

Tessenderlo Group

Energy Challenges of the Future

March 1, 2011

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"IF BEING COLD MEANS THERE'S NO SUCH THING AS GLOBAL WARMING,  
DOES BEING FULL MEAN THERE'S NO SUCH THING AS WORLD HUNGER?"

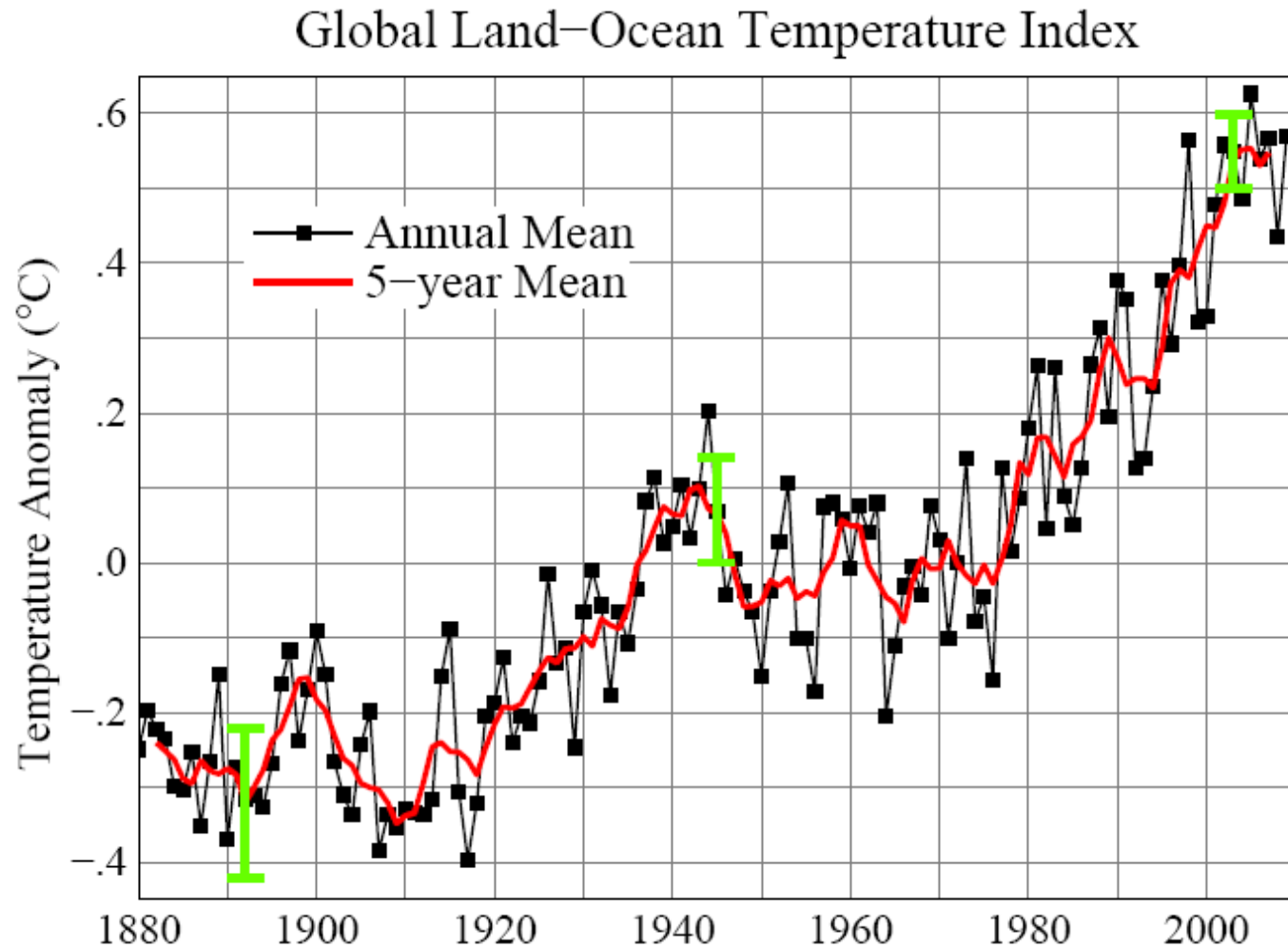


Since the industrial revolution, GHG concentration has shown a dramatic increase





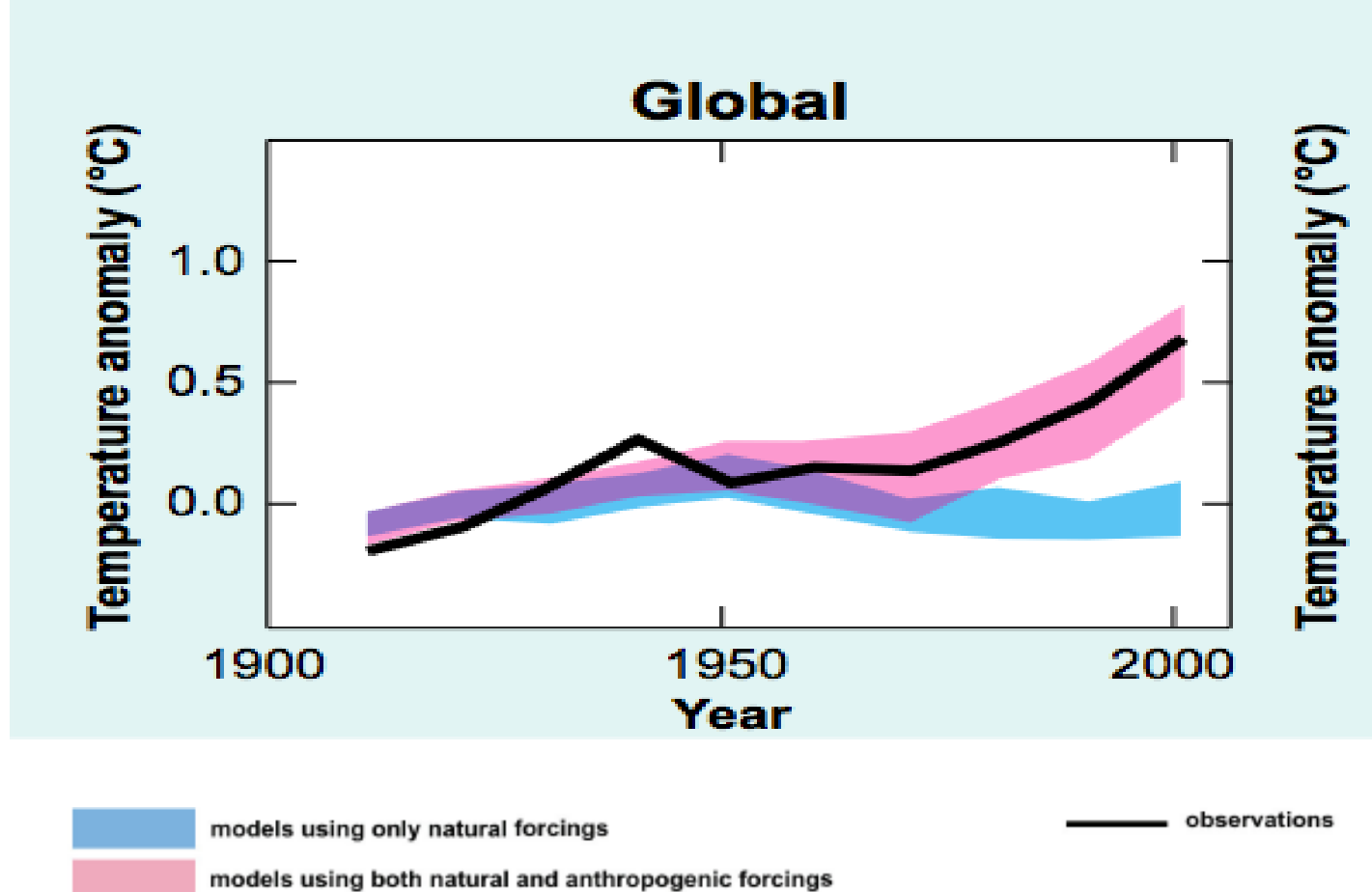
# Causing an accelerating increase in global temperatures





# With little doubt about the correlation

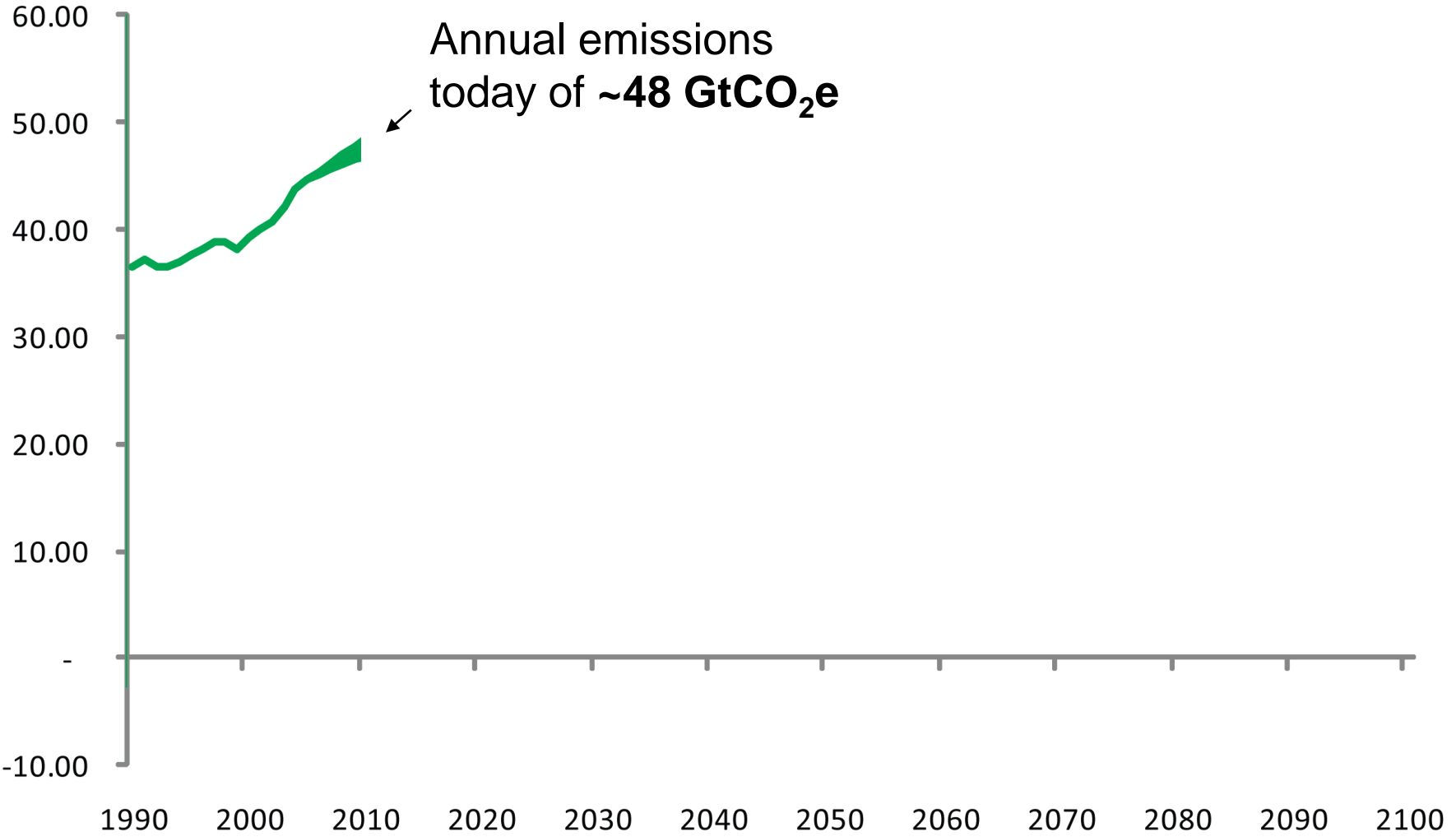
IPCC AR4: “Most of the temperature increase is *very likely* due to the increase in anthropogenic GHG concentrations”





# What are we aiming for ?

Global emissions, GtCO<sub>2</sub>e

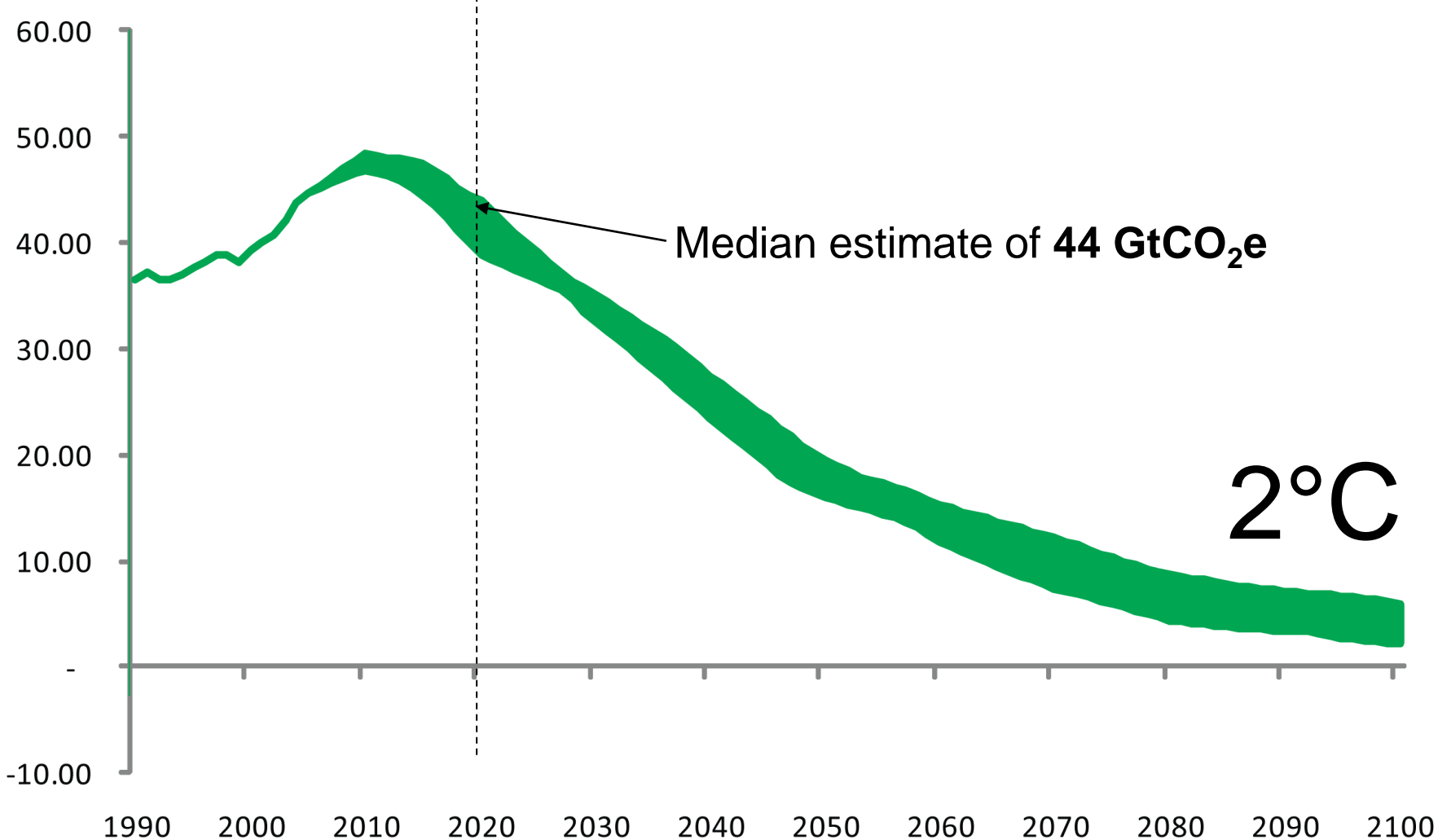


Source: Adapted from The Emissions Gap report, UNEP, 2010



# What are we aiming for?

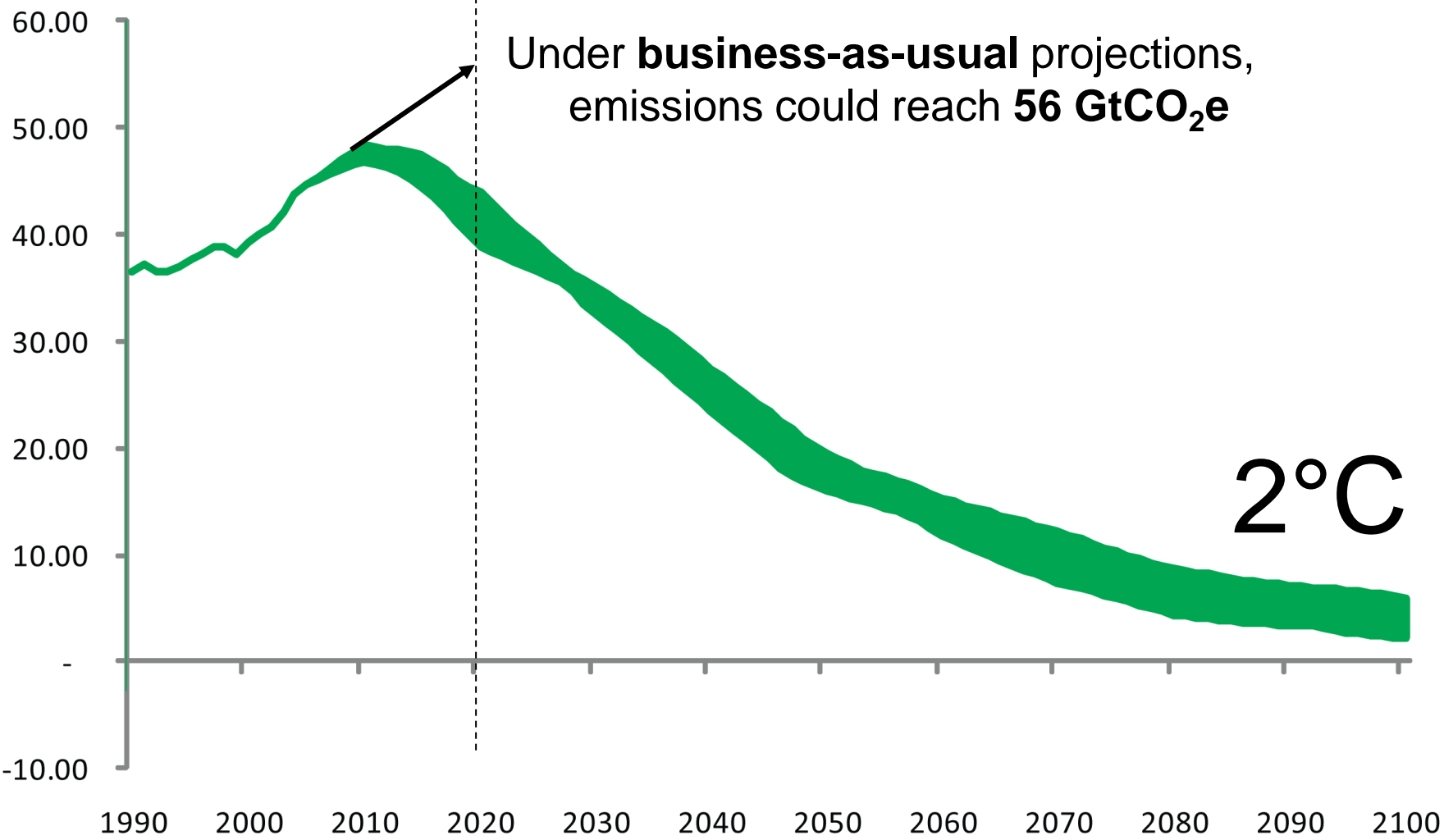
Global emissions, GtCO<sub>2</sub>e





# Where are we heading?

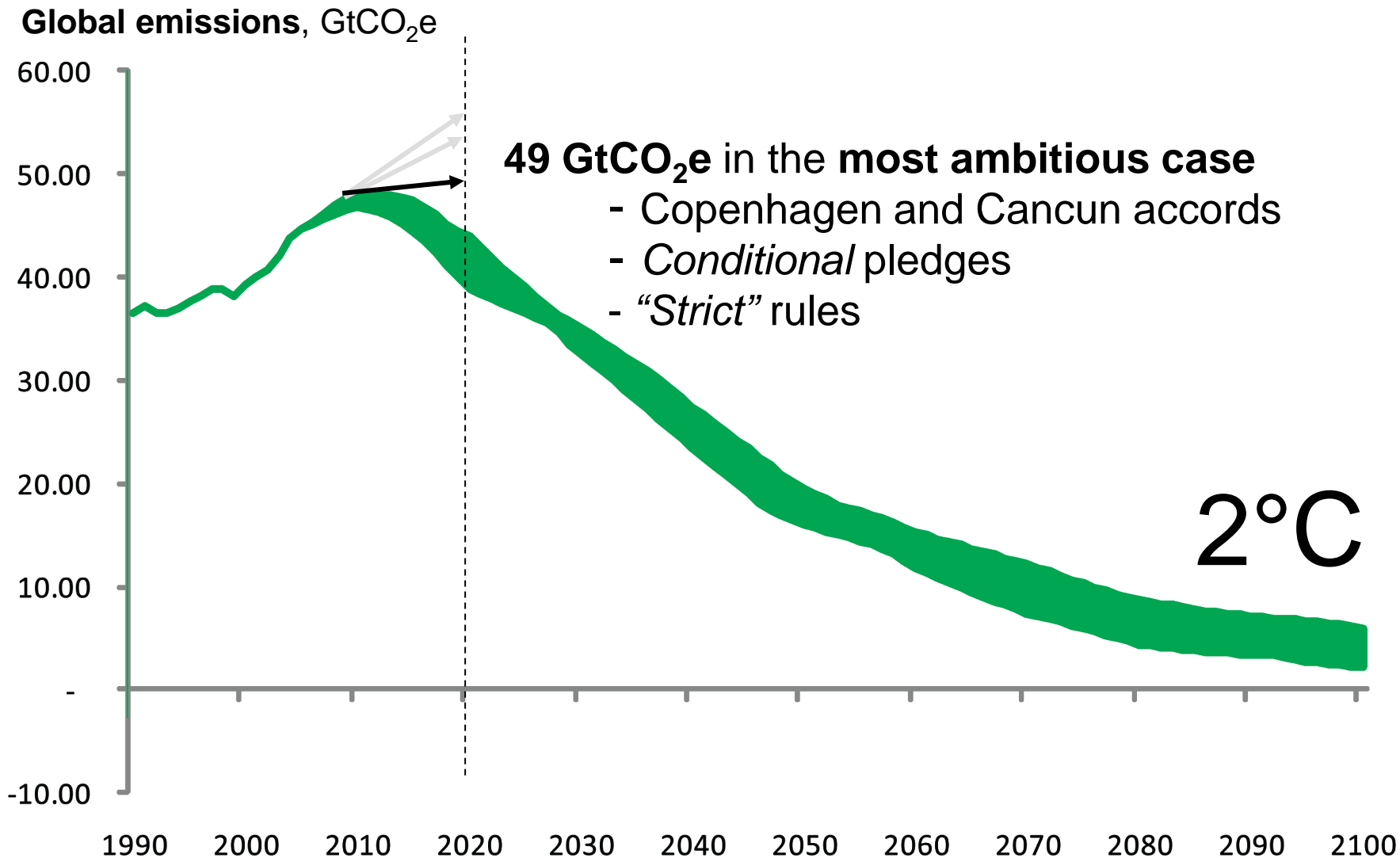
Global emissions, GtCO<sub>2</sub>e



Source: Adapted from The Emissions Gap report, UNEP, 2010



# But we are definitely falling short of the goal

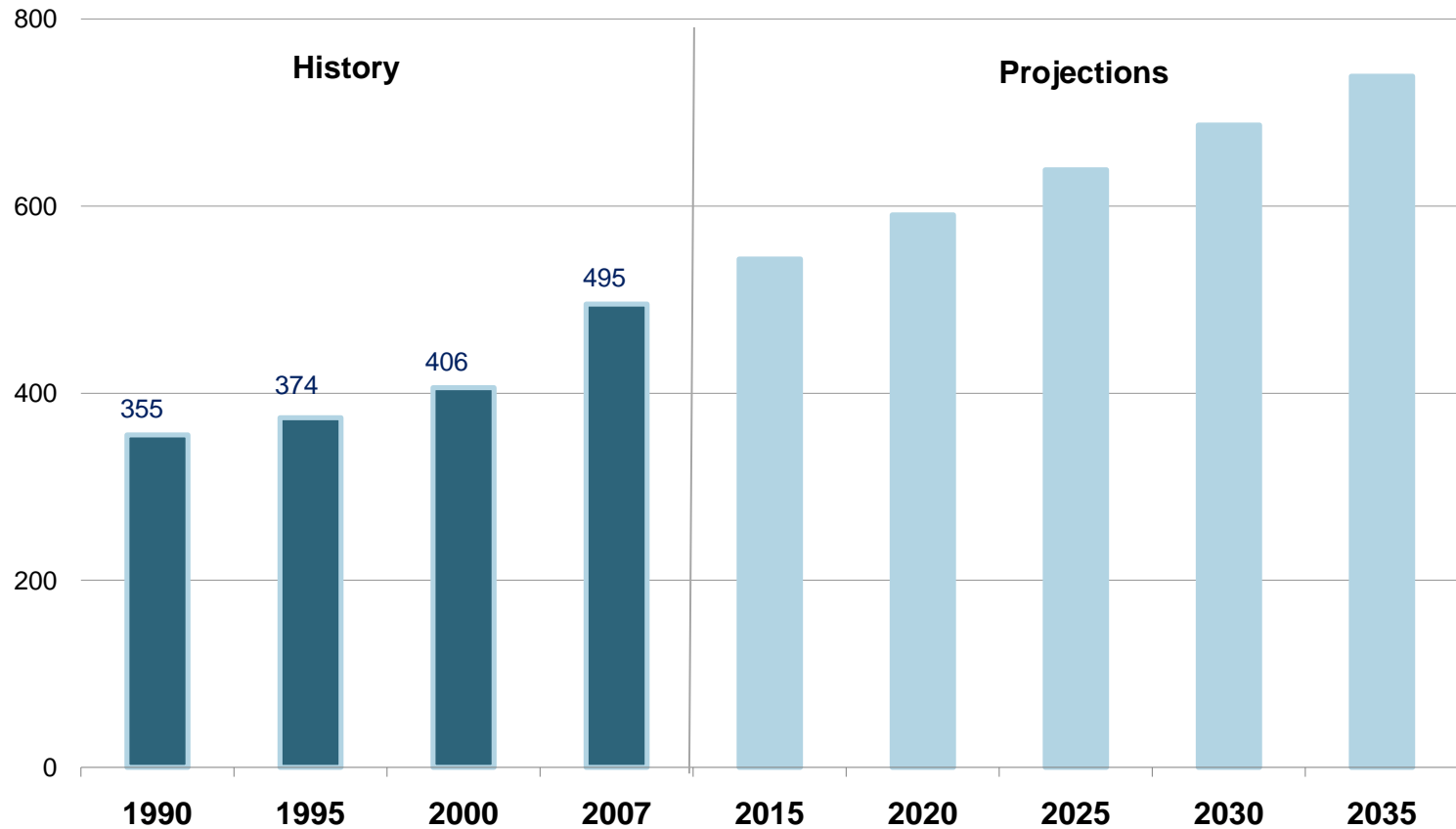




# At the same time, energy demand continues to grow rapidly

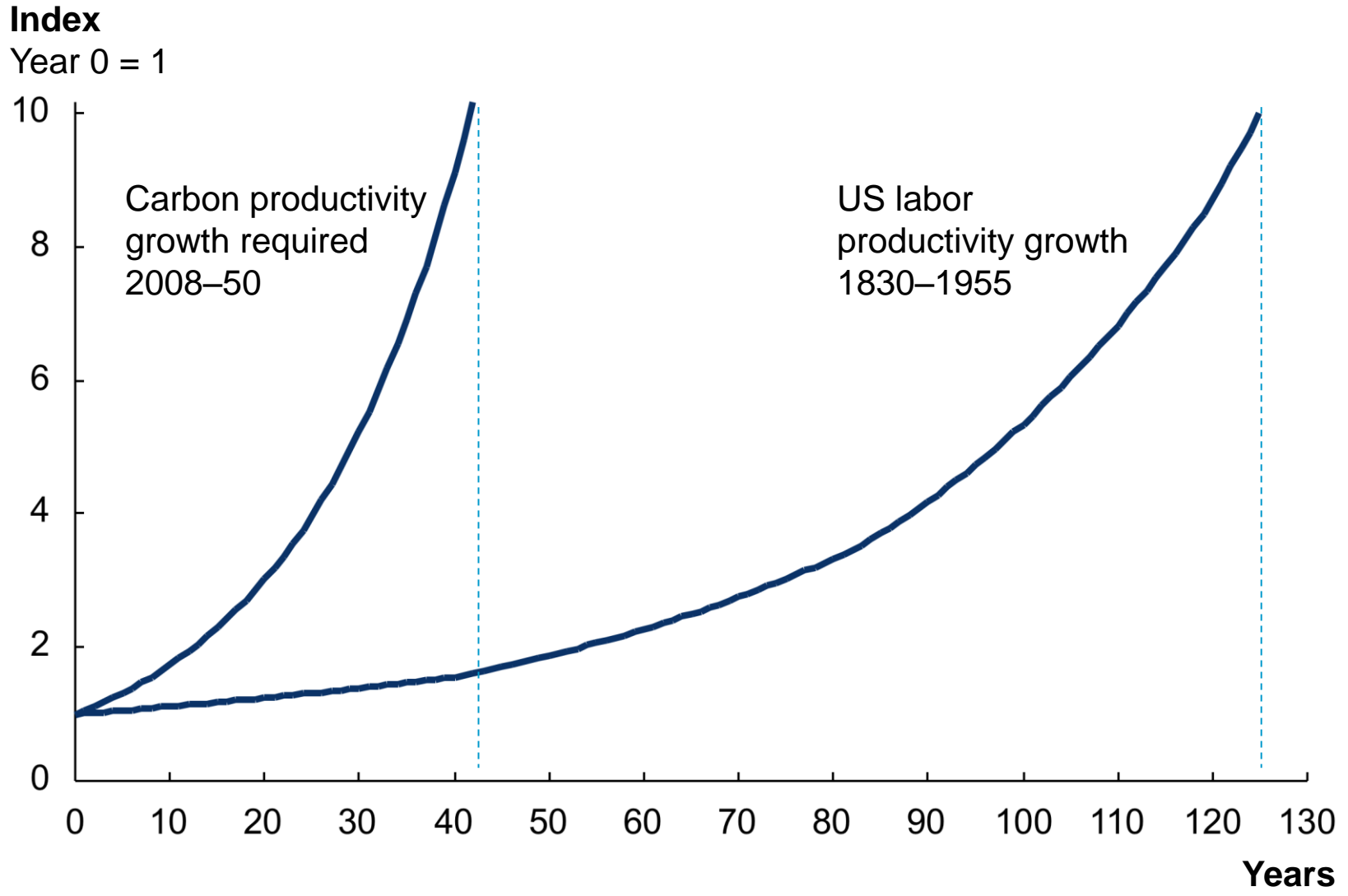
## World marketed energy consumption, 1990-2035

quadrillion Btu





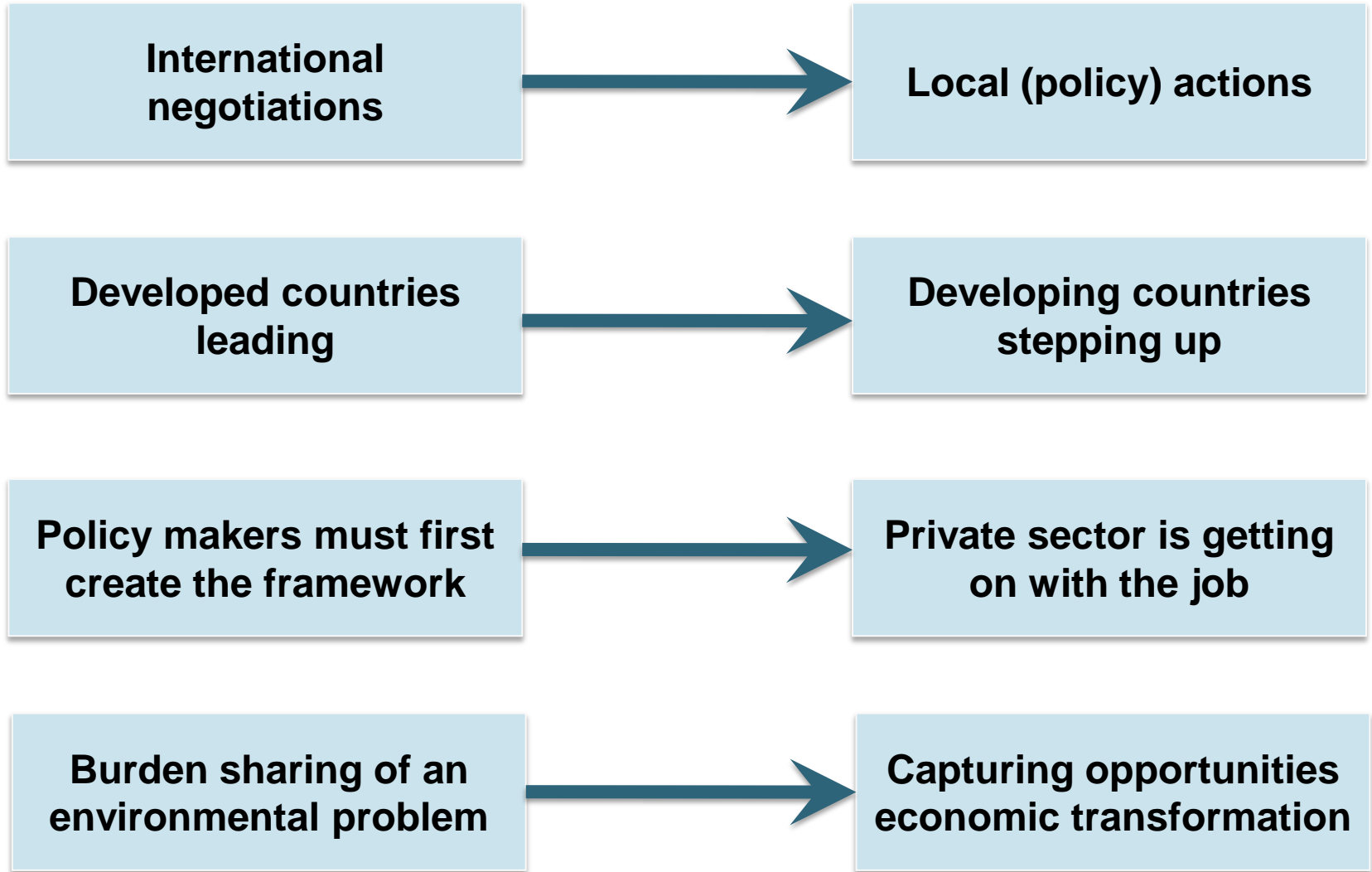
# So carbon productivity needs to improve 3x faster than labor productivity during the industrial revolution



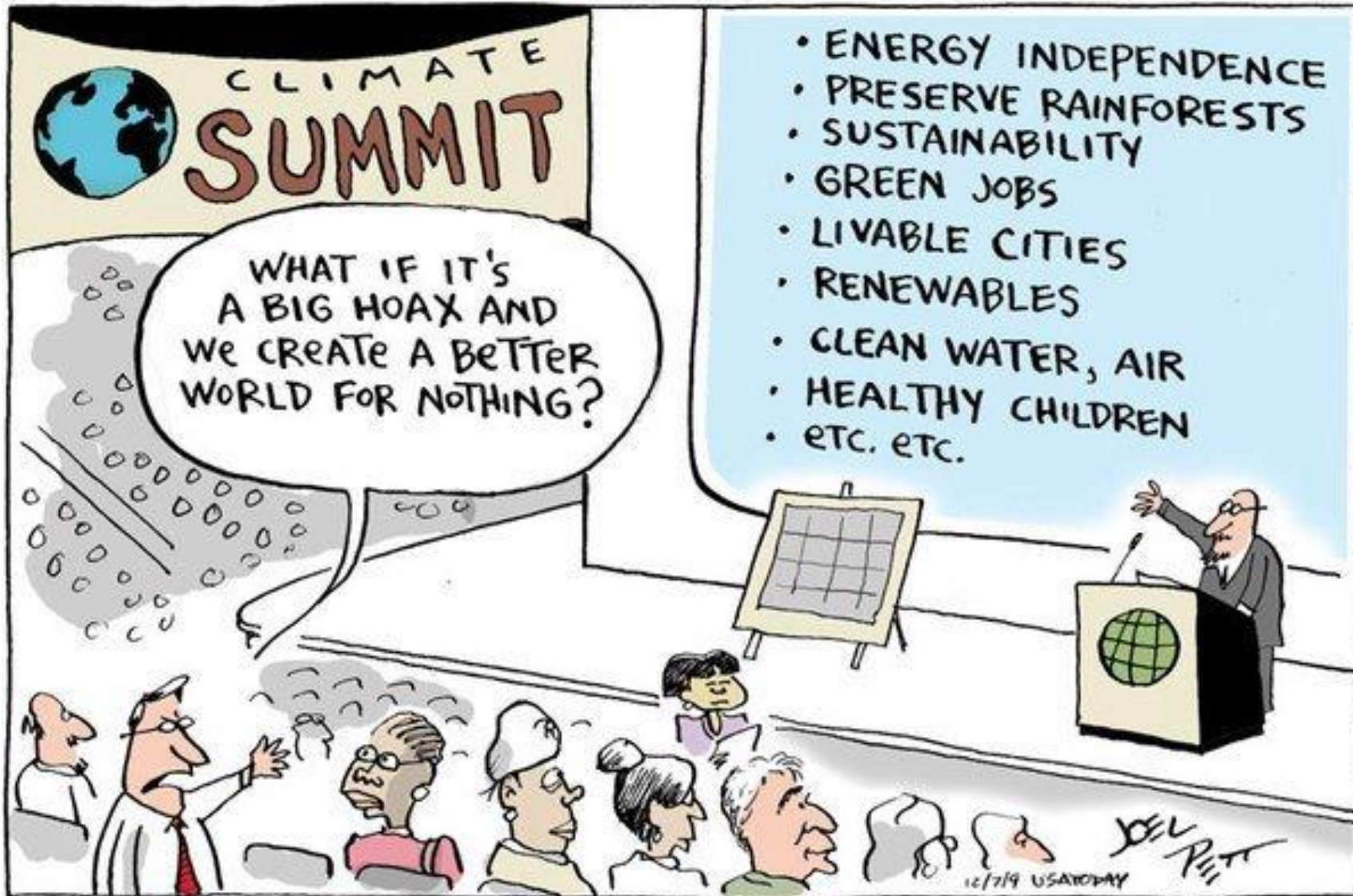
Source: Contours of the World Economy 1 – 2030 A.D., Maddison, 2007; McKinsey analysis



# Four major shifts in the global debate around energy and climate

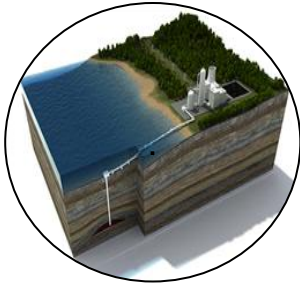
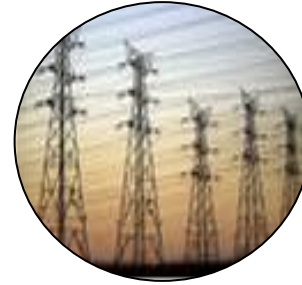


# We are on the way to the next industrial revolution





# Which together represent a trillion dollar opportunity

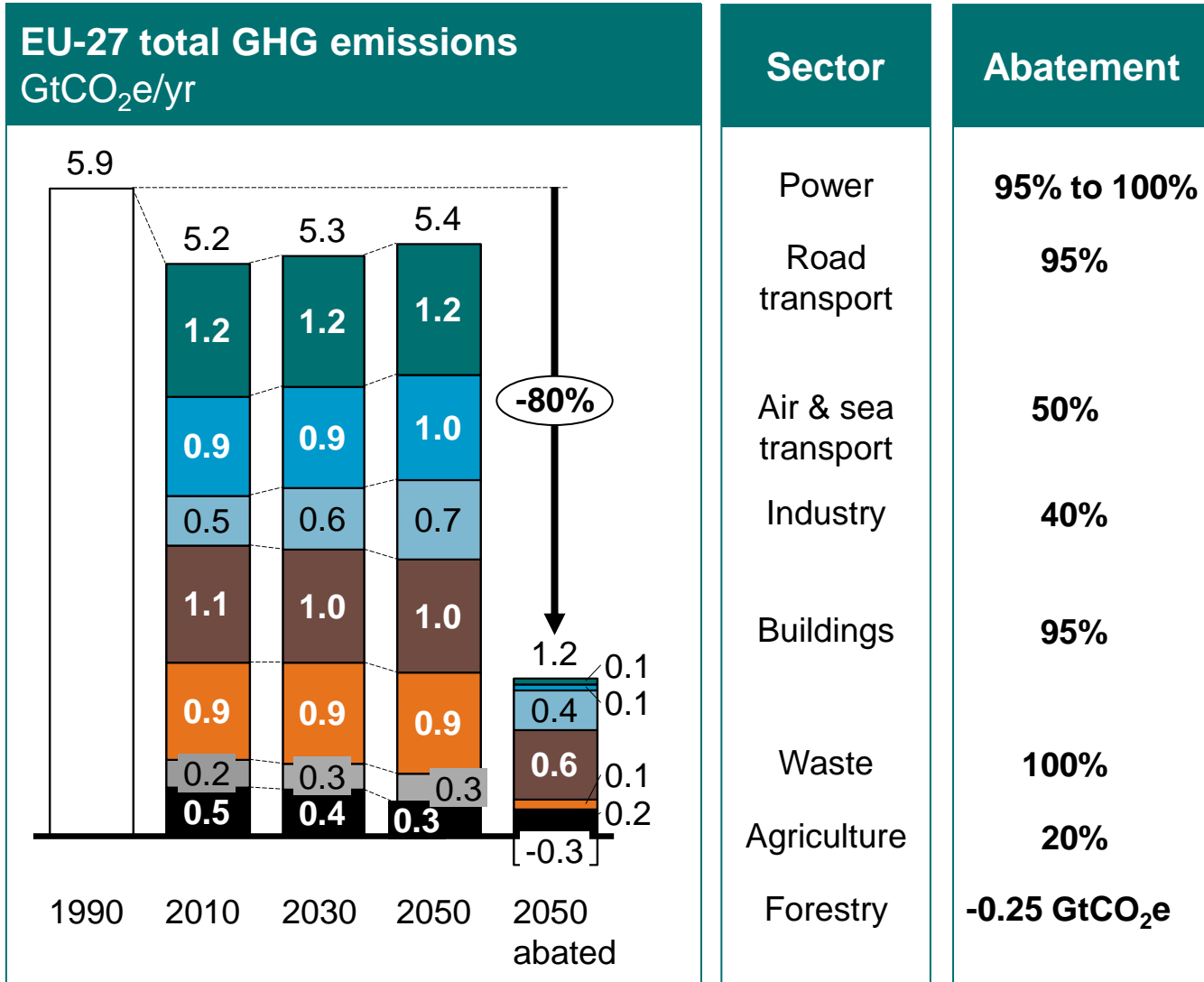


**\$1.5-2.7  
trillion  
in 2020**





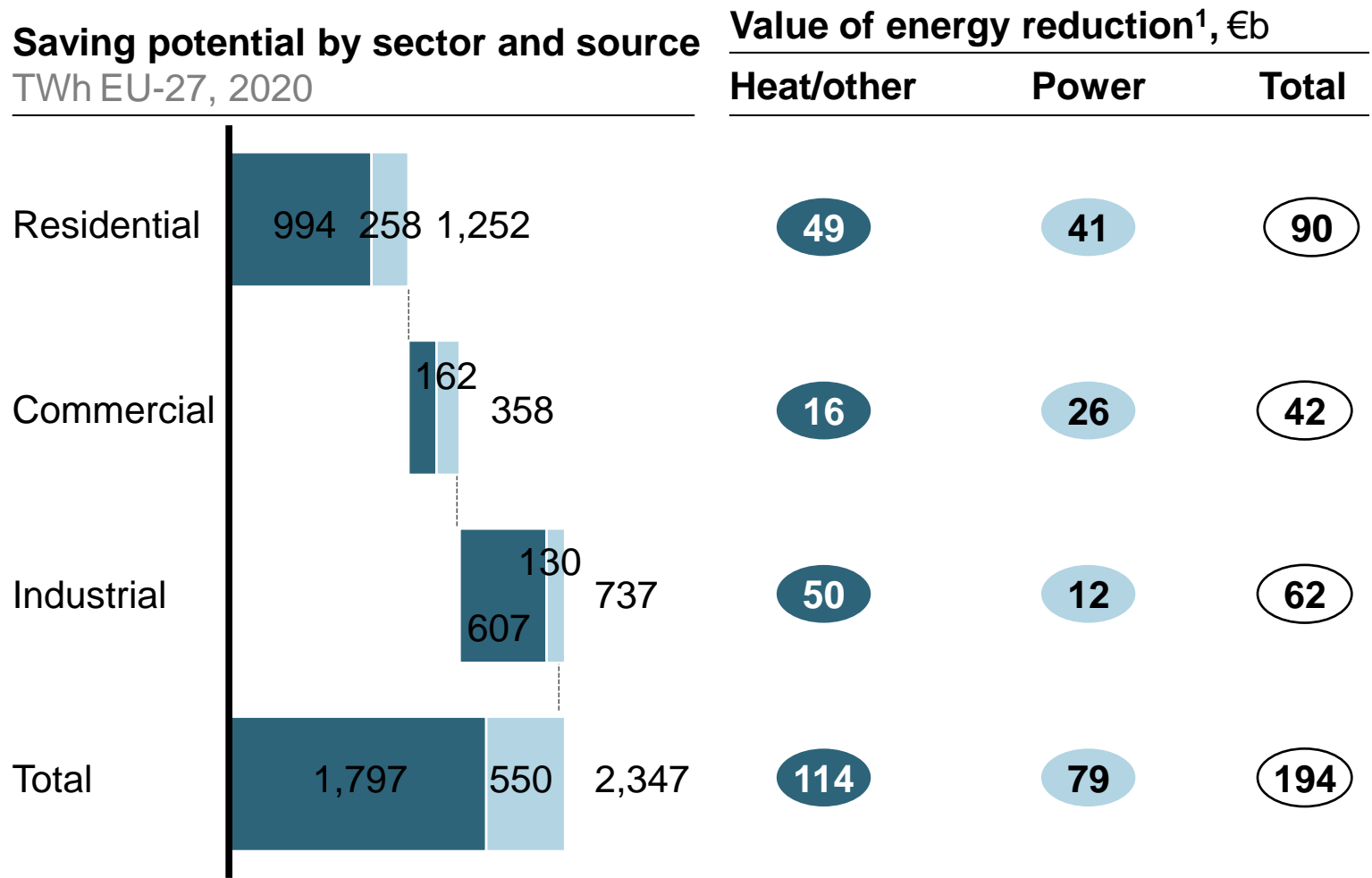
# The implications for energy in Europe are mind boggling





# Massive scope for energy efficiency, creating a large commercial opportunity

■ Heat/other  
■ Power



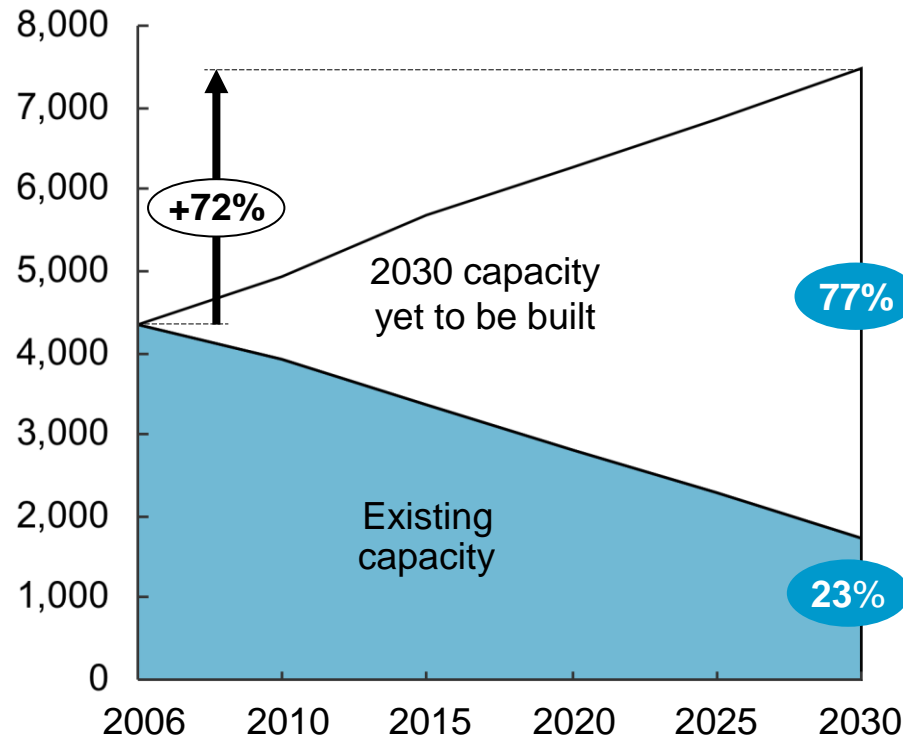
SOURCE: Industry vision IGP; McKinsey analysis



# Replacement and additional capacity in power generation will need huge investment

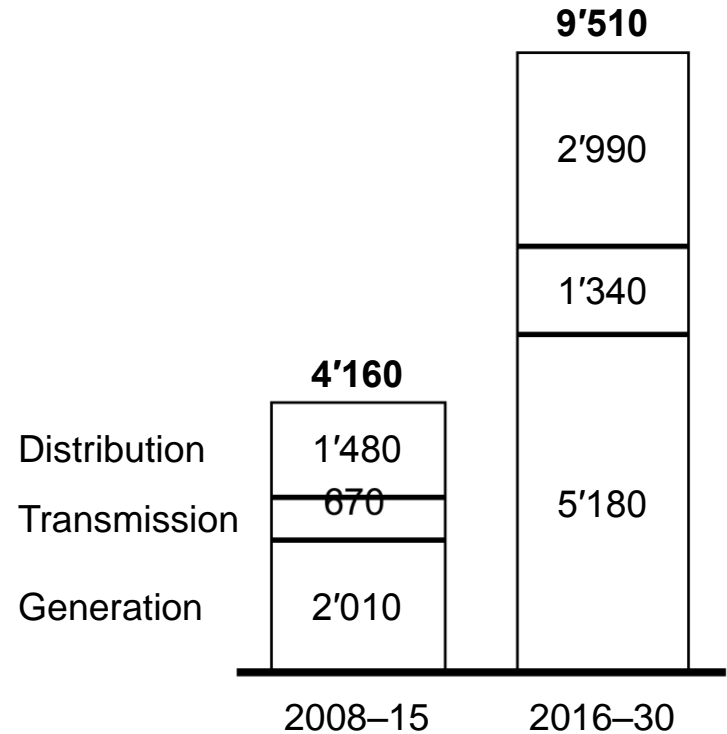
70% more generation needed by 2030, along with replacement of existing assets . . .

**Required global power generation capacity**  
GW



. . . requiring heavy investments until 2030

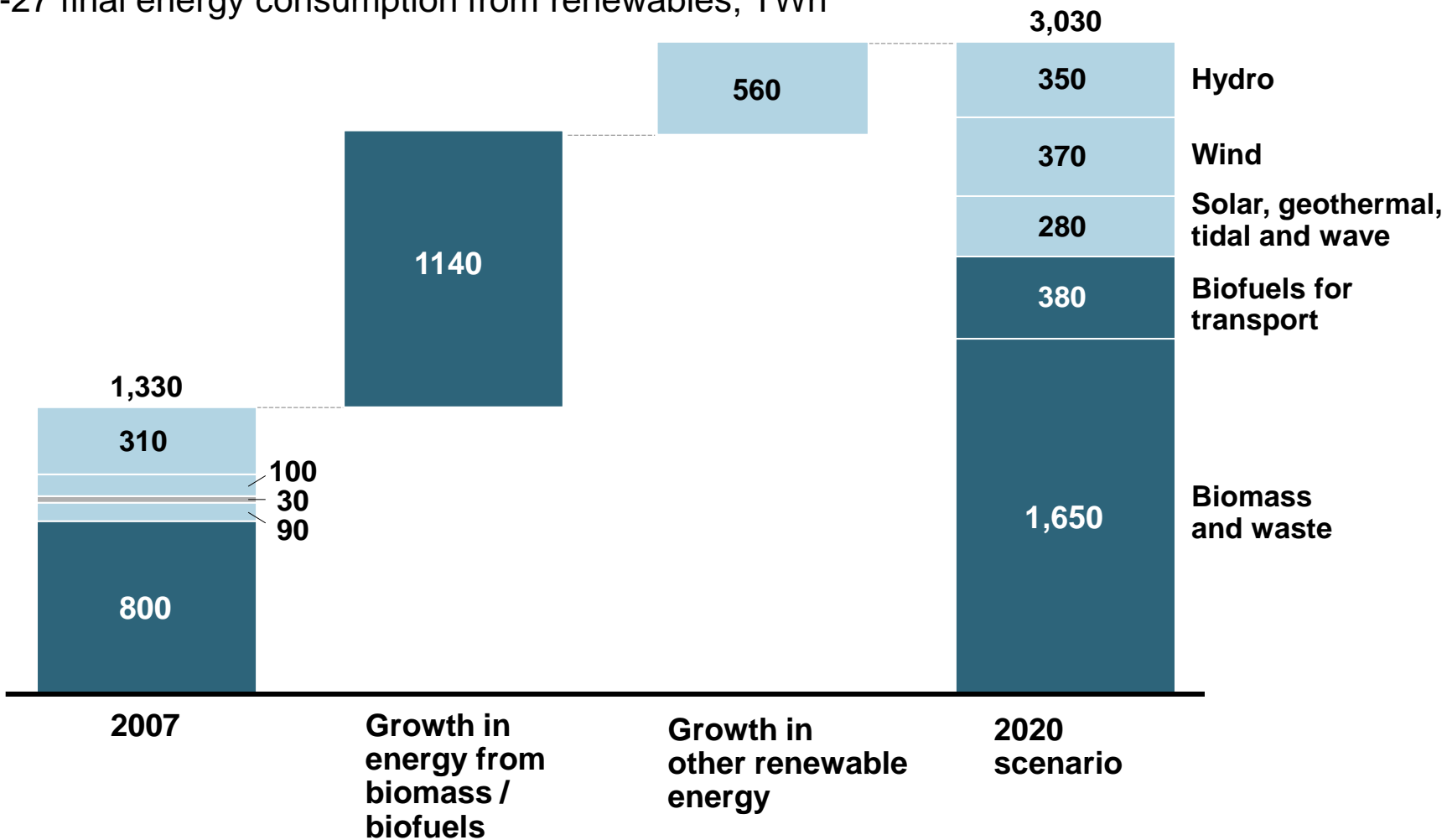
**Required investment**  
2008, \$b



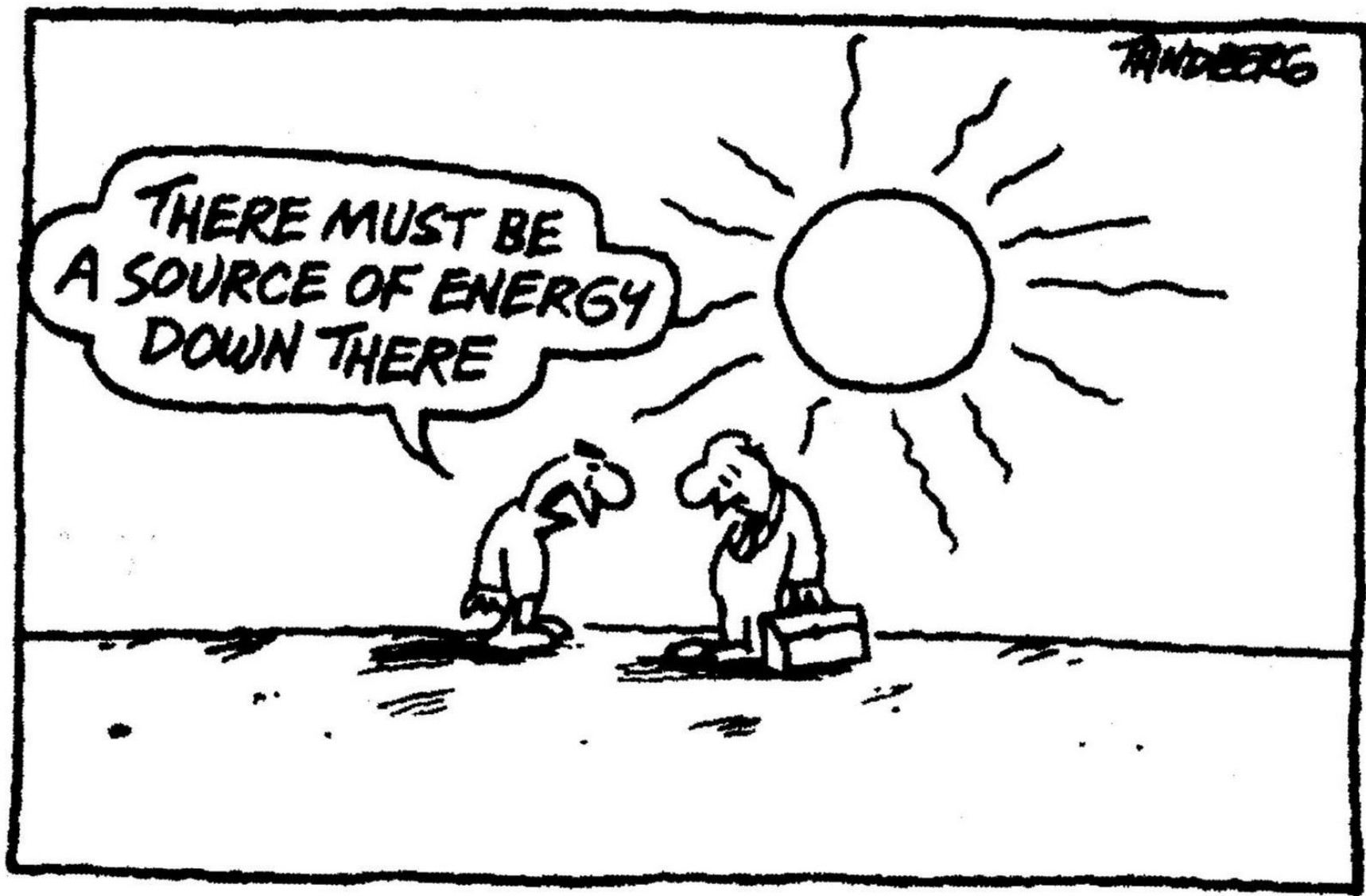


# Big role for bio-based energy in meeting Europe's renewable targets

EU-27 final energy consumption from renewables; TWh



To unlock the business opportunities of this revolution, companies need to think outside the box





# Implications for Tessengerlo Group

**Sustainability  
impact**

