

# Climate at Mason

Colin Nackerman

Climate Program Specialist

Center for Climate Change Communication

Center for Ocean-Land-Atmosphere Studies

[cnackerm@gmu.edu](mailto:cnackerm@gmu.edu)



at Mason

- **Center for Ocean-Land-Atmosphere Studies – COLA**
- **Mason hosts the largest single academic group of climate dynamics and climate modeling experts in the U.S.**, including contributors to the IPCC reports
- The Mason Climate Dynamics Ph.D. program is unique in its focus on **training the next generation of climate modelers and analysts** (17 current students; 37 Ph.D. graduates since 2002)
- **B.S. in Atmospheric Science:** fundamental training in meteorology and computational atmospheric sciences

# Scientists Have ...



- Developed or contributed **to new and innovative approaches** for climate research
- Established a scientific basis for quantitative, **dynamical seasonal and decadal prediction**
- Contributed to **national leadership** in climate science, national and international program integration
- Achieved important breakthroughs in **high-resolution seamless weather and climate prediction**

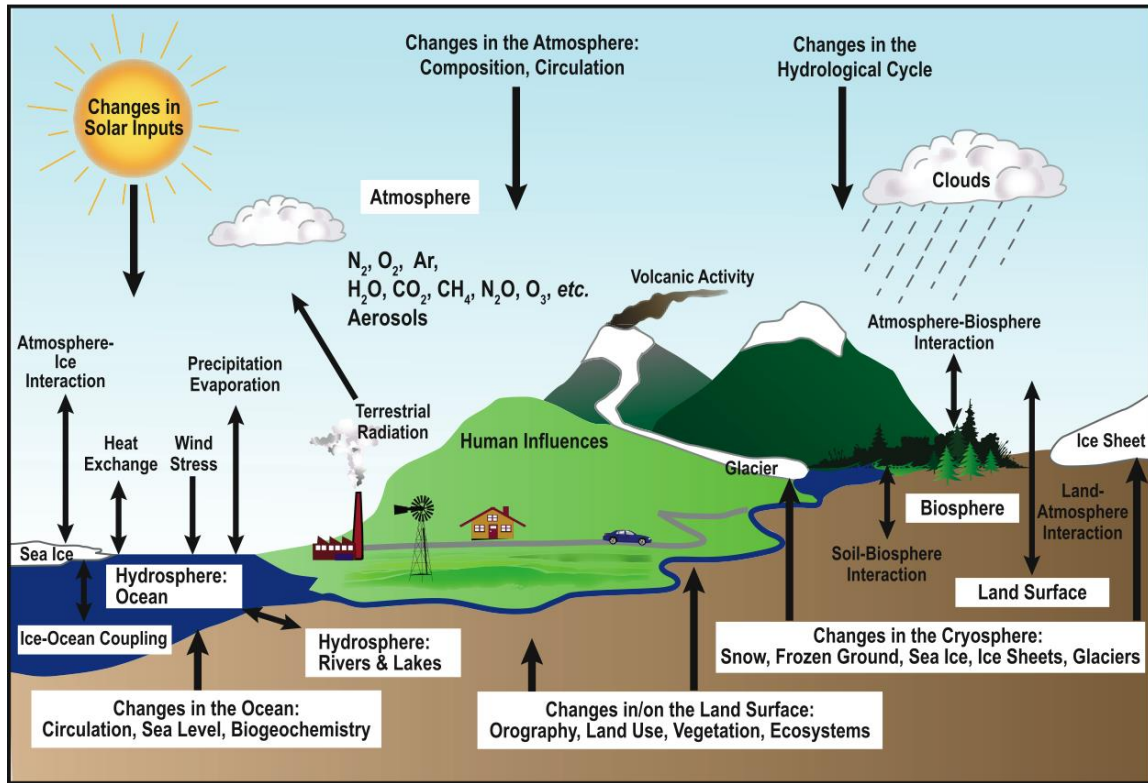
# WHEN IT RAINS IT POURS

CHANGE IN FREQUENCY OF HEAVIEST DOWNPOURS • VIRGINIA



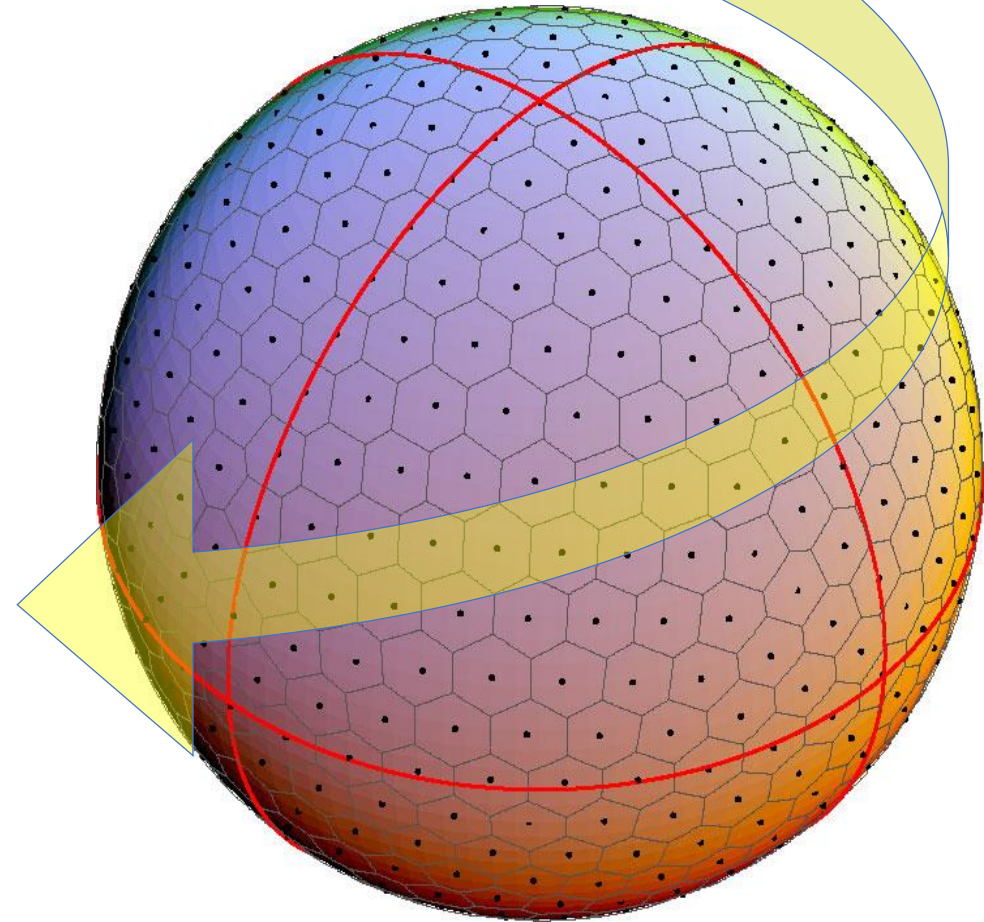
Source: Applied Climate Information System ([rcc-acis.org](http://rcc-acis.org))  
Heaviest downpours defined as top 1% of all rain events. Shown as departure from 1950-2014 Avg.

# Earth System Modeling – Petascale Computation



- Equations of motions and laws of mass and energy conservation to predict rate of change of:

*T, P, V, q, etc. (A, O, L, CO<sub>2</sub>, etc.)*

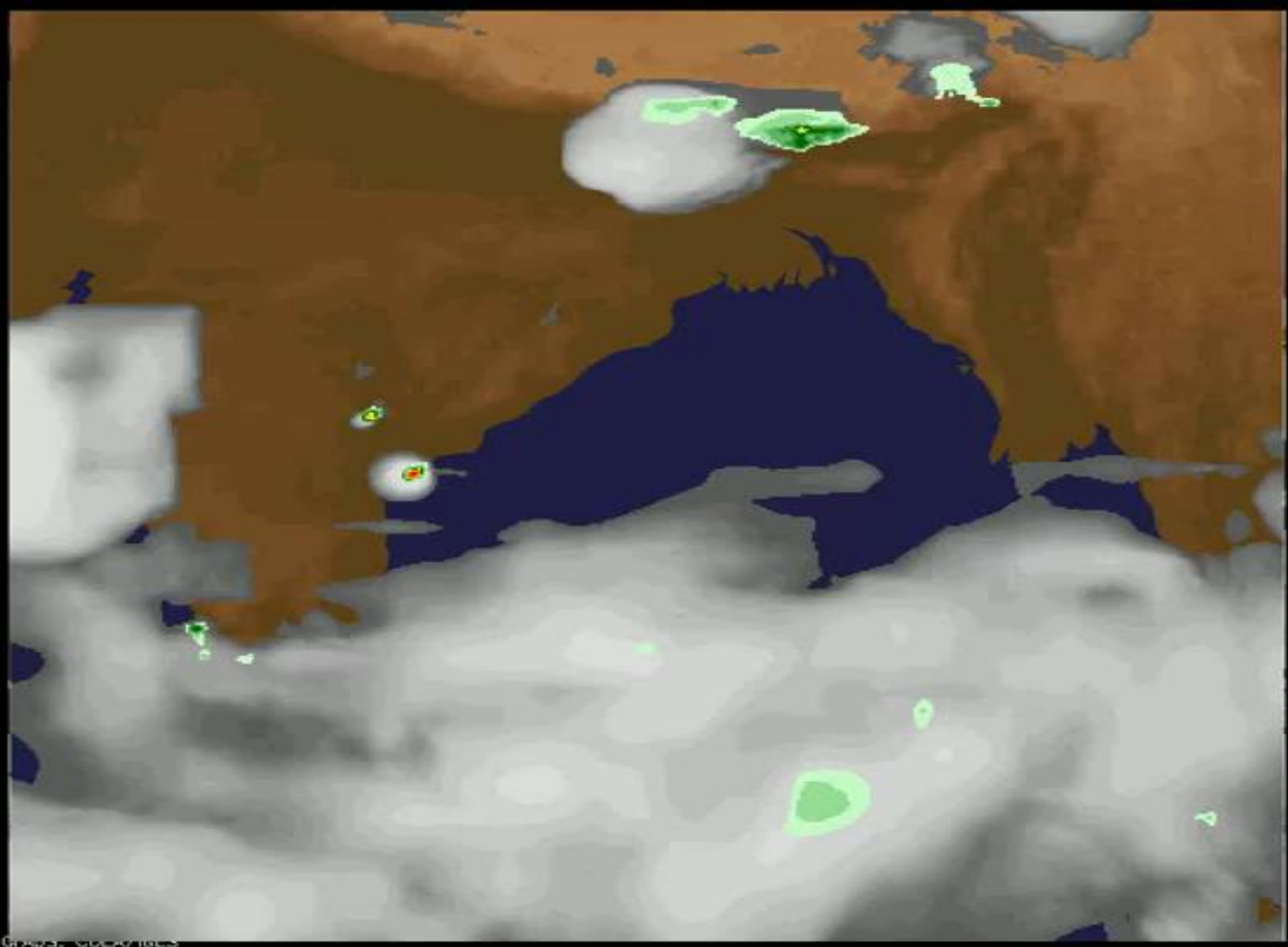
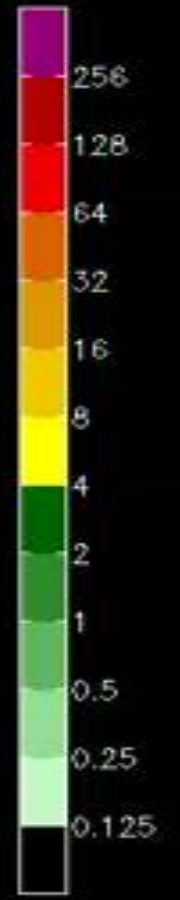


- 10 Million Equations:  
**100,000 Points × 100 Levels × 10 Variables**
- With Time Steps of: **~ 10 Minutes**

- **How do we solve 10 million simultaneous equations over 5 million times? Supercomputers!**

01Z MAY 21, 2009

mm/day



**A strategic communication imperative:**

**Develop and deliver—at scale—narratives and messages that reduce this psychological distance.**

How Mason 4C is addressing the  
strategic communication imperative:

Developing and delivering —at scale—narratives and  
messages that reduce this psychological distance.





**CLIMATE  
MATTERS**

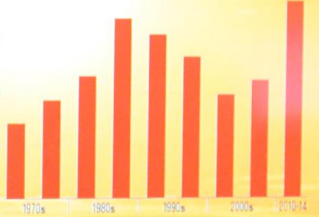
WLTX.COM

on your side

CLIMATE MATTERS

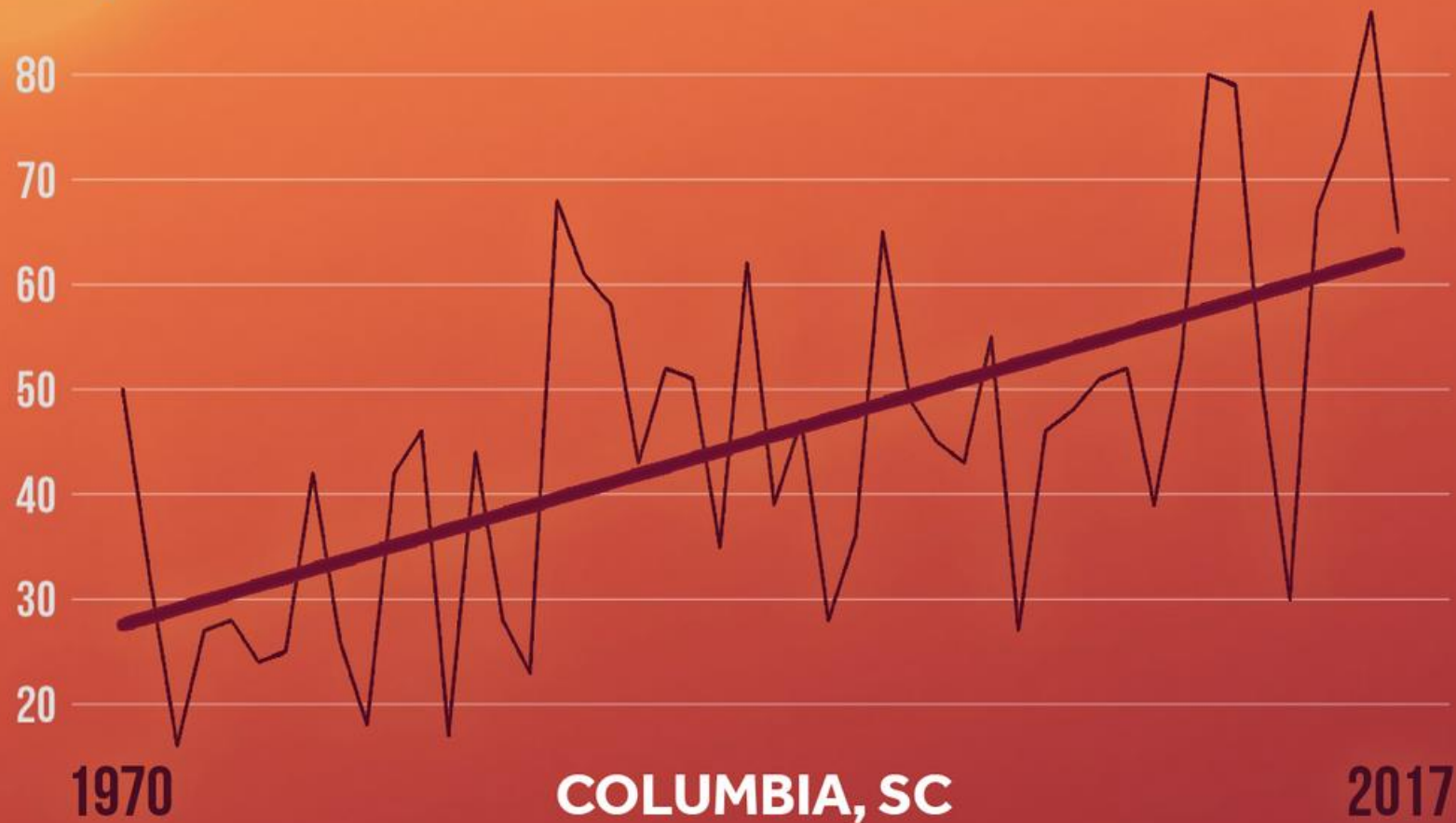
DAYS ABOVE 95°

Columbia  
Five-Year Totals



# MORE HOT SUMMER DAYS

Days Above Normal



June, July, August annual days above normal  
Source: RCC-ACIS.org

# Climate Change Education through TV Weathercasts: Results of a Field Experiment

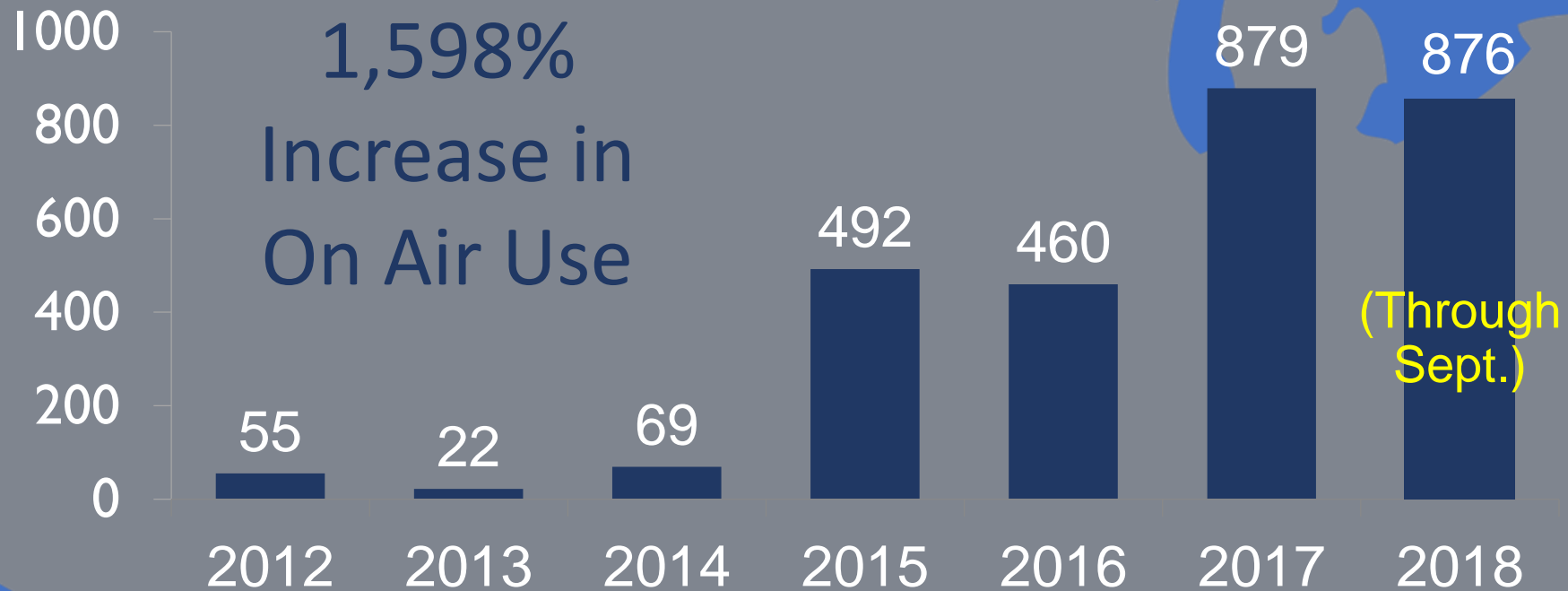
Zhao, Maibach, Gandy, Witte, Cullen, Klinger, et al. (2013) BAMS. DOI: 10.1175/BAMS-D-12-00144.1



*“The results of this field experiment suggest that when TV weathercasters educate their viewers about climate change, viewers gain a more science-based understanding of the issue.”*

Note: Article was published as an “early release” – this is not the real journal cover.

# Climate Matters: Growth & Reach



620+ TV weathercasters • 331 stations • 161 markets • 30+ Spanish



The Medical  
Society Consortium

ON CLIMATE & HEALTH



# MEDICAL ALERT!

## Climate Change Is Harming Our Health



## Every American should know the following important facts:

1. There is a scientific consensus about human-caused climate change.
2. In communities across the nation, climate change is harming our health now.
3. The health of any American can be harmed by climate change, but some of us face greater risk than others.
4. Unless we take concerted action, the harms to health are going to get much worse.
5. The most important action we can take to protect our health is reduce heat-trapping pollution by reducing energy waste and accelerating the inevitable transition to clean renewable energy.





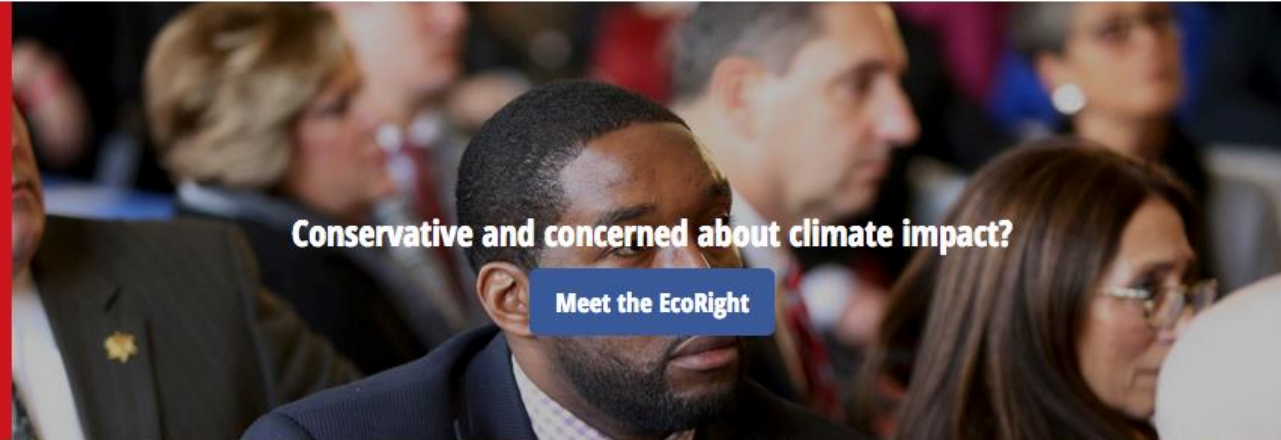
republic **En**  
Energy Optimists  
Climate Realists

*Powered by*  
**En**ergy and **En**terprise™

Who feels conservatives should lead on climate?

We need 1,000 hand raisers in each state!

[Raise your hand](#)



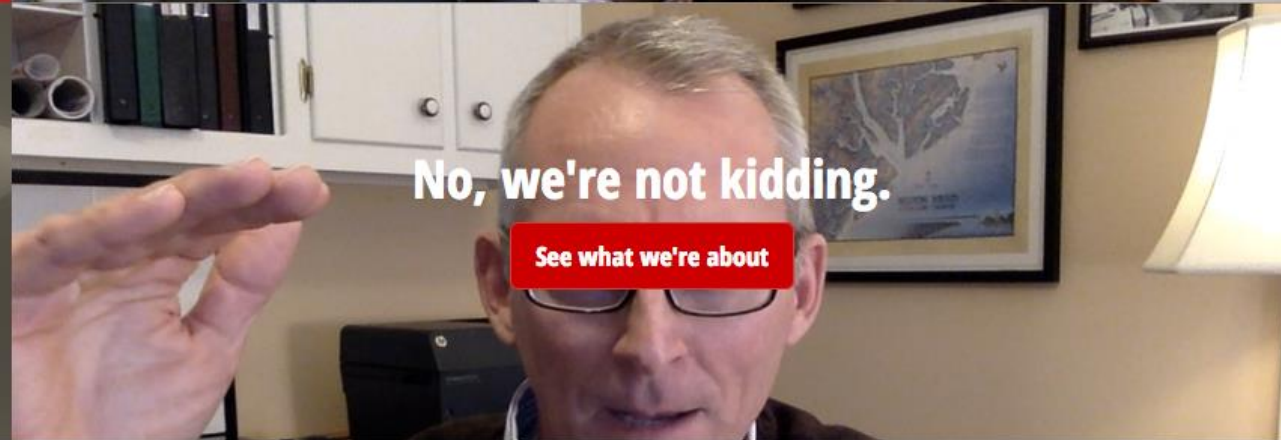
Conservative and concerned about climate impact?

[Meet the EcoRight](#)



# En Encourage Tour

[Learn about the Encourage Tour](#)



No, we're not kidding.

[See what we're about](#)



How you can help.

[Take action](#)

## ECORIGHTNEWS

[Climate & Clean Energy News](#)

THE JOHN F. KENNEDY  
Profile in Courage Award

JOHN F. KENNEDY LIBRARY FOUNDATION

library.org



John F. Kennedy  
PRESIDENTIAL LIBRARY AND MUSEUM



# Global Warming's Six Americas: March 2018

Alarmed

Concerned

Cautious

Disengaged

Doubtful

Dismissive

21%

30%

21%

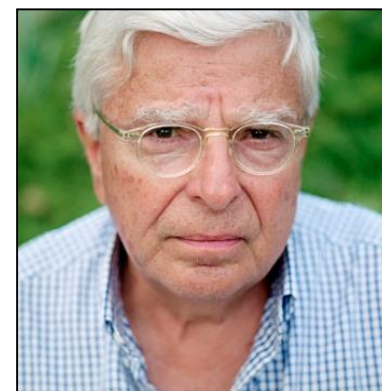
7%

12%

9%

Highest Belief in Global Warming  
Most Concerned  
Most Motivated

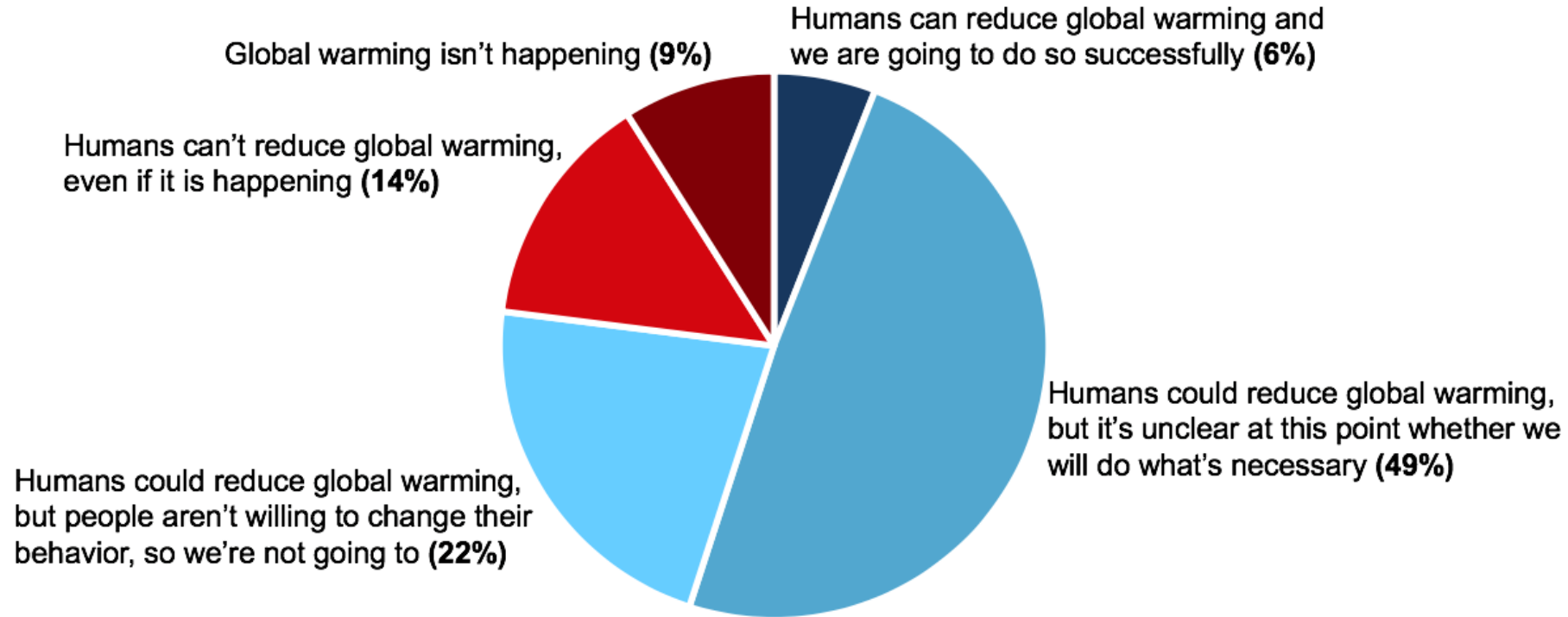
Lowest Belief in Global Warming  
Least Concerned  
Least Motivated



# A Majority of Americans Think Humans Can Reduce Global Warming

- But few are optimistic that we will -

*Which of the following comes closest to your view?*



Which of the following comes closest to your view?

March 2018. Base: Americans 18+ (n=1,278).

A tactical communication imperative:

Simple clear messages, repeated often,  
by a variety of trusted voices.

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**To mount the challenge of spreading important ideas, the guiding heuristic is:**



**Simple clear  
messages**



**repeated often**



**by a variety  
of trusted  
voices**



# Simple Clear Messages

**1**

**The less you say, the more you are heard**

**2**

**Say the things that have the most value to your audience**

**3**

**Use audience research to determine what has the most value**







# Repeated Often

**1**

**Repetition is the mother of learning, liking & trust**

**2**

**Adapt, elaborate, but most importantly, deliver your messages early & often**

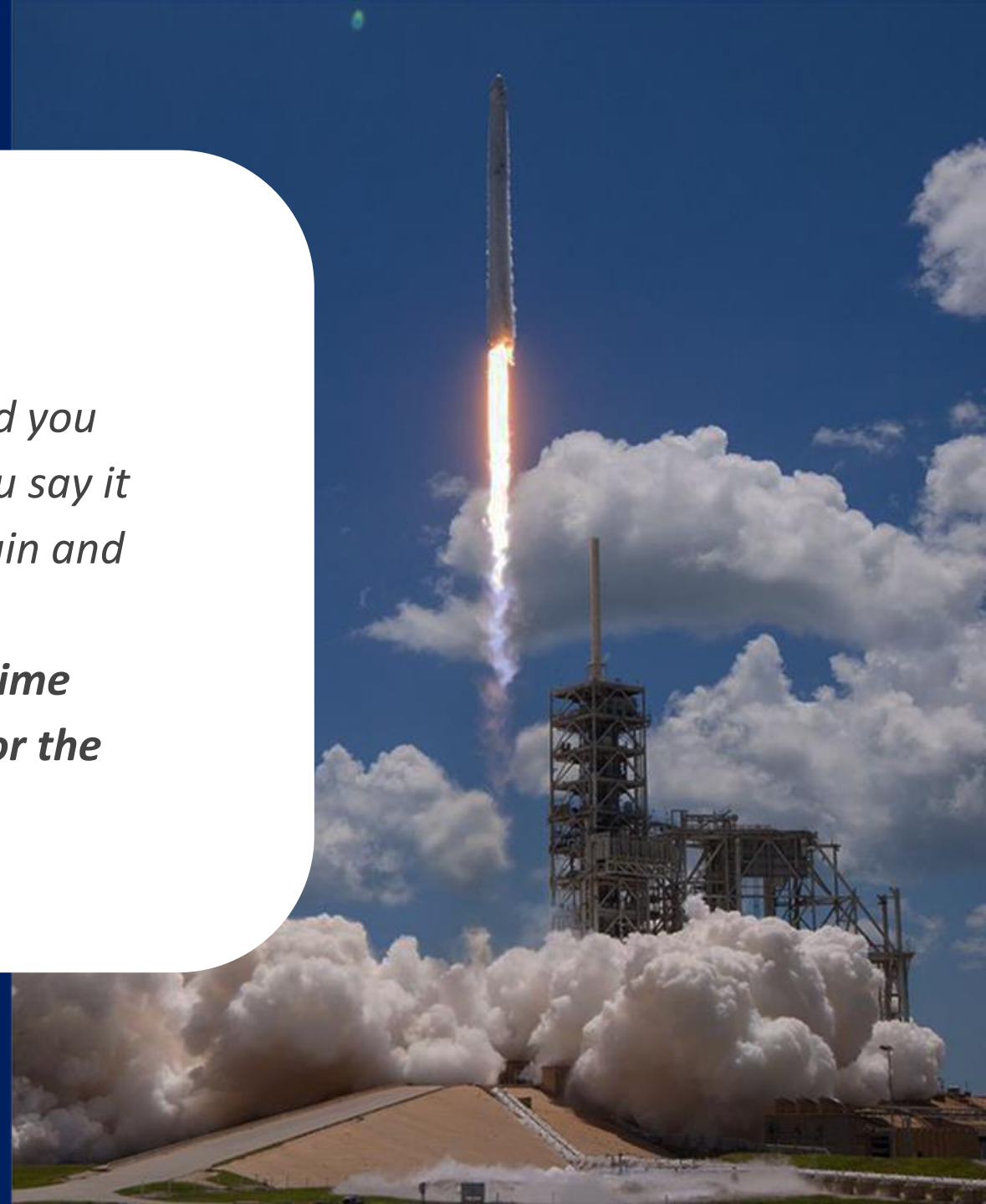
**3**

**Reinforce with visual and verbal images (i.e., metaphors)**



There is a simple rule:

*You say it again, and you say it again, and you say it again, and you say it again, and you say it again, and then again and again and again and again, and **about the time that you're absolutely sick of saying it is about the time that your target audience has heard it for the first time.***





# By a Variety of Trusted Sources

**1**

**Determine who is most trusted**

**2**

**Ask those messengers to convey your message — and make it easy for them to do so**

**3**

**Ideally, the audience will start repeating your message to their friends, family & colleagues**



A teal speech bubble with a white border and a small tail pointing downwards and to the left. The text "Message guidance" is written inside in white, bold, sans-serif font.

**Message guidance**



# Simple Clear Messages for Climate Change

## **Experts Agree...**

Human-caused climate change is happening

It's **Real**

It's **Us** (human-caused)

It's **Bad** (for people)

It's **Solvable**



# Simple Clear Messages for Climate Change

## **Experts Agree...**

Human-caused climate change is happening

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It's **Bad** (for people)

It's **Solvable**

## **Appropriate**

### **Attitudes & Actions**

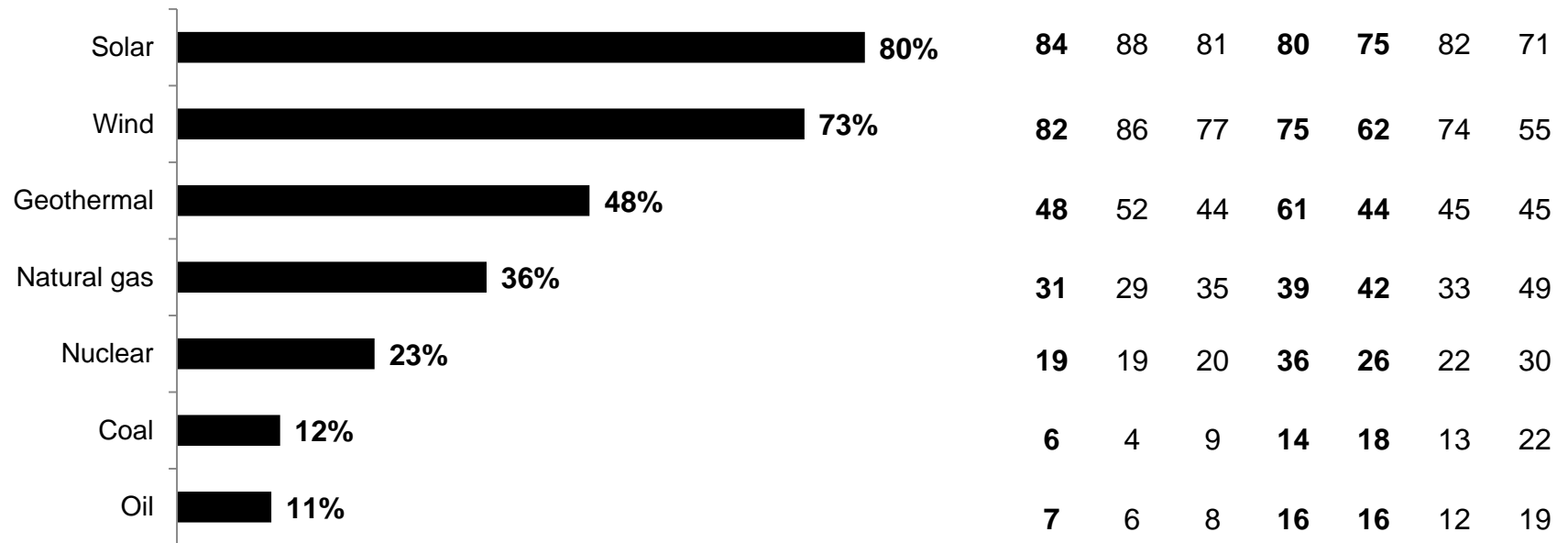
- Support for societal response
- Political & consumer actions

# Large Majorities of Voters Think the U.S. Should Use More Solar and/or Wind Power

- Few support more oil, coal, and/or nuclear -



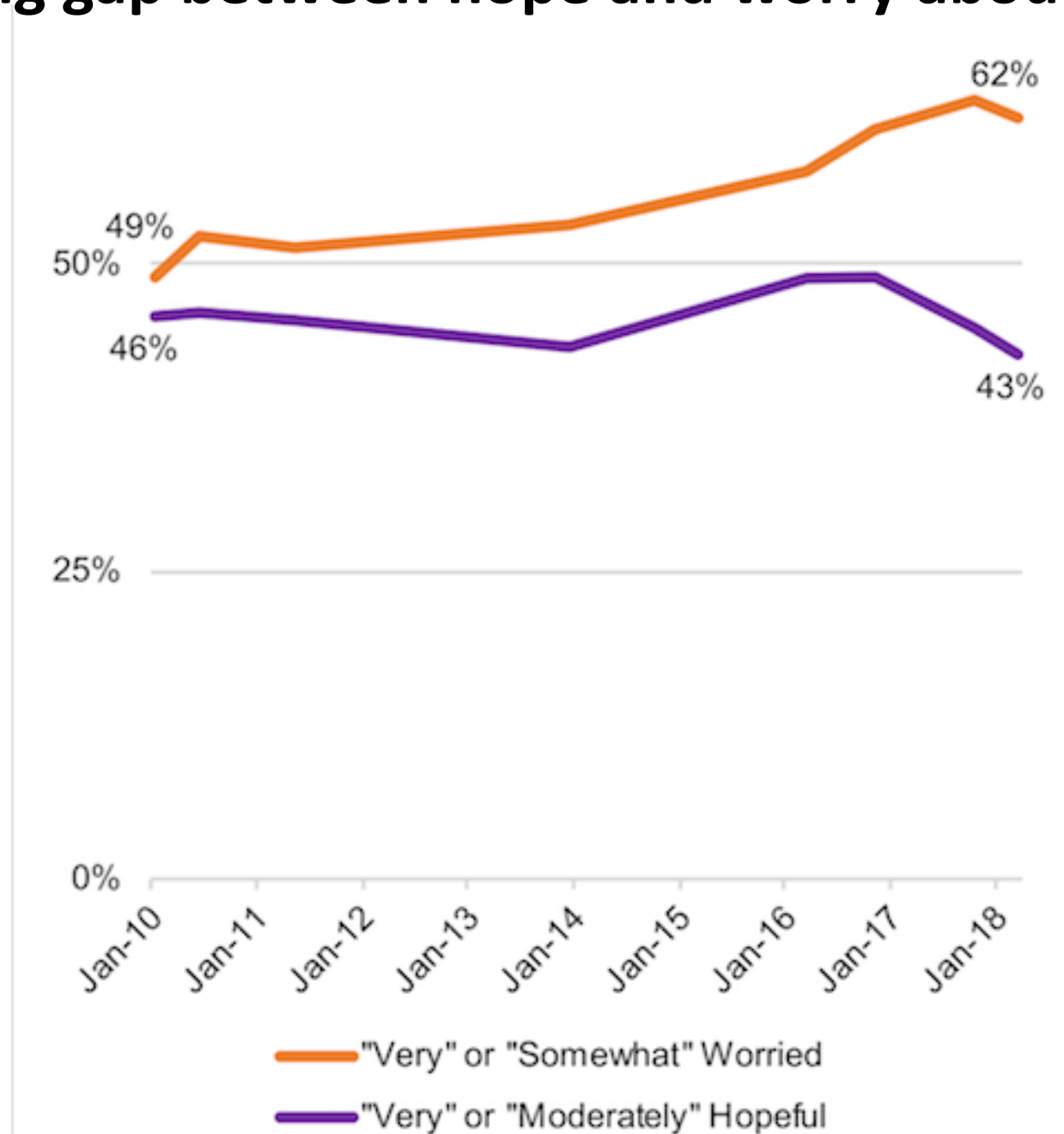
- % who say “much more” or “somewhat more” -



In the future, do you think the United States should use the following sources of energy less, more, or about the same as we do today?

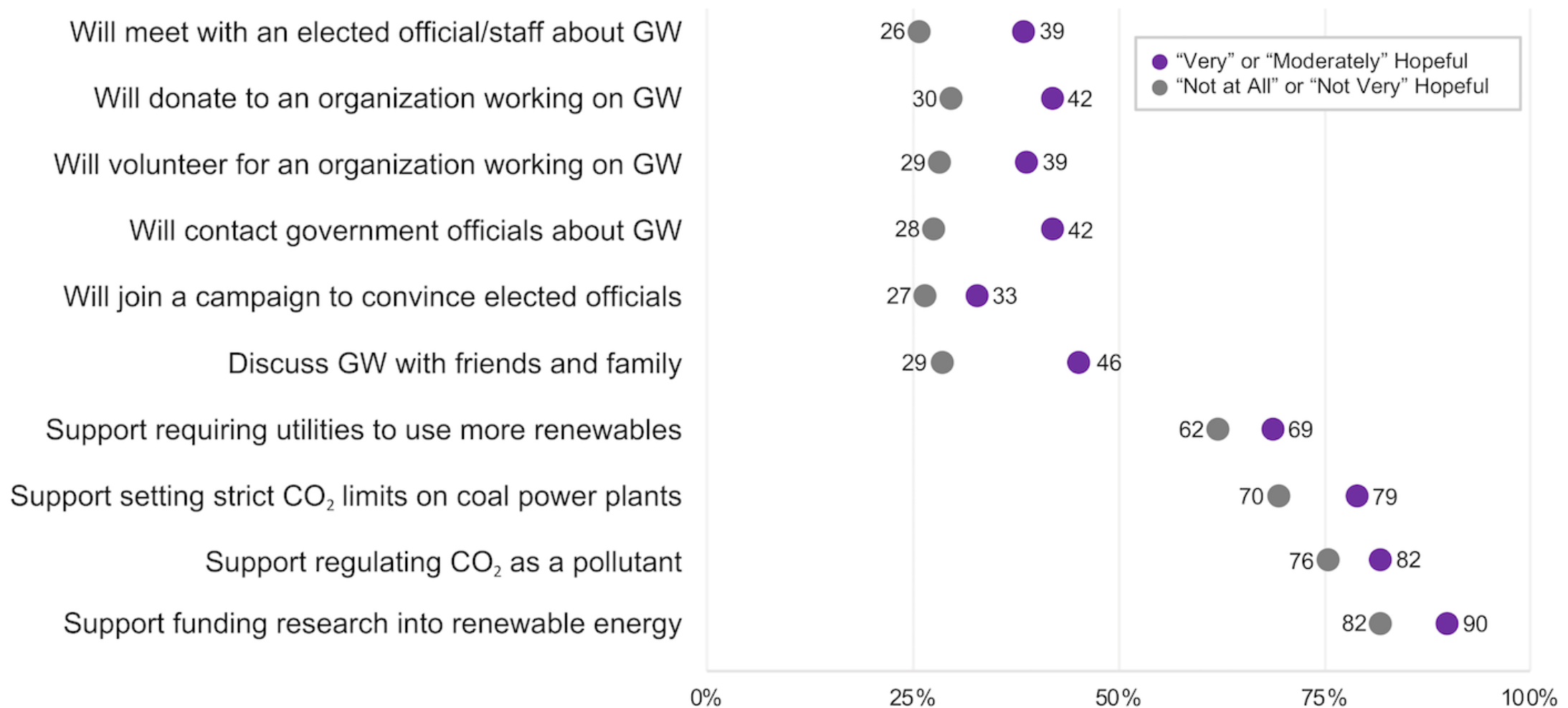
March 2018. Base: Registered American Voters (n=1,067).

# There is a growing gap between hope and worry about global warming





# The growing gap between hope and worry is worrisome, because hopeful people are more likely to take action



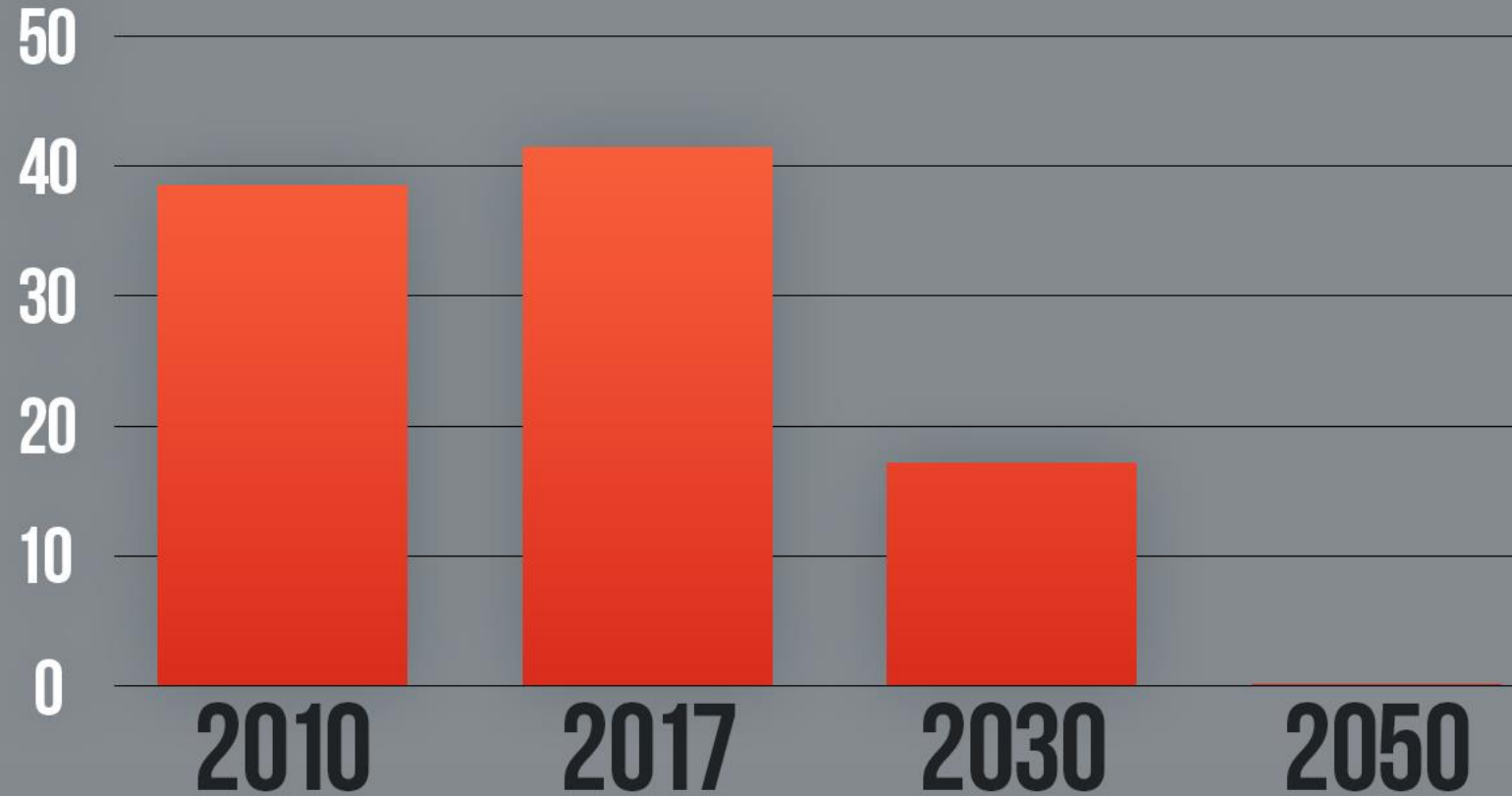
Numbers represent the percent of those who are "Very" or "Moderately" hopeful (purple) vs. "Not at all" or "Not very" hopeful (grey) reporting the above intentions, behaviors, and policy preferences.

March, 2018

# BIG CHANGES NEEDED

Limiting Global Warming to 1.5°C Will Require Deep Emissions Cuts

(GtCO<sub>2</sub> per year)



1.5°C is equal to 2.7°F  
Source: IPCC Global Warming of 1.5°C Report

# More Energy & Climate

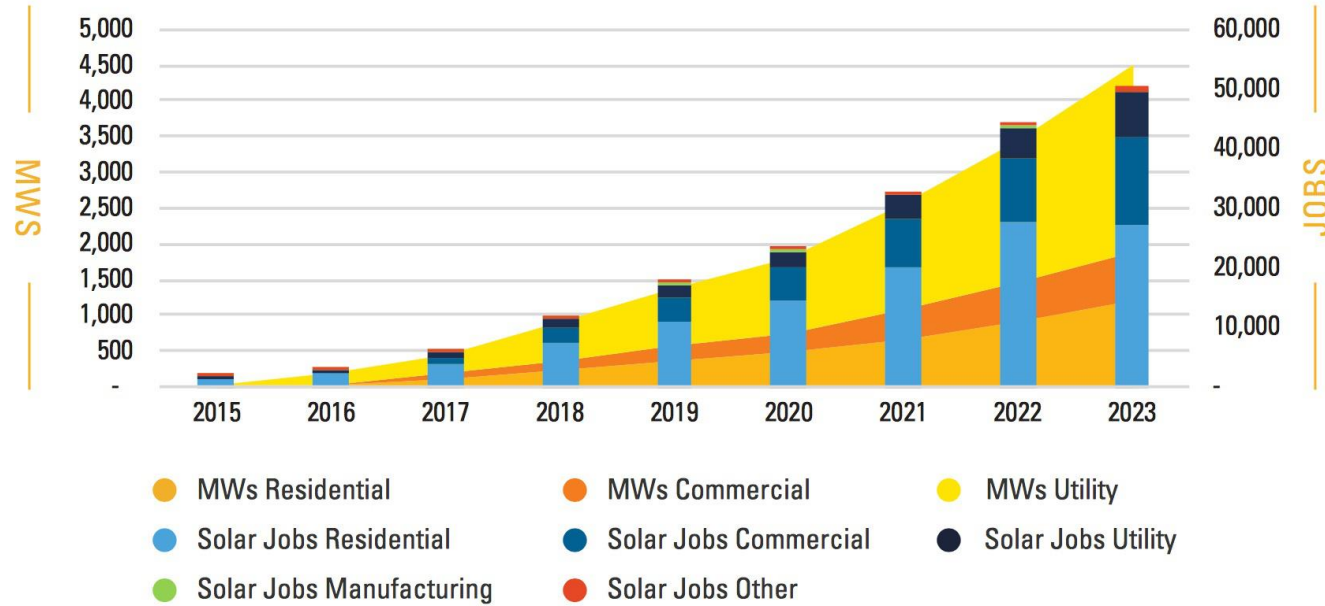
- **UC3**
- **Solar RFI**
- **Sustainability Institute**

# A More Ideal Portfolio

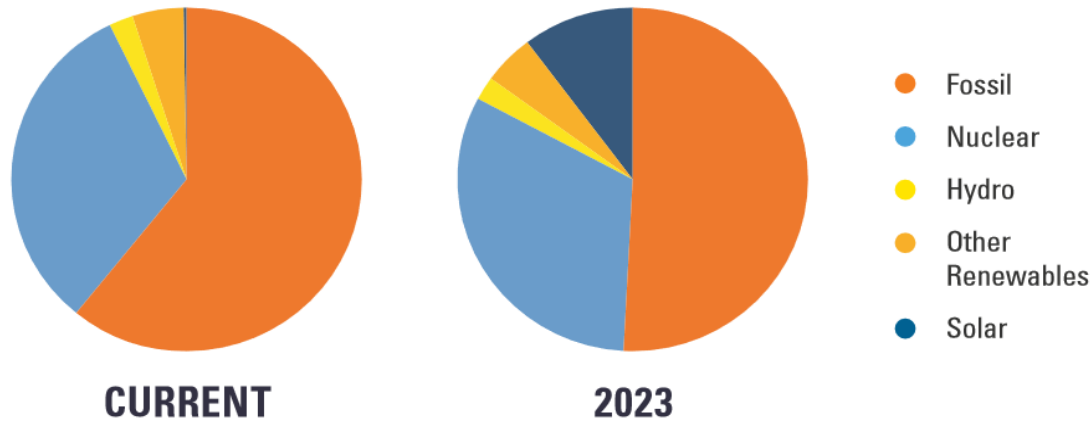
- Locally installed distributed generation or commercial solar
- Phase-out of coal → new natural gas pipelines
- Take ownership of negotiating power
- 10% Solar by 2023



## VA SOLAR CAPACITY & JOB GROWTH SCENARIO



## VA ELECTRICITY MIX VS. 2023 SCENARIO



## SOLAR INSTALLED 2016



**61%** VA needs to hit 61% annual solar installation growth to achieve 2023 goal.

**87%** CA + NC averaged 87% annual solar installation growth in previous 6 years.

# Thanks!

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