

An aerial photograph of a densely populated city, likely Los Angeles, showing a vast expanse of buildings and infrastructure. The atmosphere is hazy, suggesting air pollution or smog, which is a key theme of the presentation. The text is overlaid on the top half of the image.

What makes something anthropogenic anyway?

the devils in the details of climate change policies

Aaron Strong

Connecting the Dots 2014

THE CLIMATE, ENERGY, FOOD, AND WATER NEXUS

Outline

- Anthropogenic emissions
- Carbon accounting in climate policies
- California's cap and trade regulation

CO₂, the pollutant

CO₂



CO₂



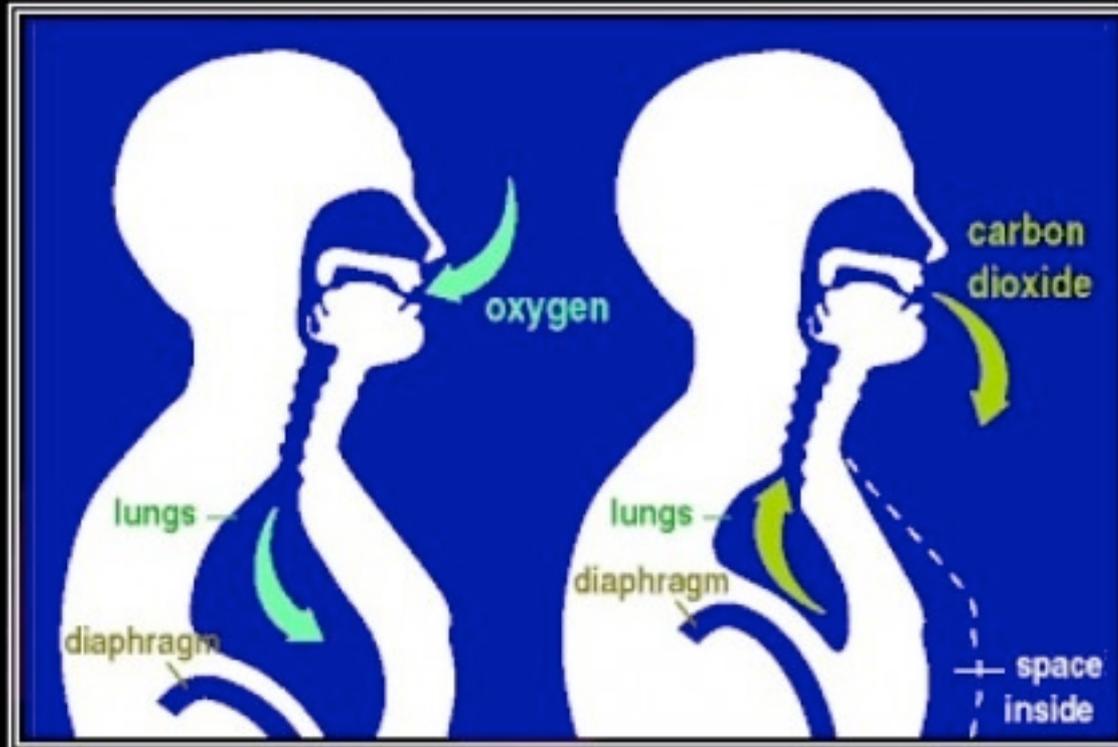
Your breath

CO₂



Fossil fuel combustion

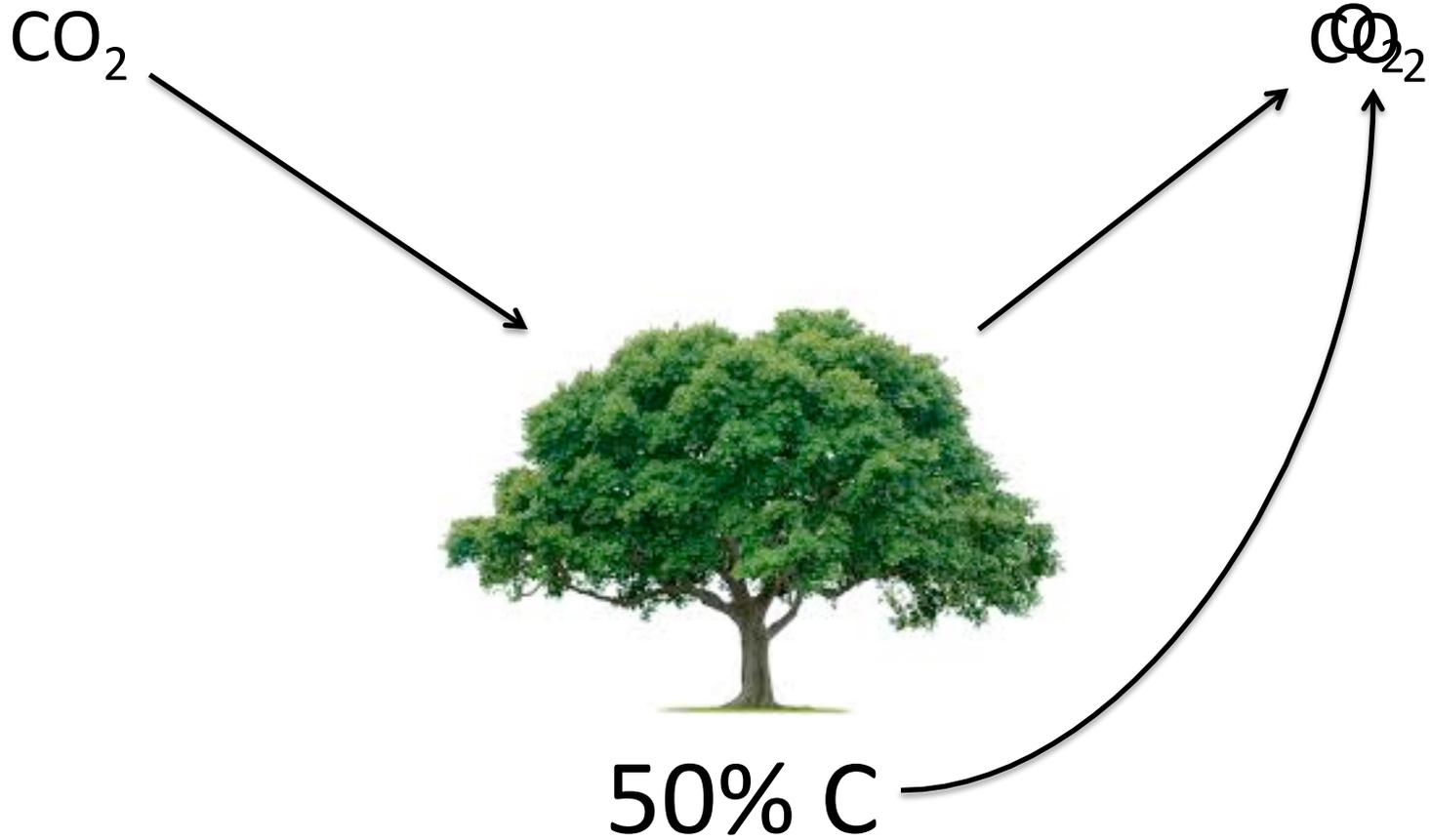
the problem with this:



STOP BREATHING

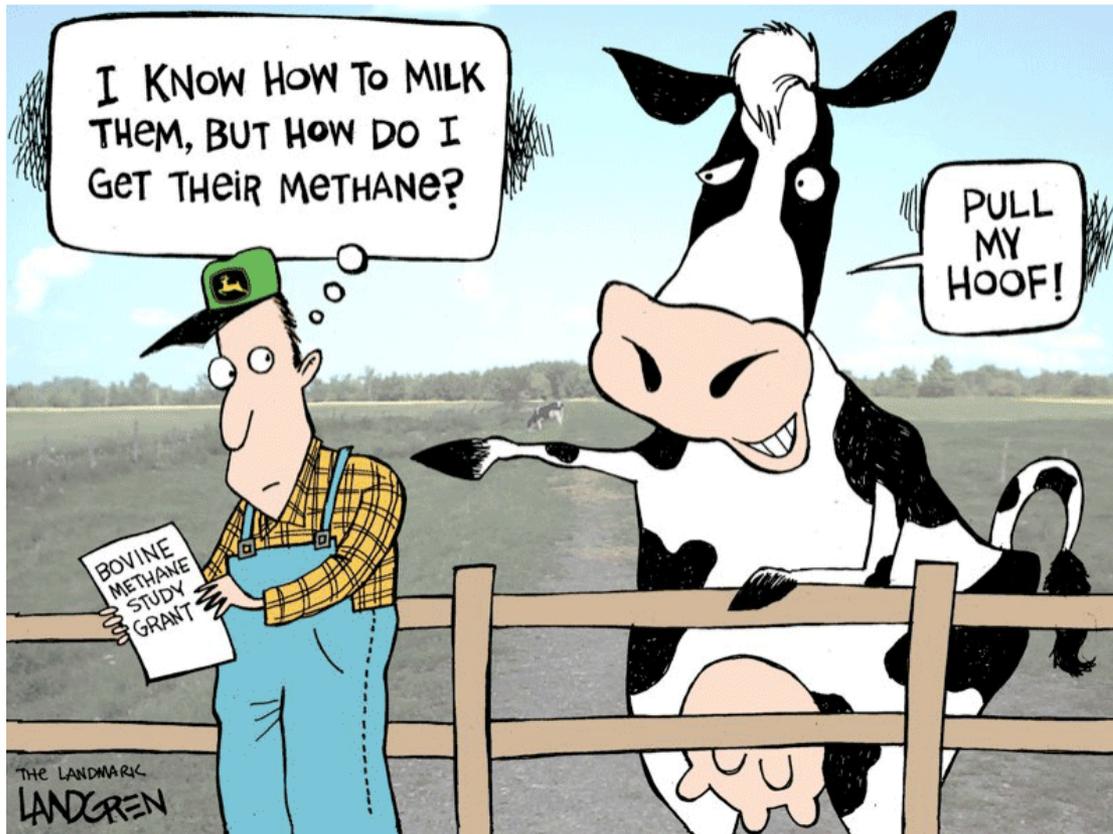
The EPA says you're poisoning me





Sequestration ~ Stored for 100 years

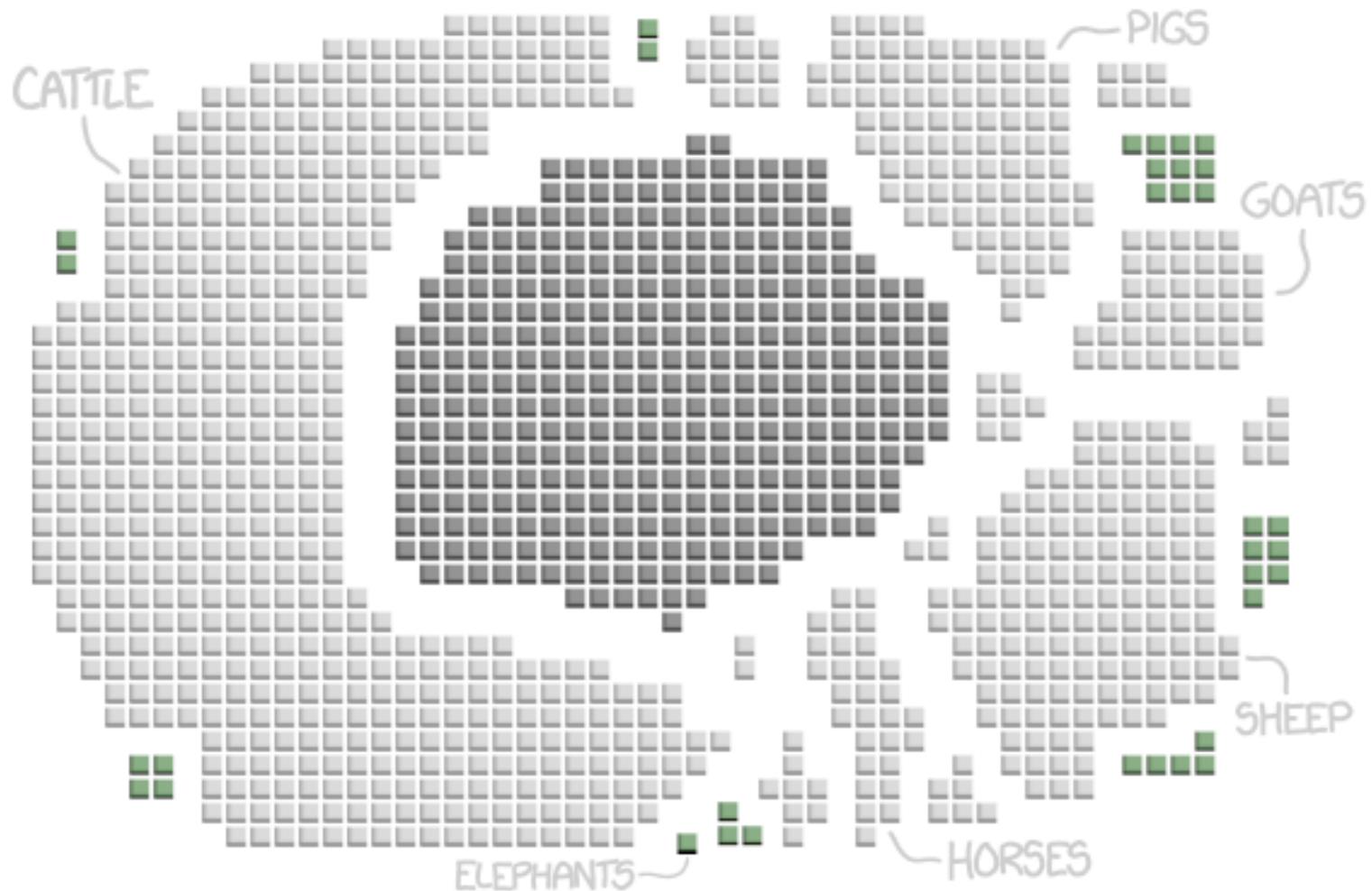
Are livestock emissions anthropogenic?



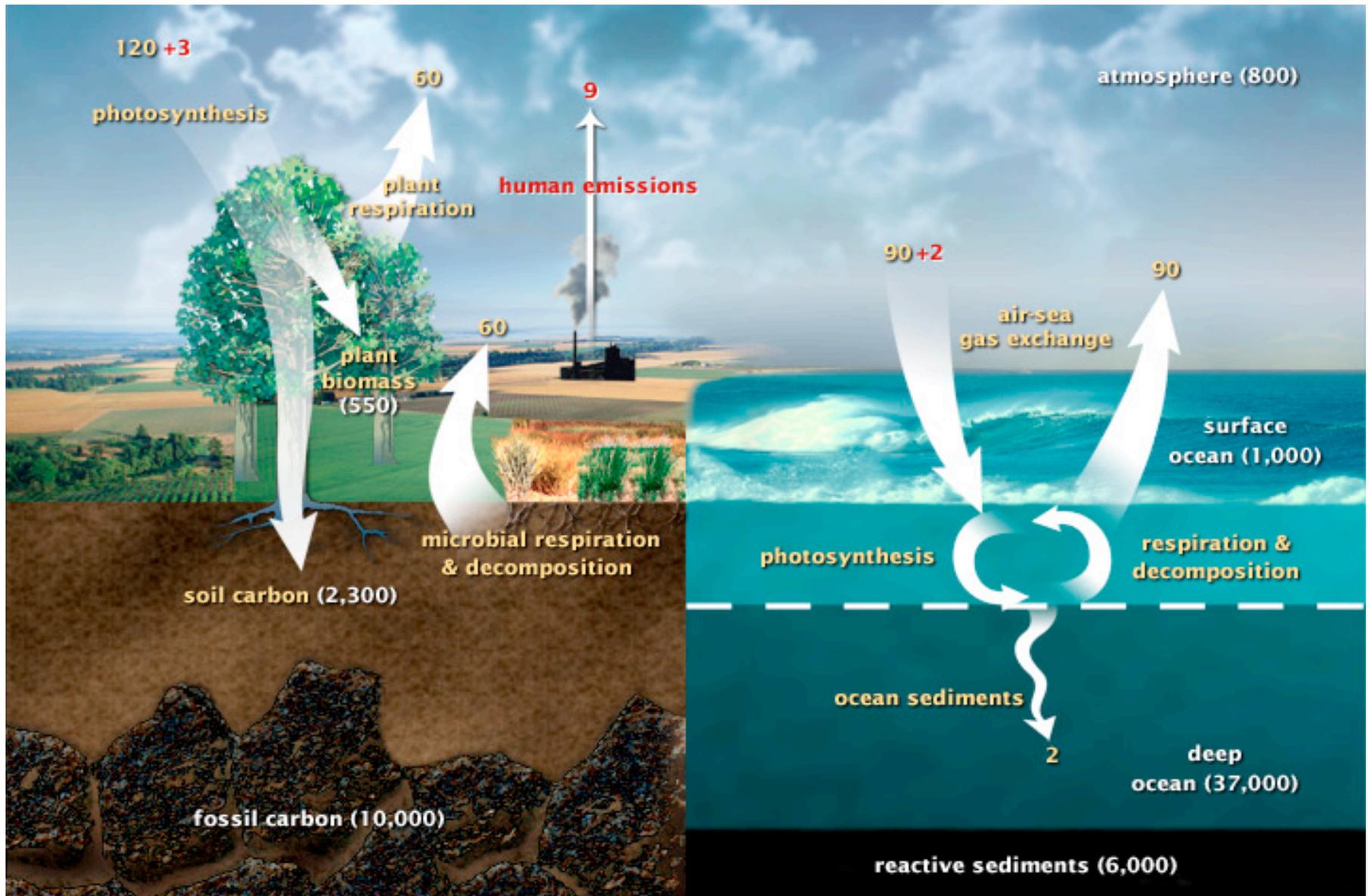
EARTH'S LAND MAMMALS BY WEIGHT

■ = 1,000,000 TONS

■ HUMANS ■ OUR PETS AND LIVESTOCK ■ WILD ANIMALS



DATA FROM VACLAV SMIL'S *THE EARTH'S BIOSPHERE: EVOLUTION, DYNAMICS, AND CHANGE*, PLUS A FEW OTHER SOURCES.

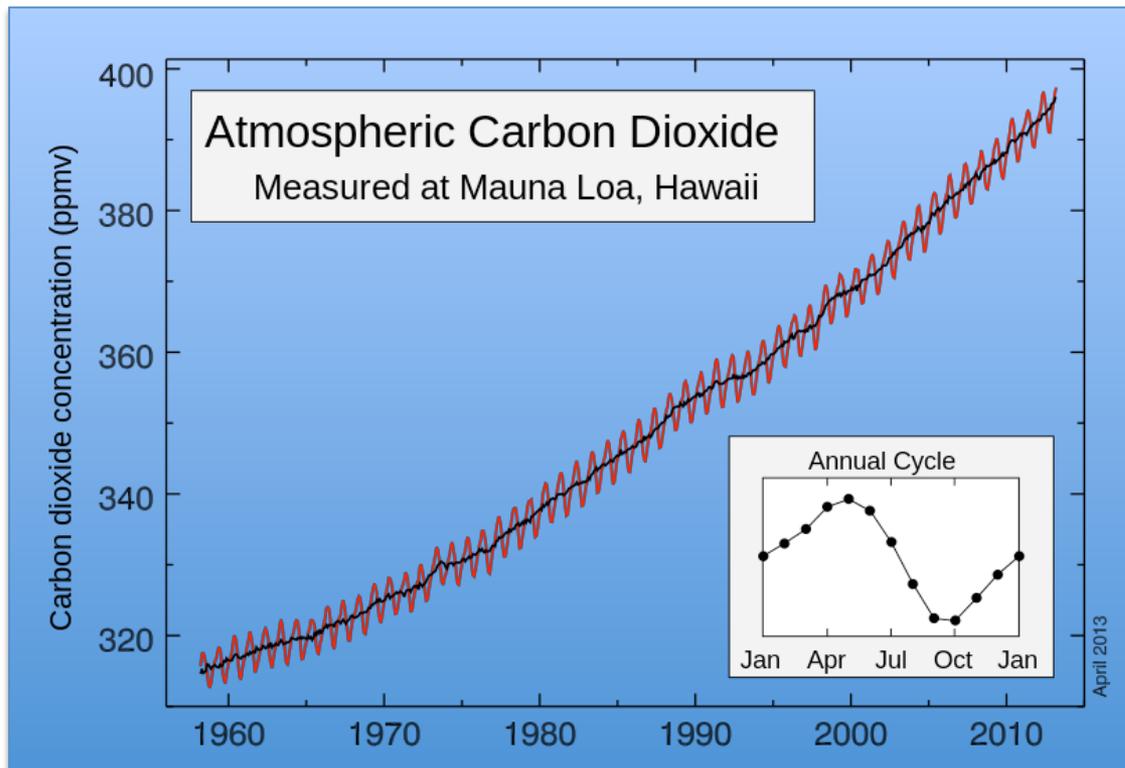


What's makes a GHG emission anthropogenic?

- NOT simply something which humans emit!
- Something which increases atmospheric concentration of GHGs, and which would not have occurred, *but for* humanity.

The Policy Goal

- To avoid “dangerous anthropogenic interference with the climate system”



It's all about attribution of emissions to sources

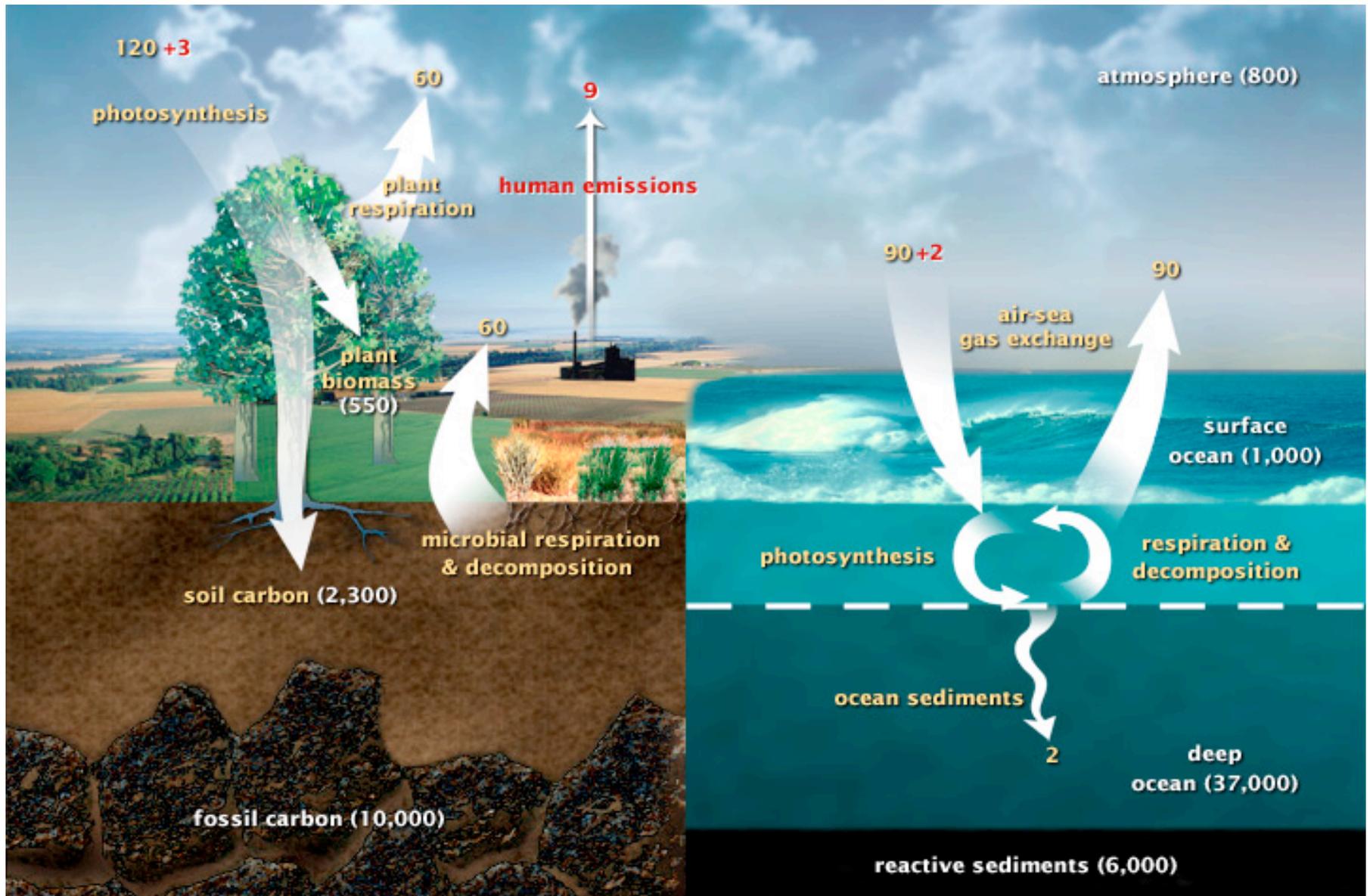
- 1. International Agreements
- 2. Market Based Mechanisms
- 3. Carbon Footprints

It's all about attribution of emissions to sources

- 1. International Agreements
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National Emissions Inventories

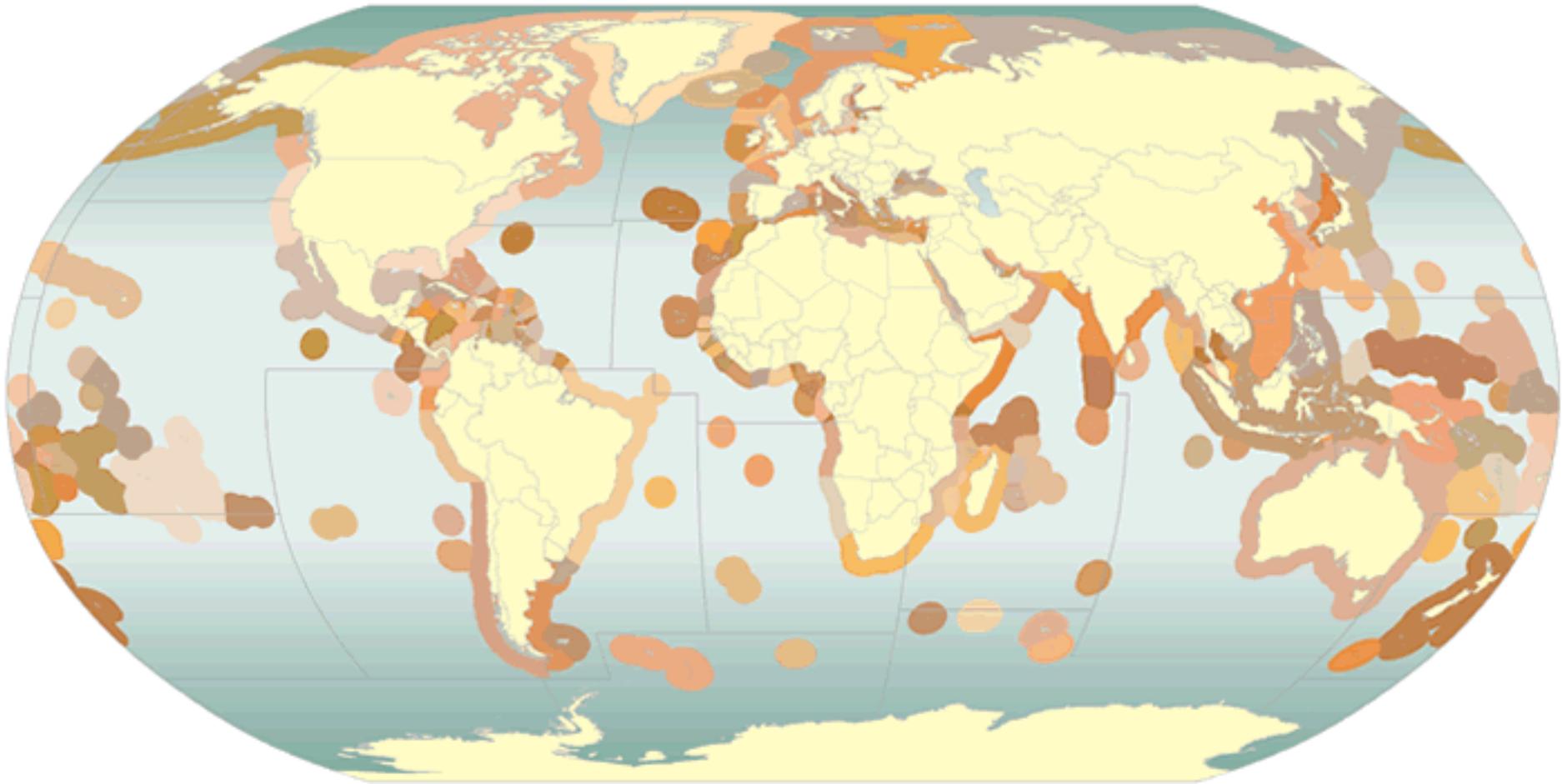
- Under Kyoto Protocol (had the U.S. ratified), reduce emissions by 7% below 1990 levels by 2012.
- So, how do we know what U.S. emissions are?
- It's all in a cute little 531 page document at:
<http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Main-Text.pdf>



Are Arctic nations responsible for GHG emissions from permafrost melting?



Are coastal nations responsible for carbon emitted from their exclusive economic zones?



Who is responsible for shipping emissions?



New Zealand's Kyoto Forests



“Those areas planted during the latest period of high investment, in the 1990s, are likely to be harvested during the 2020s.”



HIDE YOUR EMISSIONS
IN THE LULUCF

PORTLAND
DESTRUCTION

FLEXIBLE
PARTICULATE

LOOPHOLES

VOLUNTARY
ACCOUNTING

GET YOUR
LOOPHOLE
HERE!

NO
CO2

unfccc.int

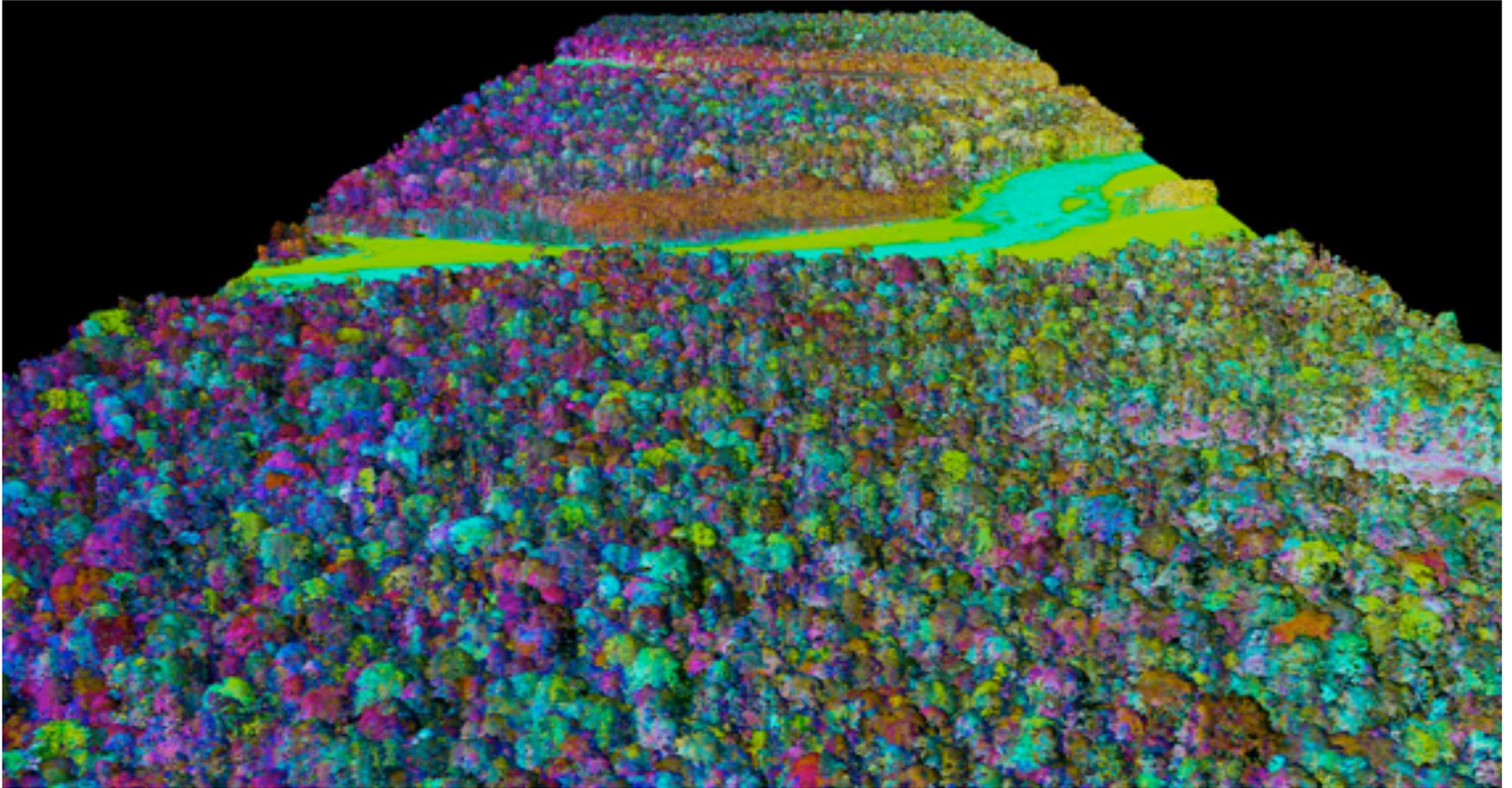
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the “did we get the number right ” question...
...is not purely a science question



What about market-based policy mechanisms, like cap and trade?

- Which emissions are included?
- How do we count those emissions?
- Who bears responsibility for changes?
- How do we make sure we aren't crediting reductions in emissions that would have otherwise happened?

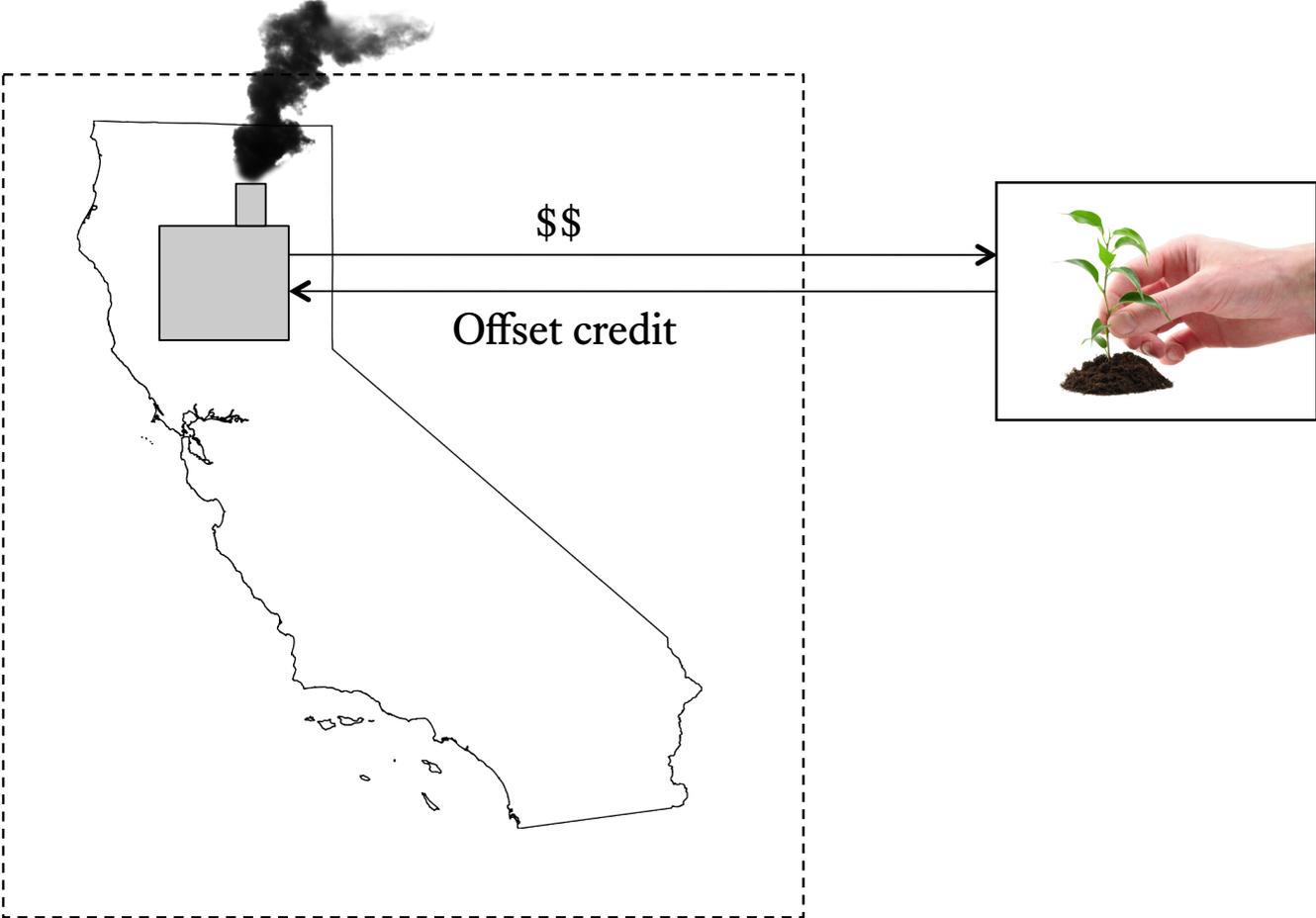
The history of carbon markets is riddled with accounting issues

- Double counting of emissions
- Fake credits
- Perverse incentives
- Right now, we are writing these accounting rules in California!

Cap and Trade Basics

- Emitters need to have permits for each ton
- By 2020 emissions = 1990 emissions
- “Floor price” for permits (lesson learned!)
- “Offsets” can be used for 8% of emissions permits (This is big!)

Carbon Offsets



Carbon Offset Protocols in California



Carbon Offset Protocols Under Consideration



April 2014



January 2015

Are farmers responsible for where the water goes?



What is the boundary of a mine?



California's Approach to Additionality (So Far)

- Standard approach based on “common practice”
- If an activity is not “common practice” then it is “additional” in that we assume it would not have otherwise occurred, *but for* the incentive of the Protocol
- But, what is “common practice”?

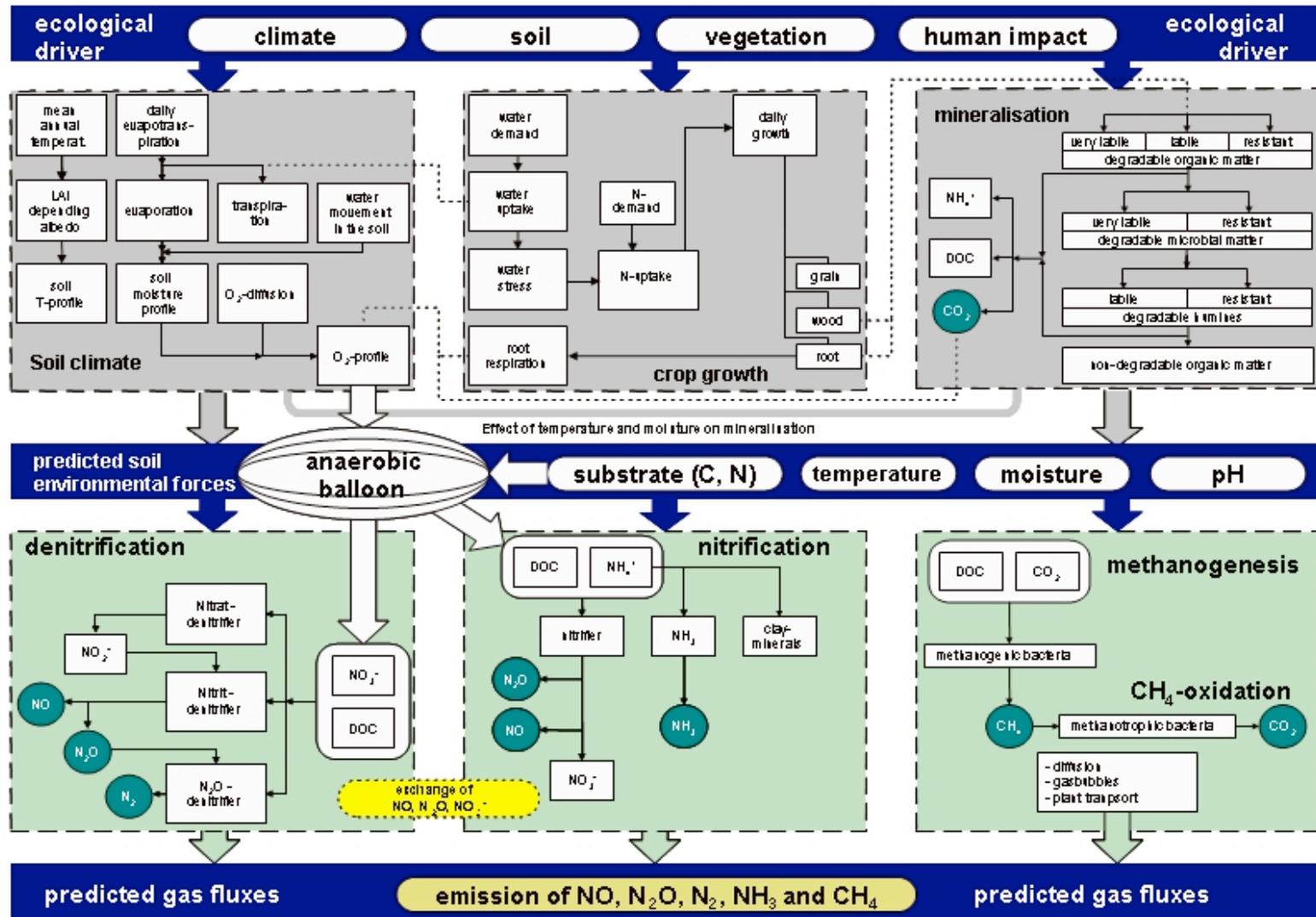
Far fewer assumptions involved in
this...

CO₂



...than in this

DNDC-Model



(Y)our challenge

- What's your definition of “anthropogenic” emissions?
- What emissions do you/should you hold yourself responsible for?

Contact and Extra Info

- Aaron Strong, PhD Candidate, E-IPER, Stanford: alstrong@stanford.edu
- Paper comparing footprint calculators: <https://www.greenbiz.com/sites/default/files/document/EIARVol28Issue2-3pgs106-115.pdf>