

Climate Change: Science and Beyond

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What We'll Talk About:

- How We Got Where We Are Today
- Climate Change Fundamentals
- How Do We Leverage Change? An Individual & Community Guide



Remember:
We Have
Inherited the
Earth

Let's Look at Some Climate Fundamentals

WEATHER

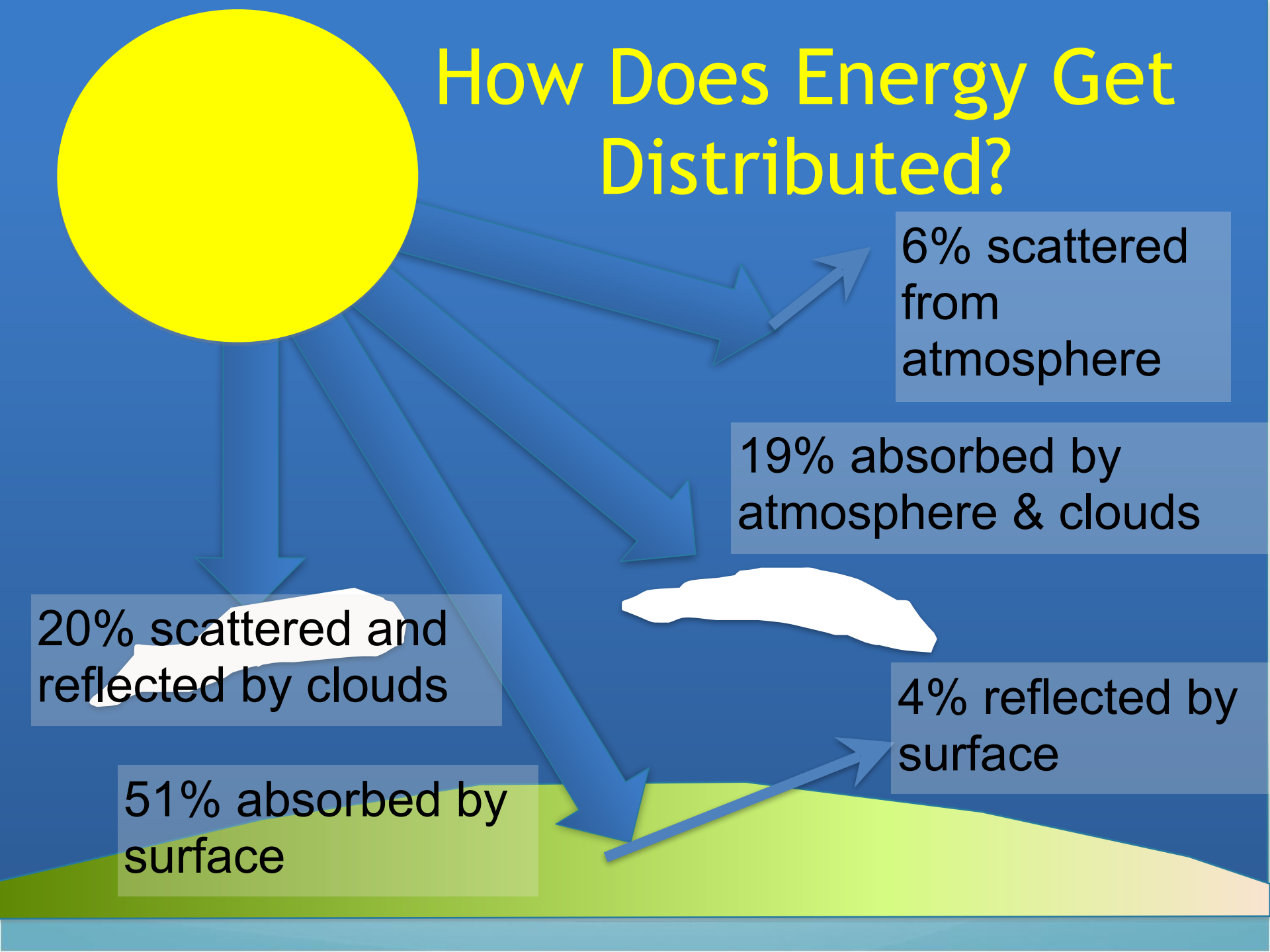
- Short-term
- Individual storms and events, e.g. today's weather, Hurricane Sandy, the drought of 2011

CLIMATE

- Long-term
- Weather averaged over a longer period of time
- Decadal trends

“Climate tells you which clothes to buy; Weather tells you which clothes to wear”.

How Does Energy Get Distributed?



6% scattered from atmosphere

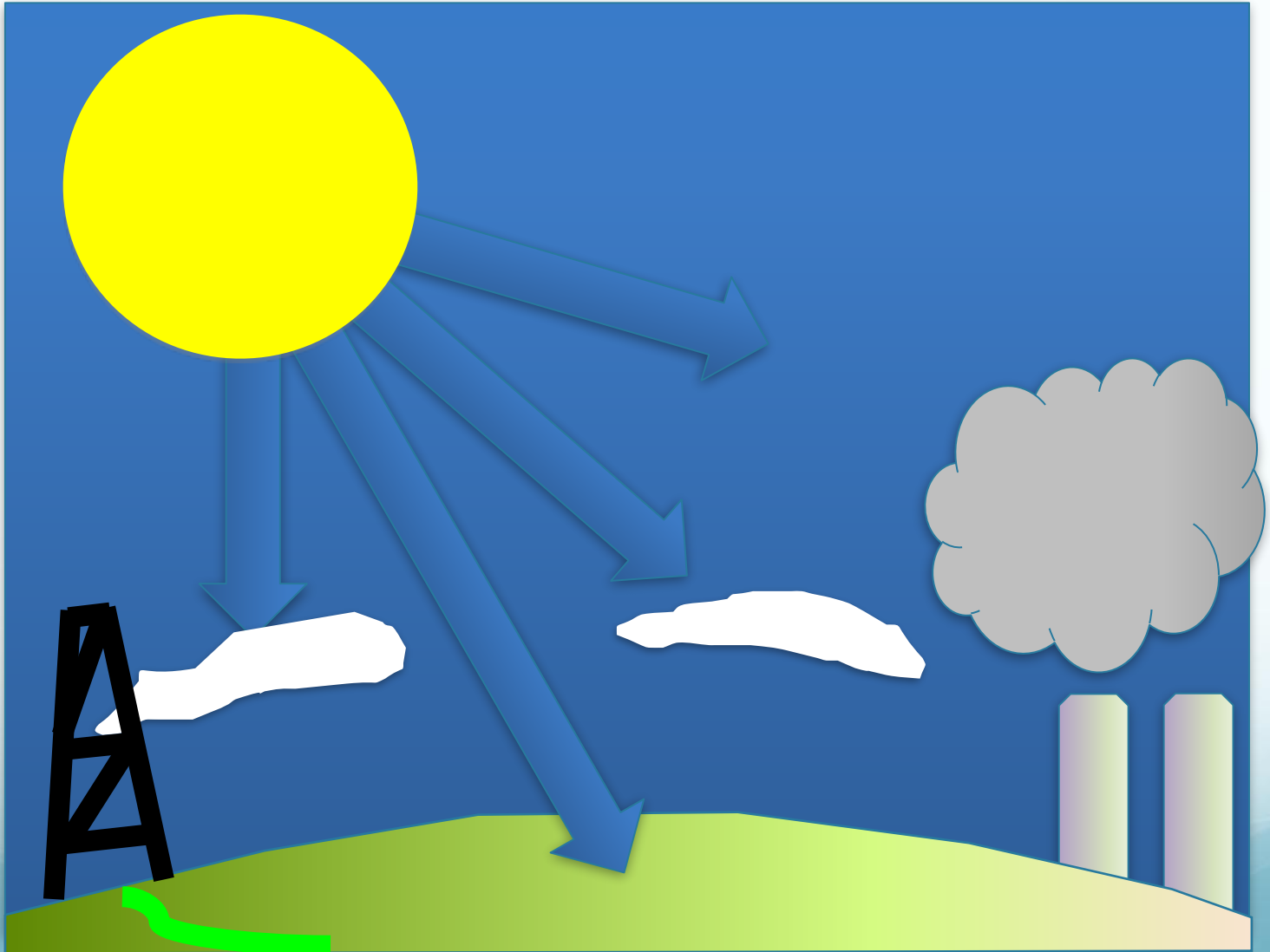
19% absorbed by atmosphere & clouds

20% scattered and reflected by clouds

4% reflected by surface

51% absorbed by surface

How Does Energy Get Distributed?

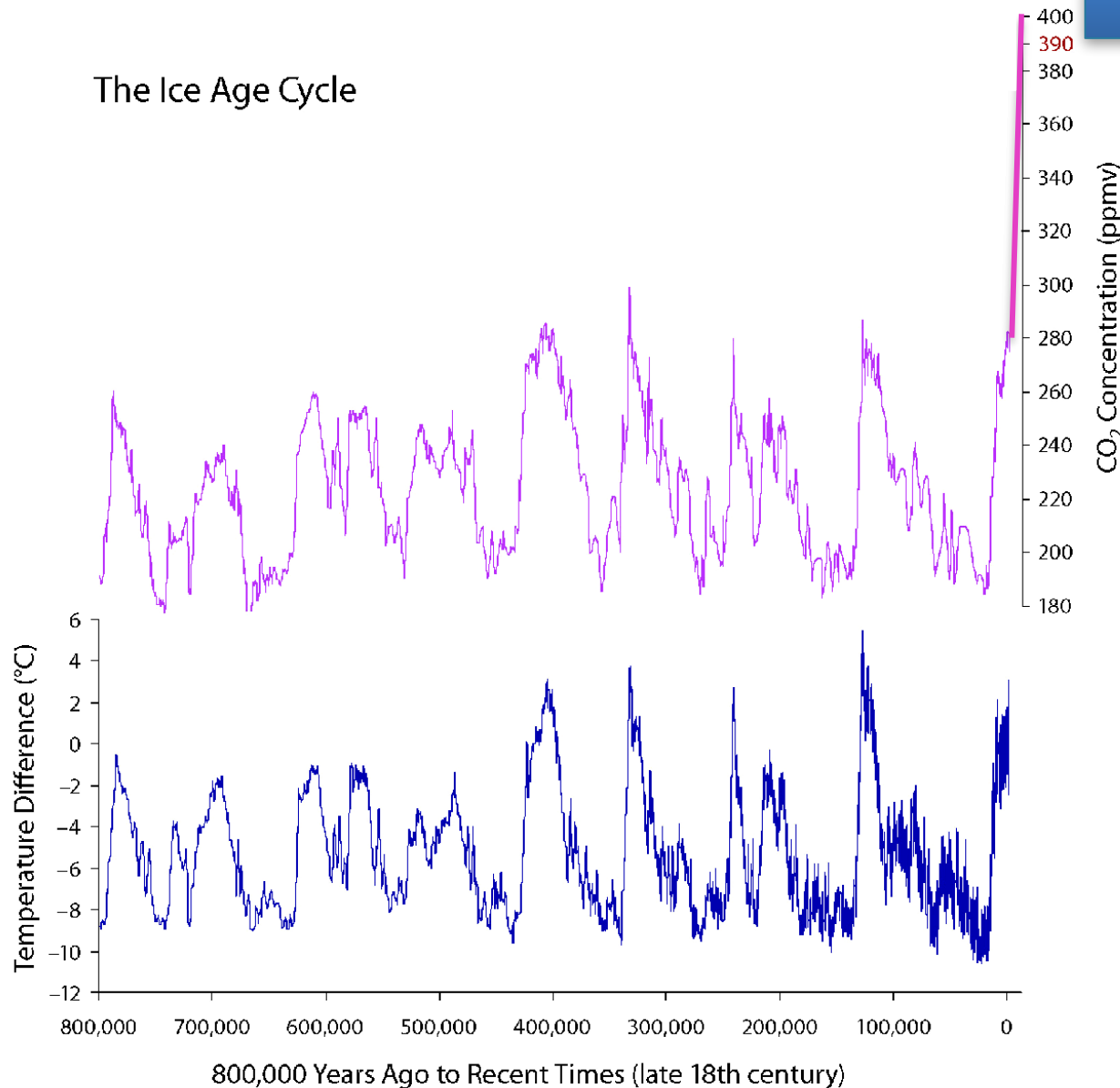


Global Warming Is Not a New Idea

Tyndall (1869)	Earth's climate can be altered through variations in a few trace gases like CO ₂ and water vapor	261 ppm
Arrhenius (1896)	"birth" of modern climate science by showing saturation band of CO ₂ expands with increasing atmospheric CO ₂ concentration	295 ppm
Callendar (1938)	human activity is causing atmospheric CO ₂ to rise	311 ppm
Keeling (1970)	If specialists assert that accelerated use of fossil fuels is harmful, what will we do?	325 ppm
Shaw (1980)	Document shares predictions on atmospheric CO ₂ and changing climate in internal ExxonMobil document (which btw is pretty spot on)	339 ppm

(http://cdn.exxonmobil.com/-/media/global/files/climate/02_technological-forecast-on-co2-greenhouse-effect-1980.pdf)

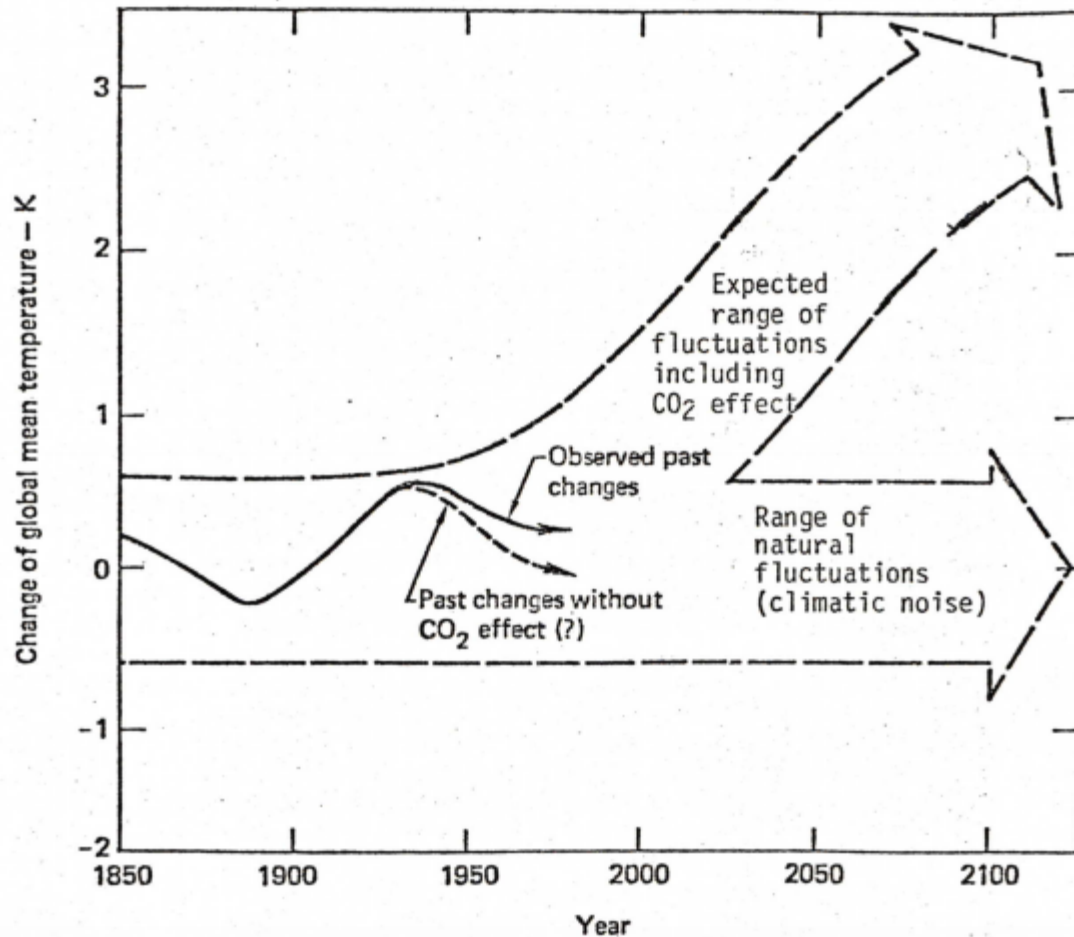
The Ice Age Cycle



Current CO₂
in the
atmosphere

**Climate
Change:
Beyond
“natural”
cyclicality**

Climate Change: Beyond “natural” cyclicity. Shaw (1980)



Predictions captured by Shaw and others from the late 1970s/early 1980s show the predicted impact of CO₂ on global mean temperature.

**But wait...what about “global cooling”
in the 1970s?**

Not actually that popular of a theory

Partially based on the anthropogenic
release of aerosols into the atmosphere

It's not just climate change...

It is predicted that there will be more plastic in the ocean than fish by 2050

Nitrogen and phosphorus pollution creates “dead zones” in oceans and estuaries

The Sixth Mass Extinction is currently underway

(<https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics>)

(<http://www.cbf.org/about-the-bay/issues/dead-zones/nitrogen-phosphorus>)

(<http://advances.sciencemag.org/content/1/5/e1400253.short>)

Individual Choices: Do They Matter?



Photo From National Geographic

The Myth of Inevitability

Individual Choices: Do They Matter?

The Myth of Insufficiency

- A drop in the bucket is a drop in the bucket - and all those drops add up.
- A sense of lack cultivates anxiety and consumption.

Collective Choices Matter, Too



Create Space for Awareness

- Are you aware of global issues?
- Are you aware of community issues?
- Are you aware of your own actions? Your internal motivations? Your values?

Awareness creates space for right action.

Things we can do

- Support local climate action plans
- Support the Clean Power Plan and other strategies for reducing emissions
- Educate yourself & others
- There is strength in numbers
- Look and listen for opportunities

The U.S. Clean Power Plan

2030 IMPACT: BY THE NUMBERS



32% reduction in power sector emissions by 2030*

30% more renewable energy by 2030

*2005 BASELINE

ECONOMIC STRENGTHS



\$155 billion in consumer savings between 2020-2030



\$1 invested in clean energy creates 3x as many jobs as \$1 invested in fossil fuels



Tens of thousands of renewable energy jobs added by 2040



HEALTH BENEFITS

UP TO
\$54 BILLION

in public health and climate benefits

90,000

childhood asthma attacks prevented

UP TO
3,600

premature deaths avoided in 2030 due to cleaner air

Sources:
PERI Center for American Progress
U.S. Energy Administration
U.S. EPA

Figures based on EPA's estimated projections

EDF
ENVIRONMENTAL
DEFENSE FUND
Finding the ways that work