What's the cause of CO₂? - Kaya Identity

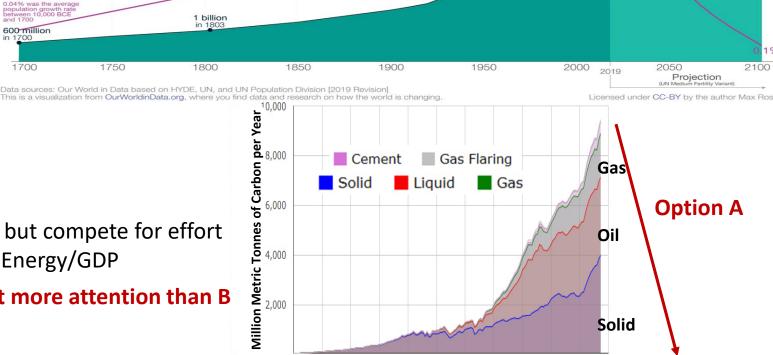
 CO_2 Emissions = Population × (GDP/Population) × (CO_2 /GDP)

Cannot reduce Population or GDP to zero so must reduce CO₂/GDP to zero

But $(CO_2/GDP) = (Fossil / Energy) \times (CO_2/Fossil) \times (Energy/GDP)$

So two options for Net Zero, either has to happen very quickly:

- A. Fossil/Energy to zero: completely stop fossil fuel use (and conventional cement, steel etc.) very rapidly
- B. CO₂/Fossil to zero: deploy CCS on all the fossil fuels that are used needs Direct Air Capture as well as 'conventional' CCS
- A & B are obviously mutually complementary, but compete for effort and investment; both also helped by reduced Energy/GDP
- Neither are easy to date A has received a lot more attention than B



World population growth, 1700-2100 ______

Annual growth rate of the world population

World population

10.9 Billion

9.7 Billion

7.7 Billion in 2019

5 Billion

2.5 Billion

1850 1865 1880 1895 1910 1925 1940 1955 1970 1985 2000 2015

2 Billion

or