Can we get there from here? Emission reduction **potentials** and air quality and climate **goals**

Tami Bond, Nick Lam (Humboldt), Luke Conibear (Leeds)
and other co-conspirators

@ ETHOS, Jan 2020

Tami: Walter Scott, Jr. Presidential Chair in Energy,
Environment and Health, Colorado State University

side note

At the end of last year, Ryan Thompson & Cheryl Weyant published 2 papers summarizing about 100 field measurements from traditional stoves in Nepal, Tibet & Yunnan.

I'm not presenting those here

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In this talk

1. High-level climate & health messages
2. Linking action with climate & health outcomes
3. Our(*) new frontier: Reduction potentials

(*) co-conspirators

“High-level” messages

Air quality messages

PNAS

Indian annual ambient air quality standard is achievable by completely mitigating emissions from household sources

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Contributed by Kirk R. Smith, March 11, 2019 (sent for review January 17, 2019; reviewed by Achuthan Jayaraman and Christine Wiedinmyer)

note: Air quality = Health

Climate messages

RESEARCH ARTICLE

Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security

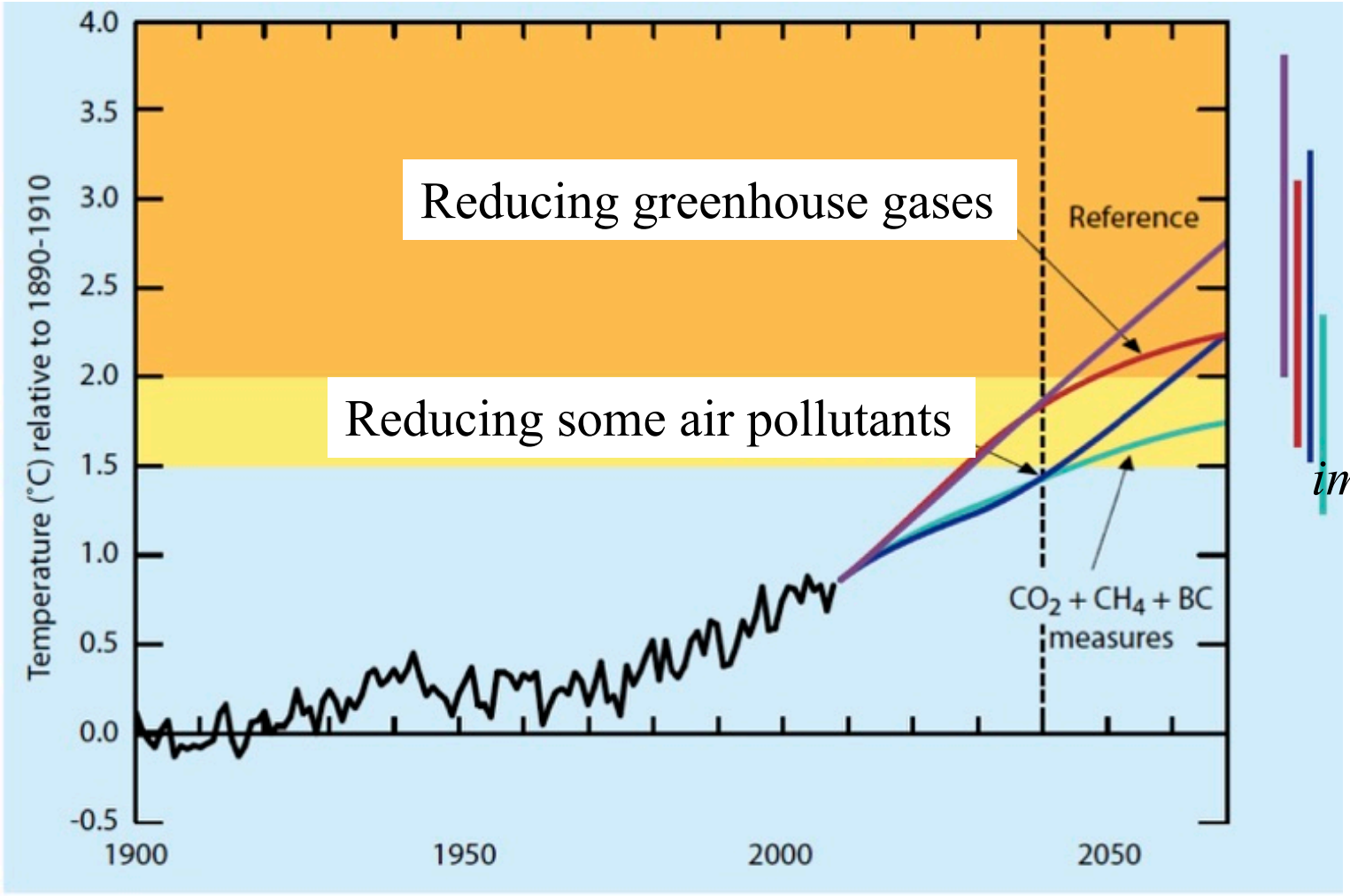
Drew Shindell,[1]* Johan C. I. Kuylenstierna,[2] Elisabetta Vignati,[3] Rita van Dingenen,[3] Markus Amann,[4] Zbigniew Klimont,[4] Susan C. Anenberg,[5] Nicholas Muller,[6] Greet Janssens-Maenhout,[3] Frank Raes,[3] Joel Schwartz,[7] Greg Faluvegi,[1] Luca Pozzoli,[3]† Kaarle Kupiainen,[4] Lena Höglund-Isaksson,[4] Lisa Emberson,[2] David Streets,[8] V. Ramanathan,[9] Kevin Hicks,[2] N. T. Kim Oanh,[10] George Milly,[1] Martin Williams,[11] Volodymyr Demkine,[12] David Fowler[13]

ing revealed that the top 14 measures realized nearly 90% of the maximum reduction in net GWP (table S1 and fig. S2). Seven measures target CH_4 emissions, covering coal mining, oil and gas production, long-distance gas transmission, municipal waste and landfills, wastewater, livestock manure, and rice paddies. The others target emissions from incomplete combustion and include technical measures (set "Tech"), covering diesel vehicles, clean-burning biomass stoves, brick kilns, and coke ovens, as well as primarily regulatory measures (set "Reg"), including banning agricultural waste burning, eliminating high-emitting vehicles, and providing modern cooking and heating. We refer to these seven as "BC measures," although in practice, we consider all co-emitted species (7).

Science
AAAS

Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security
Drew Shindell *et al.*
Science **335**, 183 (2012);
DOI: 10.1126/science.1210026

Reducing uncontrolled combustion may have a climate benefit

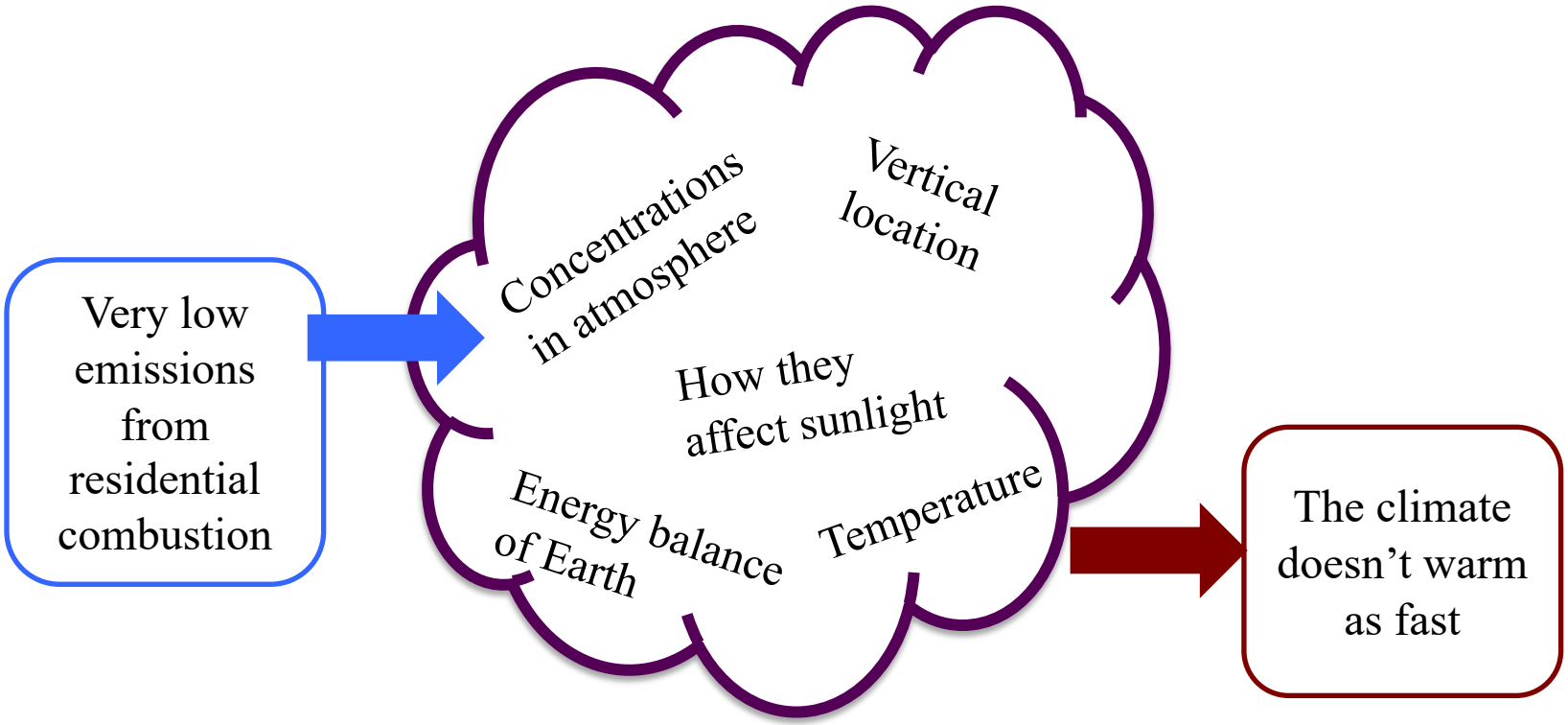


includes solid-fuel improvement

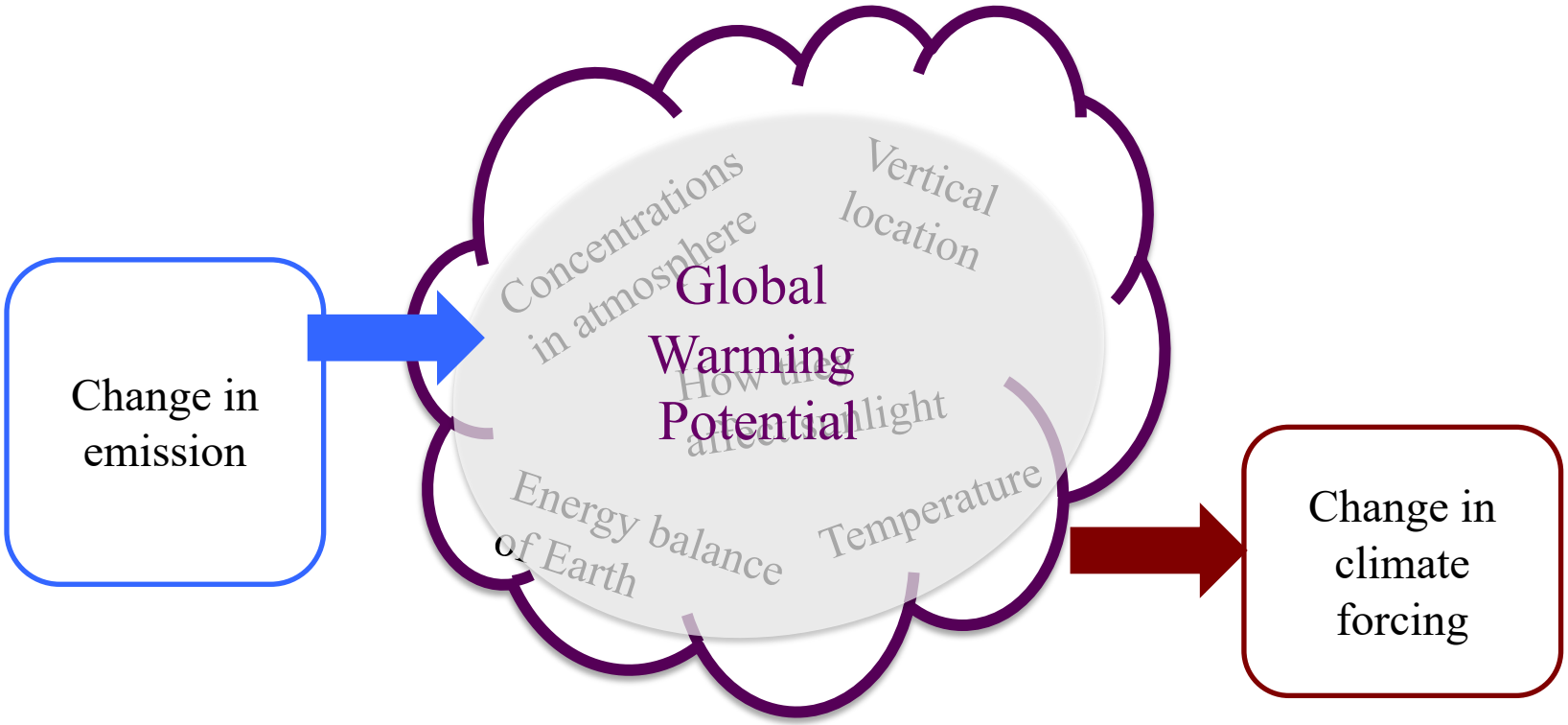
UNEP Integrated Assessment of Black Carbon and Tropospheric Ozone, 2011

Great story.
Anything moving in there?

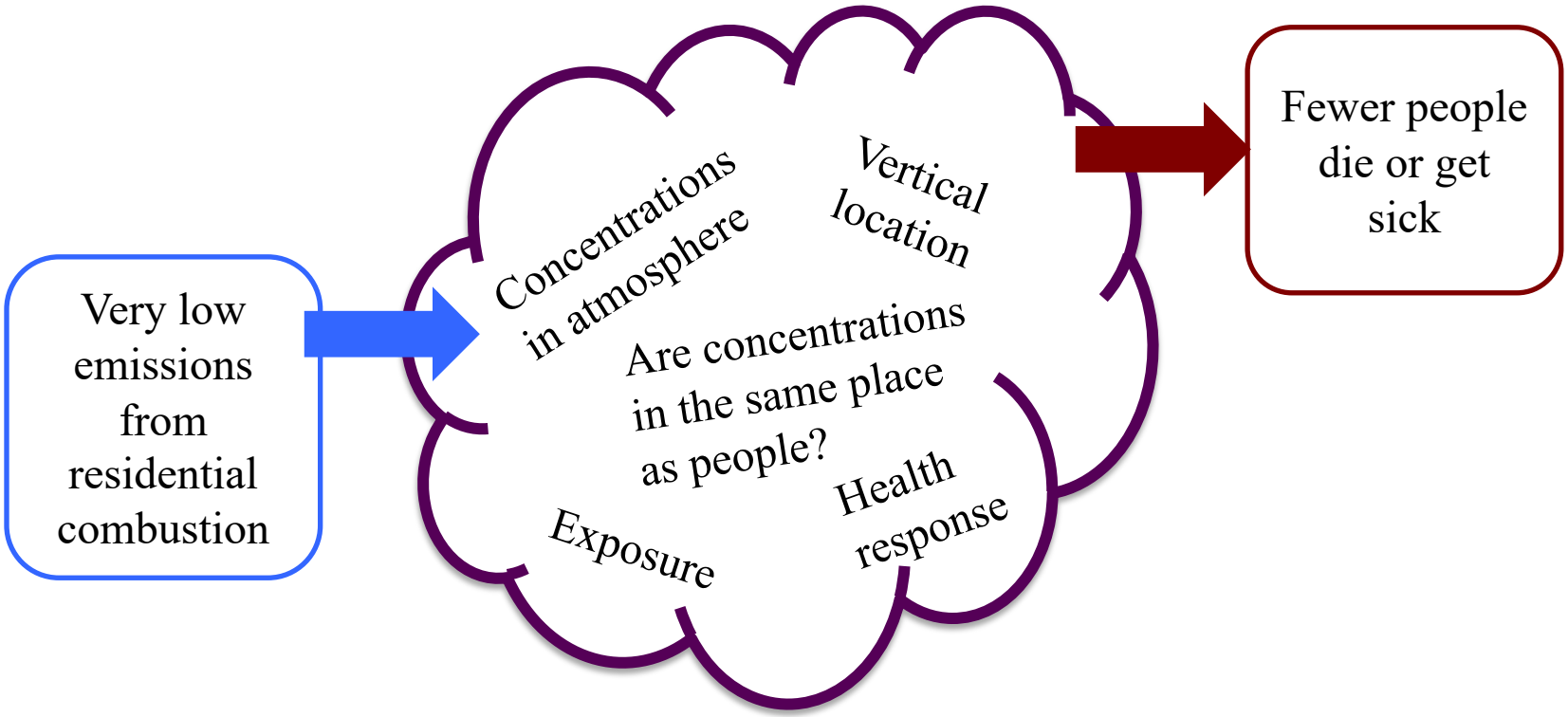
A chemistry-climate simulation



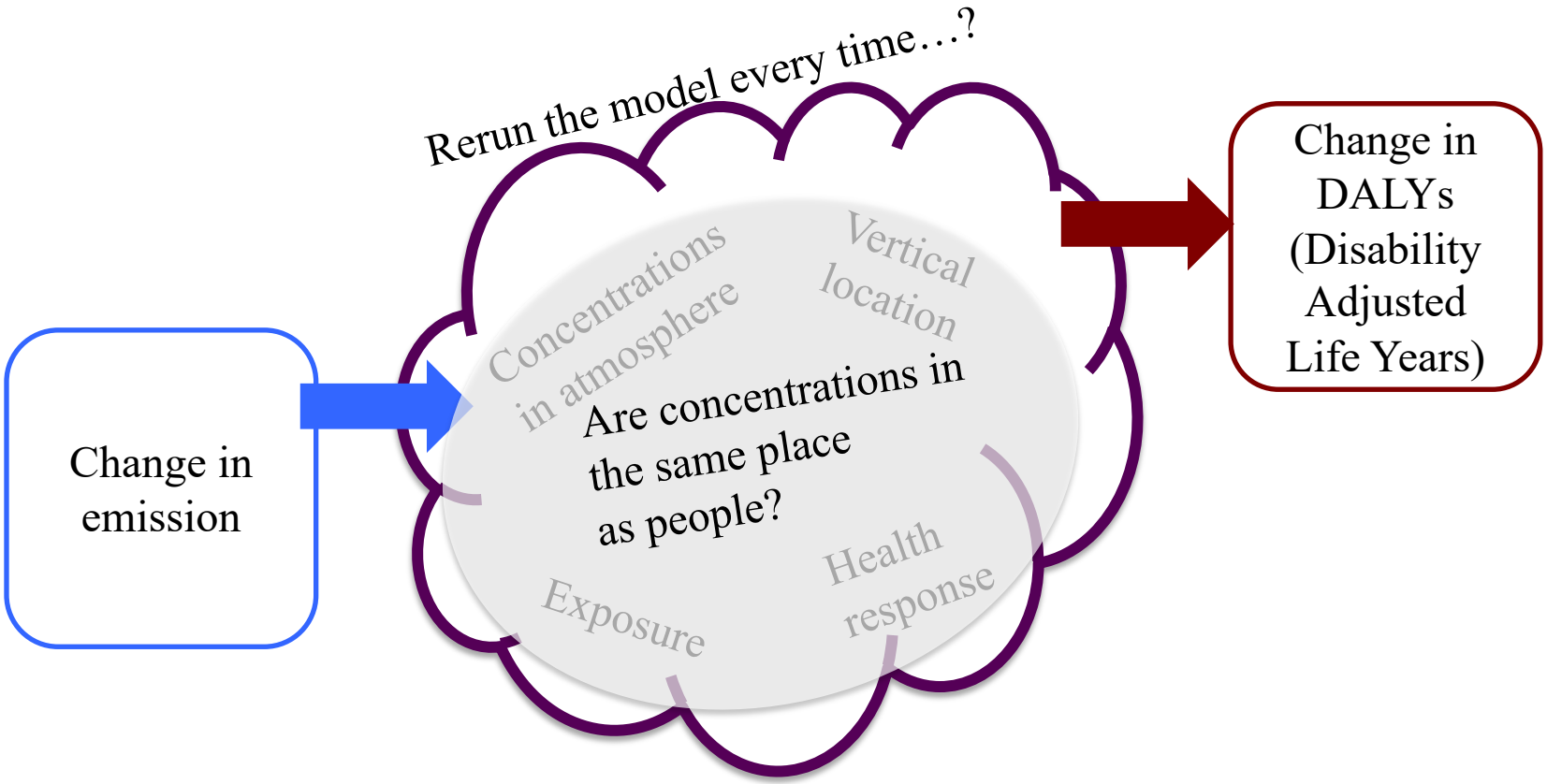
A chemistry-climate simulation – in a few numbers



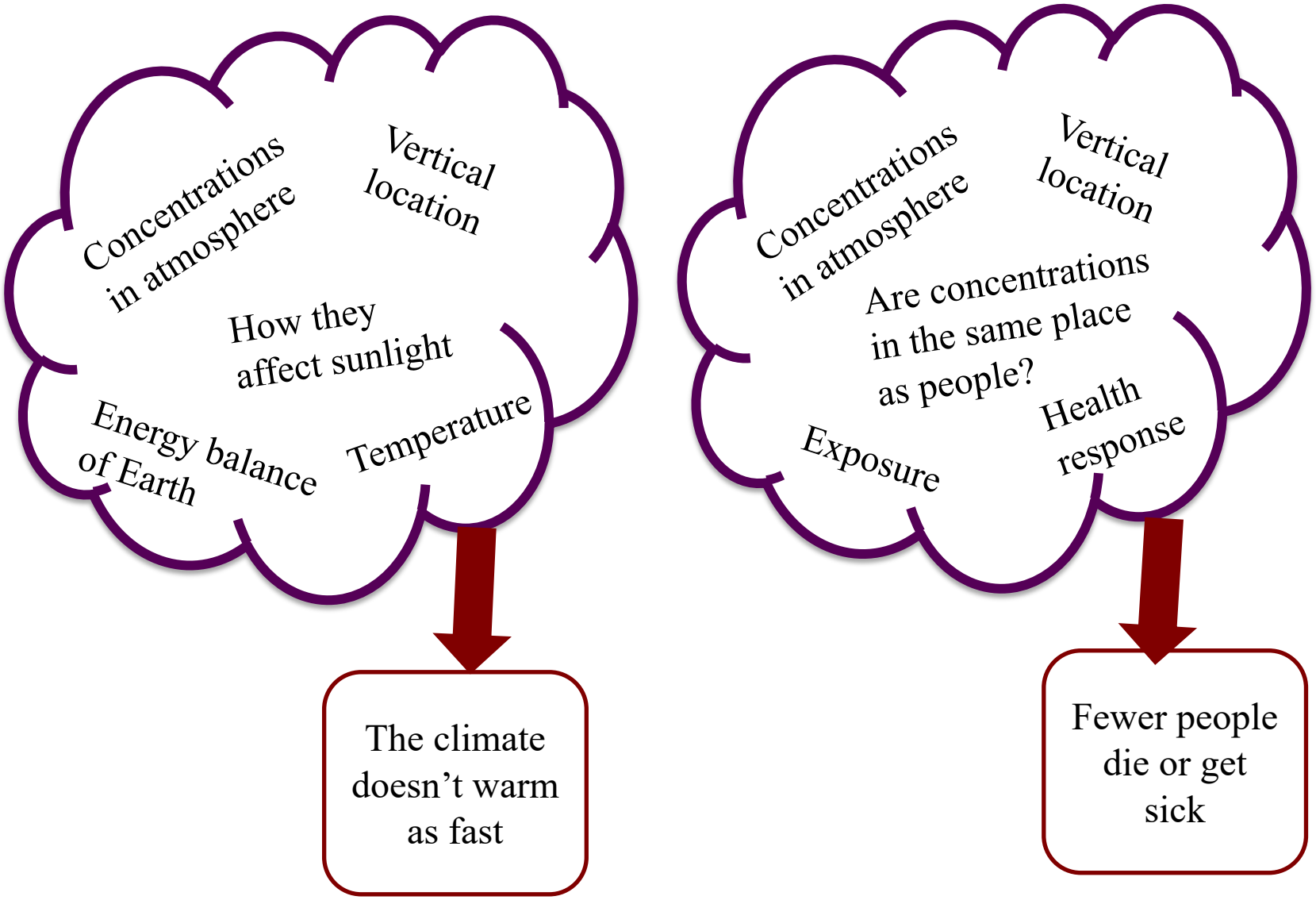
An air-pollution + health simulation



An air-pollution + health simulation



Where all the funding is



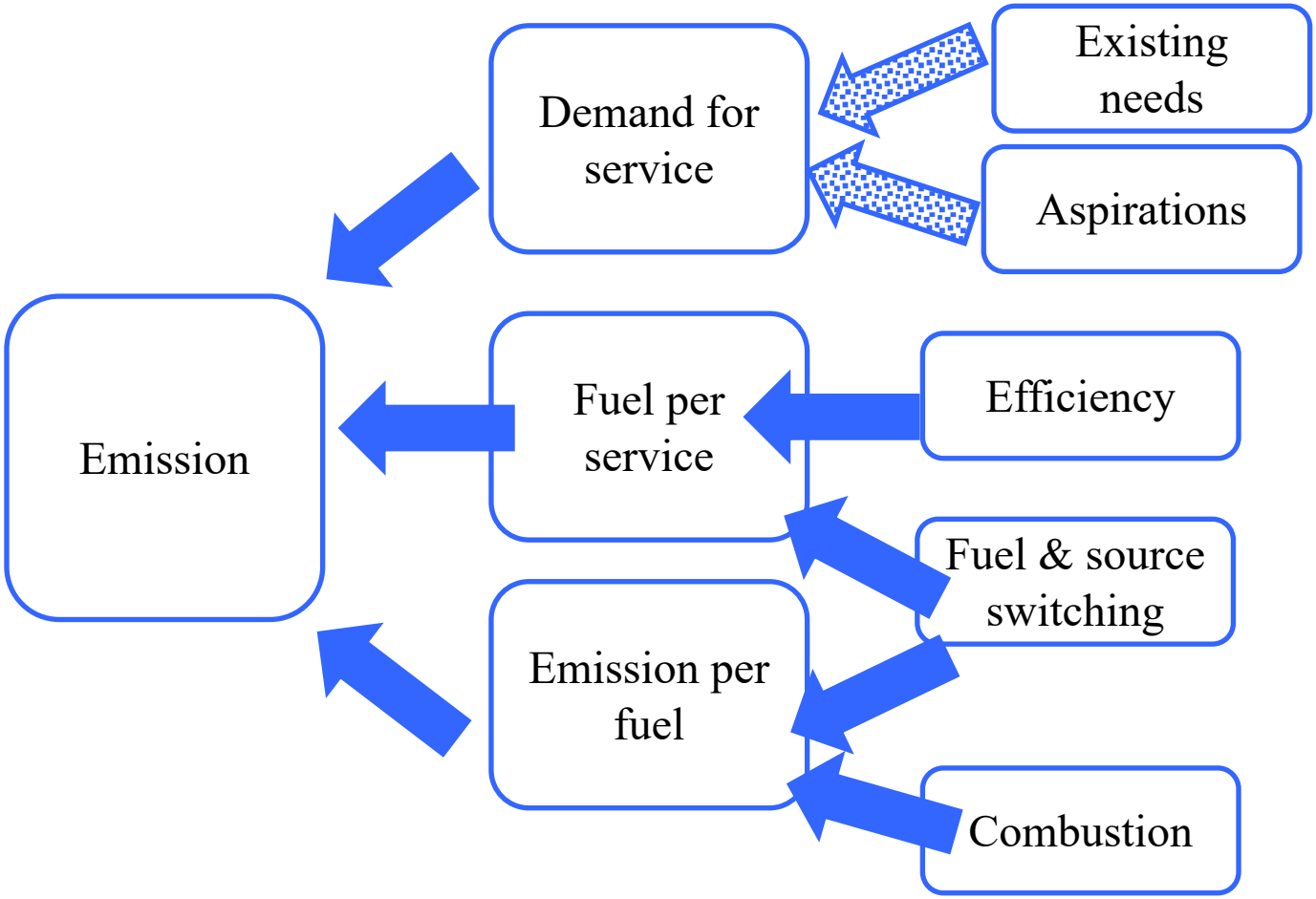
OK, so… no engine.

What can we(*) change?

Emission

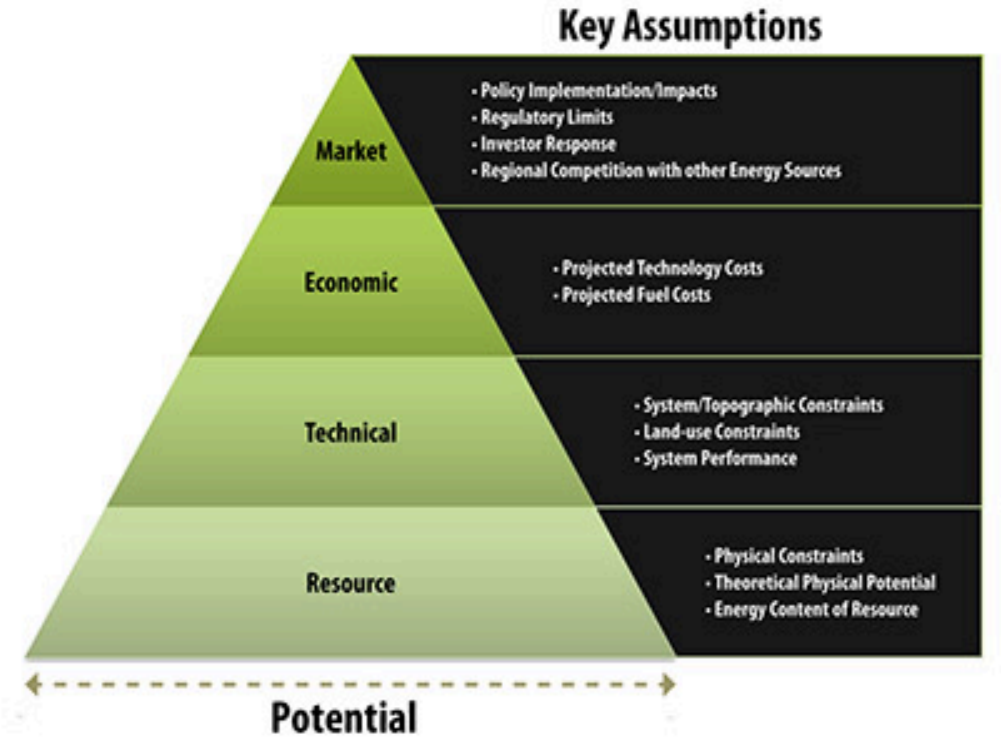
(*) Society, programs, etc.

What can we(*) change?

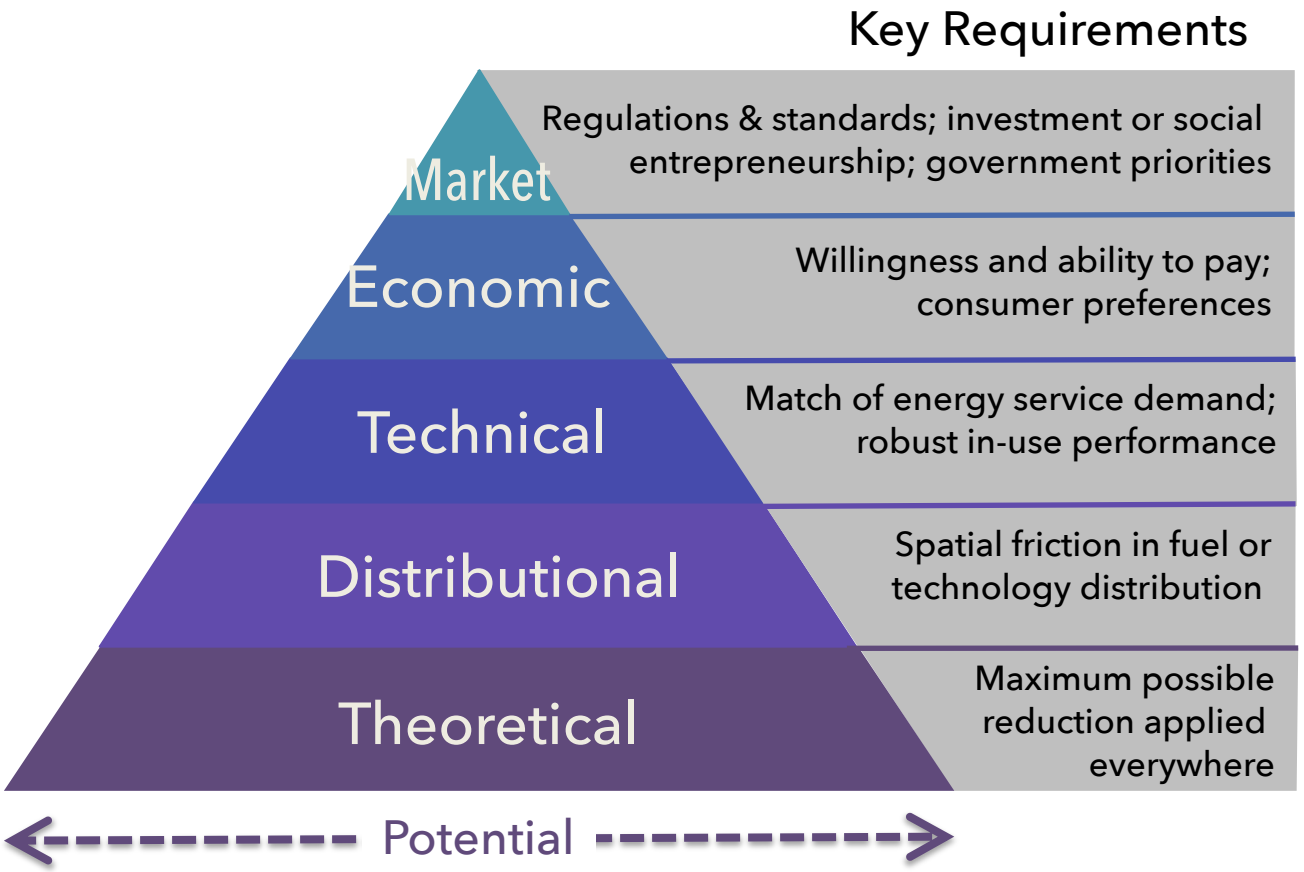


(*) Society, programs, etc.

Stolen from Renewable Energy community



Household Energy technical potential pyramid



Lam, Bond et al – in prep

Summary

1. High-level climate & health messages

2. Linking action with climate & health outcomes

3. Our(*) new frontier: Reduction potentials and why they exist

(*) co-conspirators