

En-Roads Introduction LWV Delaware Sept 23rd 2024

Phil Smith

En-Roads Climate Ambassador

Co-Leader CCL Delaware Chapter

Phil Smith

philip.james.smith@gmail.com

En-Roads Climate Ambassador,

CCL Volunteer, Co-Leader Delaware Chapter

Climate Reality Project Leader

Retired Technical Leader W.L.Gore Fabrics and Industrial Products
Divisions

Project Leader Eastman Kodak

PhD Organic Chemistry



From this weeks Newspapers

Environment

Earth may have breached seven of nine planetary boundaries, health check shows

Weather tracker

Extensive flooding in Japan after 'unprecedented' rainfall

US news

'A break from the heat': Americans most affected by climate crisis head midwest

See the latest house in this Outer Banks town to fall into the ocean

/// People must understand: we in Malawi are paying for the climate crisis with our lives

*mbize Kandodo
onda*

California Mountain Towns Are Too Risky for Insurers, but Residents Want to Stay

the drowning south

The ocean is eating away at an island in Texas. People are planning new condos.

California lawsuit says ExxonMobil lied about plastics being recyclable in 'decades-long campaign of deception'

1 strike Florida late this week

Home Sales in Flood Zones Are Booming. Here's Why Buyers Take the Risk

**Floods Worsen
Continued**

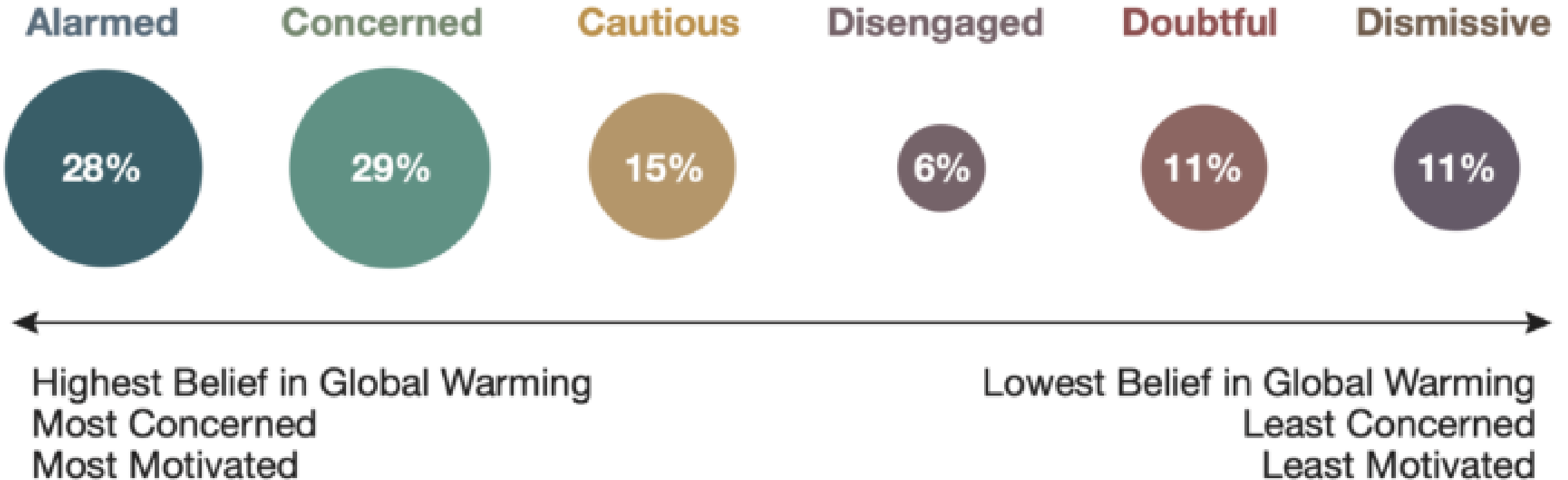
Flooding even

atmosphere made warmer by climate change. What can be done to help citizens prepare?

**Three in four crop varieties have gone extinct.
You can save the rest in your garden.**

Mapping the Decline of Eelgrass Along Maine's Coast

Yale Climate Communications Program - Six Americas Survey



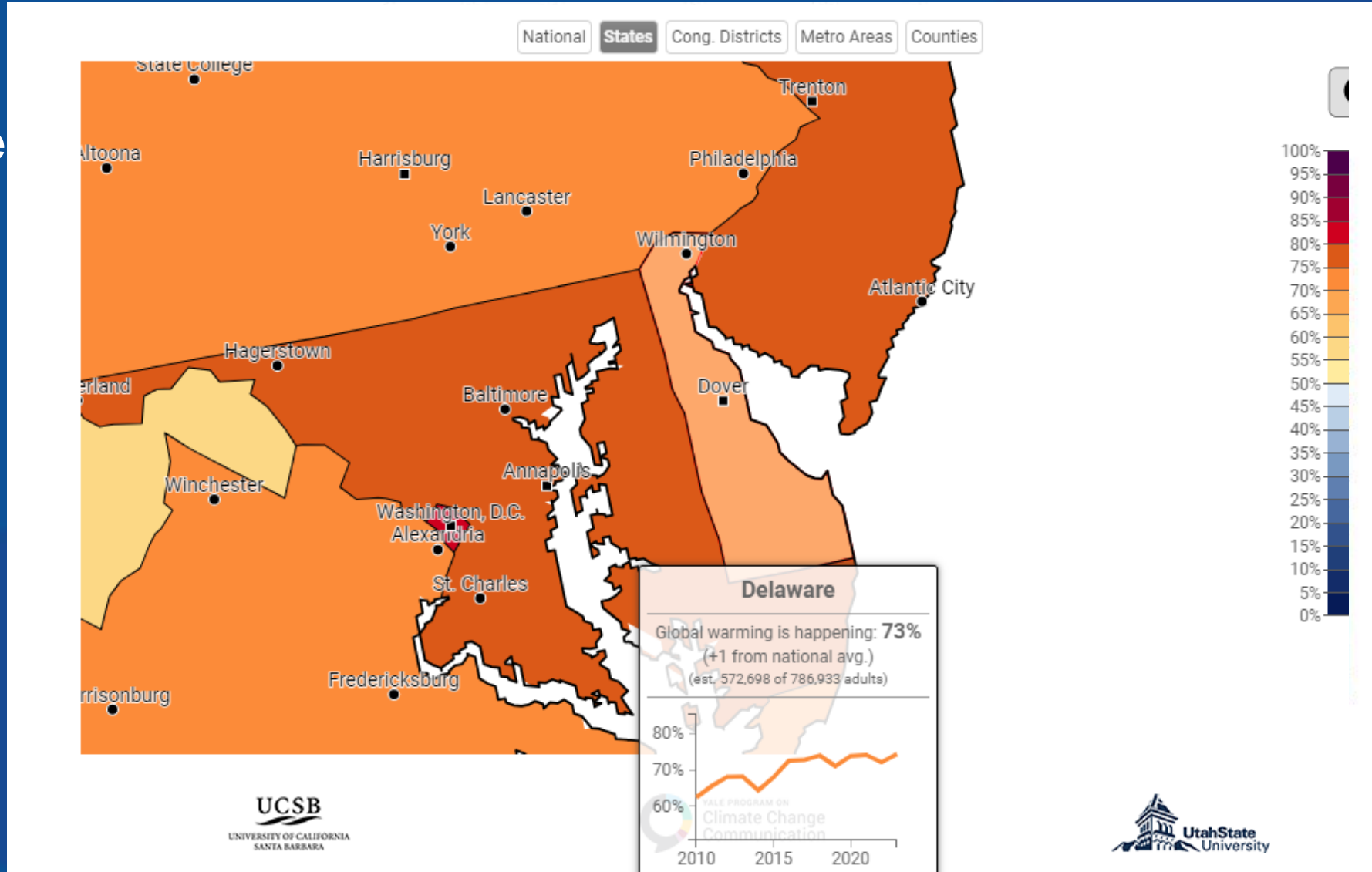
Global Warming's Six Americas, Fall 2023

Base: 1,033 U.S. adults

Source: Yale Program on Climate Change Communication;
George Mason University Center for Climate Change Communication

Global Warming is Happening? Fall 2023 Yale study

National Average
72%



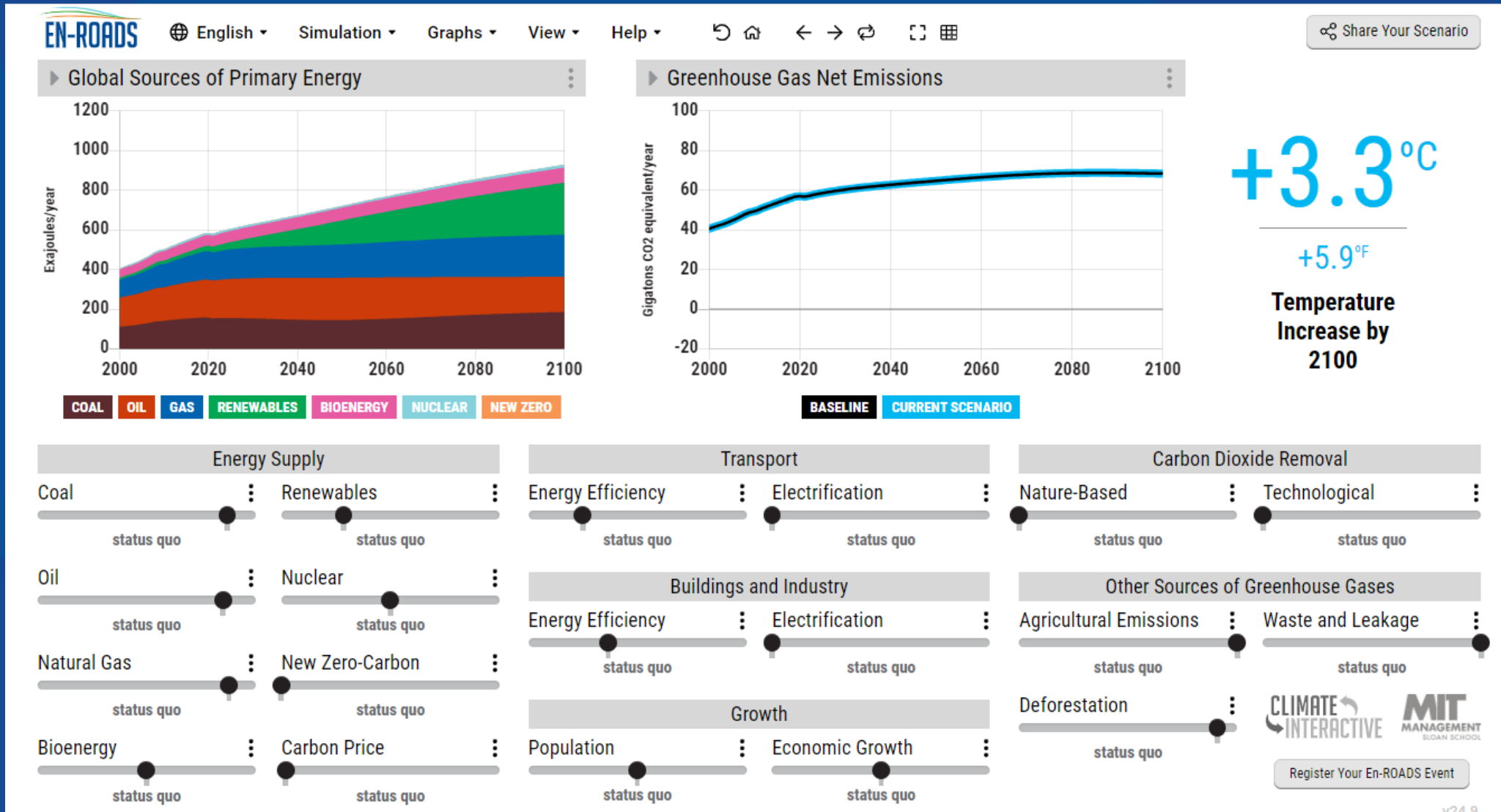
Developed by:

CLIMATE 
 **INTERACTIVE**

MIT
MANAGEMENT

Sustainability
Initiative

En-ROADS is a cutting-edge simulation model used to test climate solutions and generate climate scenarios for the future.



En-ROADS simulations:



9,022
EVENTS

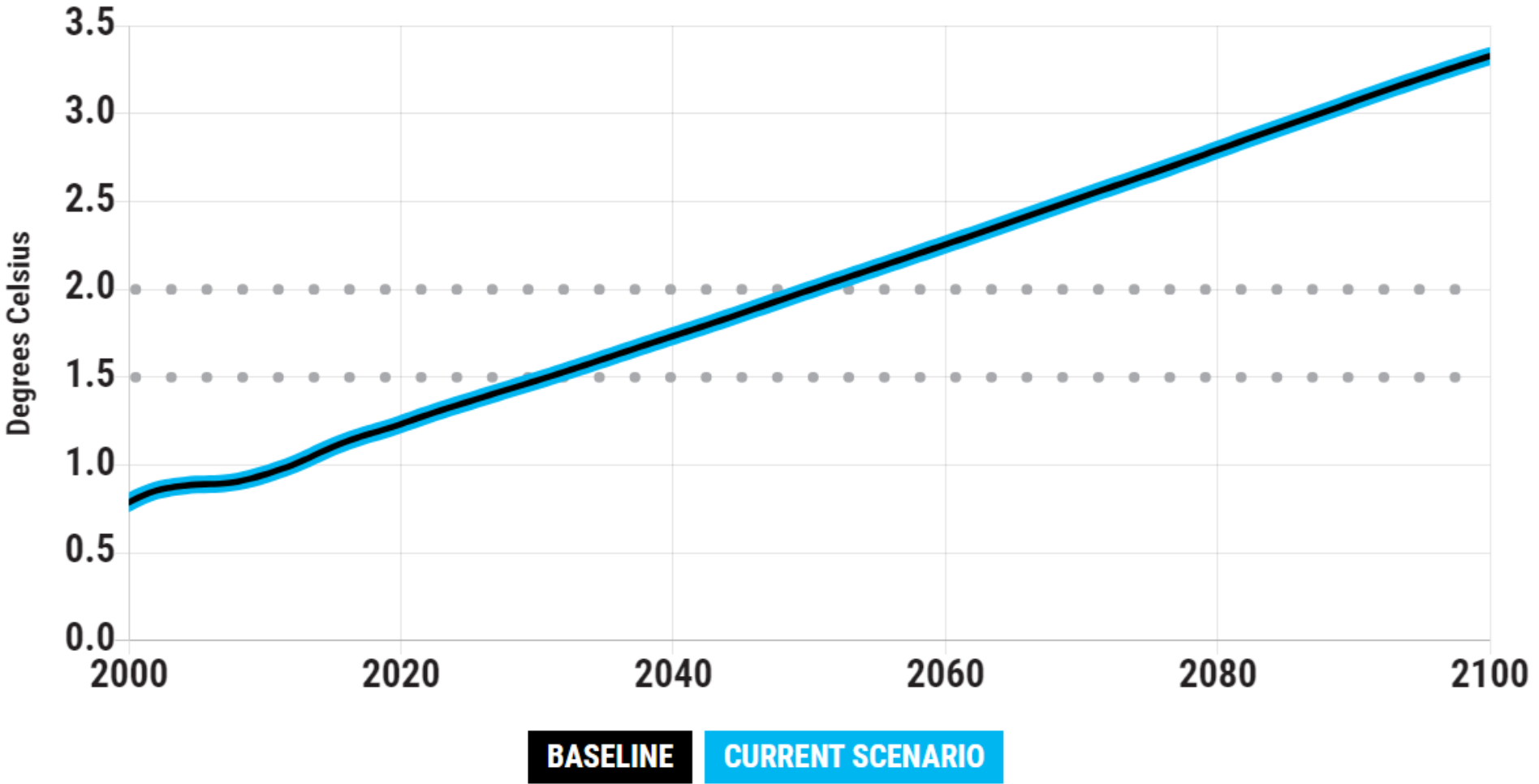
149
COUNTRIES

2,732
FACILITATORS

269,354
PARTICIPANTS

Baseline scenario

Temperature Change



2°C of warming (or 3.6°F)



Risk of river flooding **more than doubles**¹

Average 170% increase in river flooding, with highest risk in U.S., Asia, and Europe



90% of coral reefs bleached²



Drought: **4 months longer**

*Increase in average drought length*³



Over 50% of world's population exposed to lethal heat for more than 20 days per year⁴

Multisolving Lens

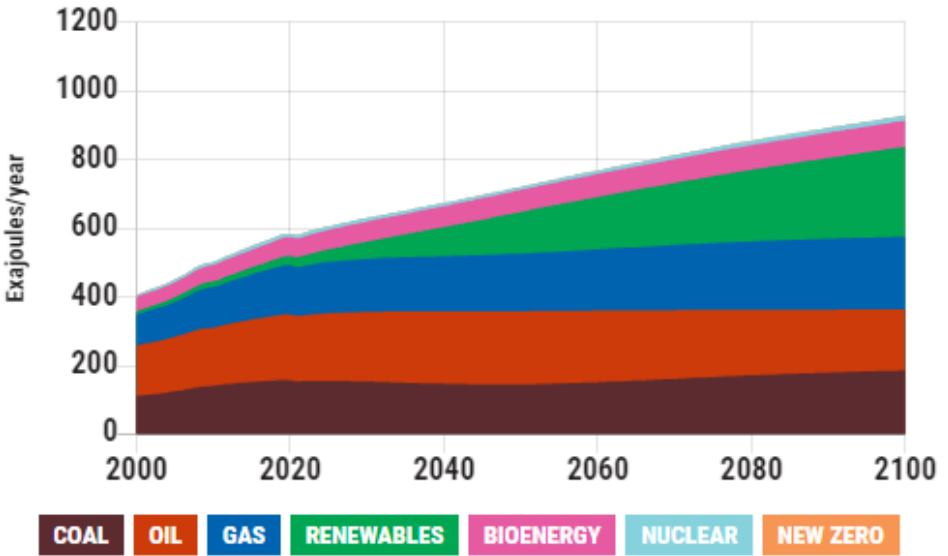
Co-Benefits

- A near-term co-benefit from your proposal. How can you address more than one problem with one action?

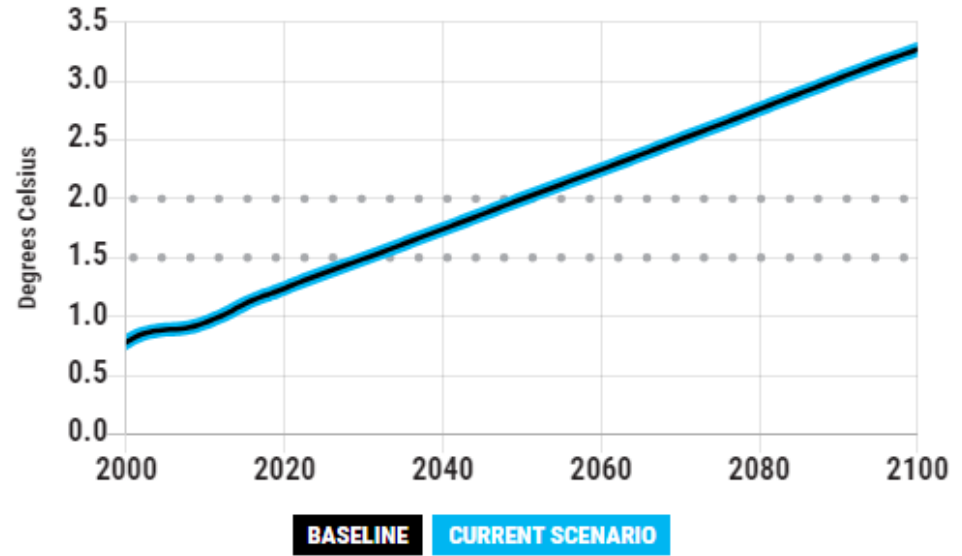
Equity Considerations

- In what ways could implementation of this policy harm vulnerable communities?

Global Sources of Primary Energy



Temperature Change



+3.3°C
 +5.9°F
Temperature Increase by 2100

Related Examples

Energy Supply

- Coal**: Taxes, Less subsidies, Air pollution
- Oil**: Less subsidies, Pipelines, Divestment
- Natural Gas**: Fracking, Pipelines, Divestment
- Bioenergy**: Biofuels, Wood fuel
- Renewables**: Wind, Solar, Hydro, Clean energy, Energy storage
- Nuclear**: Radiation, Waste storage
- New Zero-Carbon**: Thorium fission, Nuclear fusion
- Carbon Price**: Carbon Price, Cap and trade

Transport

- Energy Efficiency**: Hybrid cars, Walkability, Public transportation
- Electrification**: Electric vehicles, Battery technology, Charging infrastructure

Buildings and Industry

- Energy Efficiency**: Green buildings, Efficient industry, Energy conservation
- Electrification**: Electric heating, Heat pumps

Growth

- Population**: Women's empowerment, Fertility rates
- Economic Growth**: GDP per person, Simplicity movement

Carbon Dioxide Removal

- Nature-Based**: Afforestation, Ag Soil Carbon, Biochar
- Technological**: Direct Air Capture, Mineralization

Other Sources of Greenhouse Gases

- Agricultural Emissions**: Manure management, Fertilizer, Plant-based diets
- Waste and Leakage**: Methane, N₂O, HFCs, Refrigerants
- Deforestation**: Protect forests, New forests

What Impacts would you like to investigate?

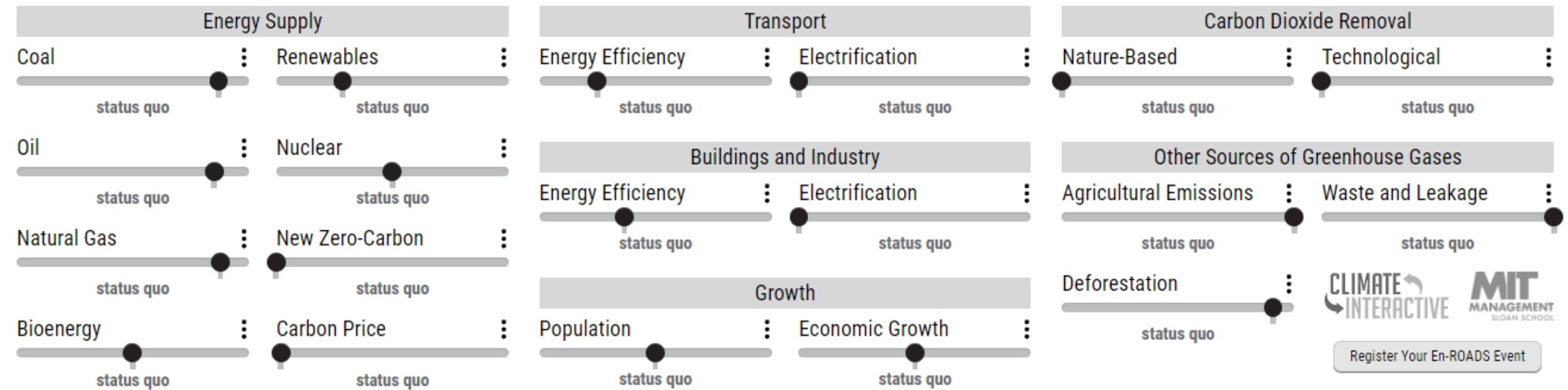
Write in chat

Temperature Change
CO₂ Concentration
Methane Concentration
Greenhouse Gas Concentration
Air Pollution from Energy
Air Pollution from Energy by Source—Area
Decrease in Crop Yield from Warming
Frequency of Extreme Heat
Additional Deaths from Extreme Heat
Global GDP Loss
Sea Level Rise
Sea Level Rise—Flood Risk Map
Population Exposed to Sea Level Rise
Ocean Acidification
Probability of Ice-free Arctic Summer
Ecosystem Shifts from Warming
Arid Land Expansion from Warming
Species Losing More than 50% of Climatic Range

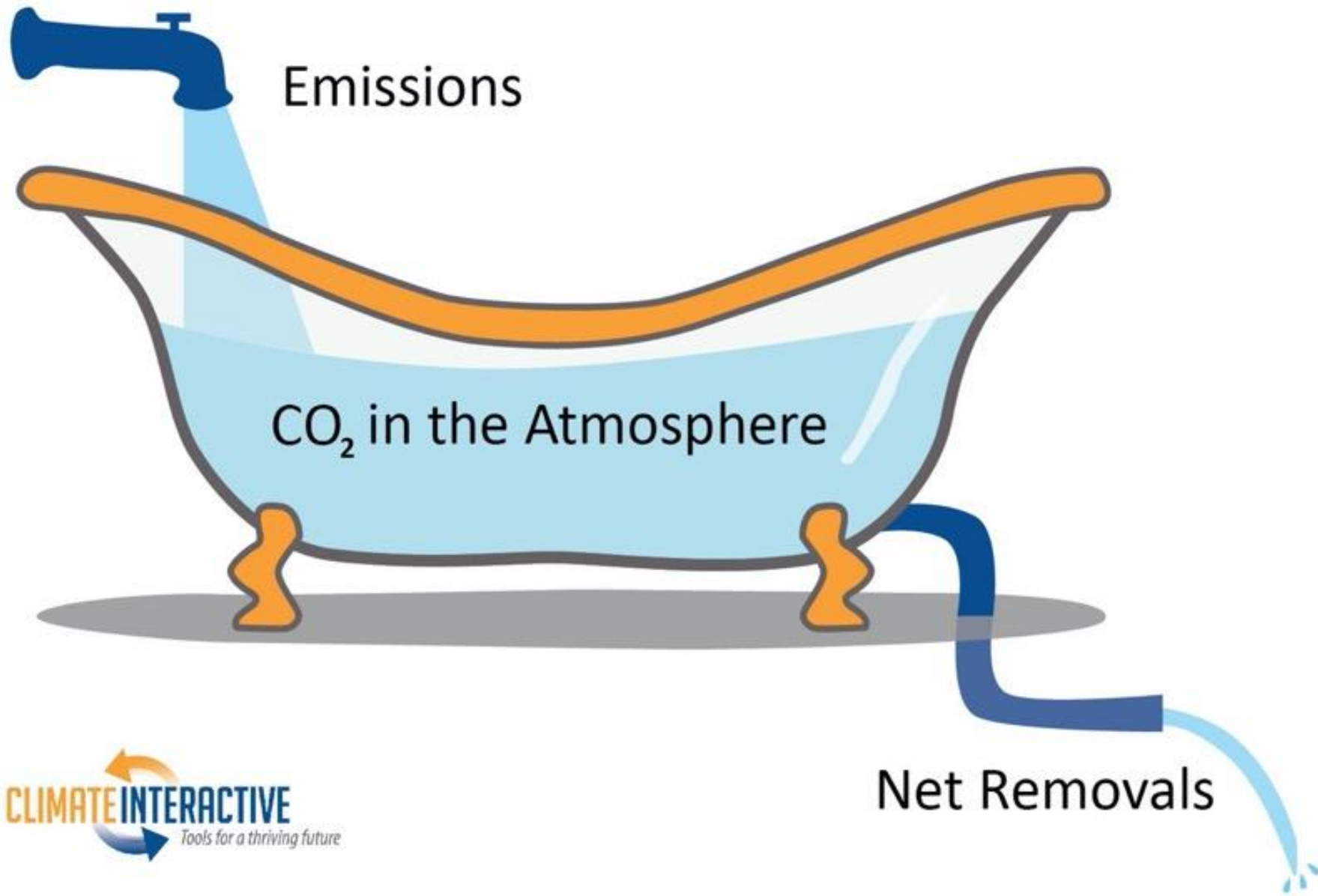
Your Actions

What actions do you think we should do to help mitigate climate change?

Write in chat.



www.climateinteractive.org



Overall framing by Dr. John Sterman, MIT Sloan



Debrief

Reflection

Think of something you would love about being part of this sort of future.

Take **one minute of silence** to reflect on your experience.

Thoughts and Reflection?

- What surprised you?
- What were your key insights?
- What will you take away from today, and how can you apply what you learned to the real world?

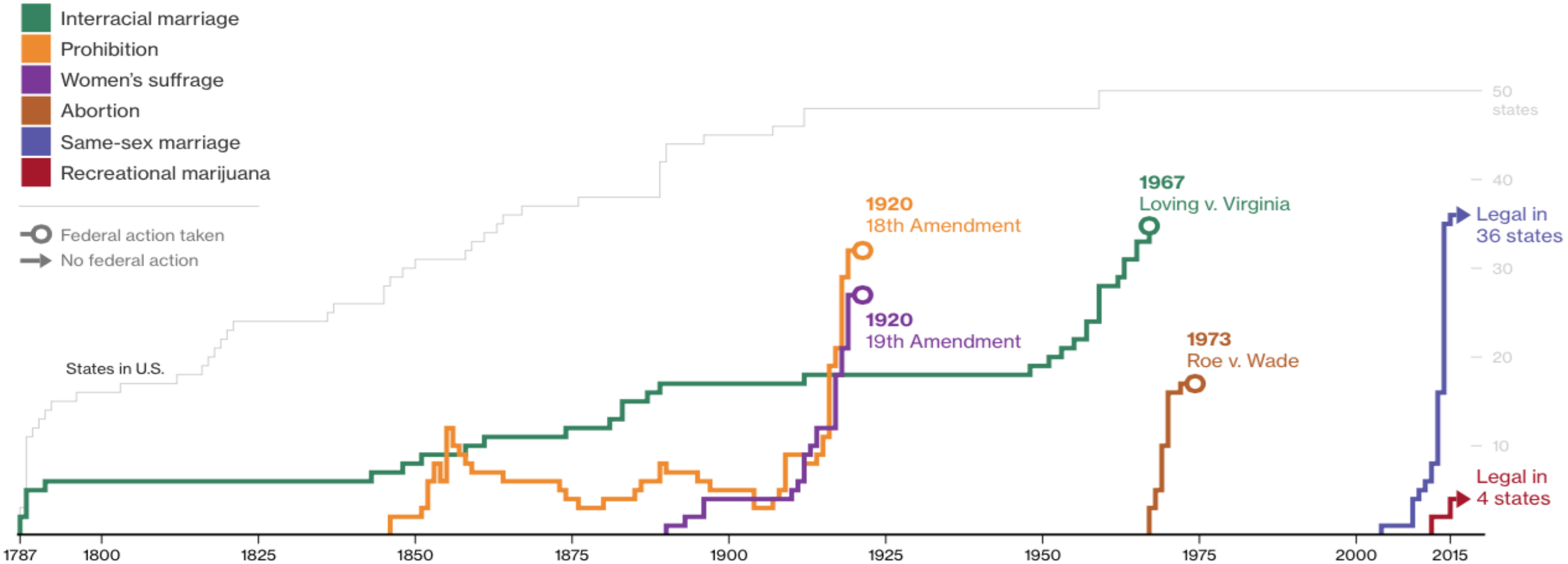
1.5°C is still possible – it will be a real challenge.

- <https://www.outrageandoptimism.org/episodes/the-thorny-issue-of-15c?hsLang=en> Podcast Interview with Michael Mann
- “The greatest threat to meaningful climate action today is no longer denial, but despair and doomism, premised on the flawed notion that it is too late to do anything.”
Michael Mann – Our Fragile moment 2023
- It needs all our collective actions, there is no single solution

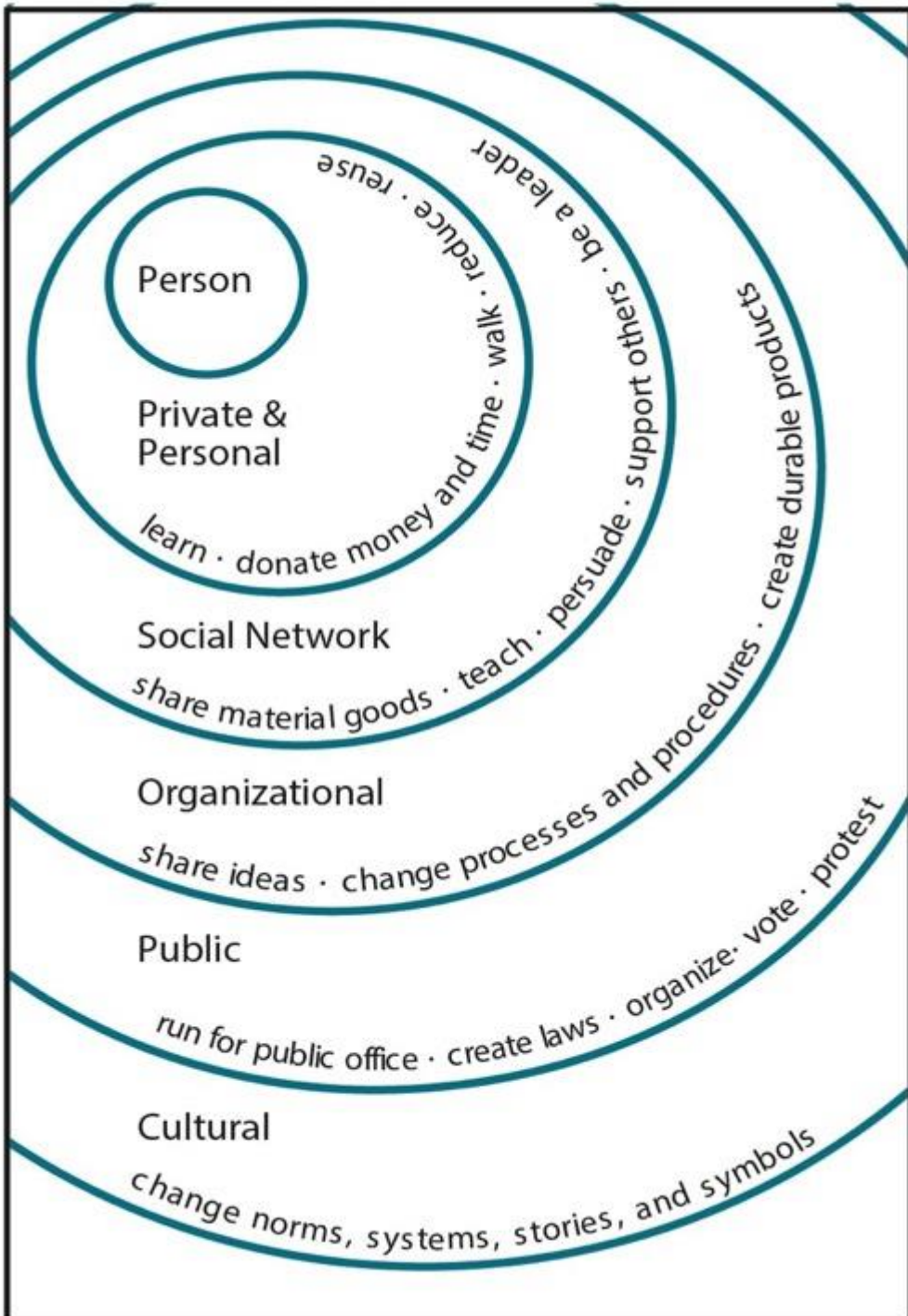
Social Change Looks Impossible Until it is Completed

Tracking the Pace of Social Change

Number of states that have removed a ban, by year
(Prohibition shows the number of states that enacted)







What can you do?

Illustration by Elise Amel

What can I do?

**Change
the
System**

**Change
My
Lifestyle**

My Comfort Zone

Where the Magic Happens

What can you do?

Citizens' Climate Lobby

cclusa.org

- **Personal Conviction** - Education and training from one of the largest grassroots climate organizations in USA
- **Path to Success** - Roadmap to effective national climate policy
- **Action Opportunities** - Specific next steps to make a difference today
- **Support** - Chapters organize respectful, non-partisan collaboration



Resources

Citizens' Climate Lobby - cclusa.org

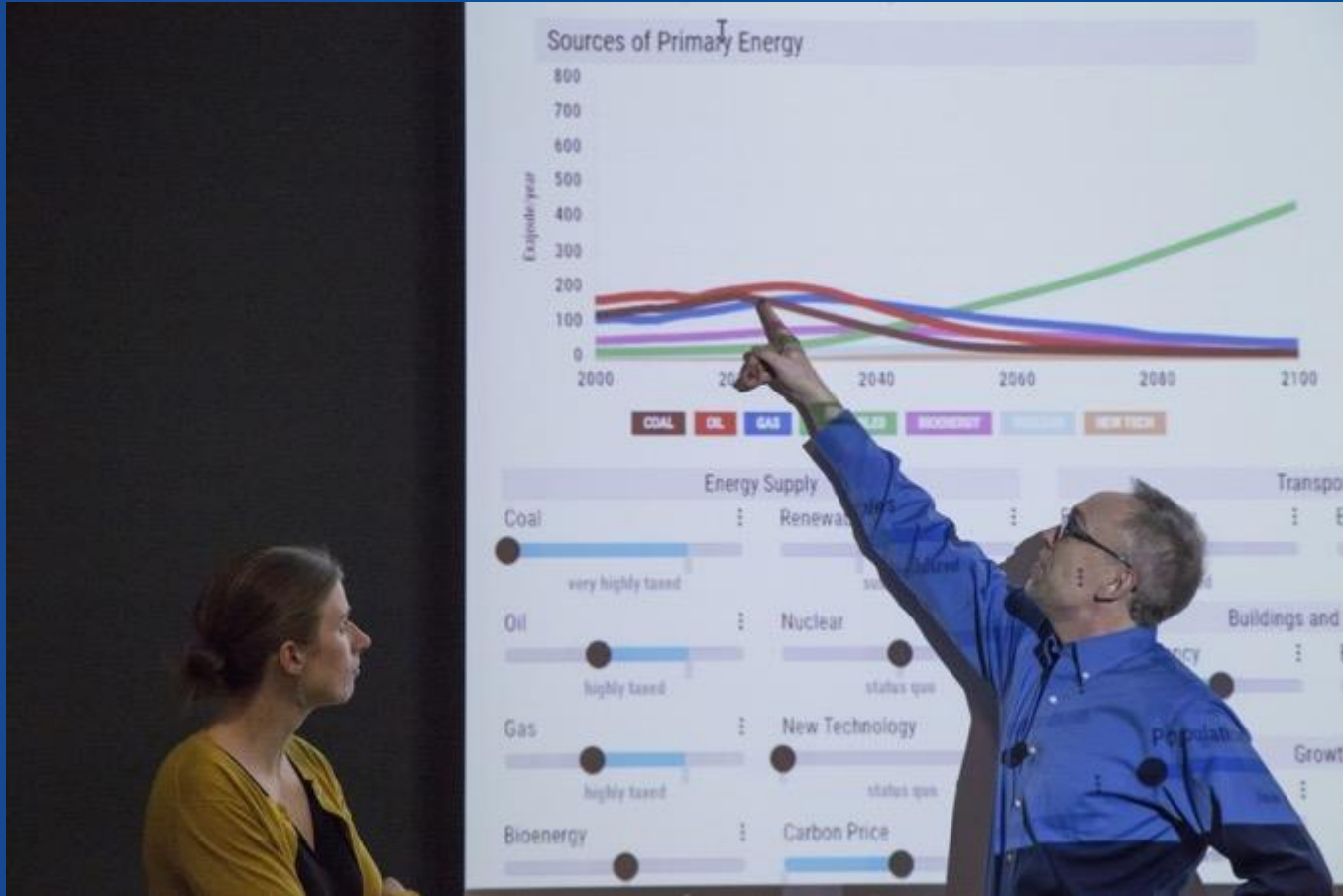
En-Roads - climateinteractive.org

Online training is available from that website.

Probablefutures.org - Interesting insights into the effect of warming planet on a number of weather variables.

Want More En-ROADS?

- Reach out to me
- We have 13 Climate Scholars at UD trained in EN-ROADS on the path to being Ambassadors
- Looking for more community engagement, schools, churches, groups etc.



Thank You!

Visit:

climateinteractive.org