

# Modelers Perspective on the Use of IAMs

Jae Edmonds

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# ACKNOWLEDGEMENTS

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# Overview

- ▶ **What do we do well?**
- ▶ **What do we do badly?**
- ▶ **What do we not want to do?**



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# What Do We Do Relatively Well?

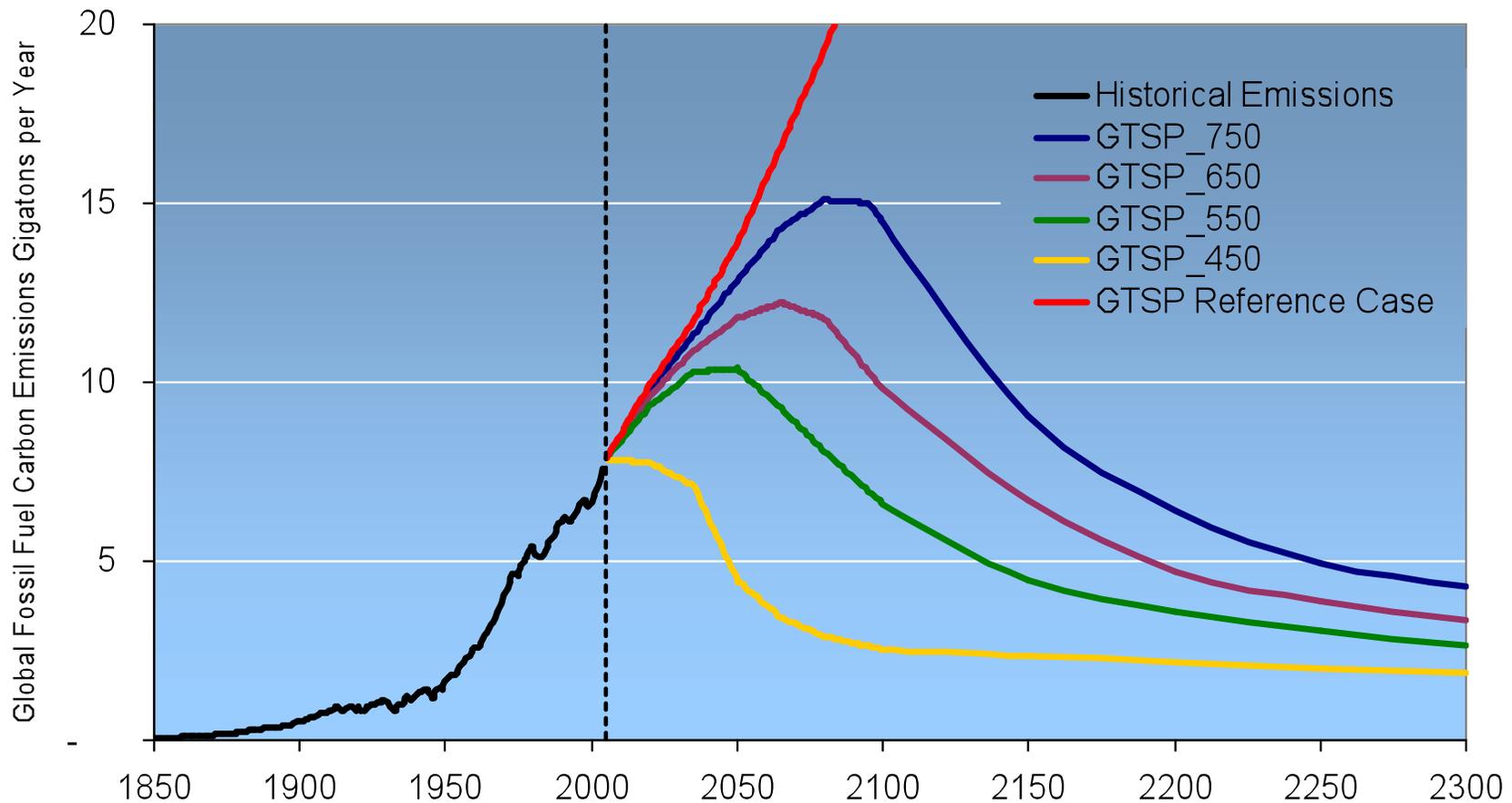


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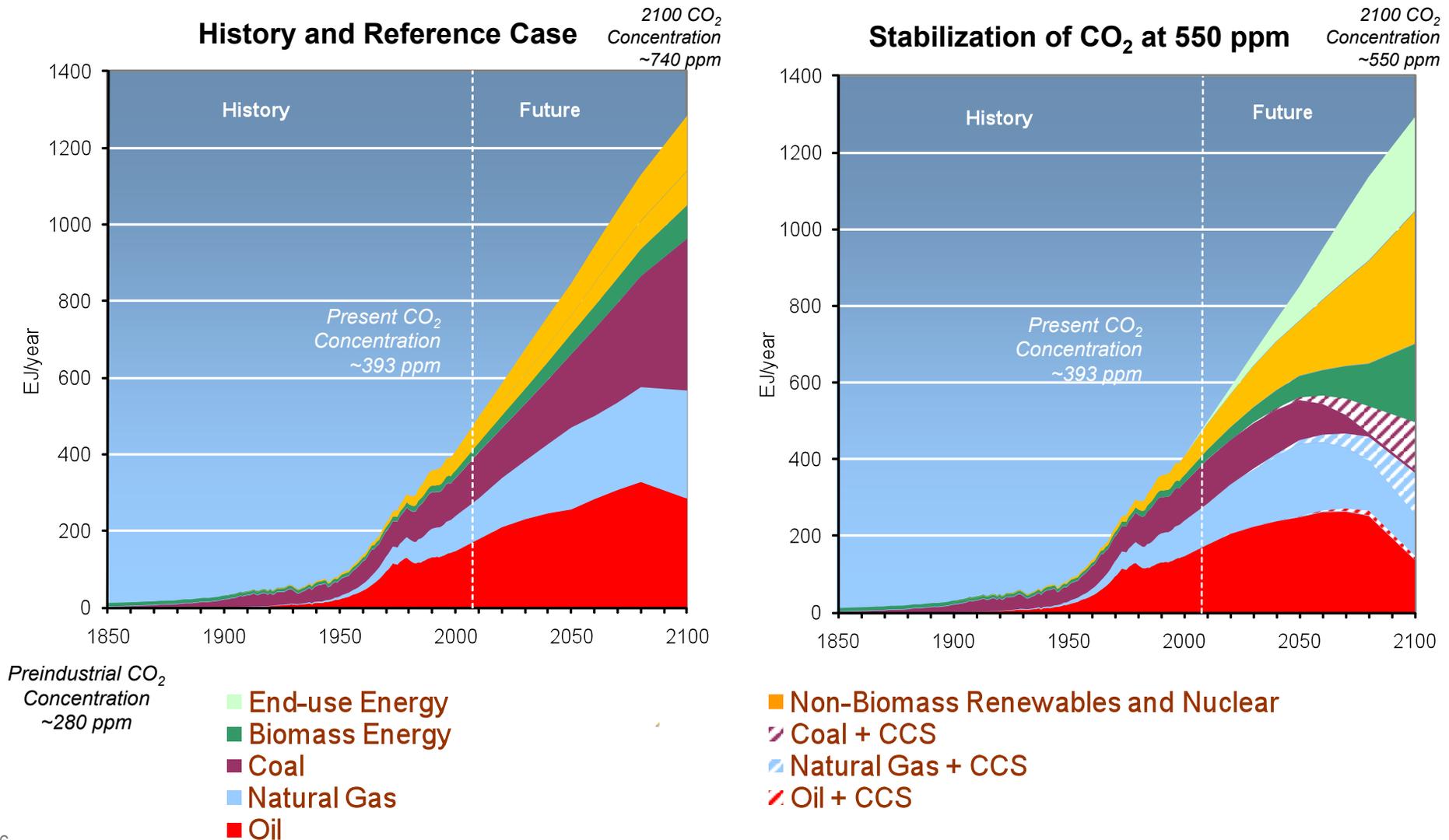
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## What do we do well?

- ▶ In general we have had some reasonably good success in generating insights into the behavior of systems.

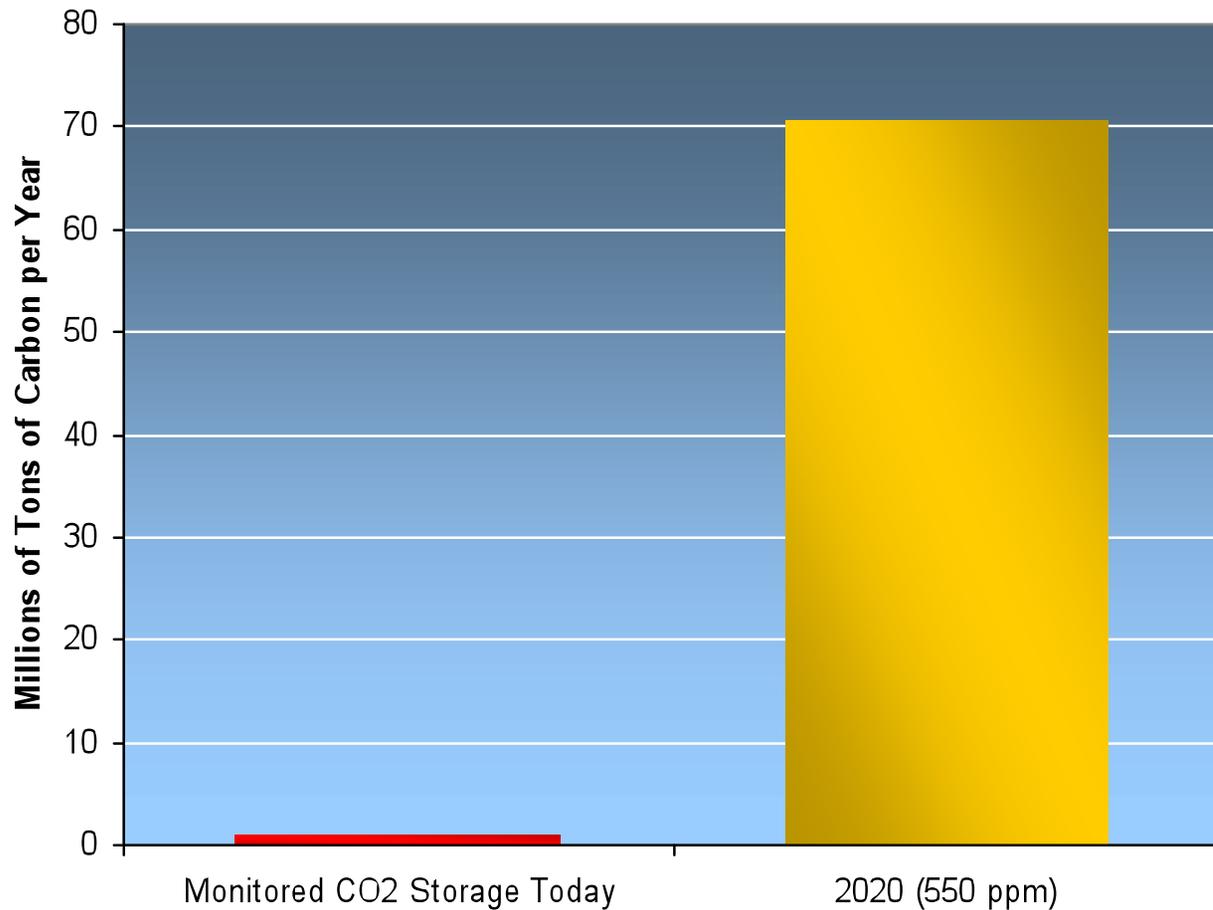


# Stabilizing CO<sub>2</sub> concentrations will require fundamental change to national, regional, and global energy systems.

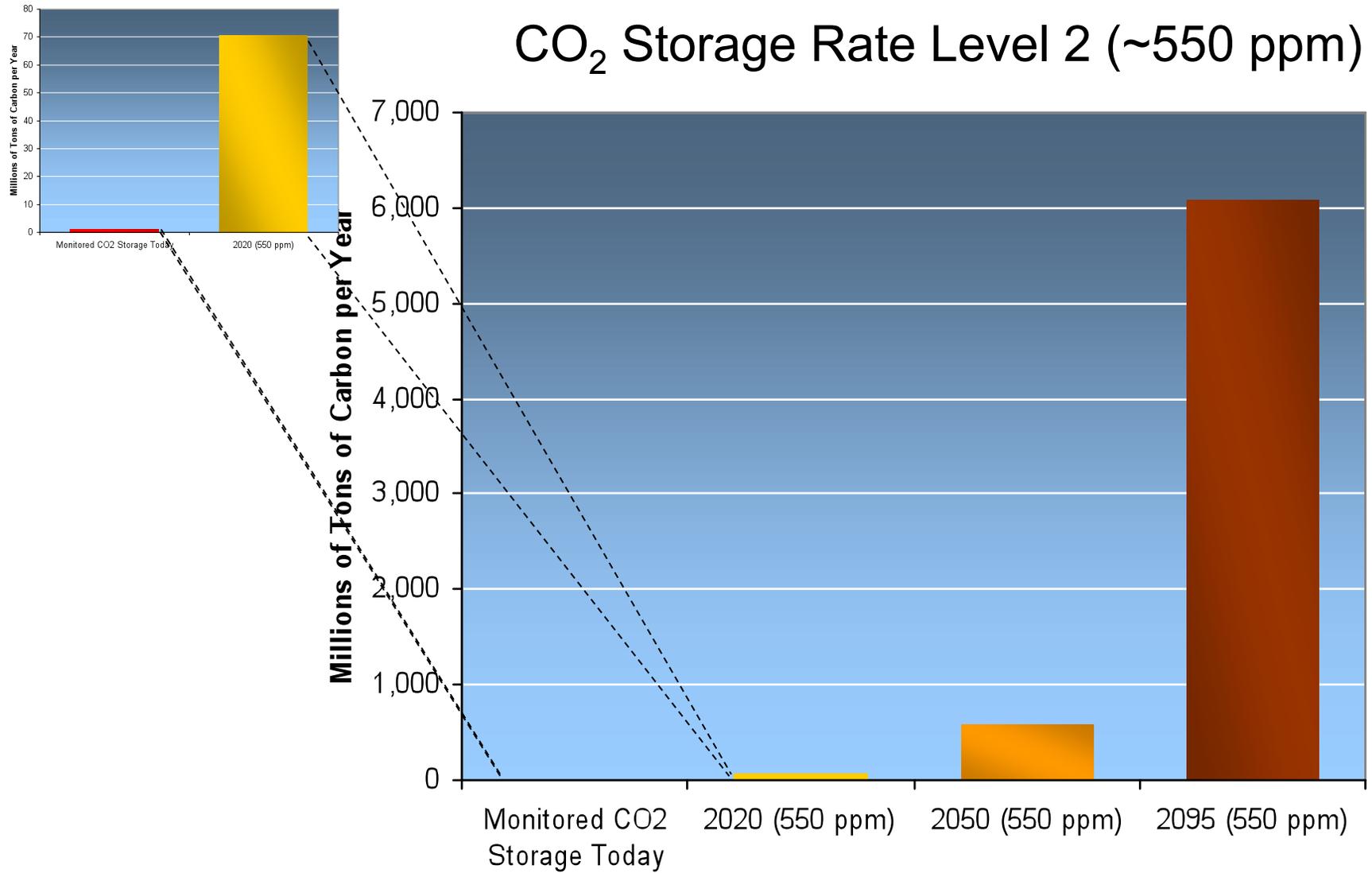


# The Near-term Challenge of Scale

CO<sub>2</sub> Storage—550 ppm Stabilization Case



# The long-term challenge

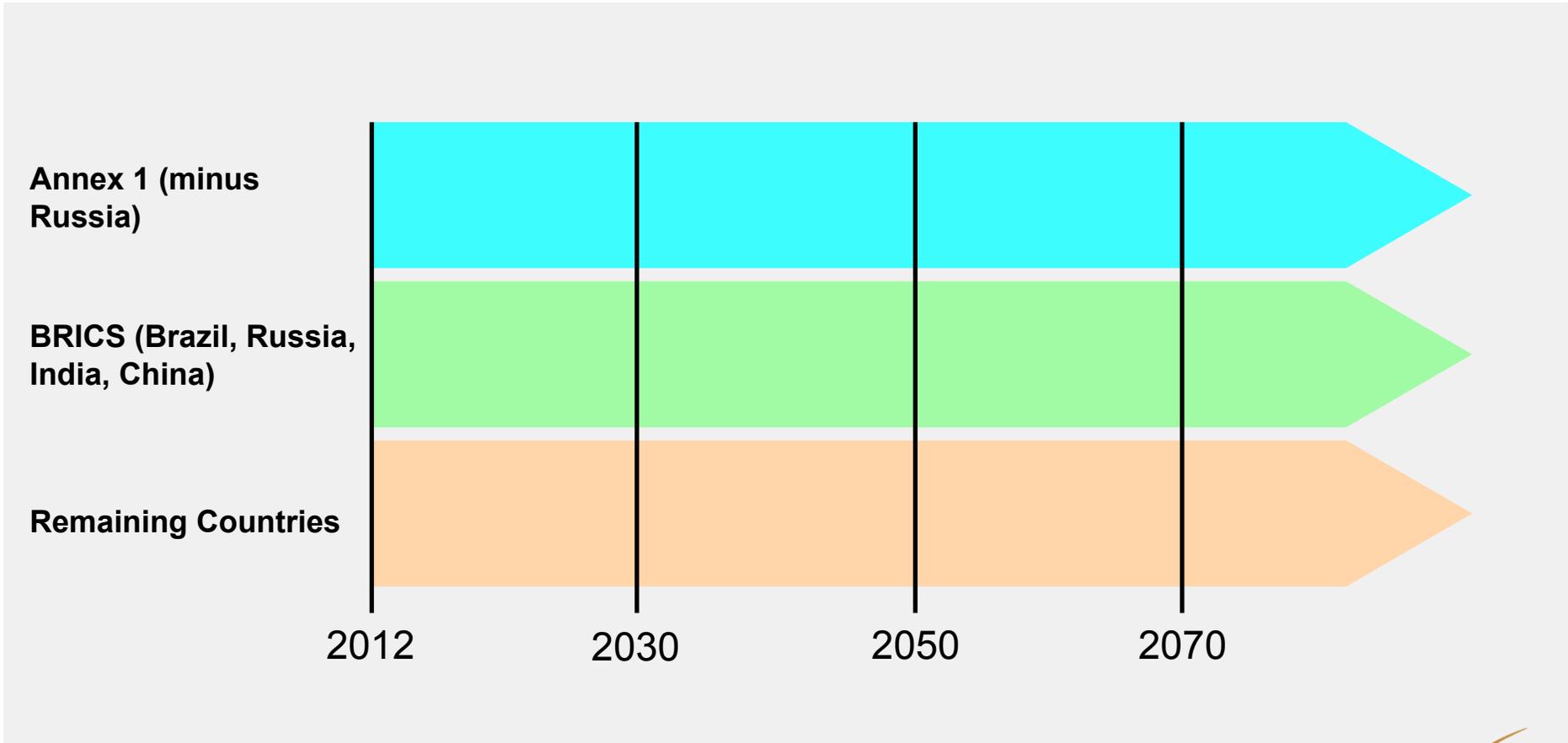


# A Quick Cross-walk between W/m<sup>2</sup>, CO<sub>2</sub>-e and CO<sub>2</sub> Concentrations

- ▶ Carbon and CO<sub>2</sub>
- ▶ 1 ton C = 44/12 tons CO<sub>2</sub>

<b>Radiative forcing</b> (2005=2.36 W/m <sup>2</sup> Kyoto Gases)	<b>CO<sub>2</sub> Equivalent Concentration</b> (2005=435 ppm <sub>e</sub> Kyoto gases)	<b>Atmospheric CO<sub>2</sub> Concentration</b> (2005=381 ppm)
2.6 W/m <sup>2</sup>	450 ppm <sub>e</sub>	383 ppm (depends on non-CO <sub>2</sub> gases)
3.7 W/m <sup>2</sup>	550 ppm <sub>e</sub>	445 ppm (depends on non-CO <sub>2</sub> gases)
4.5 W/m <sup>2</sup>	650 ppm <sub>e</sub>	520 ppm (depends on non-CO <sub>2</sub> gases)

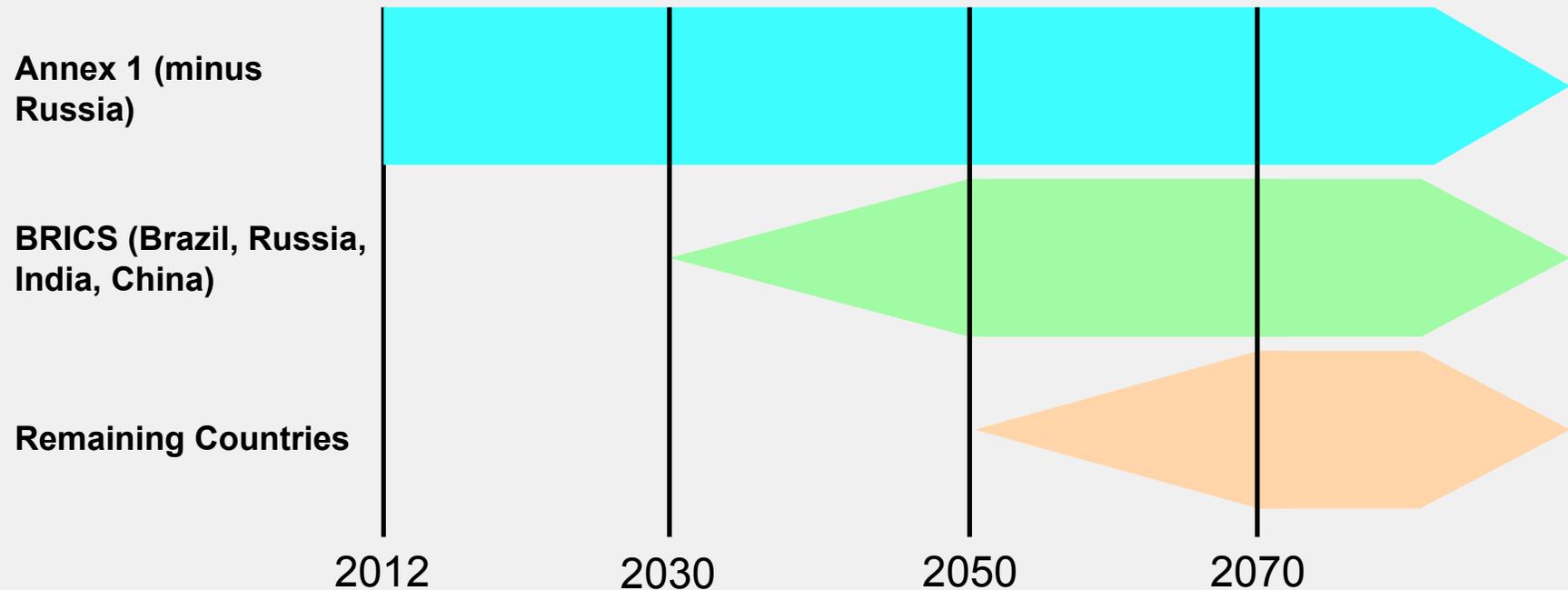
# Full Participation: All Begin Reductions Immediately: S1



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# Delayed Participation: Regions Enter the Global Coalition over Time: S2



The delayed participation case explores the potential impacts of a one single possibility for delay in non-Annex I participation – it does not represent any real policy proposal. Mechanisms such as offsets may lead to policy structures that lie between the two cases explored in this study.

# Which scenarios were the modeling groups able to provide?

Model	650 CO2-e		550 CO2-e				450 CO2-e				
	Full	Delay	Full		Delay		Full		Delay		
	Not-to-Exceed	Not-to-Exceed	Not-to-Exceed	Overshoot	Not-To-Exceed	Overshoot	Not-to-Exceed	Overshoot	Not-To-Exceed	Overshoot	
1 ETSAP-TIAM	+	+	+	+	+	+	+	+	+	XX	+
2 FUND	+	+	+	+	+	+	XX	+	XX	XX	XX
3 GTEM	+	+	+	+	XX	+	XX	+	XX	XX	XX
4 IMAGE	+	+	+	+	+	+	XX	XX	XX	XX	XX
IMAGE-BC	+	+	+	+	+	+	XX	+	XX	XX	XX
5 MERGE Optimistic	+	+	+	+	XX	XX	XX	XX	XX	XX	XX
MERGE Pessimistic	+	+	+	+	+	+	XX	XX	XX	XX	XX
6 MESSAGE	+	+	+	+	XX	+	XX	+	XX	XX	XX
7 MiniCAM Base	+	+	+	+	XX	+	+	+	XX	+	+
MiniCAM LoTech	+	+	+	+	XX	+	XX	+	XX	XX	XX
8 POLES	+	+	+	+	XX	+	XX	XX	XX	XX	XX
9 SGM	+	+	+	+	+	+	XX	XX	XX	XX	XX
10 WITCH	+	+	+	+	+	+	XX	XX	XX	XX	XX

2 6 0 2

# What Don't We Do Well?



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# What don't we do well?

- ▶ Where does one begin?
- ▶ IAMs don't do impacts very well.
- ▶ IAMs don't do regional mitigation and impacts very well.
- ▶ IAMs don't do governance very well.

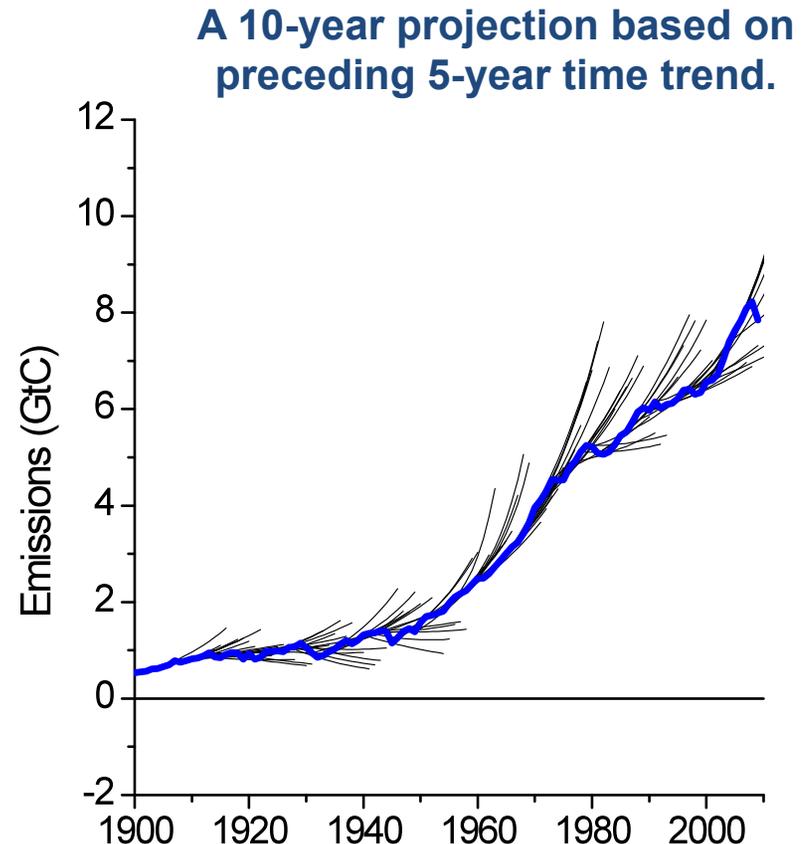
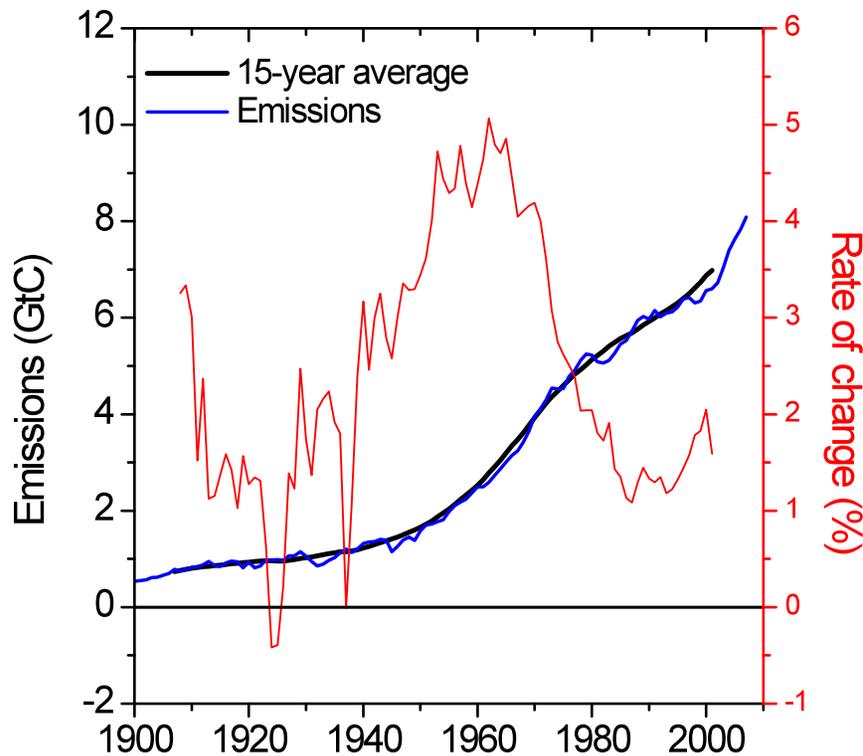


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# What don't we do well?

- ▶ The short term. IAMs are, in general, long-term strategic analysis tools.



Source: Van Vuuren, et al. 2010. What do near-term observations tell us about long-term developments in greenhouse gas emissions? In review.

# What don't we do well?

- ▶ History
- ▶ Unlike carbon cycle or climate models, we do not do studies that begin 100 ybp and roll up through the present.
- ▶ This is something we should think about.
  - It raises non-trivial issues with regard to experimental design and the historical data base?
  - Since we do not try to predict business cycles and price spikes, what history we should be reproducing?



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# What Do We Not Want To Do?



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# What we don't want to do

- ▶ Don't go beyond the capabilities of your model.
- ▶ Don't get trickled into thinking that because its your model its unqualified truth.
- ▶ Always listen to Rich Richels.



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