

The Health Impacts of Climate Change in Washington State (And what we can do)

Chris Covert-Bowlds, MD,

Presentation created by Howard Frumkin, M.D., Dr.P.H.,
FACP

Emeritus Professor, Environmental and Occupational Health
Sciences

University of Washington School of Public Health



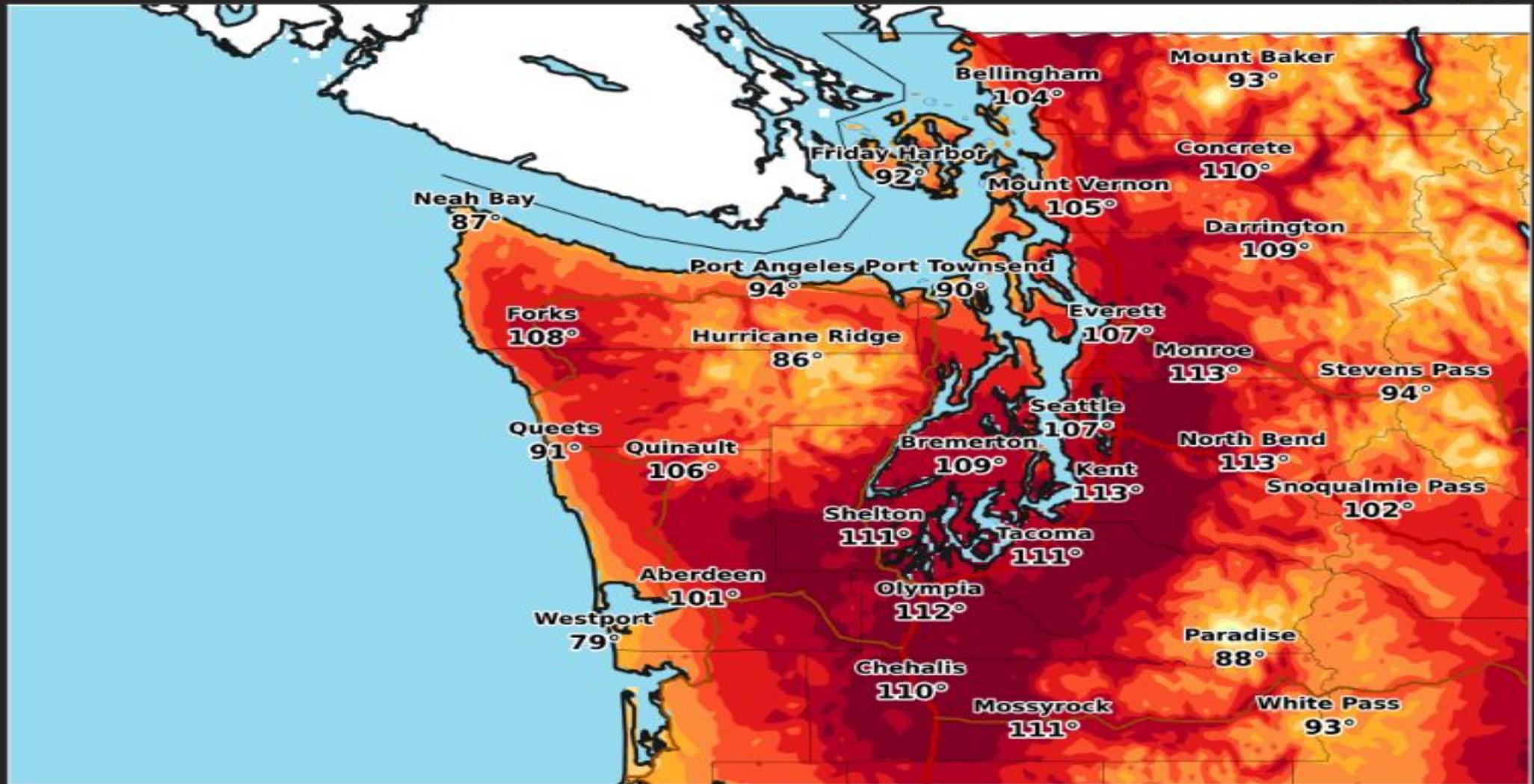
Health impacts of climate change, what we can do

1. Heat/droughts
2. Wildfires/smoke
3. Sea level rise, floods
4. Harmful algal blooms
5. Infections
6. Loss of livelihood
7. Mental health impacts
8. What we can do



High Temperatures

June 28, 2021



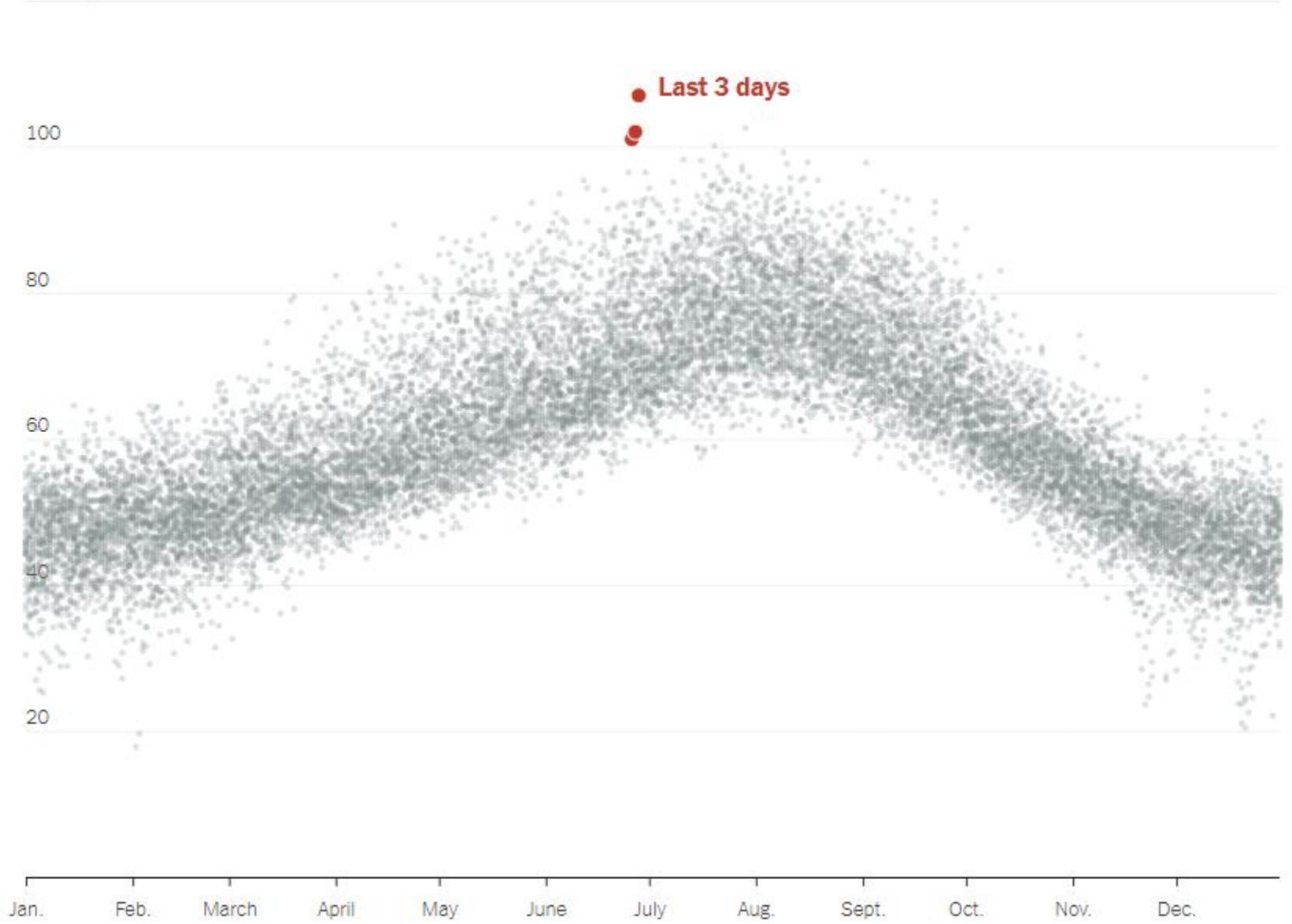
Created: 04:52 AM PDT 06/28/2021

weather.gov/Seattle

High temperatures in western Washington on June 28, 2021. Source: National Weather Service

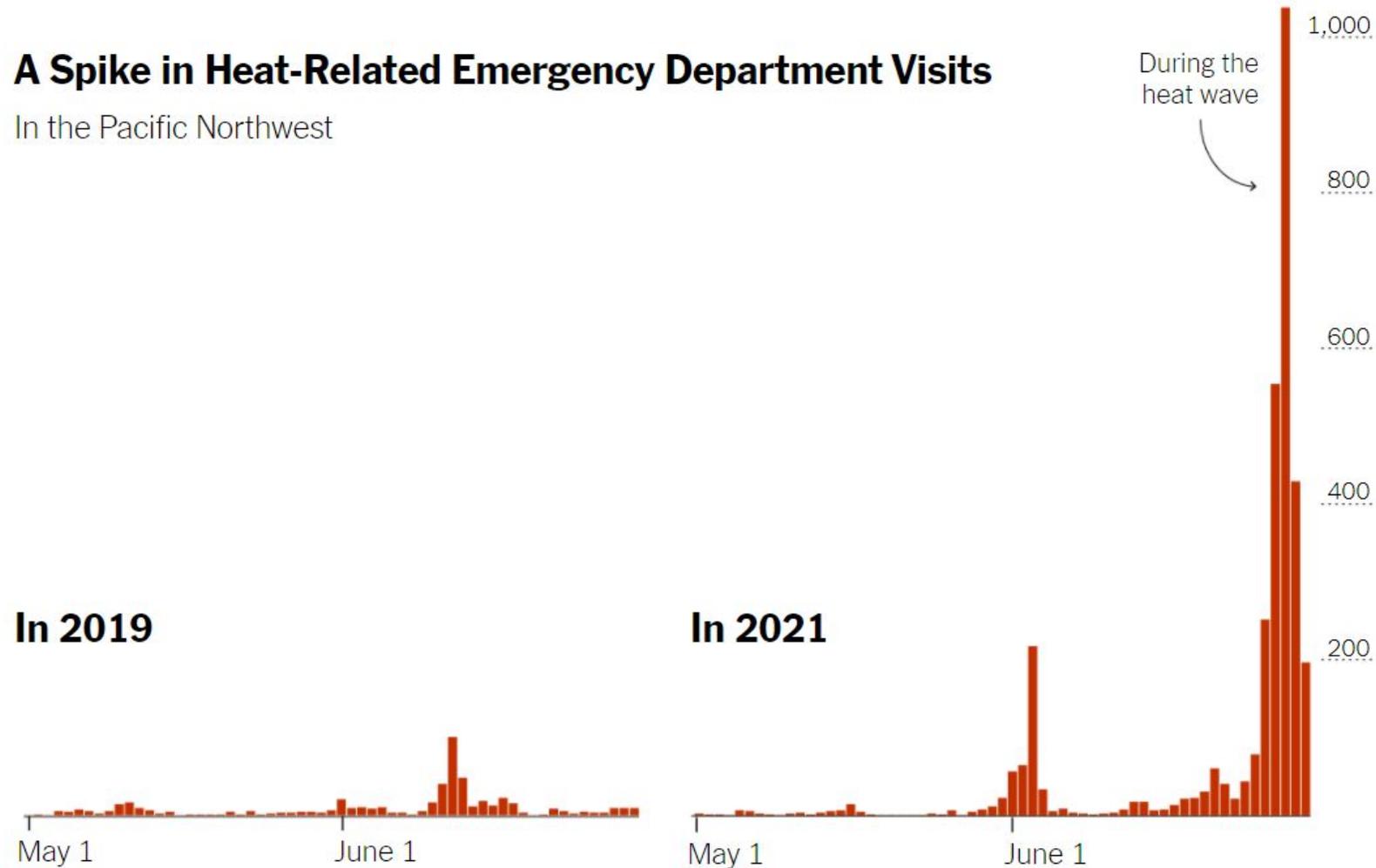
Daily maximum temperatures in Seattle, 1979-2021

120 deg. Fahrenheit



A Spike in Heat-Related Emergency Department Visits

In the Pacific Northwest



Source: Morbidity and Mortality Weekly Report, C.D.C. ■ Data comes from the U.S. Department of Health and Human Services Region 10, which includes Oregon, Washington, Idaho and Alaska.

Counts of heat-related emergency department visits across the Pacific Northwest (WA, OR, AK, and ID) during 2021 (right panel) and, for comparison, during 2019 (left panel)

Health effects of heat



VIOLENCE



SELF-HARM



KIDNEY DISEASE



**ADVERSE BIRTH
OUTCOMES**



FOOD POISONING



**WORSE SCHOOL
PERFORMANCE**



**SLEEP
DISTURBANCES**



**WORKPLACE
INJURIES**



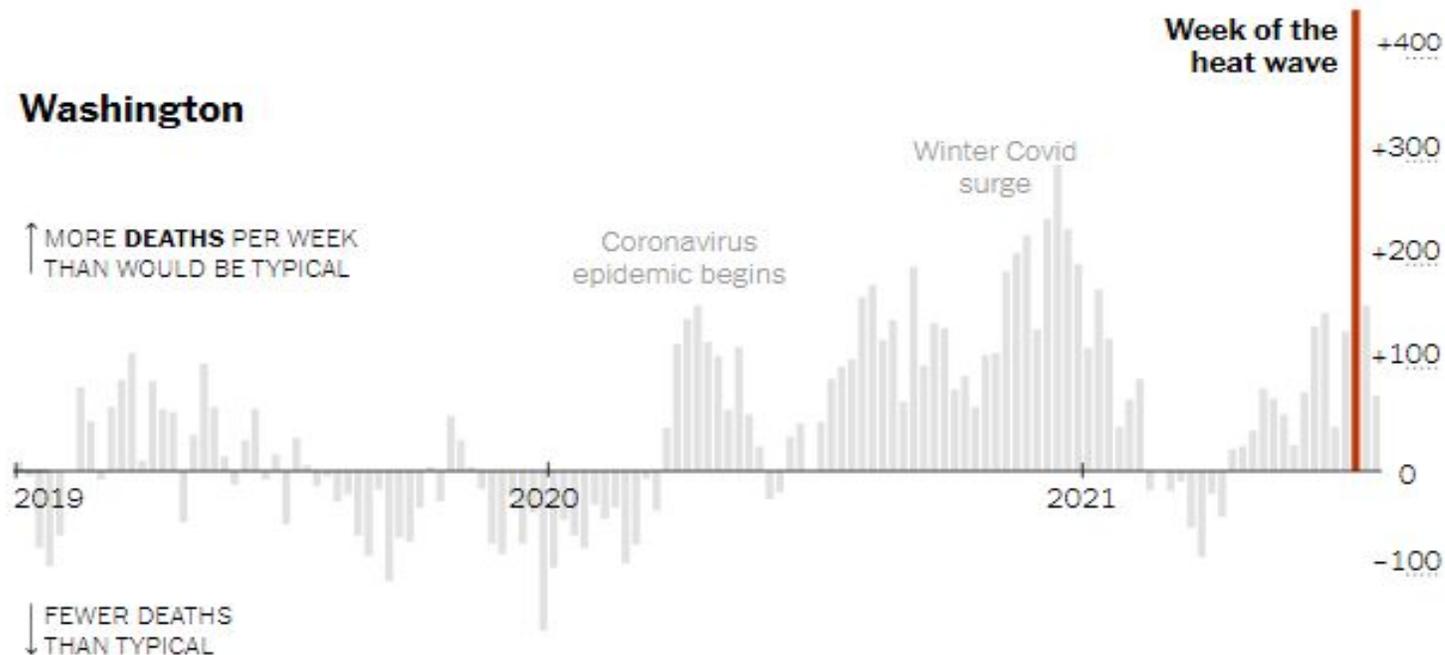
**REDUCED PHYSICAL
ACTIVITY**



**REDUCED WORK
CAPACITY**

Hidden Toll of the Northwest Heat Wave: Hundreds of Extra Deaths

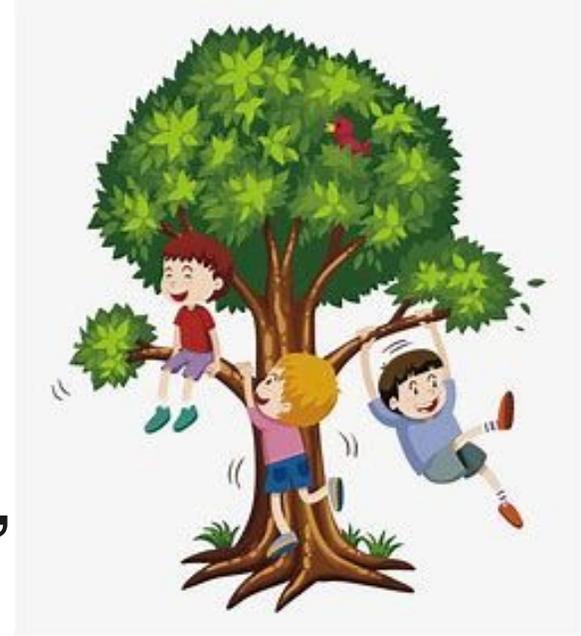
By [Nadja Popovich](#) and [Winston Choi-Schagrin](#) Aug. 11, 2021



[nytimes.com/interactive/2021/08/11/climate/deaths-pacific-northwest-heat-wave.html](https://www.nytimes.com/interactive/2021/08/11/climate/deaths-pacific-northwest-heat-wave.html)

Local ways to reduce harms of heat

- Plant trees, support groups that do
- Use energy-efficient appliances
- Build community, friends, family, neighbors, prevent/address overheating
- Use rooftop gardens: vegetation grown on a rooftop
- Install cool roofs: light colored roofs reflect heat and light
- Organize cooling centers, plan for heatwaves
- Strengthen laws for outdoor workers' cooling breaks



Source: epa.gov/heat-islands/what-you-can-do-reduce-heat-island

Health Impact Assessment of the 2020 Washington State Wildfire Smoke Episode: Excess Health Burden Attributable to Increased PM_{2.5} Exposures and Potential Exposure Reductions

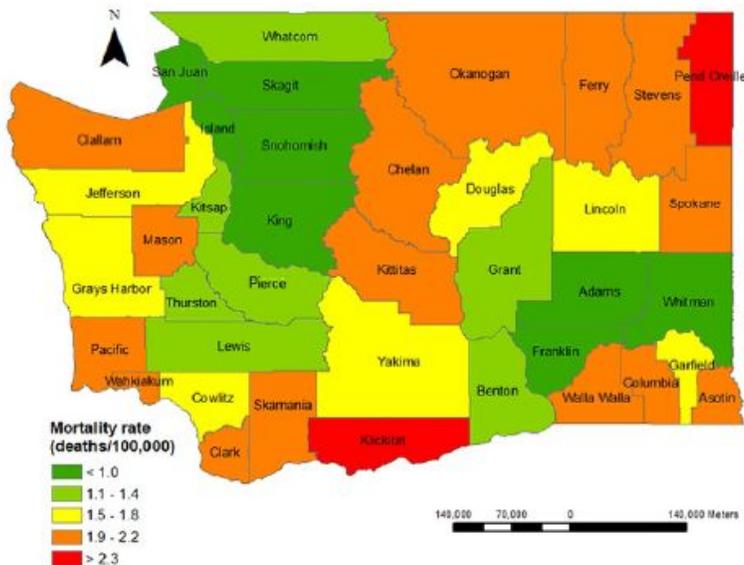
Yisi Liu¹ , Elena Austin¹, Jianbang Xiang¹, Tim Gould², Tim Larson^{1,2}, and Edmund Seto¹

Estimated excess deaths:

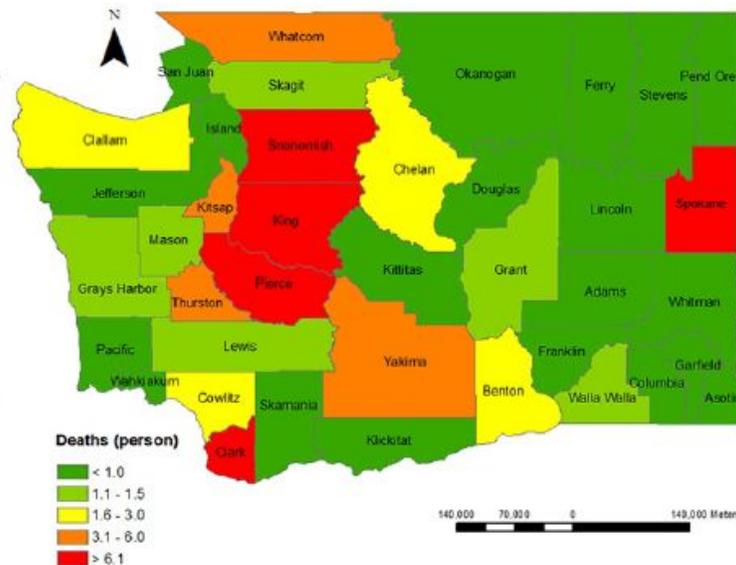
Short-term (13 days): **92**

Long-term (1 year): **1076**

A. Increased per-capita all-cause mortality attributed to PM_{2.5} exposure during the wildfire smoke episode



B. Increased all-cause mortality attributed to PM_{2.5} exposure during the wildfire smoke episode



Liu et al. Health impact assessment of the 2020 Washington State wildfire smoke episode: excess health burden attributable to increased pm_{2.5} exposures and potential exposure reductions. *GeoHealth* 2021; 5(5): e2020GH000359. doi: <https://doi.org/10.1029/2020GH000359>

Harmful algal blooms



Saltwater State Park, Des Moines, June 2018.

Diseases causes by harmful algal blooms

Human health impact	Primary toxin
Amnesic Shellfish Poisoning	Domoic acid
Neurotoxic Shellfish Poisoning	Brevetoxin
Paralytic Shellfish Poisoning	Saxitoxins
Diarrhetic Shellfish Poisoning	Okadaic acid
Ciguatera Fish Poisoning	Ciguatoxin/Maititoxin

Source: WA Department of Ecology,

<https://ecology.wa.gov/Blog/Posts/June-2018/Puget-Sound-Nutrient-Watch-Algal-Blooms>

Quileute Tribe La Push, Clallam County



An aerial view of the La Push, Washington, home to the Quileute Tribe. Photo: Sam Beebe

ENVIRONMENT | NATIONAL

Quileute Tribe starts process to move village to safer ground in Washington



Wednesday, November 1, 2017

The [Quileute Tribe](#) is moving its largest community to [higher ground](#) in Washington.

Quinault Nation Taholah, Grays Harbor County

Climate Change Forces Quinault Tribe to Seek Higher Ground

The tribe has taken the lead against local projects like oil terminals that would further climate change and threaten its existence.

By [Jessica A. Knoblauch](#) | March 12, 2018



Quinault tribal member Larry Ralston stands on the beach at the Quinault Indian Nation reservation. The tribe must relocate the village of Taholah uphill due to sea level rise.

Flooding and droughts: wet areas wetter, dry areas dryer

- 2021: record-setting flooding in 14 counties
- Nooksack and Skagit river in Whatcom and Skagit counties record-setting floods. (\$50+ million)
- In Sumas, floodwaters damaged 85% of homes, businesses, and structures
- 1 Latino man driving to dairy work, flooded road, telephoned for help, drowned after several hours of no help, rescuers overwhelmed by calls.



ILLUSTRATION BY ANNIE ZHAO

[Environment](#)

'Climate Despair' Is Making People Give Up on Life

"It's super painful to be a human being right now at this point in history."

 By [Mike Pearl](#)

 Illustrated By [Annie Zhao](#)

July 11, 2019, 4:00am [Share](#) [Tweet](#) [Snap](#)

MENTAL HEALTH

Is 'climate despair' making people depressed?

[Elizabeth Su](#) December 15, 2019

CLIMATE CHANGE BLOG

Fighting Despair to Fight Climate Change

Without hope, the horror of climate change paralyzes rather than politicizes.

By [Michelle Goldberg](#) 

Climate Change Is Giving Us 'Pre-Traumatic Stress'

Got Eco-Anxiety? Here's How to Deal With Climate Despair



[Tina Donvito](#)

Updated: Dec. 04, 2020



Medically reviewed by

[Ashley Matskevich, MD](#)

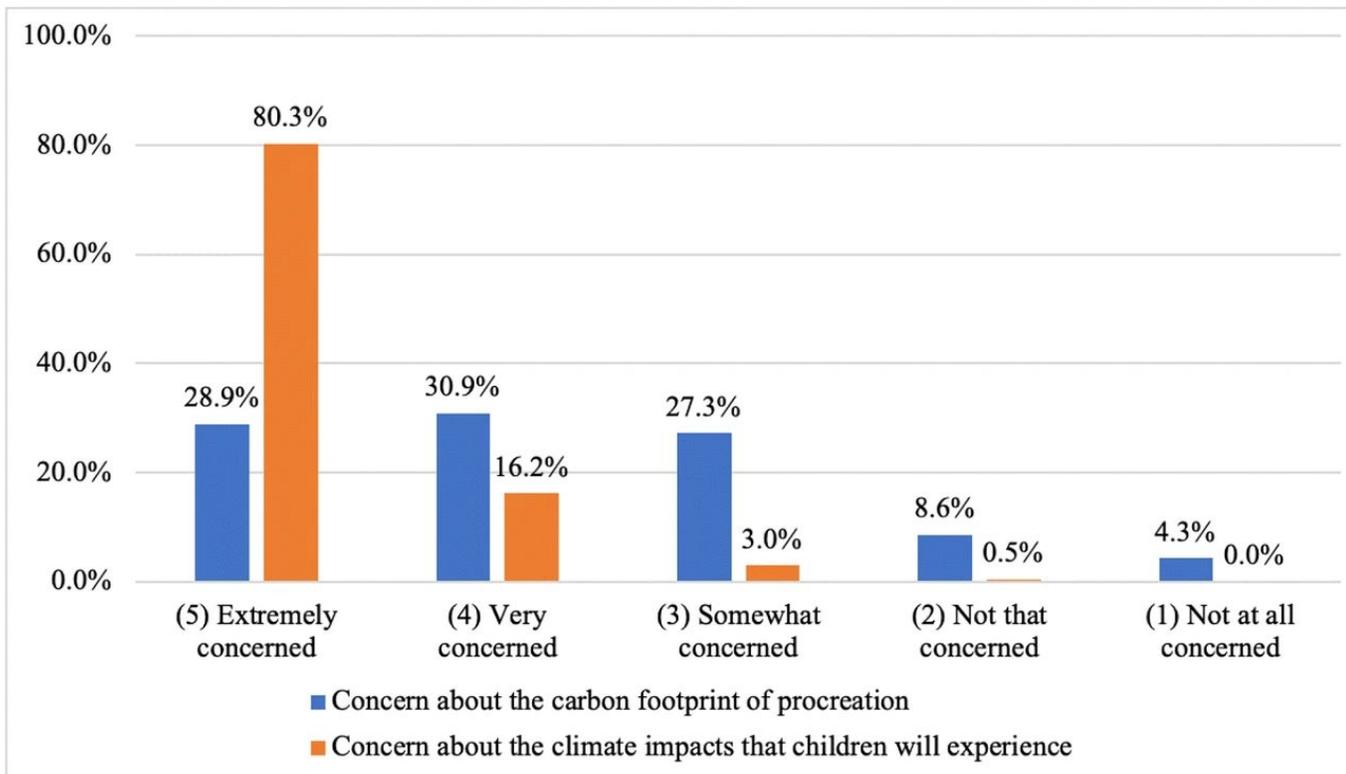
'Why Study for a Future We Don't Have?' Ask Student Climate Protesters



Eco-reproductive concerns in the age of climate change

Matthew Schneider-Mayerson¹  · Kit Ling Leong¹

Survey: 607 Americans aged 27-45



“I feel like I can’t in good conscience bring a child into this world and force them to try and survive what may be apocalyptic conditions.”

27-year-old woman

“I regret having my kids because I am terrified that they will be facing the end of the world due to climate change.”

40-year-old mother

Reasons for hope and action

1. Technology is advancing
2. Economics is improving
3. Policy is maturing
4. Activism is blossoming
5. Public opinion is shifting
6. Culture change is possible
7. Results are emerging
8. Extensive co-benefits



Technology is advancing: batteries, EV's, aviation fuel

Battery storage: The next disruptive technology in the power sector

Fueling the Future: How Batteries are Improving, in Three Ways

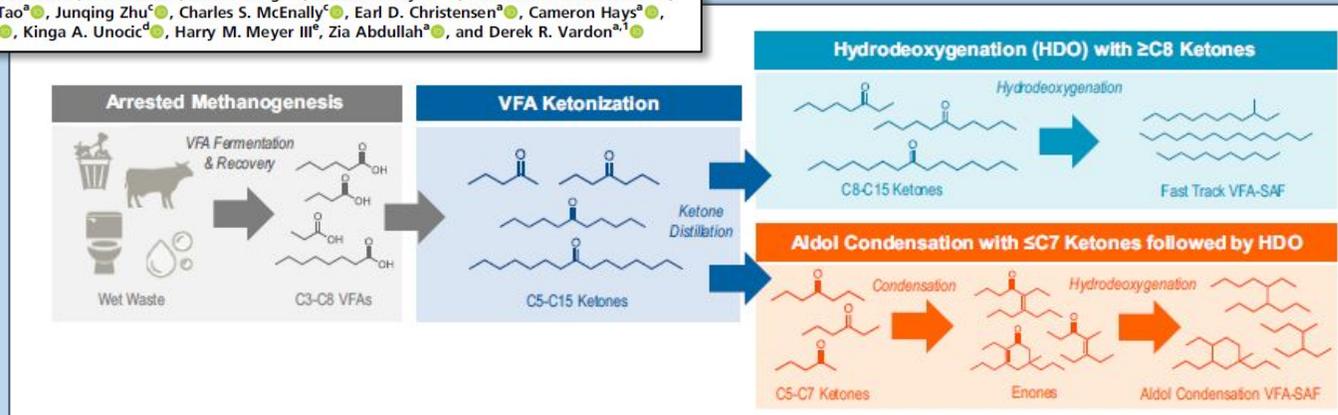
By Bloomberg News Editors | 10.23.18

'Undeniable success': South Australia's 129MWh Tesla battery

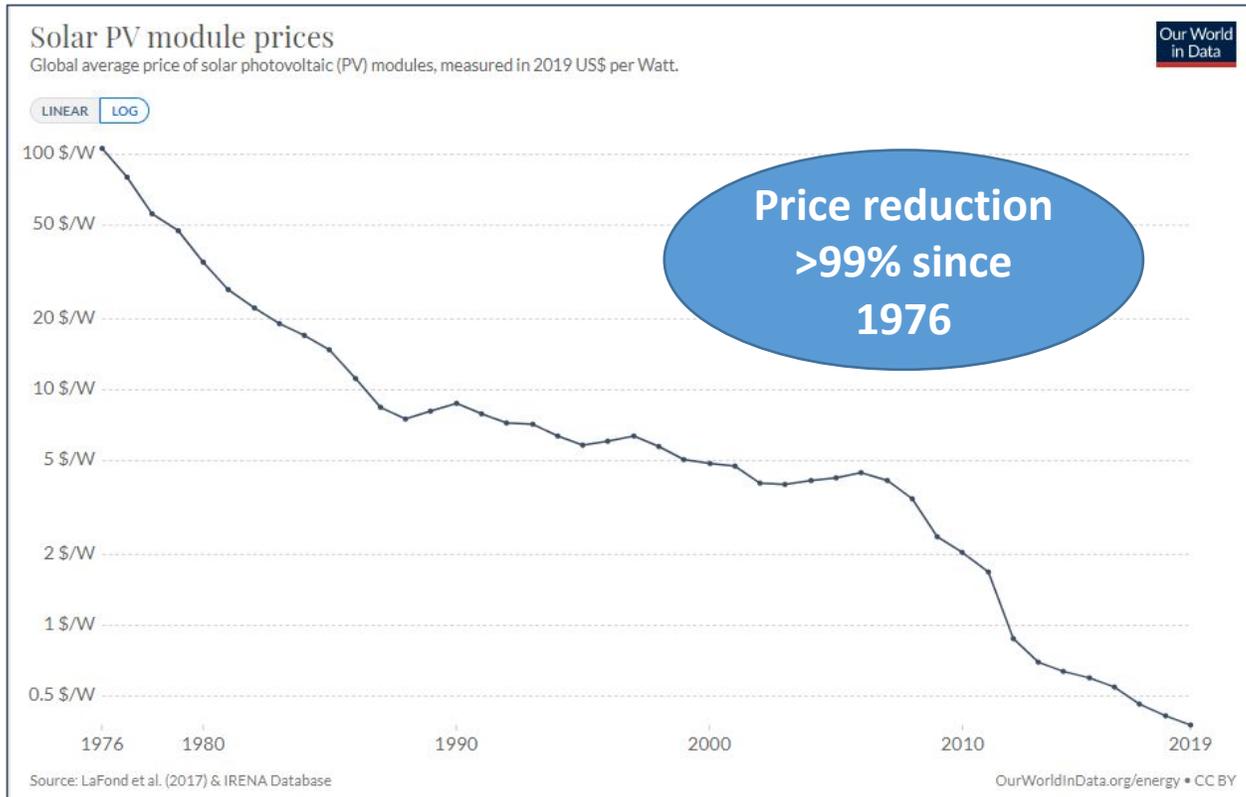


Toward net-zero sustainable aviation fuel with wet waste-derived volatile fatty acids

Nabila A. Huq^a, Glenn R. Hafenstine^a, Xiangchen Huo^a, Hannah Nguyen^a, Stephen M. Tiff^a, Davis R. Conklin^a, Daniela Stück^a, Jim Stunkel^a, Zhibin Yang^b, Joshua S. Heyne^b, Matthew R. Wiatrowski^a, Yimin Zhang^a, Ling Tao^a, Junqing Zhu^c, Charles S. McEnally^c, Earl D. Christensen^a, Cameron Hays^a, Kurt M. Van Allsburg^a, Kinga A. Unocic^d, Harry M. Meyer III^e, Zia Abdullah^a, and Derek R. Vardon^{a,1}



Economics improving



'Insanely cheap energy': how solar power continues to shock the world

Australian smarts and Chinese industrial might made solar power the cheapest power humanity has seen - and no one saw it coming



▲ 'Solar is providing the cheapest energy the world has ever seen ... It's a fundamentally different world we're moving into.' Photograph: Lukas Coch/AAP

Policy is maturing, including WA state

Theresa May commits to net zero UK carbon emissions by 2050

UK to put down legislation but Greenpeace warns of impact on developing nations



Fracking halted in England in major government U-turn

Victory for green groups follows damning scientific study and criticism from spending watchdog



▲ Fracking at Cuadrilla's site in Lancashire was out on hold after a major earth tremor. Photograph: Cuadrilla/PA

The government has halted fracking in England with immediate effect in a watershed moment for environmentalists and community activists.

WA passes Clean Fuel Standard

New Zealand passes law aiming for net zero carbon emissions by 2050

France introduces 2050 carbon-neutral law

GOAL SETTING

Sweden legally commits to reaching net-zero emissions by 2045

Glasgow and Edinburgh fight to become the UK's first 'net-zero' city

New York's landmark climate bill aims for net zero emissions by 2050

Québec sets 2050 goal for climate neutrality

Bristol plans to become carbon neutral by 2030

Montpelier Aims For Net Zero

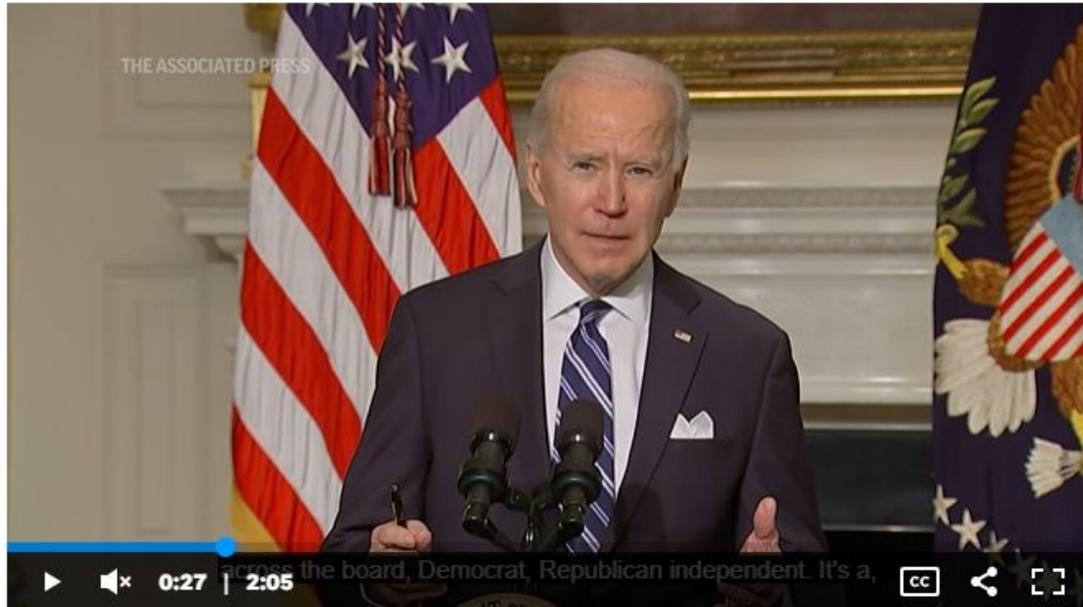
Policy is maturing: Earth Day 2021

[POLITICS](#)

At Earth Day climate summit, Biden promises 50% reduction in US greenhouse emissions

[Deirdre Shesgreen](#) USA TODAY

Published 6:01 a.m. ET Apr. 22, 2021 | Updated 5:24 p.m. ET Apr. 22, 2021



Economy | Mining

US miners' union backs shift from coal for renewable energy jobs

Cecil Roberts, president of the United Mine Workers of America, said ensuring jobs for displaced miners — including 7,000 coal workers who lost their jobs last year — is crucial to any infrastructure bill taken up by the US Congress.



A plan put forward by the United Mine Workers of America calls for significant expansion of tax incentives for renewable energy and preference in hiring for dislocated miners, among other provisions [File: J David Ake/AP Photo]

Policy is maturing: Transformational local initiatives

Glasgow and Edinburgh fight to become the UK's first 'net-zero' city

New York's landmark climate bill aims for net zero emissions by 2050

Québec sets 2050 goal for climate neutrality

Bristol plans to become carbon neutral by 2030

Montpelier Aims For Net Zero

America's race to zero emissions

Washington state county is first in US to ban new fossil fuel infrastructure



San Francisco Becomes the Latest City to Ban Natural Gas in New Buildings, Citing Climate Effects



Petaluma First US City To Ban New Gas Stations



ENERGY TRANSITIONS

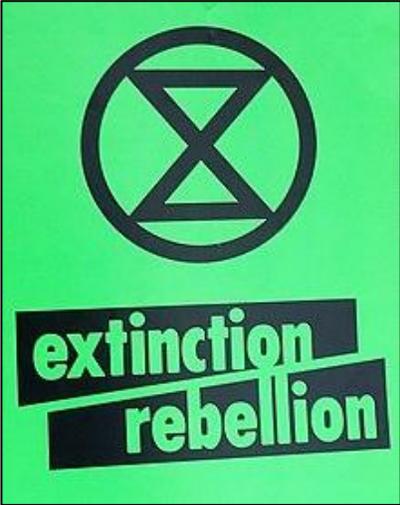
N.M. finalizes landmark oil methane rules



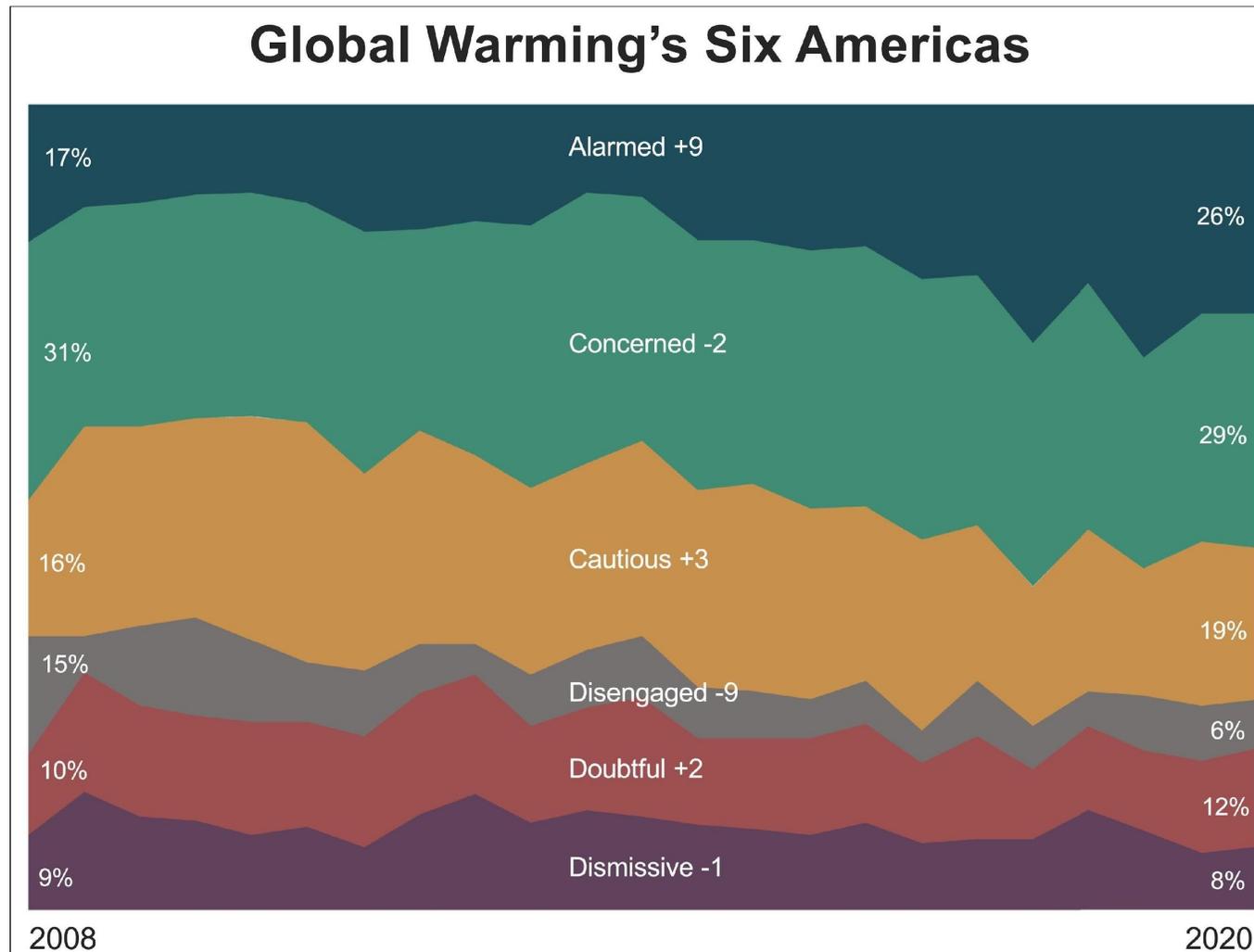
Atlanta Passes Electric Vehicle Readiness Ordinance



Activism is blossoming



Public opinion is shifting



Data from 23 waves of the *Climate Change in the American Mind* national survey.
November 2008 – December 2020. (n = 27,075).



Current Opinion in Behavioral Sciences

LIVE



FOX NEWS
VOTER ANALYSIS
NATIONAL

INCREASING
GOVERNMENT SPENDING
ON GREEN & RENEWABLE
ENERGY

STRONGLY FAVOR	37%
SOMEWHAT FAVOR	33%
SOMEWHAT OPPOSE	16%
STRONGLY OPPOSE	15%

FOX NEWS
2:17 PT

ELECTION NIGHT
FIRST STATE POLLS CLOSE AT 7PM ET
THE FIVE

DEMOCRACY
+ 2020
SPECIAL COVERAGE
TONIGHT 6PM ET

N, AND ACCUSED COUNTY OFFICIALS OF USING THEIR OFFICE TO HELP DEMS WIN ON TUES FOX NEWS

70% of voters surveyed by Fox News favor increased government spending on green and renewable energy

Culture change is possible, WWII

SERVE
our fighting men abroad
CONSERVE
these services at home...

ELECTRICITY...
Turn off lights and home appliances when not needed

COMMUNICATIONS...
Don't make unnecessary long distance phone calls

WATER...
Repair leaky faucets... don't let water run needlessly

TRANSPORTATION...
War traffic comes first... travel only when you must

Saving these services frees fuel, manpower, material and equipment for War.



www.mainememory.net/item/15116
© Maine Historical Society

food

- 1- buy it with thought
- 2- cook it with care
- 3- use less wheat & meat
- 4- buy local foods
- 5- serve just enough
- 6- use what is left

don't waste it

U. S. FOOD ADMINISTRATION

© 1943 U.S. GOVERNMENT PRINTING OFFICE

www.WW1propaganda.com

DON'T

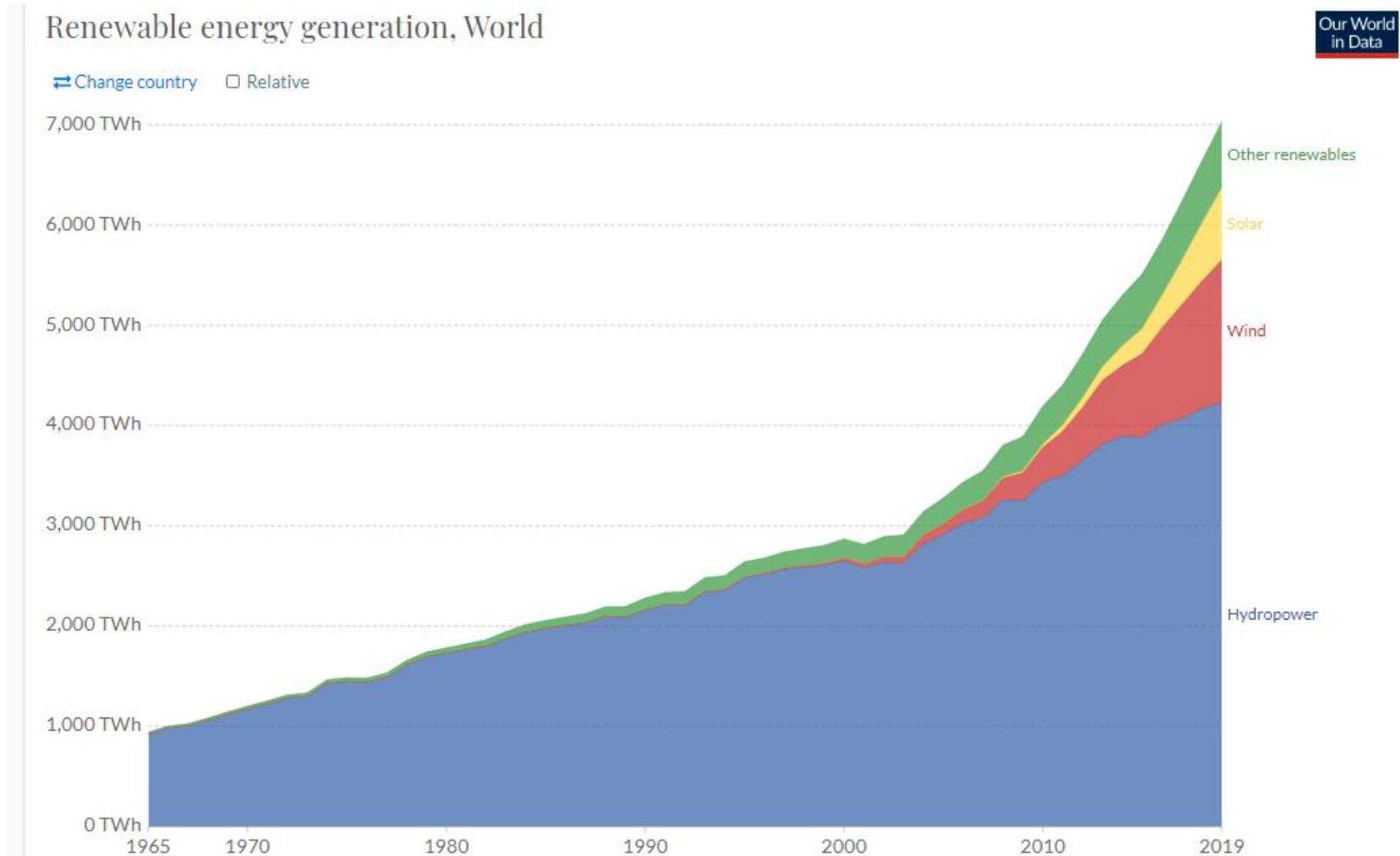
1. Don't use a motor car or motor cycle for pleasure purposes.
2. Don't buy new clothes needlessly. Don't be ashamed of wearing old clothes in War time.
3. Don't keep more servants than you really need.

In this way you will save money for the War, set the right example, and free labour for more useful purposes.

Your Country will Appreciate Your Help.

Printed by the NATIONAL ORGANIZING COMMITTEE, LONDON. Printed by DAVID ALLEN & SONS, Ltd., Haver, Wilt.

Results are emerging



Source: BP Statistical Review of Global Energy

Note: 'Other renewables' refers to renewable sources including geothermal, biomass, waste, wave and tidal. Traditional biomass is not included.

OurWorldInData.org/renewable-energy • CC BY

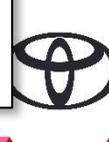
Nissan sets carbon neutral goal for 2050

100 % of all-new vehicle offerings in key markets to be electrified by the early 2030s



Volvo Plans to Sell Only Electric Cars by 2030

The Swedish company would phase out internal combustion engine vehicles faster than other automakers.



Daimler commits to carbon-neutral cars in 2030s as EV race intensifies

Toyota's electric vehicle plans just got aggressive

Climate and Environment

General Motors to eliminate gasoline and diesel light-duty cars and SUVs by 2035

Big U.S. automaker says it will invest heavily in electric vehicles and be carbon neutral by 2040



Chinese £3,200 budget electric car takes on Tesla

Jaguar will be an all-electric car brand from 2025

While the first all-electric Land Rover is coming in 2024



Volkswagen Accelerates Investment in Electric Cars as It Races to Overtake Tesla

German company aims to become the world's leading maker of electric vehicles

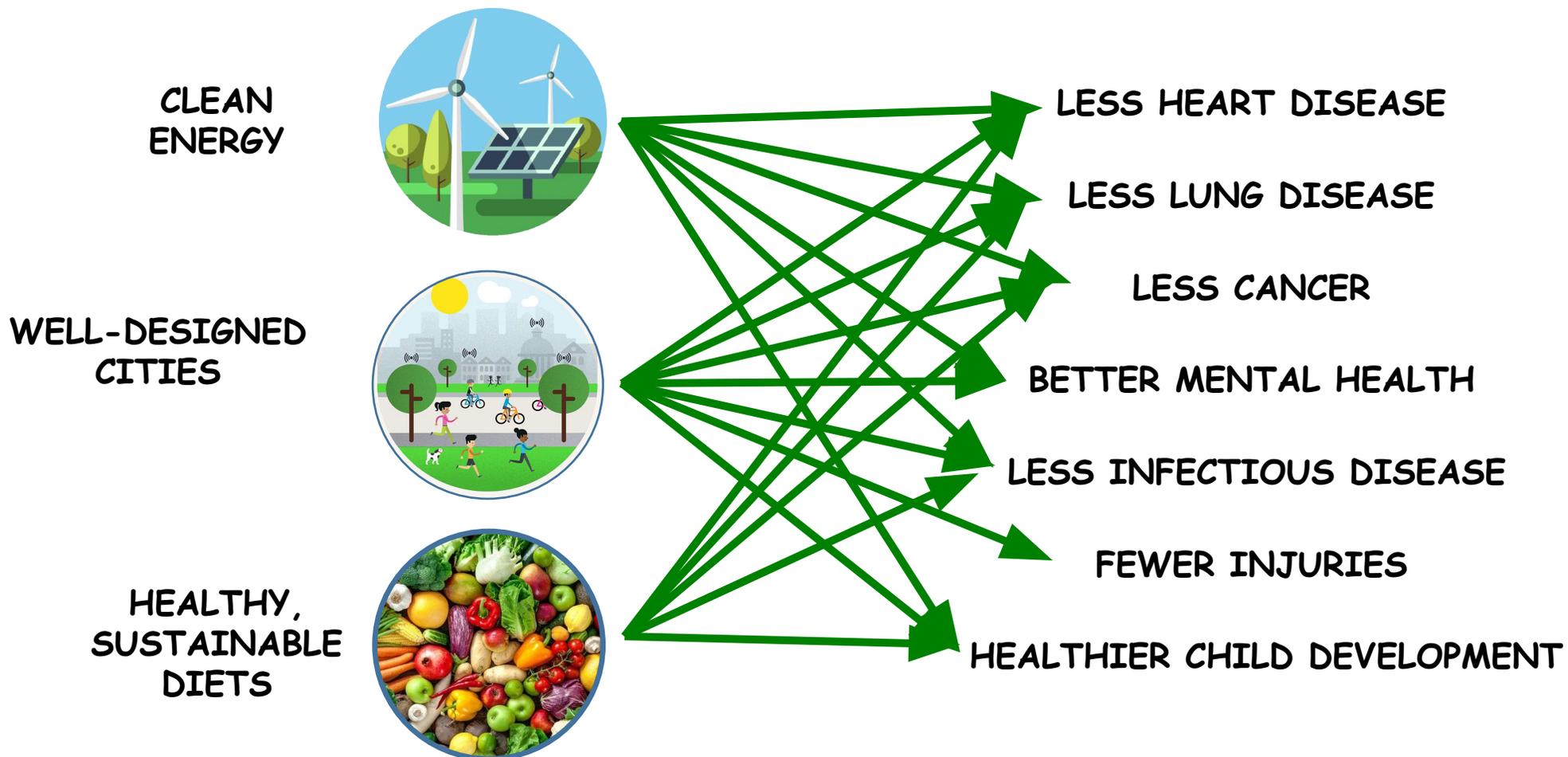


Ford Makes \$29 Billion Commitment to Electric and Self-Driving Cars

The automaker, which starts producing the electric F-150 in 2022, announced it will invest heavily in the future of powertrains and mobility through 2025.



Health benefits of climate mitigation



It's us/real/bad, experts agree, there's hope

- Climate change is a health emergency.
- The impacts are happening here and now.
- Anxiety, depression, and despair are real
- There are compelling reasons for hope.
- Action is the antidote to despair
- What can we do? personal/local/policy recommendations

Climate action: we can all do our part

- Personal: LESS: Internal combustion engine (ICE) vehicles/flying, meat, long distance buying, household fossil fuel use, lower thermostat, plastic
- MORE: walk/bus/bike/electric vehicles, plant trees, buy local, plant-based diet, farmers markets, insulate/energy efficient homes, solar/heat pumps, efficient appliances/lights, community sharing, reduce/reuse/recycle
- Join others advocating for group/policy climate action

Climate prescription: doctors bicycling to Olympia Jan 28, to urge Governor Inslee/legislators:

- Public info campaign in media, public buildings, bus/rail stations to inform people exactly what is at stake with climate crisis
- Electrify/decarbonize residential, commercial buildings at faster pace.
- Pass legislation on growth management to rapidly build affordable housing, increase public transportation, and eliminate discriminatory zoning statewide.
- Support low-income communities w climate mitigation and adaptation.
- Ensure pandemic recovery investments support climate action and reduce social and health inequities.
- Health workers: sign:
secure.everyaction.com/1FDMqS32RkyC0M1J04aDBw2

WA transportation policy recommendations:

- Implement 2021 Clean Fuel Standard
- Pass HB 1204: all vehicles sold in WA to be fully electric by 2030.
- Focus transportation \$\$ on public transportation & reducing pollution in most highly impacted communities
- Support electric vehicles (EV) charging stations, electric buses, safer streets for walking, bicycling

Hold Governor Inslee to Glasgow climate pledges:

- New cars zero-emission by 2035 (2030 in HB 1204)
- Conserve at least 30% of land *and* 30% of coastal waters by 2030
- Ensure zero-emissions from new buildings by 2030
- All WA government vehicles to zero-emissions by 2040
- At least 40% of expenditures benefit overburdened communities and vulnerable populations
- Launch the Low Carbon Construction Task Force

Fix the WA Growth Management Act

- [HB 1099](#) requires climate change planning and targets in new land use proposals,
- [HB 1220](#) requires more affordable housing planning in cities, and
- [SB 5042](#) amends the "vesting loophole" in the Growth Management Act that allows for illegal land use expansions.

Healthy Homes/Clean Buildings Act (HB 1084)

- Requires gas utilities to develop clean heat transition plans for meeting a share of WA Greenhouse Gas (GHG) targets – by 2024
- Conversion of existing gas to electric equipment
- Gas companies provide a just transition for workers
- Provides for use of renewable hydrogen

WA building electrification/phasing out fossil fuels:

- State Building Code Council (SBCC) should be required to achieve zero carbon emissions in commercial & residential energy codes by [2030/2035/2040]
- Set standards for improving energy performance after 2031
- Remove language allowing delay due to economic, technological, or process factors

National policy recommendations

- Pass Build Back Better
- National carbon price (“fee/dividend”) (citizensclimatelobby.org)
- End fossil fuel subsidies
- Support renewable energy
- Help workers with “just transition to clean energy economy”
- Help disproportionately affected communities

Taking action

- WA Physicians for Social Responsibility: wpsr.org
- WA Conservation Voters: wcvoters.org
- Sierra Club: sierraclub.org/washington
- Carbon dividend: citizensclimatelobby.org
- Earthministry.org
- 350seattle.org
- WA legislature: leg.wa.gov, 800-562-6000
- What more can YOU do?



Thank you and thank your mother!