



# BERKELEY LAB

LAWRENCE BERKELEY NATIONAL LABORATORY

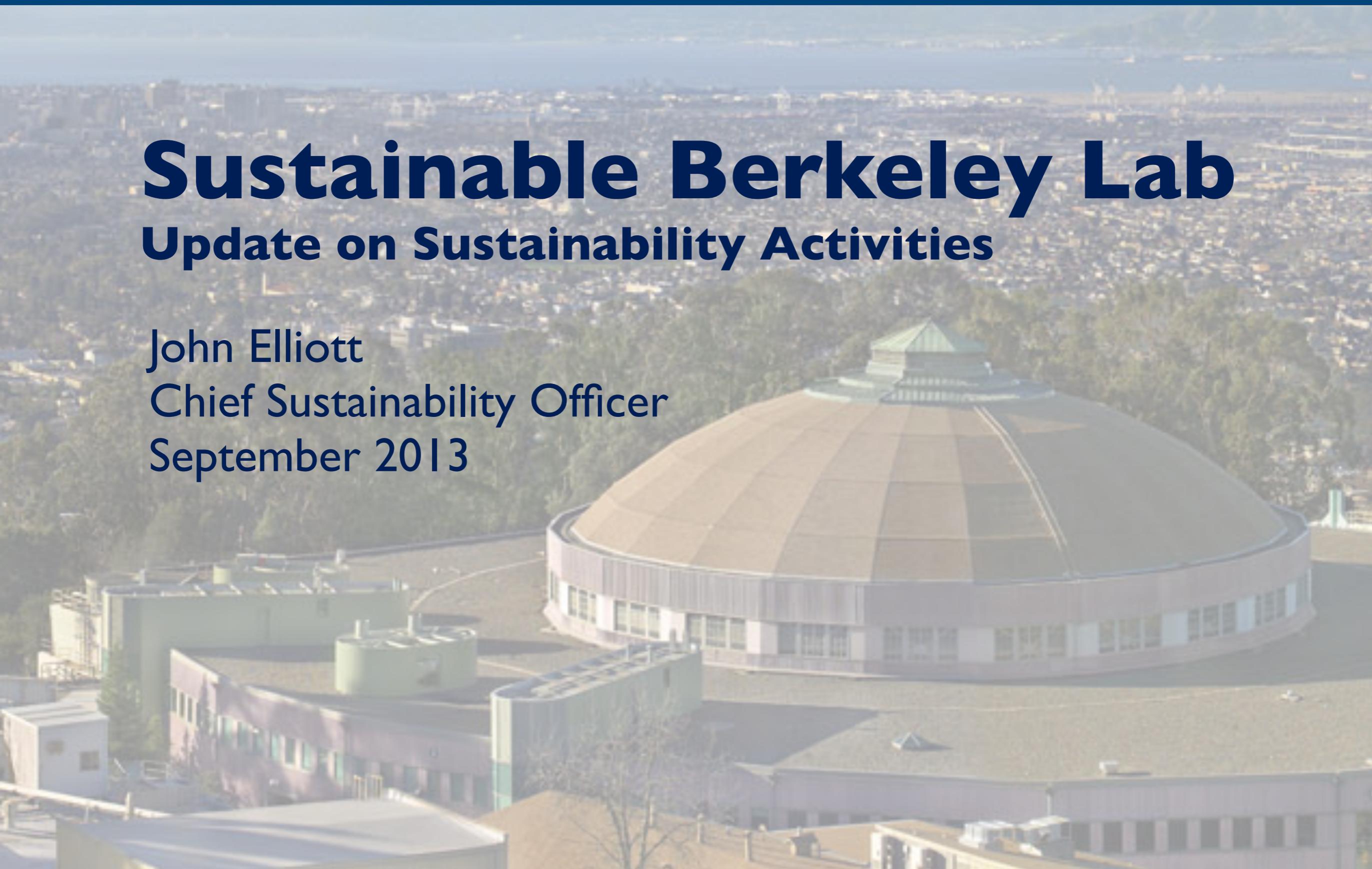


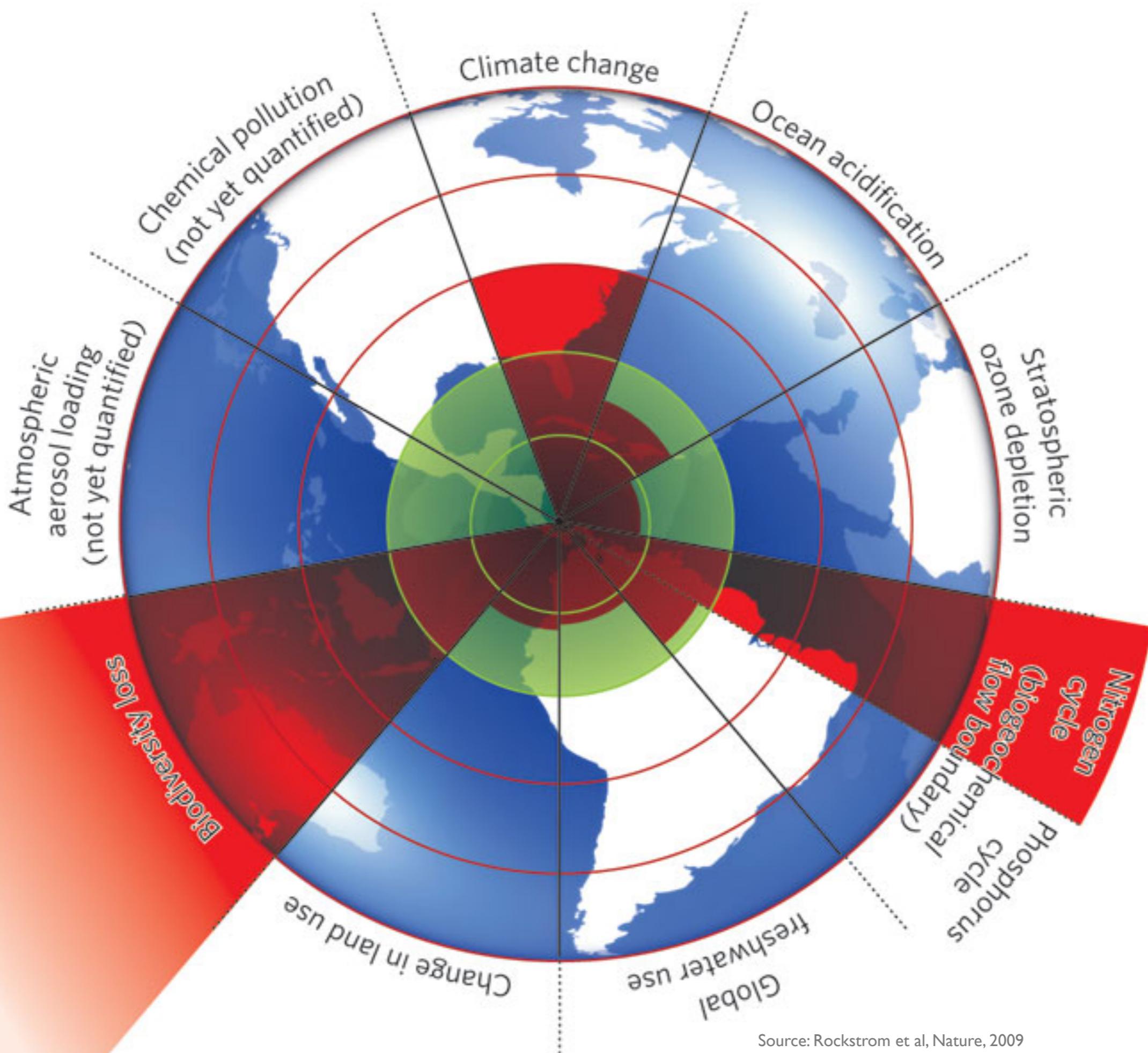
U.S. DEPARTMENT OF  
**ENERGY**

# Sustainable Berkeley Lab

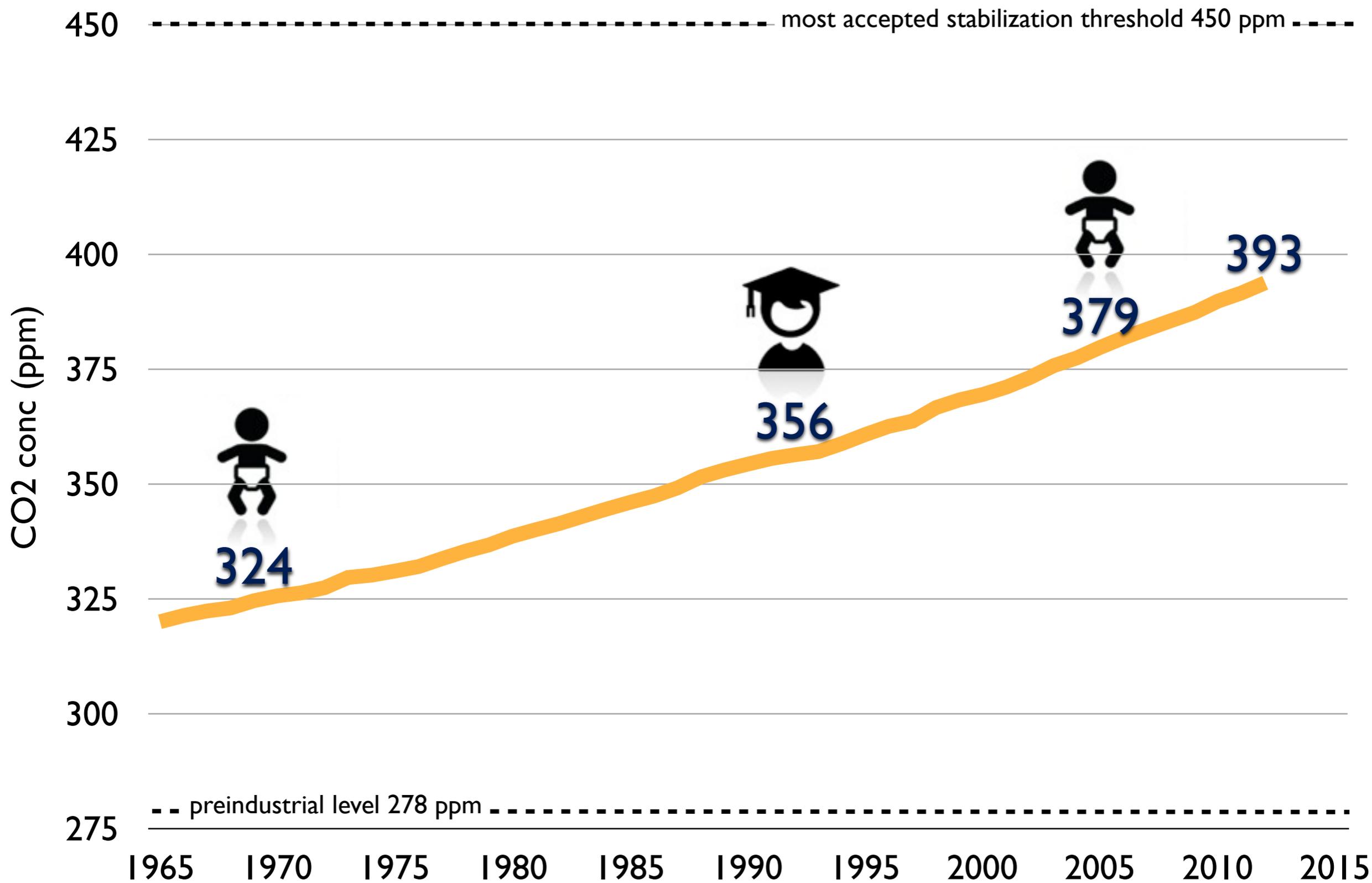
## Update on Sustainability Activities

John Elliott  
Chief Sustainability Officer  
September 2013





Source: Rockstrom et al, Nature, 2009



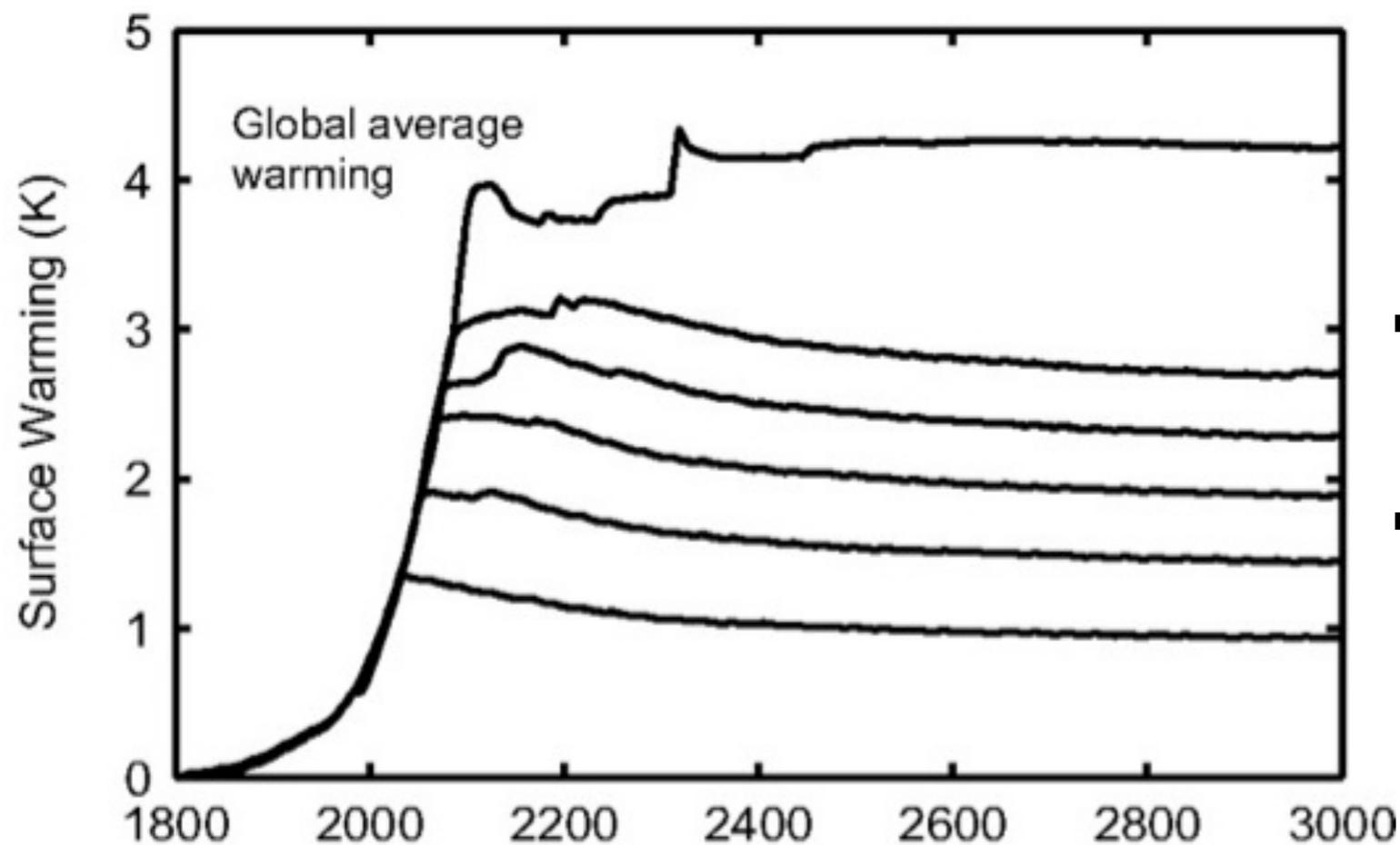
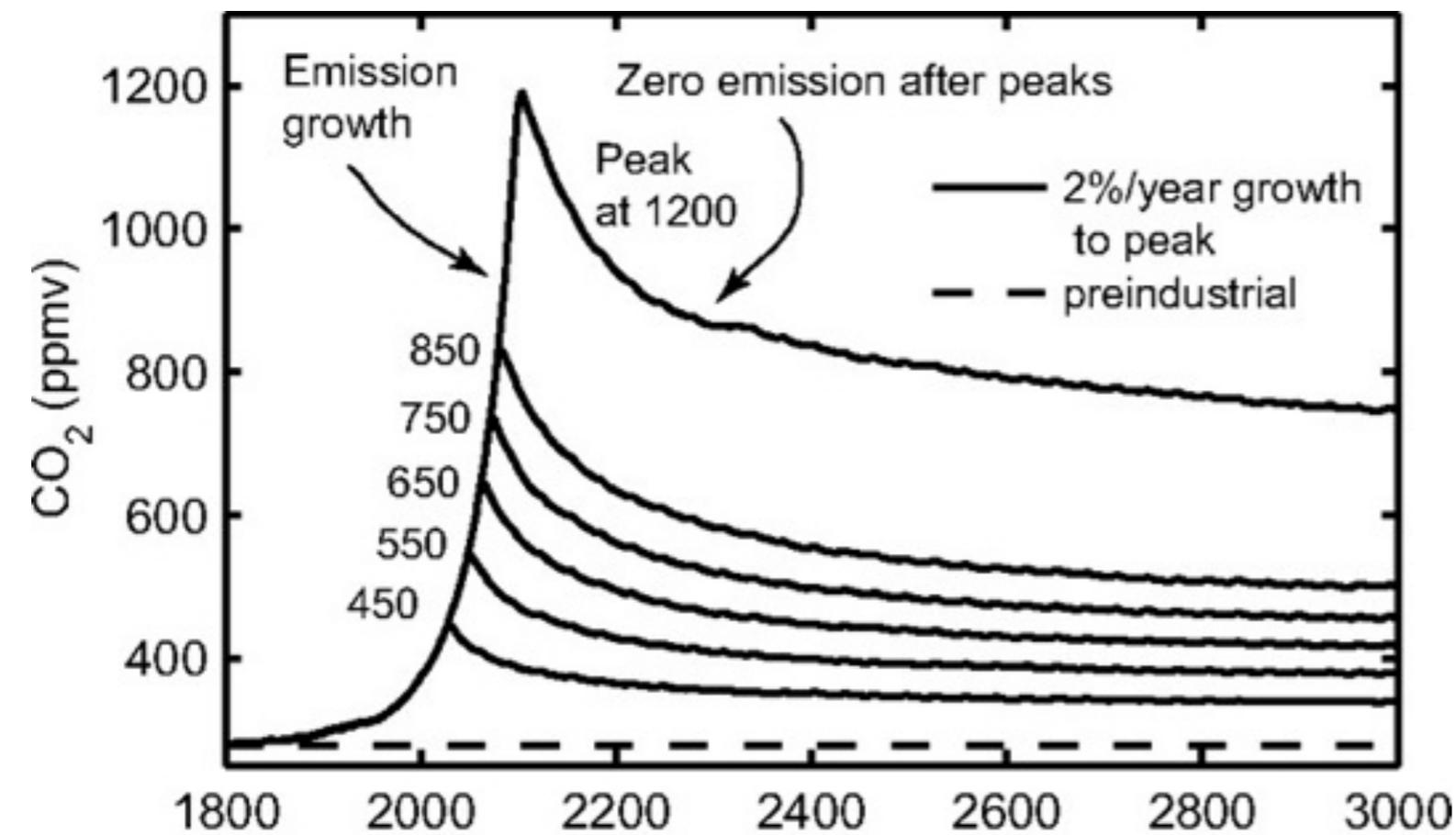
Source: ESRL NOAA, globally averaged marine surface annual mean data. See CO2 history over last 800,000 years at same site. Search for "NOAA CO2 movie"

# Climate impacts are:

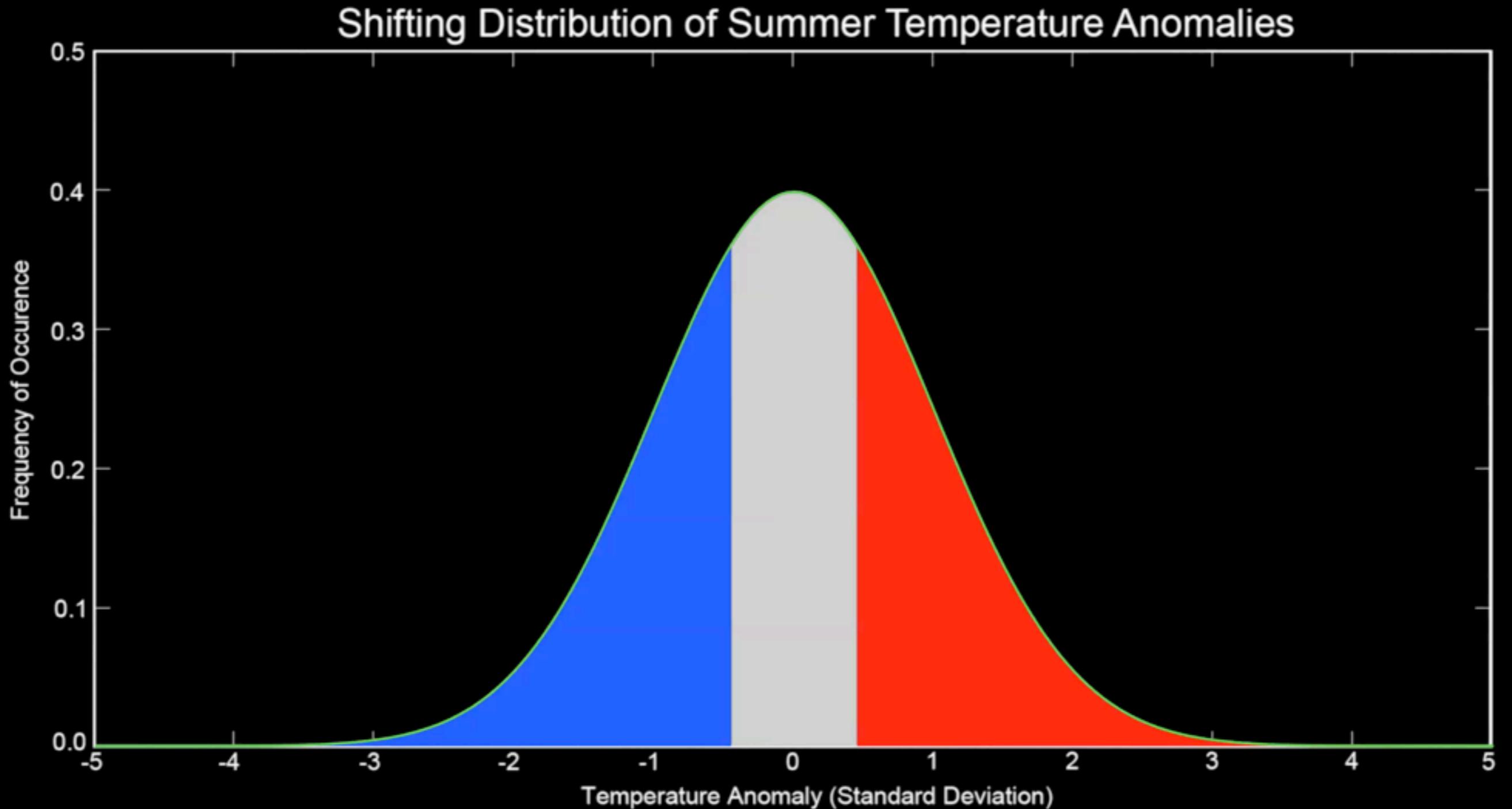
- largely irreversible over the timescale of human civilizations
- driven by cumulative emissions

# Delays:

- require more aggressive action later
- create long-lived, infrastructure with emissions



# Climate impacts are happening now

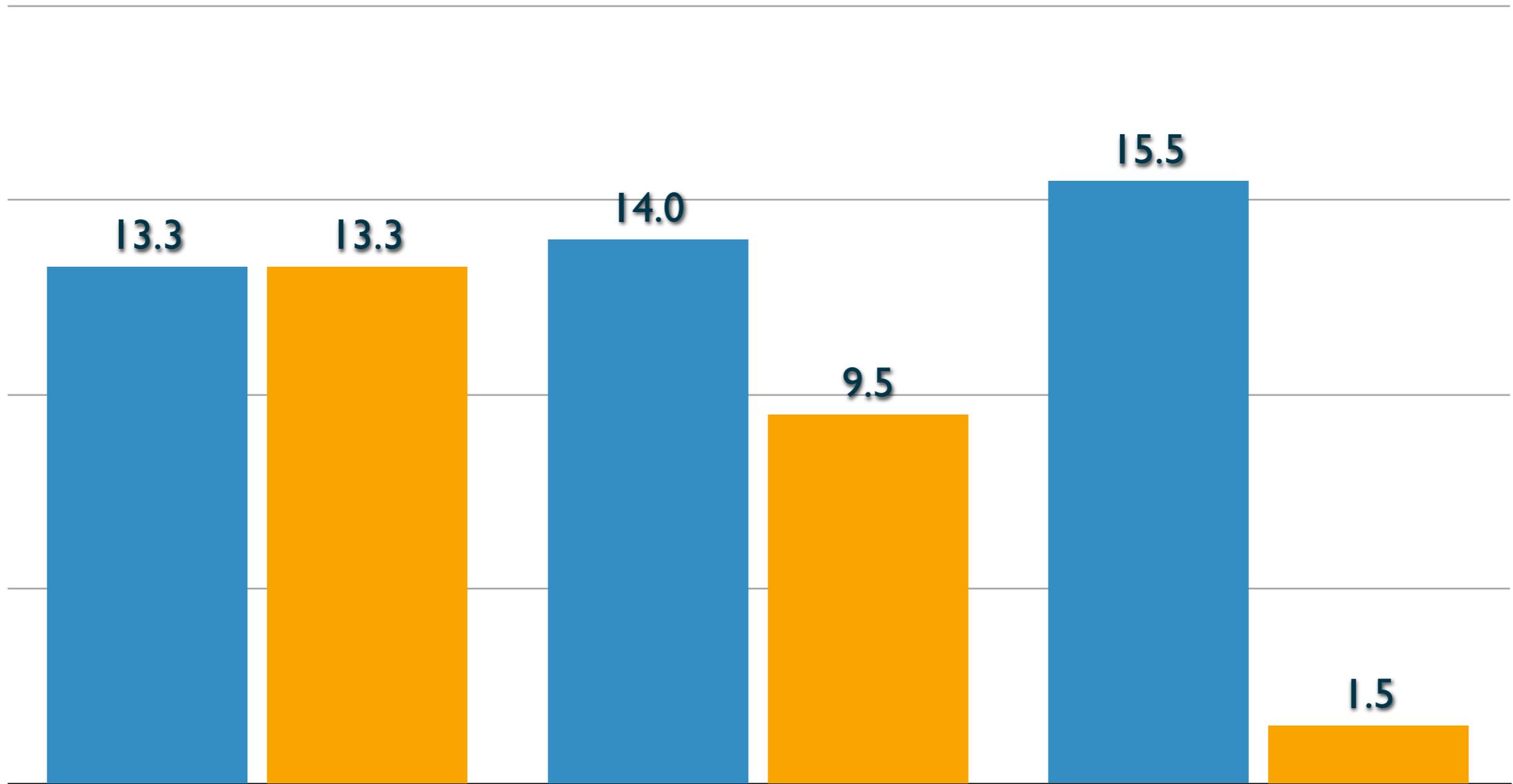




Business As Usual

With Climate Targets

GHG Emissions per Person (MTCO<sub>2</sub>e/yr)



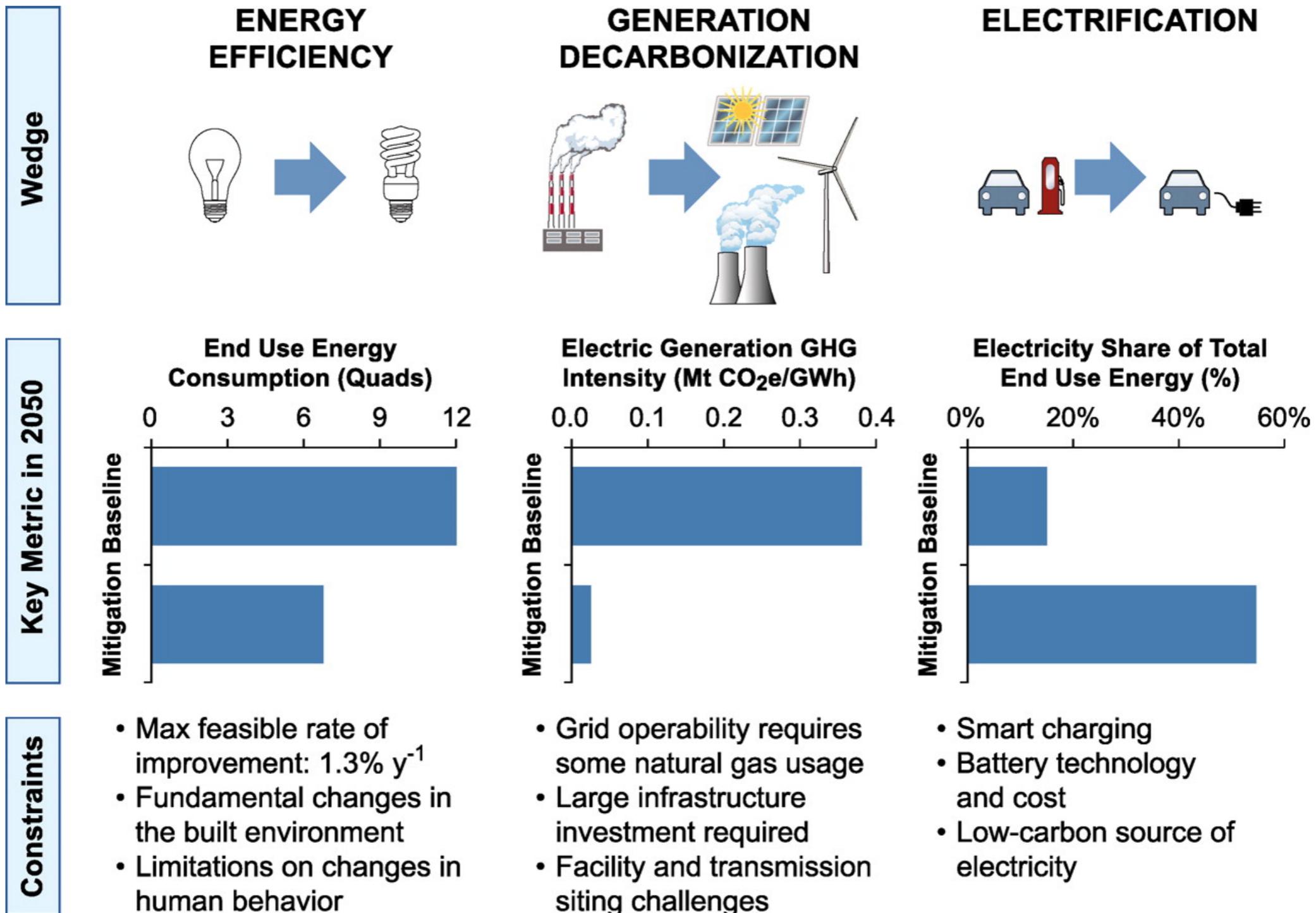
2010

2020

2050



# The three main energy system transformations required to reduce GHG emissions 80% below 1990 levels by 2050 in California.



J H Williams et al. Science 2012;335:53-59





Lawrence Berkeley National Laboratory addresses the world's most urgent scientific challenges by advancing sustainable energy, protecting human health, creating new materials, and revealing the origin and fate of the universe.





Energy Intensity Reduction (btu/ft <sup>2</sup> ) (non HEMSf)	EO 13423	30% (2003-2015)
Scope 1&2 GHG Emissions Reduction (mt CO <sub>2</sub> e/yr)	EO 13514	28% (2008-2020)
Scope 3 GHG Emissions Reduction (mt CO <sub>2</sub> e/yr)	EO 13514	13% (2008-2020)
Renewable Electricity Use	EPACT 2005, EISA 2007, EO 1342	7.5% (2013 forward)
New Building and Renovation Fossil Fuel Reduction	EISA 2007	55% (2003-2010)
		65% (2003-2015)
		80% (2003-2020)
		100% (2003-2030)
Net Zero Energy (designed after 2020)	EO 13514	100% (by 2030)
High Performance Building (LEED EB)	EO 13514	15% (by 2015)
High Performance Building (LEED NC Gold if >\$5M)	EO 13514	100%
Waste Diversion – non-hazardous and C&D	EO 13514	50% (by 2015)
Fleet Petroleum Reduction	EO 13514	30% (2005-2020)
Potable Water Use Intensity Reduction (gal/ft <sup>2</sup> )	EO 13514	26% (2007-2020)
Industrial/Other Water Use Reduction (gal/yr)	EO 13514	20% (2010-2020)
Procurements Meet Sustainability Requirements	EO 13514	95% (each year)

# SUSTAINABLE BERKELEY LAB

## Better Buildings

Build high-value buildings that support science, target efficiency, and minimize fossil fuel use

## Deep Retrofits

Deploy a multi-year, financed program for 30-50% energy use reduction

## Green Grid

Access renewable power, supporting a smart grid for greater penetration of renewables

## Performance Monitoring

Build capability to maintain and enhance savings, evaluate and track success

## EV Readiness

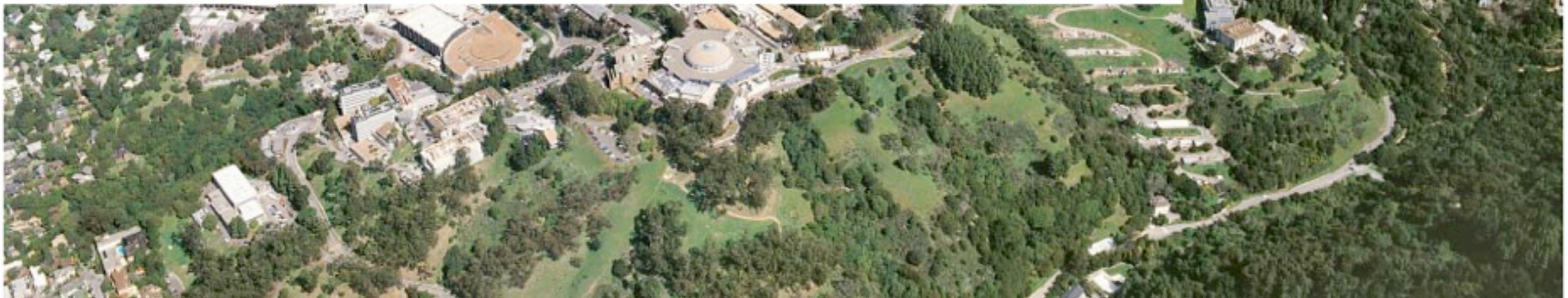
Enable staff EV charging and prepare for a transition to an electricity-based transportation system

## Employee Engagement

Engage staff to institutionalize practices that reduce footprint and enhance morale

## Waste Reduction

Establish an end-to-end, broadly deployed program for waste minimization and diversion



# Sustainability Achievements

- Adopted Berkeley Lab policy on Sustainability Standards for New Construction
- Partnered with LLNL on 10-acre solar project
- Started staff EV charging
- Held first lab-wide zero-waste event (>98% diversion)
- Completed waste diversion pilot at B74 (70-75% diversion)
- Began paper towel composting across main site
- Established sustainability organization - SBL
- Joint RBC Sustainability Committee

# Upcoming Goals

- Establish multi-year retrofit program
- Establish lab staff engagement programs
- Strengthen building design process
- Expand waste diversion program
- Expand EV charging modestly to meet demand
- Define purchasing initiative
- Refine renewable energy planning
- Share metrics and data

# SUSTAINABLE BERKELEY LAB

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