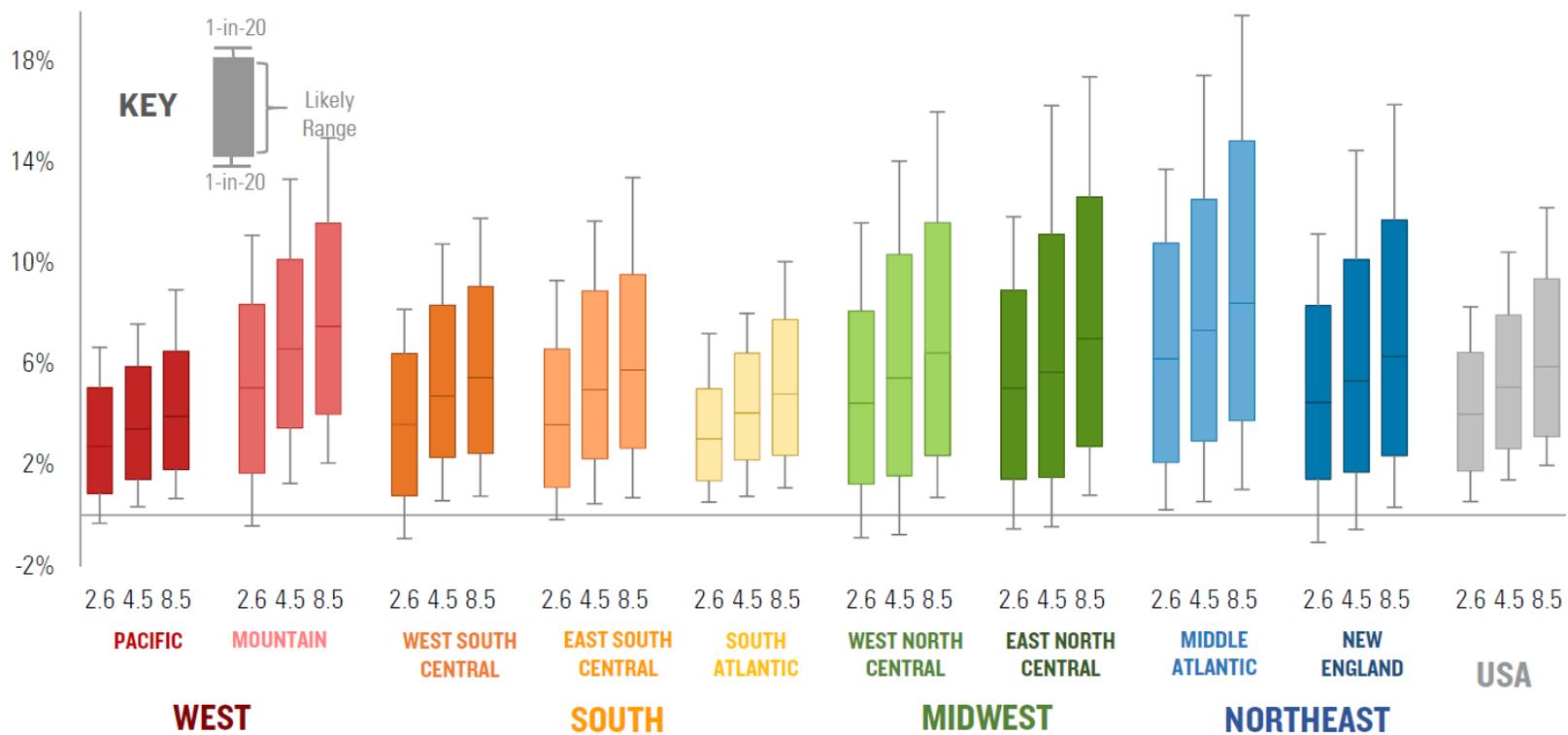
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# Even under most optimistic scenario, residential and commercial cooling demand increases 2-6%

Percent change by RCP relative to historical climate scenario (1981-2010 average)



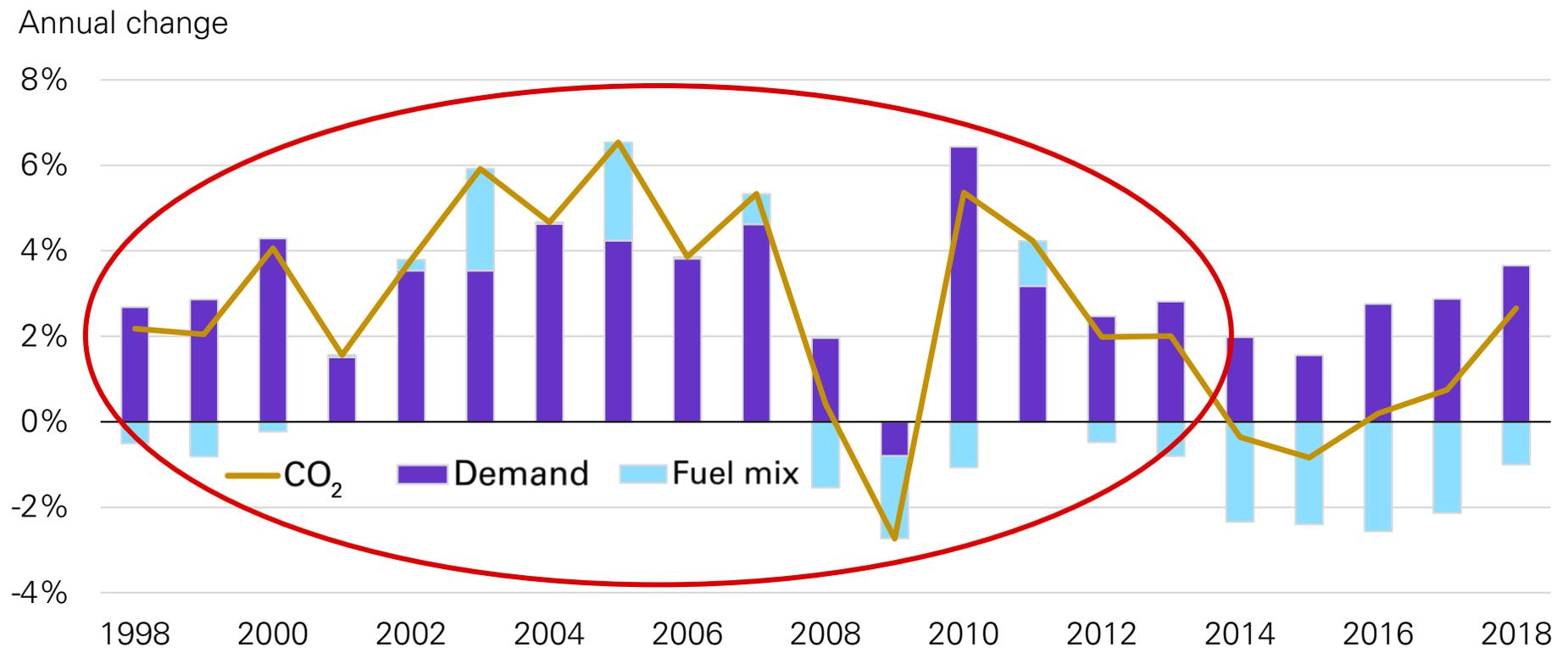
Source: Rhodium Group. "Power sector impacts of Climate Change," 2017.

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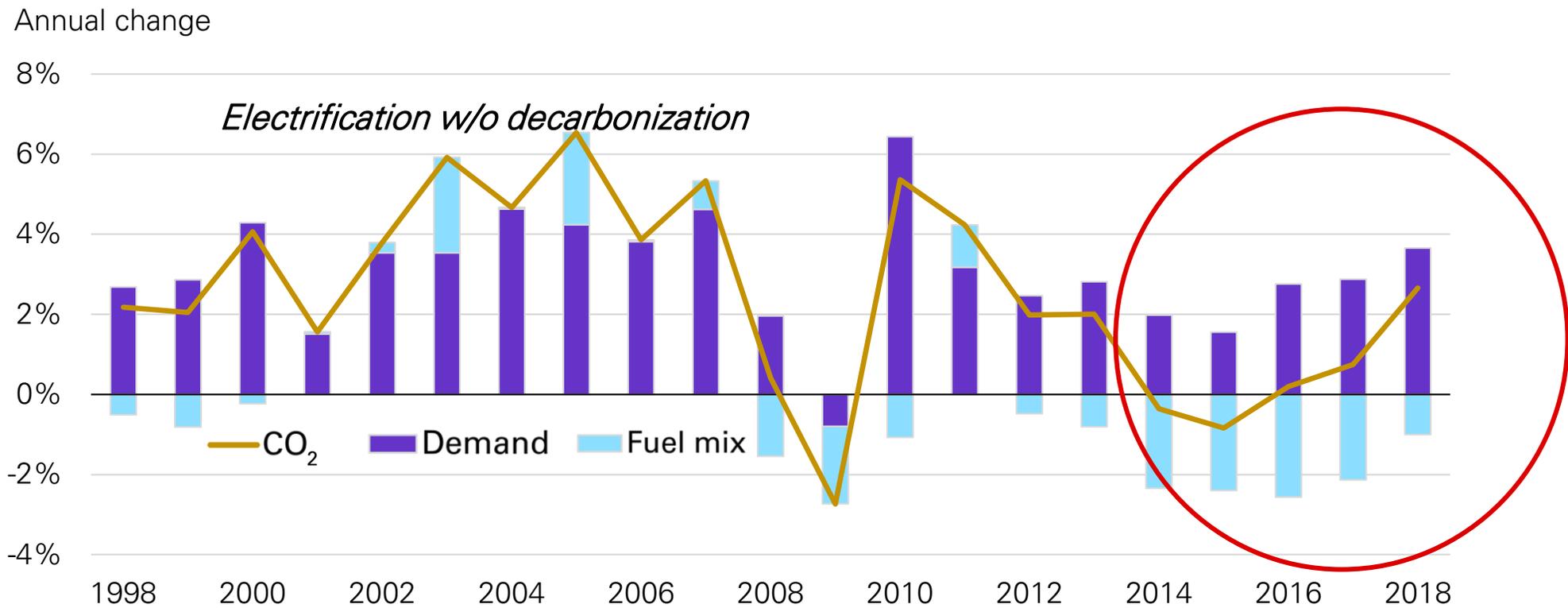
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# For most of last 20 years we've had electrification without decarbonization



# Now that is changing, but it is not enough



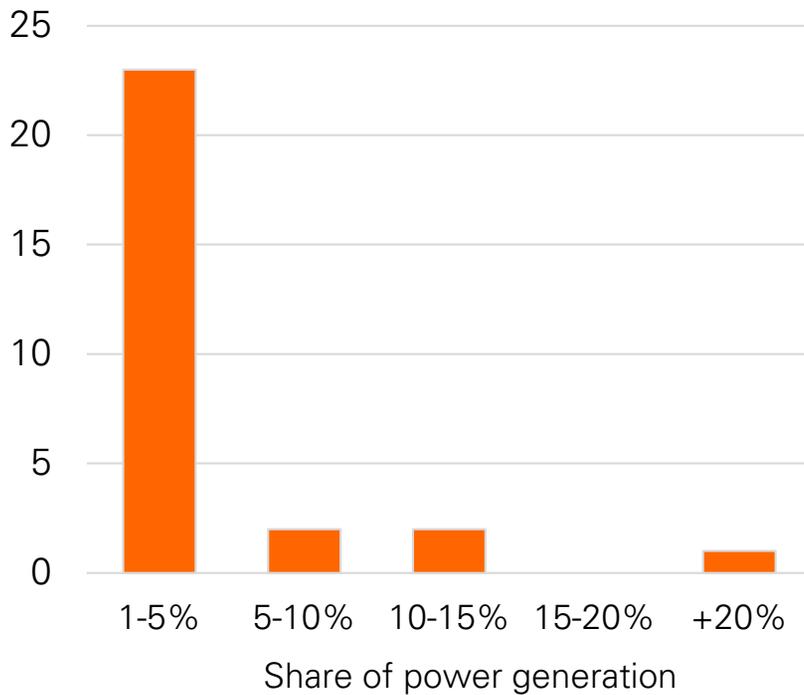
# Renewables are now more widespread



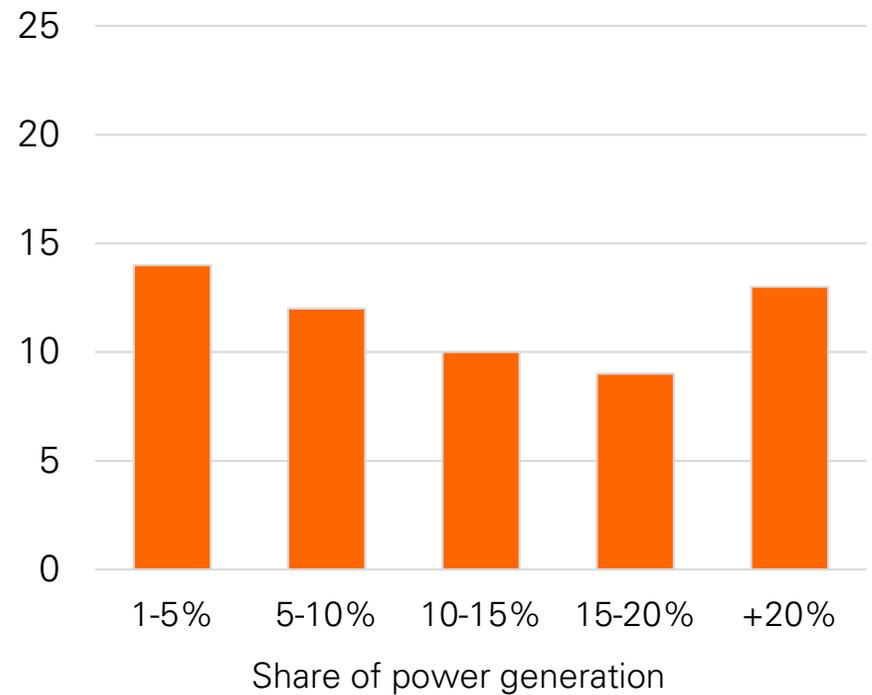
1998

2018

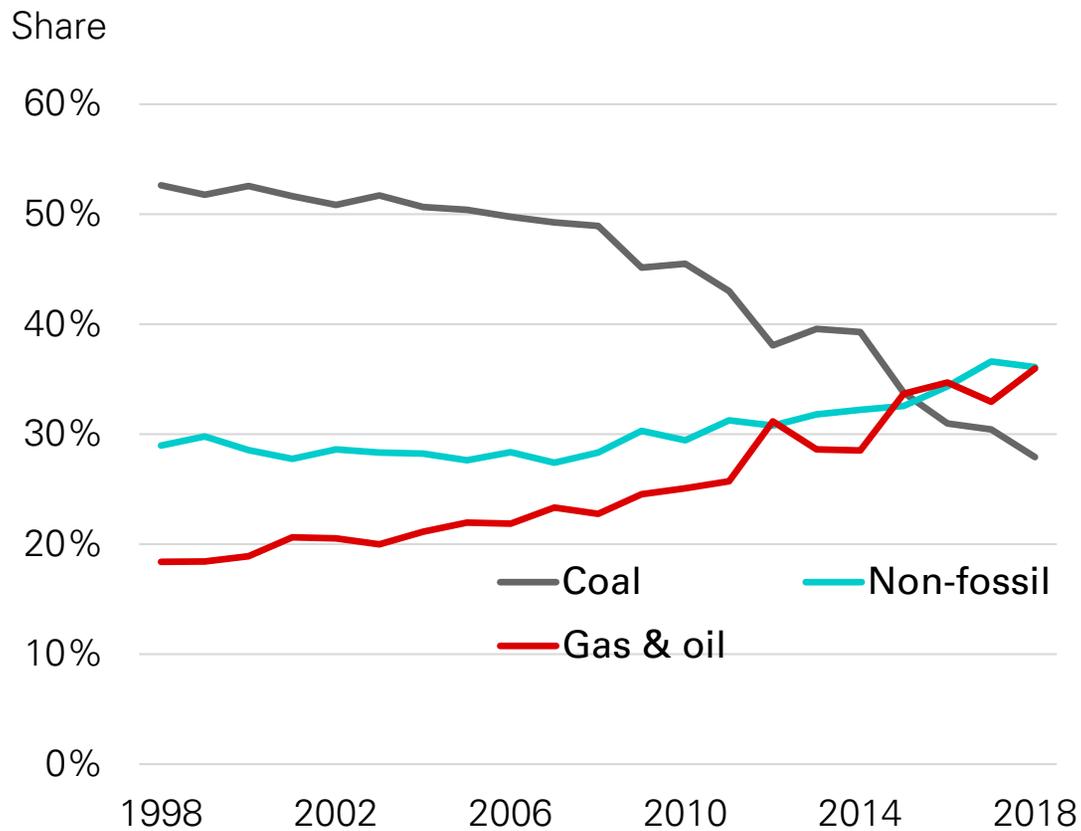
Number of countries



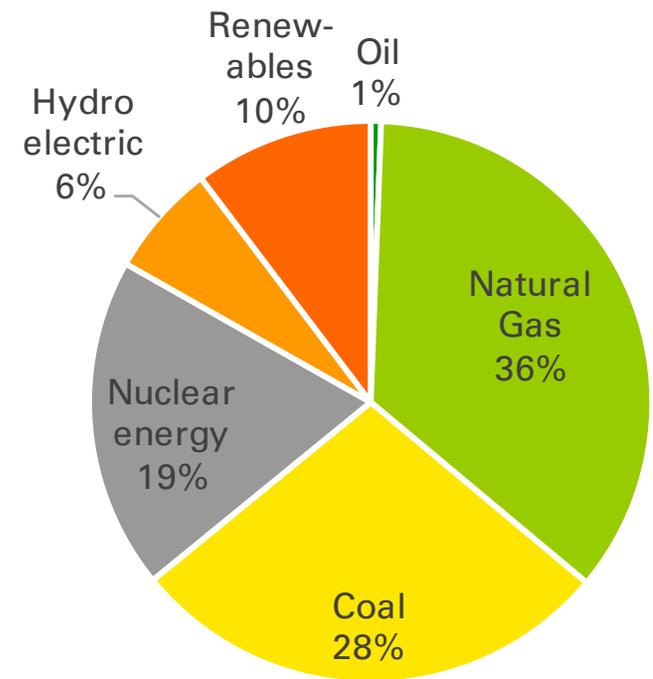
Number of countries



...especially in the US

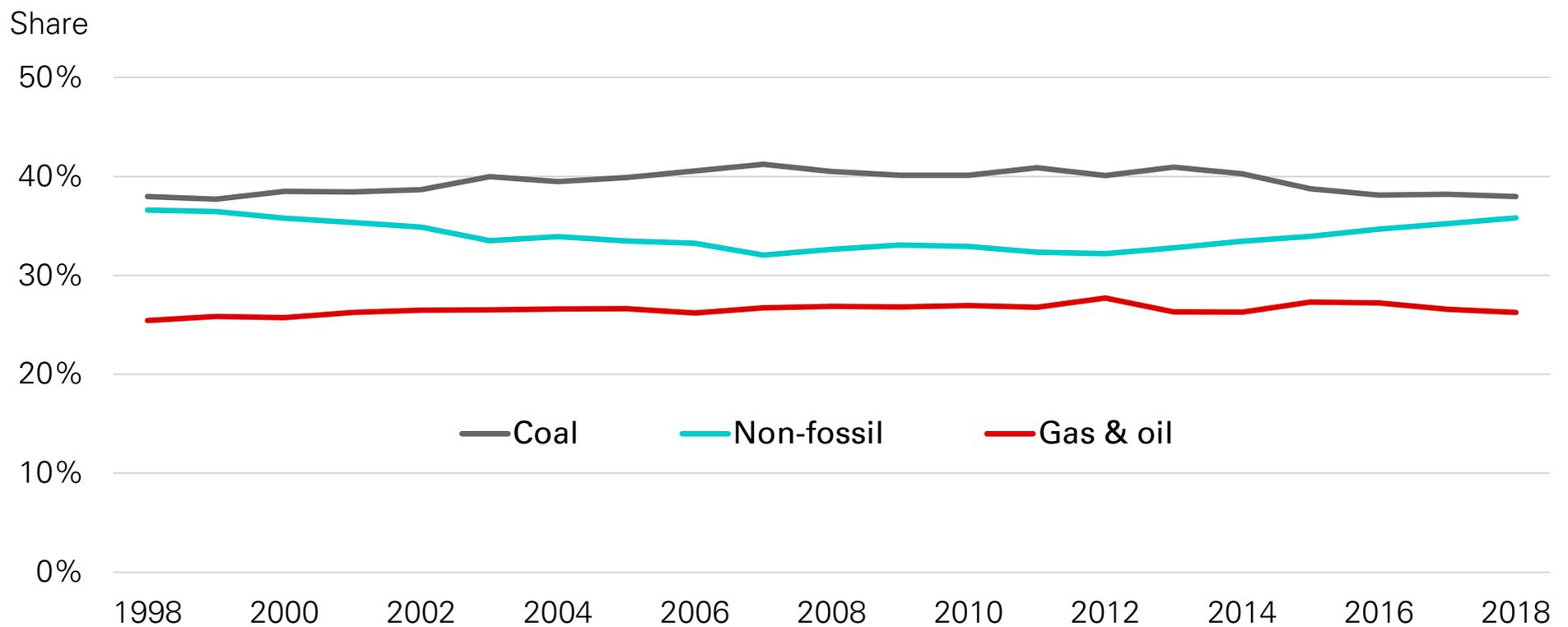


2018: US Power Mix

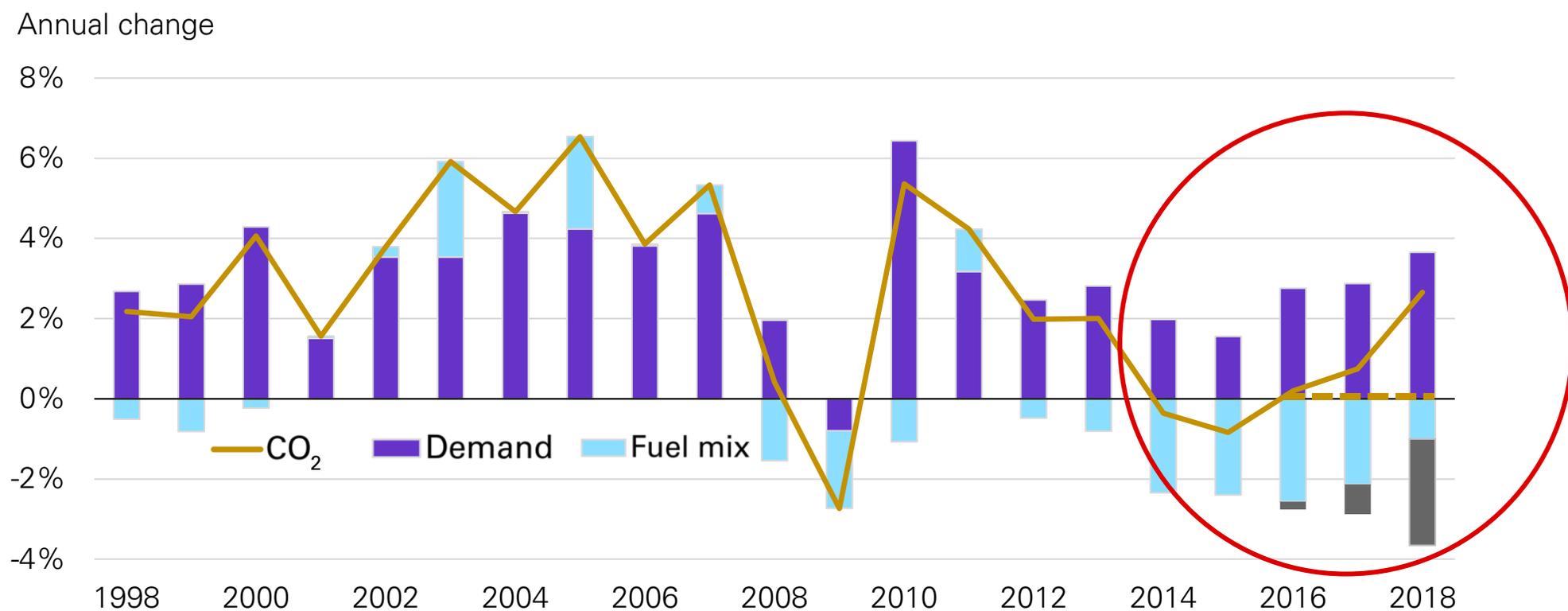




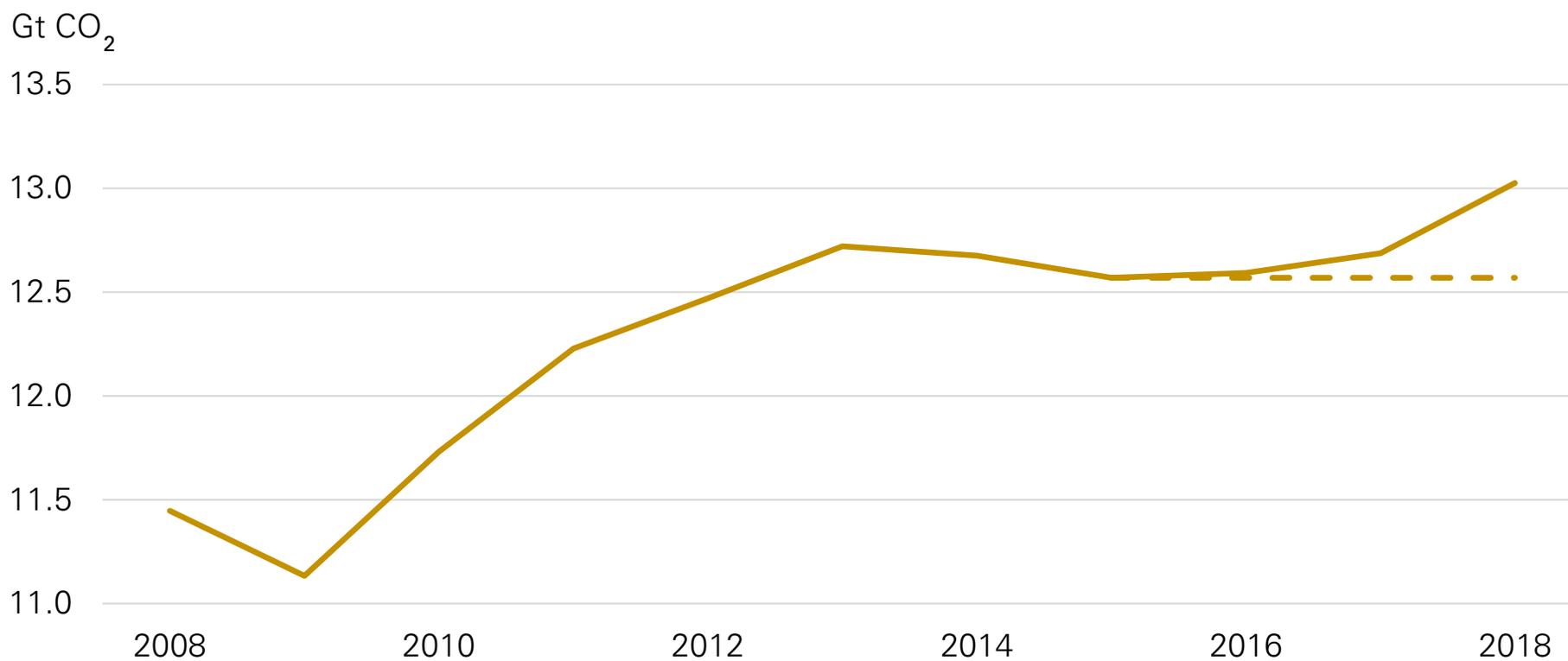
... but they are not the solution. Depressingly on a global basis, the fuel mix remains largely the same



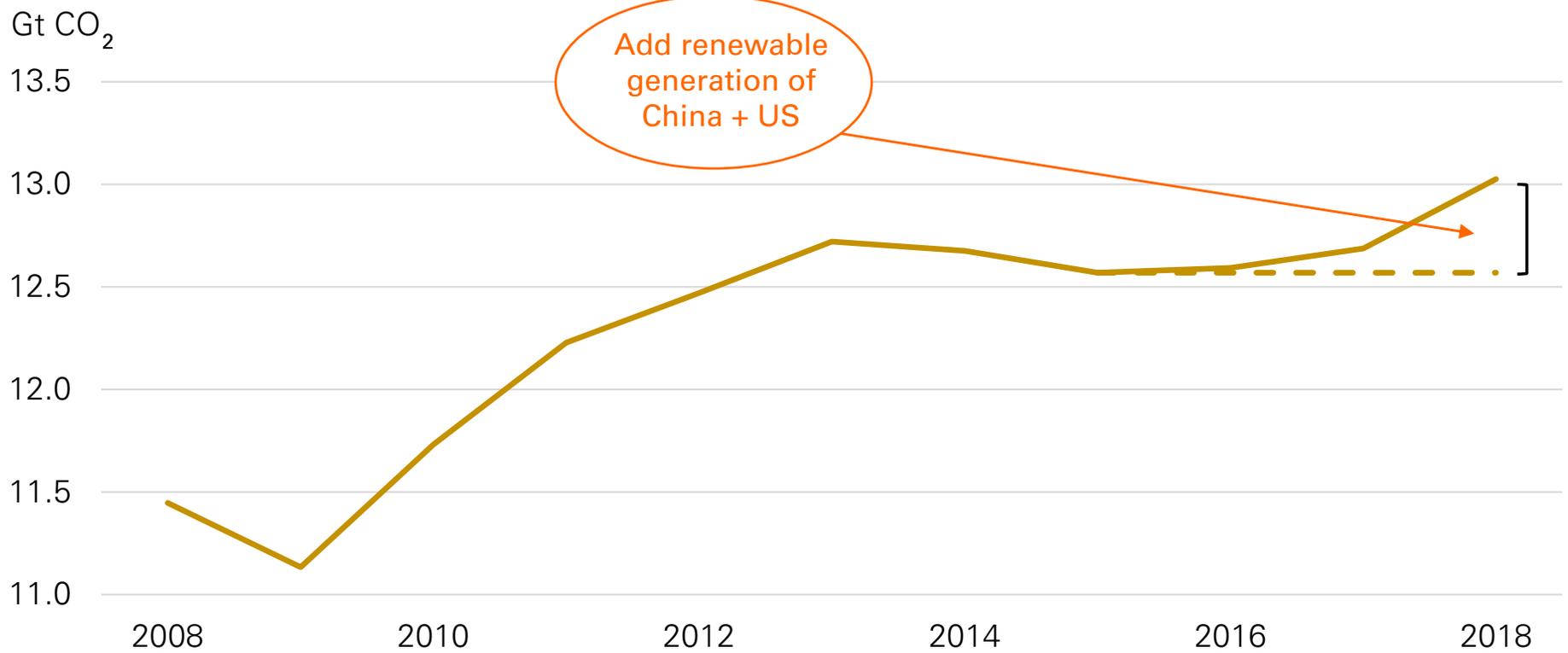
# What would it take to keep emissions levels flat?



# Carbon emissions from power sector



# Carbon emissions from power sector





# Carbon emissions from power sector

