

## Introduction

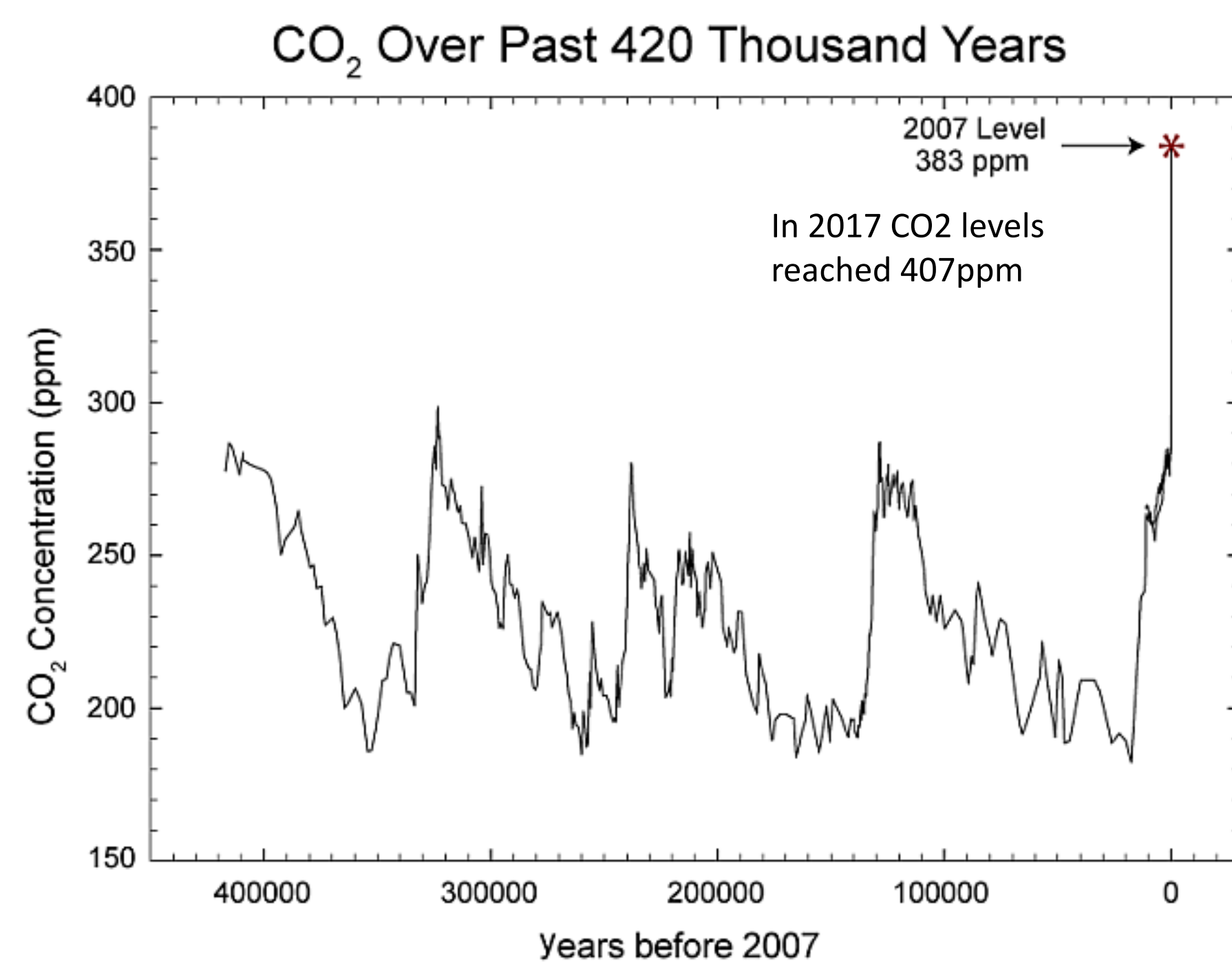
Responses to Climate Change:

1. Do Nothing (it is natural)
2. Adaptation (plan for it)
3. Mitigation (try to stop/slow)

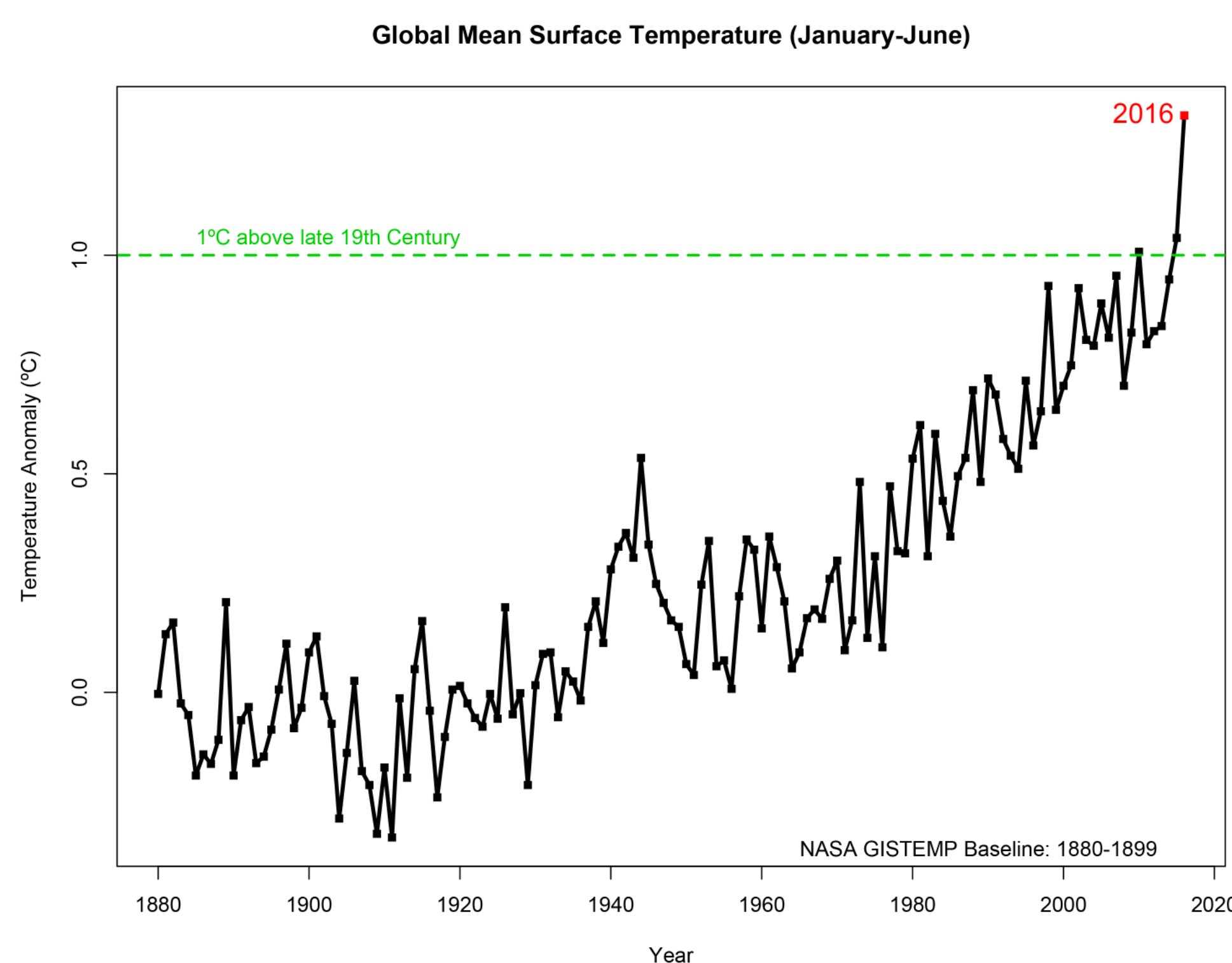
Former White House science advisor John Holdren: "We will respond to climate change with some mix of mitigation, adaptation, and suffering; all that remains to be determined is the mix."

## Is Climate Change a Problem?

The Climate has always changed hasn't it?

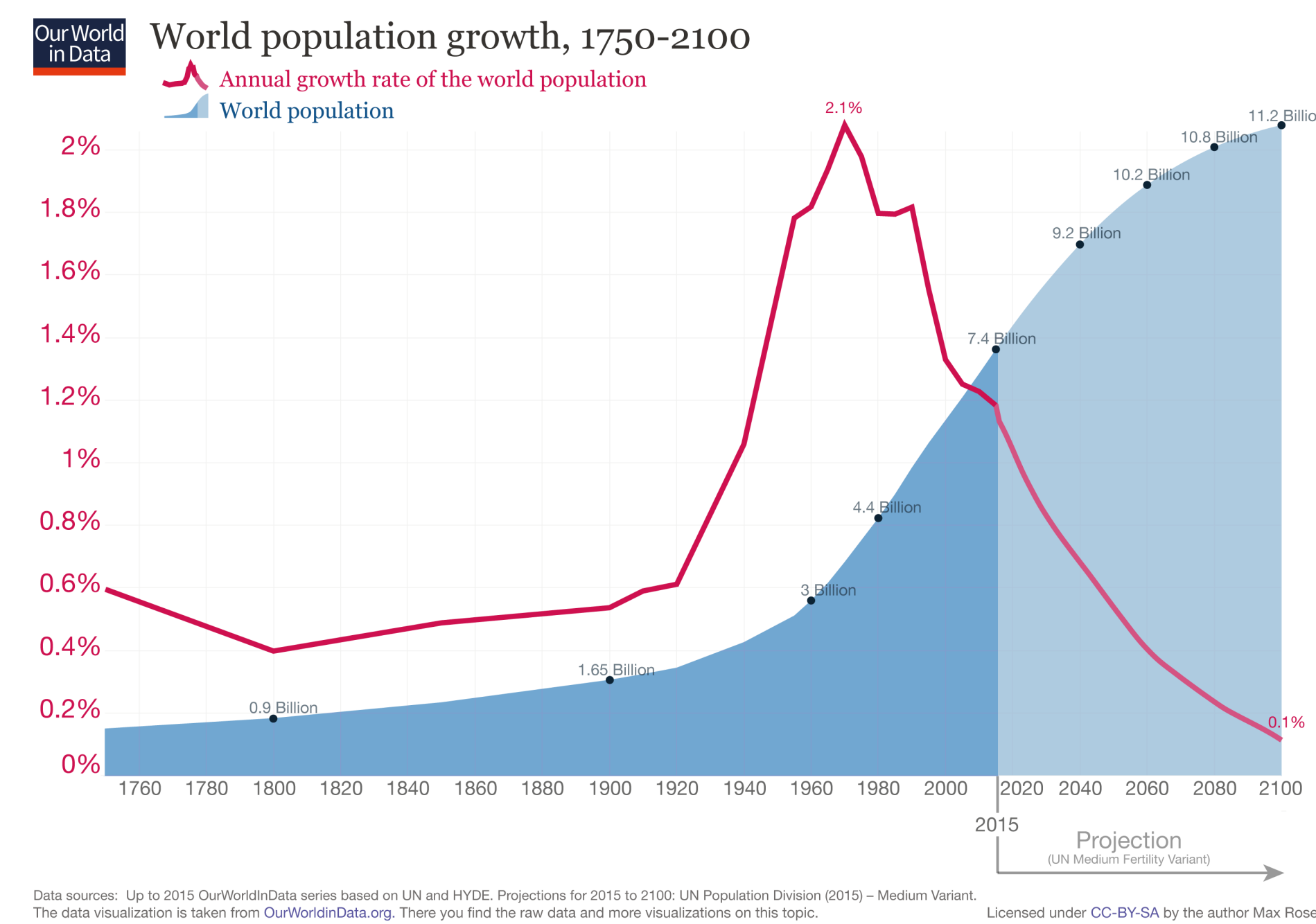


Though the climate has changed in the past, never before has it changed this quickly. Human activity is now altering the climate in an unprecedented manner. This will lead to extinction of many species, could cause food shortages, and extreme weather events.



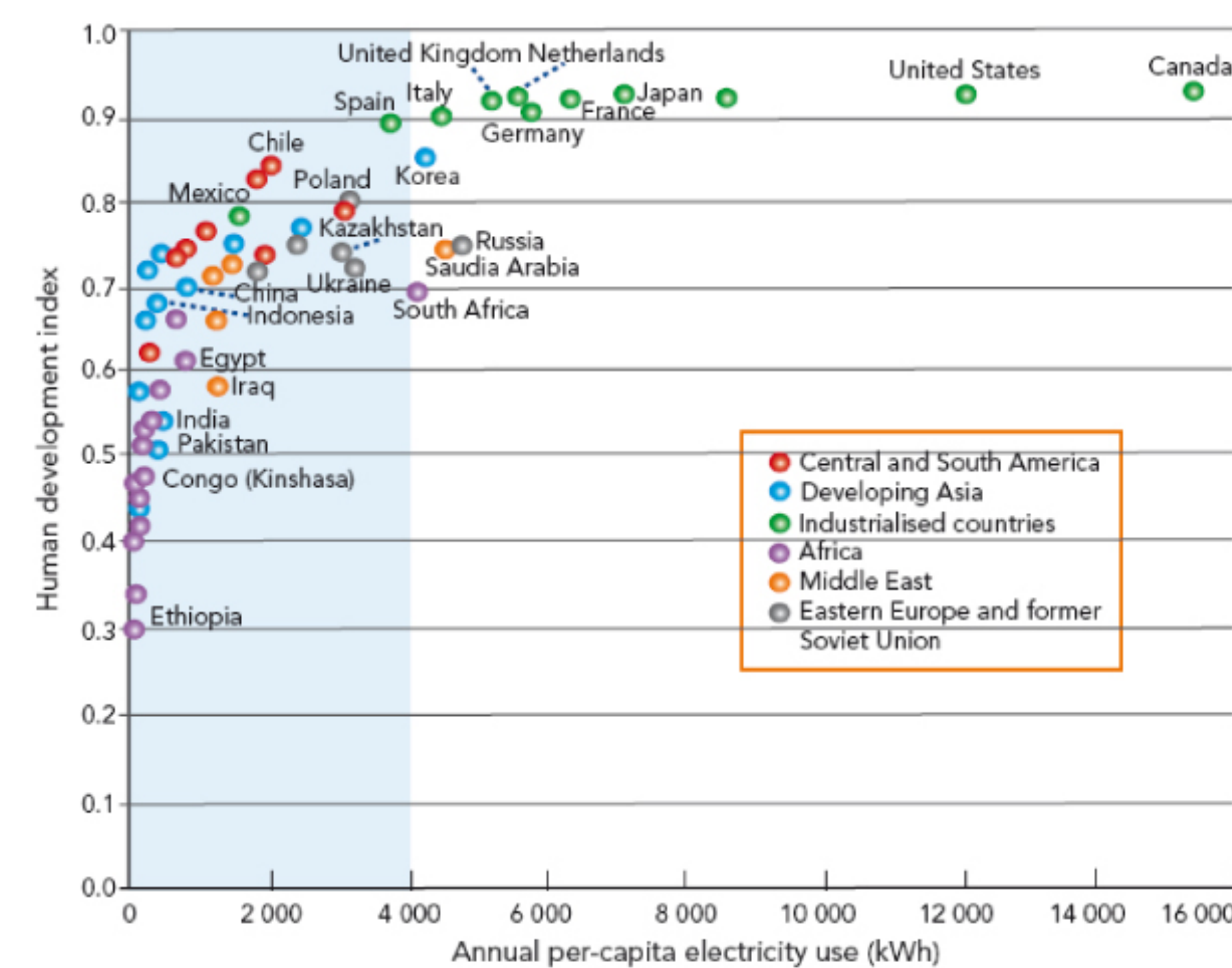
## The Mathematics

Our carbon problem =  
 (# of persons) X  
 (services used by each person) X  
 (the energy intensity of services) X  
 (the carbon intensity of energy)



Controlling human population is an important factor in the mathematical statement of the problem, but positive state-action is considered repugnant to the ideals protected within our Charter (particularly liberty and security of person).

Fortunately, data shows that education of women and protection of their reproductive rights lead to lower birth rates.



Clearly, with more people needing more services (to end poverty and improve living conditions) we must either:

- Be more Energy Efficient
- Produce Low Carbon Energy

## Is a Clean Energy Future possible?

**YES!!**

We require a concerted effort to move to clean energy sources and to improve energy efficiency.

A key point is to strive for "Deep Decarbonization" - An important question: Should we construct ANY new fossil fuel infrastructure (KMTM Pipeline)?

Electrification of most of services and transport will allow us to use clean energy sources rather than dirty fossil fuels.

Carbon footprints of electricity generation technologies

(UK & European data 2004-2006)

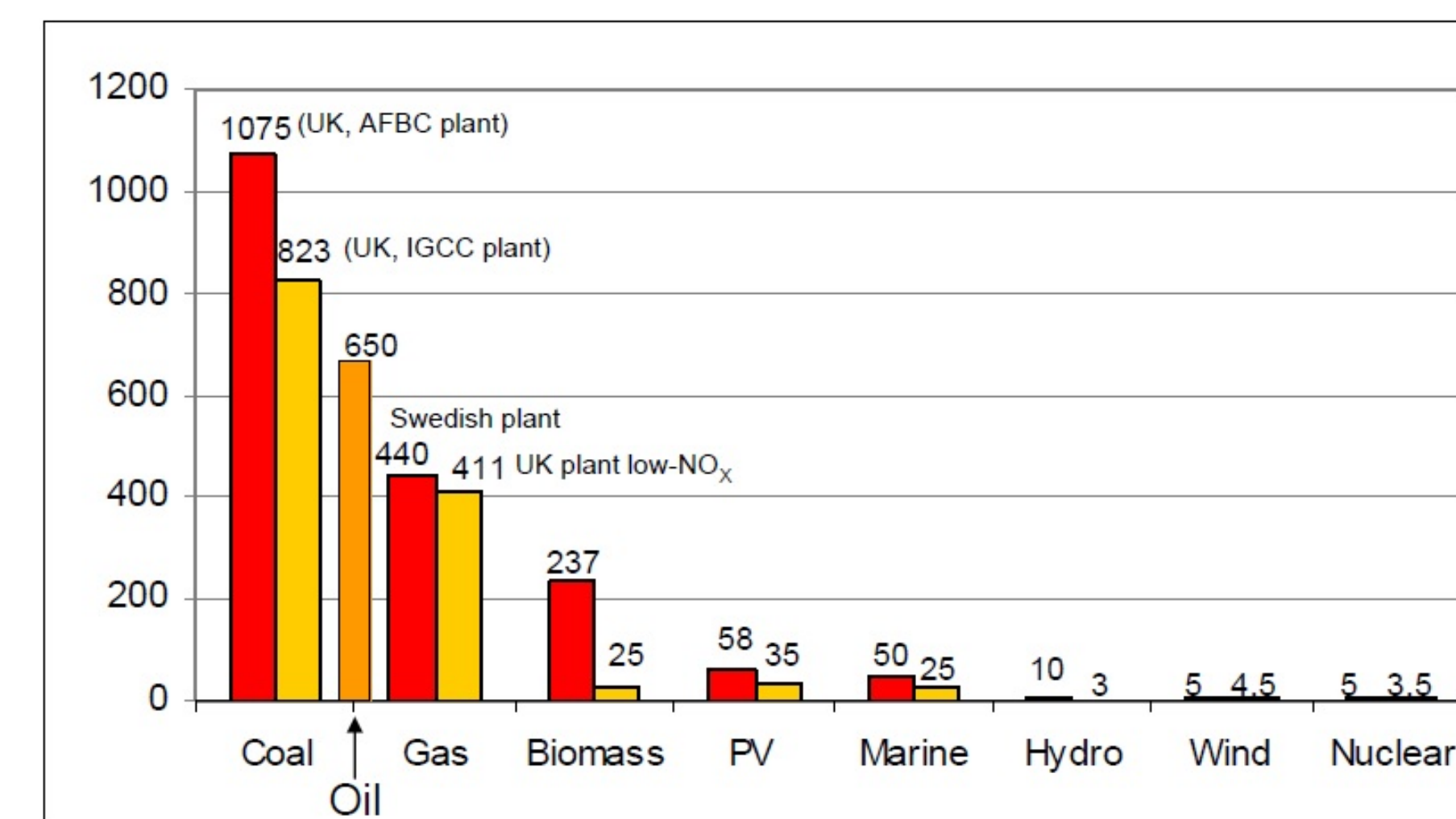


Figure 1: Total gross electricity production

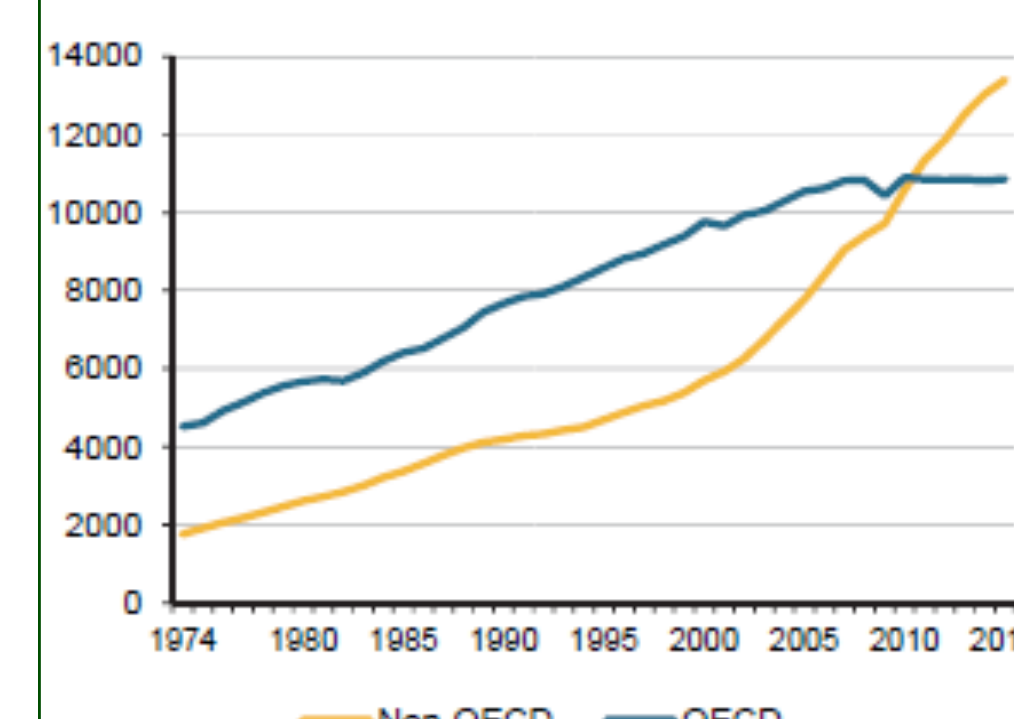


Figure 2: World gross electricity production, by source, 2015

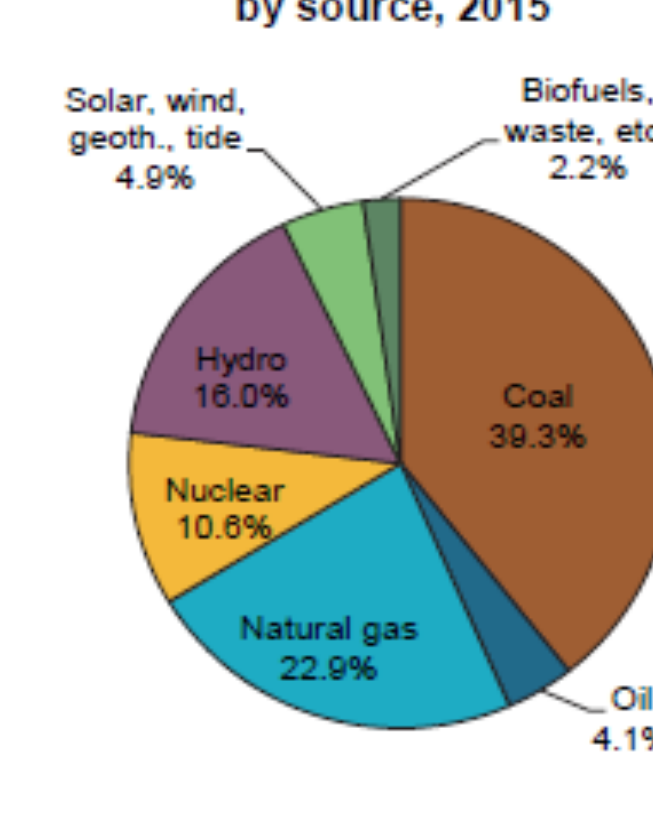


Figure 10: Annual growth rates of renewable supply from 1990 to 2016 in OECD total

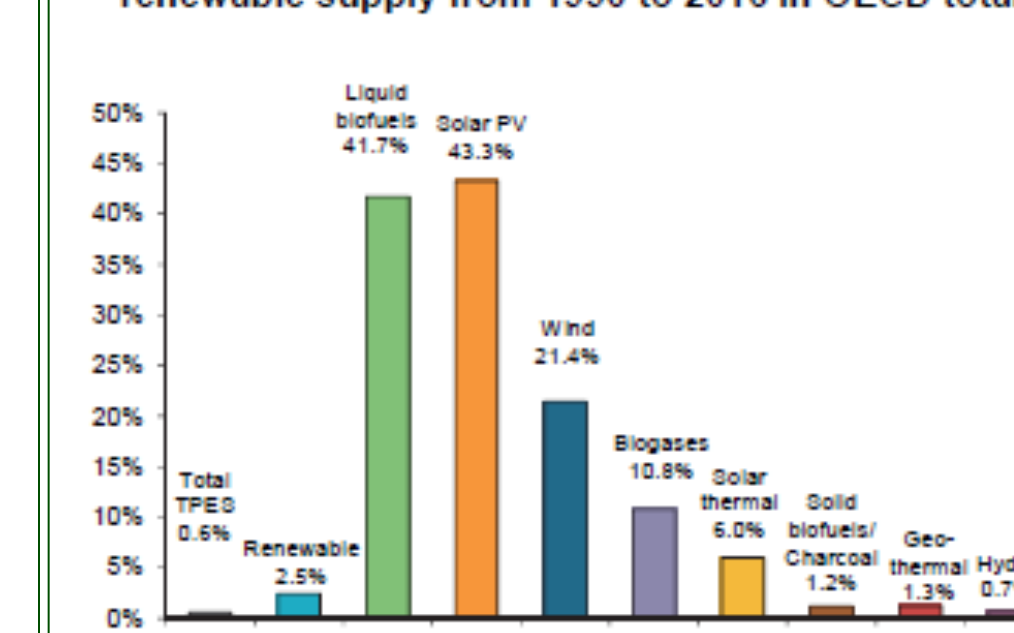
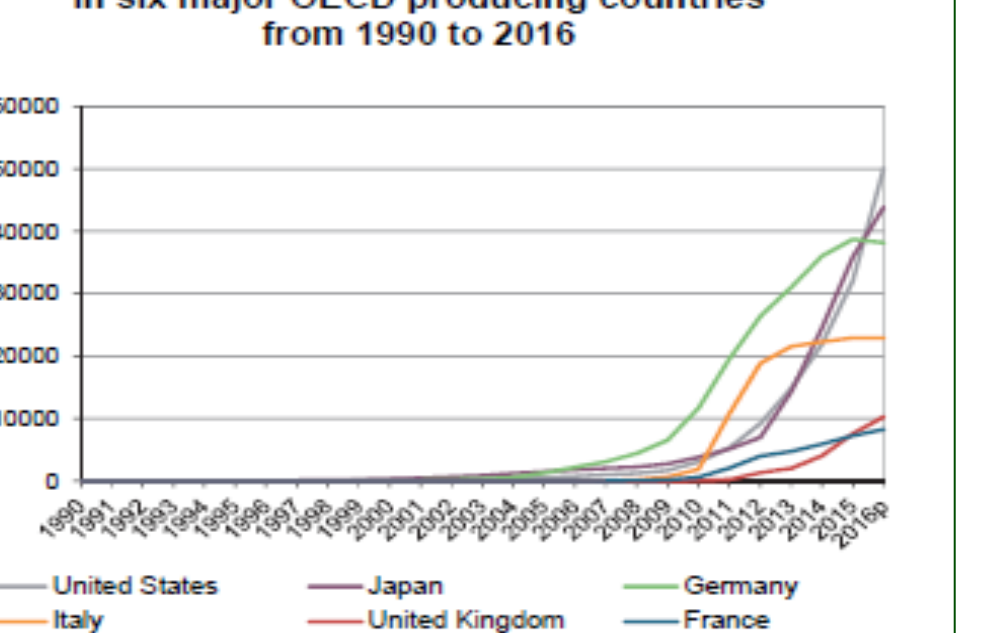
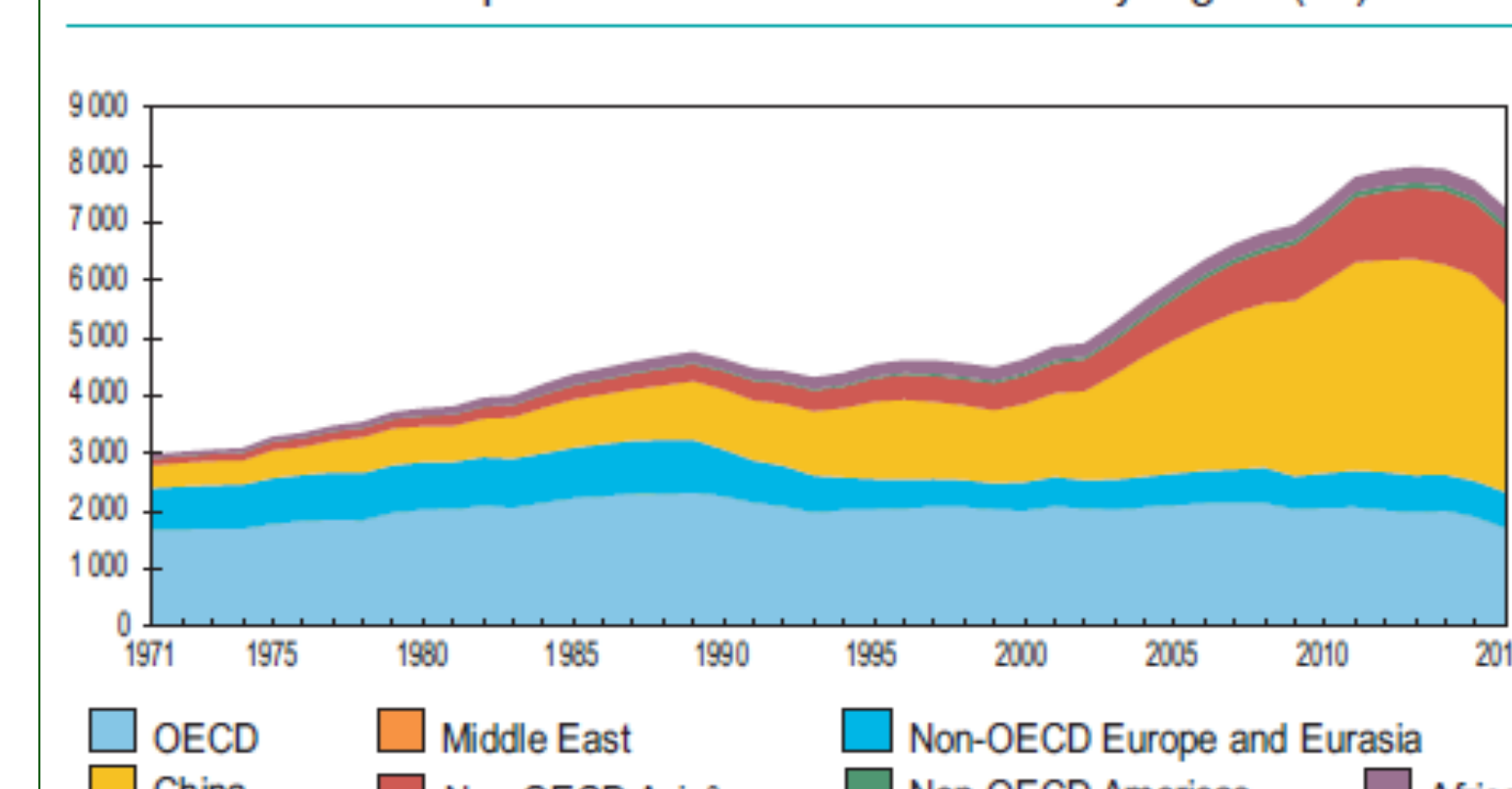


Figure 19: Solar photovoltaic electricity in six major OECD producing countries from 1990 to 2016



World coal<sup>1</sup> production from 1971 to 2016 by region (Mt)



## Issues of National Concern

To respond to climate change there is no single magic bullet solution. A meaningful response in a timely manner will require leadership on a national scale of all countries on the planet.

Canada must:

- Adopt a national strategy on clean energy
- Vastly increase inter-provincial electrical grid capacity
- Transition our energy sources to low carbon renewables
- Implement policy to promote energy efficiency
- Implement a national price on carbon
- Implement nation wide controls on fugitive emissions like methane
- Remove all tax incentives that support fossil fuel production and exploration

## References

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## Acknowledgements/Contact

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