



On the Path by 2025 to a Climate-Safe California. We can do it!

Ellie Cohen, The Climate Center

February 16, 2020

www.theclimatecenter.org/rapid-decarb

the
climate
center



Australian pyrocumulus fire clouds that created dry lightning, igniting more fires

UN IPCC 1.5C Report- Oct 2018

Required consensus => most conservative
New findings => inadequate, need to do more

- Emissions must decline by 45% by 2030 to meet 1.5C (2.7°F) limit
- Up to 1000 Gt CO₂e must be removed from atmosphere over the decades ahead



ABRUPT PERMAFROST THAW

Doubles previous est.CO2/methane emissions

Not in any climate models including IPCC 1.5C report

Must act in next decade to stave off worst consequences

Turetsky et al. Nature Geoscience | VOL 13 | February 2020

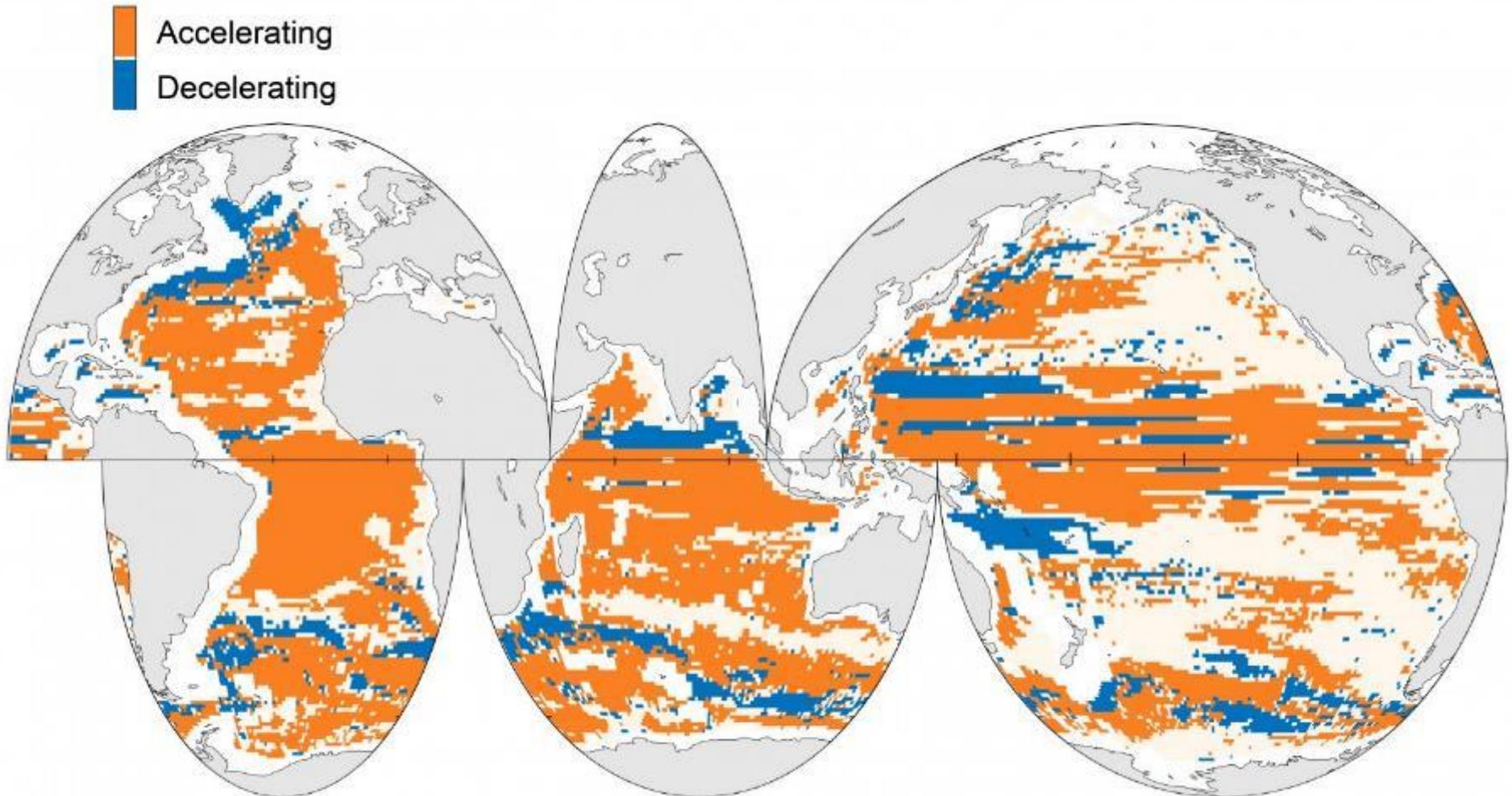
<https://www.sciencedaily.com/releases/2020/02/200203151152.htm>

<https://www.nationalgeographic.com/science/2020/02/arctic-thawing-ground-releasing-shocking-amount-dangerous-gases/>

76% of world's oceans speeding up

Wasn't expected until 2100; Earth more sensitive to climate change?

Faster winds=> faster currents => ↑ wildlife impacts & weather extremes



After assessing 5 million climate pathways:

“We must aggressively pursue carbon neutral energy by 2030 & hope for ‘some luck’ for tolerable climate future”



Lamontagne et al. [Robust abatement pathways to tolerable climate futures require immediate global action](https://www.sciencedaily.com/releases/2019/03/190311125353.htm). *Nature Climate Change*, March 2019
<https://www.sciencedaily.com/releases/2019/03/190311125353.htm>

11,000 scientists' warn: climate emergency

...To secure a sustainable future...decision-makers and all of humanity [must] promptly respond to [the] climate emergency and act to sustain life on planet Earth, our only home.”



Smoke from fires burning in California from satellite photos, Oct. 2017

-Ripple et. al. [World Scientists' Warning of a Climate Emergency](#),
Bioscience, November 2019

RAISING THE ALARM

Evidence that tipping points are under way has mounted in the past decade. Domino effects have also been proposed.



A. Amazon rainforest
Frequent droughts

B. Arctic sea ice
Reduction in area

C. Atlantic circulation
In slowdown since 1950s

D. Boreal forest
Fires and pests changing

E. Coral reefs
Large-scale die-offs

F. Greenland ice sheet
Ice loss accelerating

H. Permafrost
Thawing

I. West Antarctic ice sheet
Ice loss accelerating

J. Wilkes Basin, East Antarctica
Ice loss accelerating

9 of 15 global tipping points underway now... domino effect to uninhabitable 'hothouse' climate if we don't act soon...

Lenton, Rockstrom, Gaffney, Rahmstorf, Richardson, Steffen, Schyellhuber. *Nature*, Nov 27 2019
<https://www.nature.com/articles/d41586-019-03595-0>

“We don't want to push the 'on' buttons of runaway global warming. The next decade is our window...with consequences for all future generations.”

- Johan Rockström, Director, Potsdam Institute for Climate Impacts Research, December, 2019



<https://sverigesradio.se/avsnitt/1425542>
<https://medium.com/@rchrthy/johan-rockstr%C3%B6ms-10-point-agenda-for-saving-the-world-unofficial-transcript-431261f885c6>

Are net zero CO₂e emissions enough?

Balance
carbon emissions
with carbon
removal

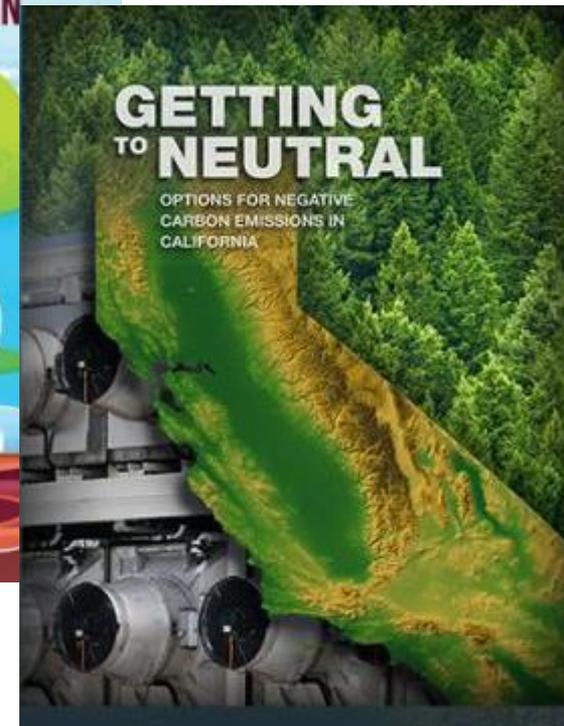
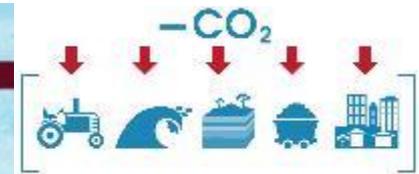
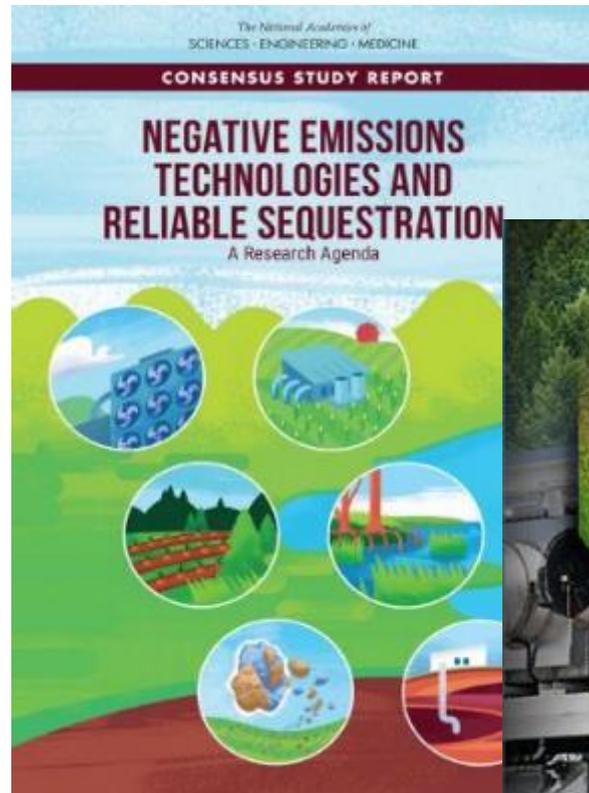
(transition to a "post-carbon
economy").



GOAL: Net negative emissions

Dramatically reduce emissions and bring atmospheric GHGs back down to reverse some (not all) of the impacts

(e.g. CO₂ at least below 350 ppm); “overshoot” pathway- the faster we do this, the more impacts we can avoid.)



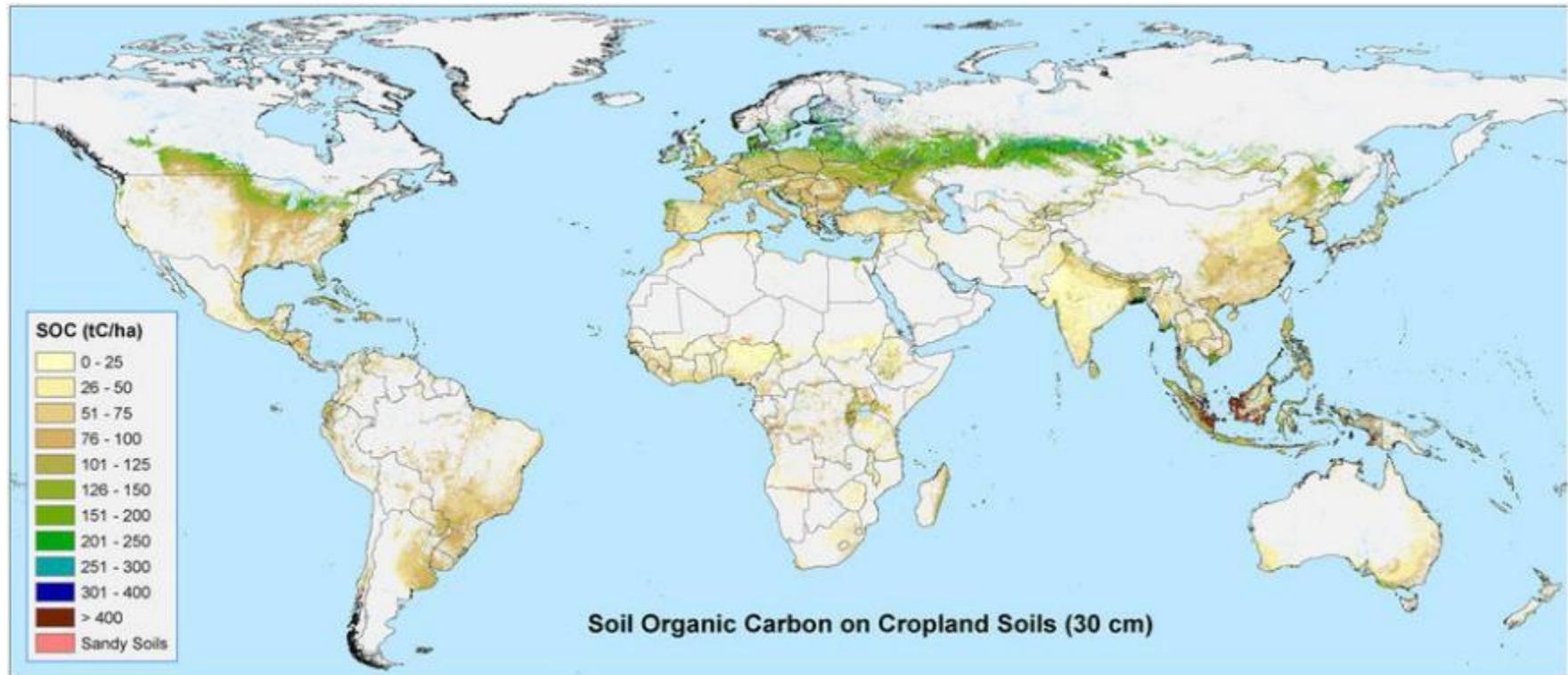
<https://www.llnl.gov/news/new-lab-report-outlines-ways-california-could-reach-goal-becoming-carbon-neutral-2045> January 2020

https://www.rmi.org/wp-content/uploads/2018/11/RMI_Negative_Emissions_Scenarios_Report_2018.pdf

<https://www.nap.edu/catalog/25259/negative-emissions-technologies-and-reliable-sequestration-a-research-agenda>

E.g.: Croplands could sequester ~1/5 of current annual emissions globally

Healthy ag soils could sequester 5+ Gt/yr or 50% of 2050 UN goal



Vermeulen et al, [A Global Agenda for Action on Soil Carbon](#). Nature Sustainability, Jan 2019
Bronson, Griscom, et al. [Natural Climate Solutions](#). PNAS October 2017 doi: 10.1073/pnas.1710465114
Zomer et al (TNC). [Global Sequestration Potential of Increased Organic Carbon in Cropland Soils](#).
Scientific Reports Nov 2017.

Global Climate Action Leaders

Finland: Carbon neutrality by 2035 w/o carbon offsets

Uruguay: Carbon neutrality by 2030— major investments in wind and increased forest cover

Norway: Banning new Internal Combustion Engine (ICE) car sales in 2025

Denmark: Reduce GHGs to 70% below 1990 by 2030

Copenhagen: Carbon neutral by 2025 with econ growth

Rhode Island: 100% renewable energy by 2030

Santa Monica:

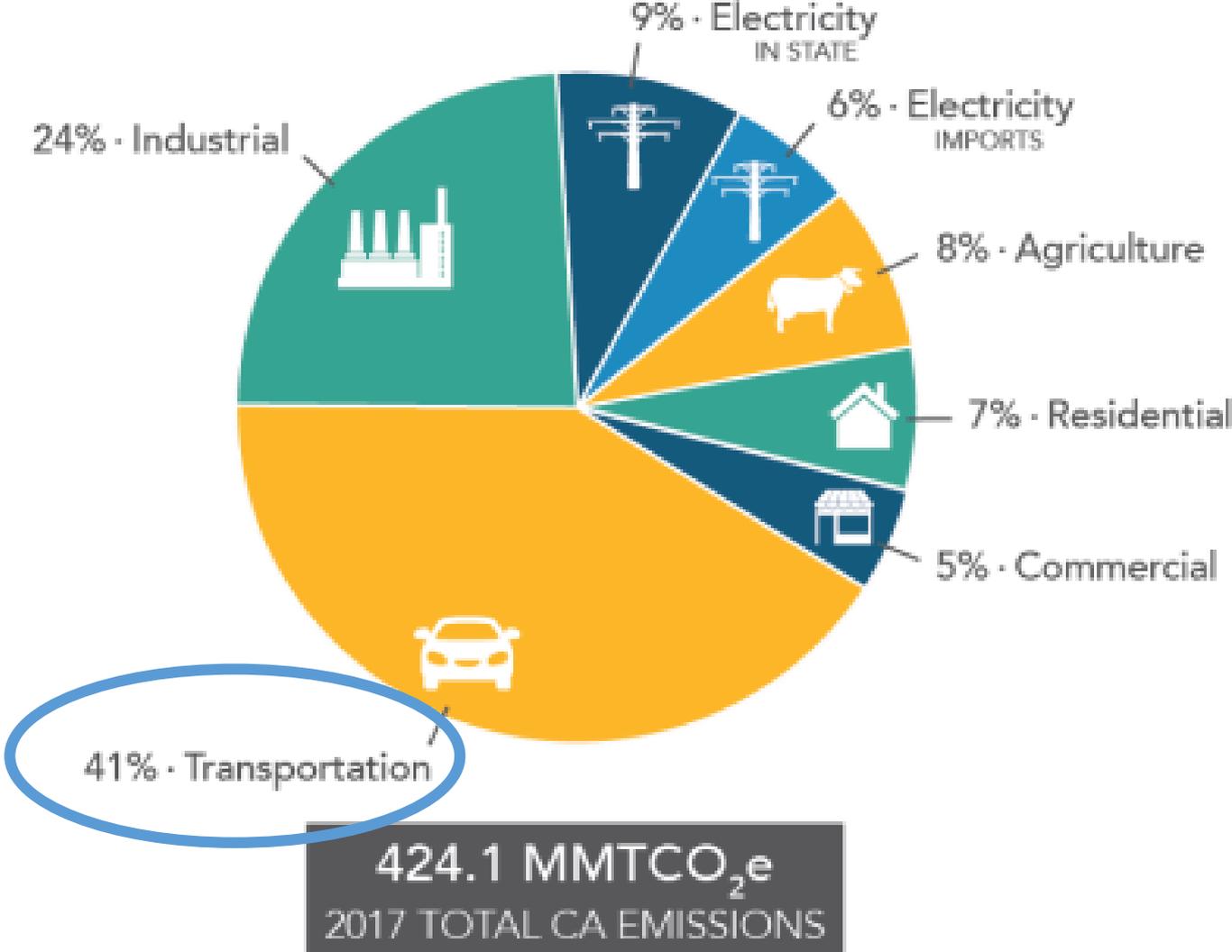
- 80% below 1990 carbon emissions by 2030
- Converting 50% ICE vehicle trips to walking or bikes/scooters/skateboard by 2030
- Water self-sufficiency by 2023; Zero waste by 2030

State of California- some key climate policies

- ❖ SB 32 (2016): Reduce GHG emissions to **40% below 1990 levels by 2030**
- ❖ SB 100 (2018): Achieve **60% renewable energy by 2030** and **100% by 2045**
- ❖ Executive Order B-55-18 (2018): Achieve **carbon neutrality by 2045** and **maintain net-negative emissions after**

Is this enough per the science and climate reality?

California Measured Emissions 2017



SUVs: 2nd biggest cause of emissions rise (2010-2018)

SUV sales doubled over past decade; SUV drivers rank 7th in world for CO₂ emissions, more than UK & Netherlands combined



Photo: Jonathan Turley

<https://www.iea.org/newsroom/news/2019/october/growing-preference-for-suvs-challenges-emissions-reductions-in-passenger-car-mark.html>

Emissions we don't count

Consumption-based, out-of-boundary emissions from embedded goods & services

- Product & food manufacturing & disposal (waste) outside boundary
- Air travel & other transportation outside boundary
- Emissions from production of natural gas and fuels; foreign fuels refined in California
- Other emissions away from home (e.g. energy)



Photo: Ellie Cohen

Need more aggressive policies and accelerated timelines now!



Climate-Safe California Campaign for Rapid Decarbonization

www.theclimatecenter.org

By 2025, CA will have enacted the accelerated policies required by science to put us on track by 2030 for a safe climate, through net-zero emissions, carbon sequestration, and resilient communities



Ensure a secure transition for workers and their families

- Support workers and communities dependent on fossil fuel enterprises
- Prioritize lower income communities



<https://www.iddri.org/en/publications-and-events/blog-post/investing-just-transition>

Goal: CA commits ASAP to accelerated decarbonization timeline & \$\$\$

- 80% below 1990 levels by 2030
- Net negative emissions soon after

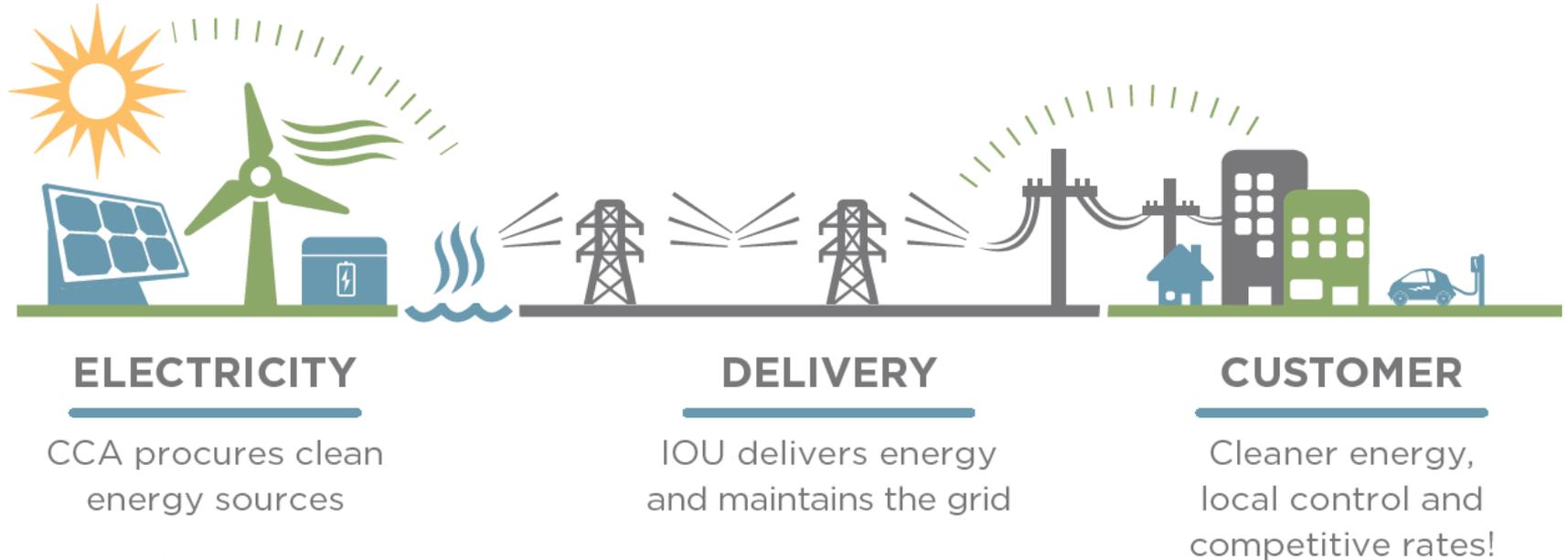


1- 100% Clean Power

- 100% clean, distributed electricity and storage by 2030
- Phase out oil/gas production and subsidies by 2030
- 100% building electrification & efficiency by 2030



Community Choice Energy -- accelerating adoption of clean energy in CA



20 CCAs serving 11 million Californians- ¼ of state- with 88% clean energy today!

<https://theclimatecenter.org/our-work/community-choice/>
<https://cal-cca.org/cca-impact/>

Building electrification

- Buildings account for 40% of global GHG emissions
- Embodied carbon (*concrete, steel, aluminum, iron*) are 11 % of global GHG emissions
- 20+ California cities have enacted **methane** gas bans for new buildings
- Moving to zero-emission building codes by 2025



Electric Induction Stove-Shutterstock

<https://www.curbed.com/platform/amp/2020/2/4/21112234/home-power-range-stove-electrification-natural-gas>

Embodied Carbon in Construction Calculator-
<https://www.buildingtransparency.org/en/>

<https://www.forbes.com/sites/pikeresearch/2020/02/06/new-solutions-emerge-for-embodied-carbon-in-buildings/#4e65204e5c88>



**BUILDING
DECARBONIZATION
COALITION**

<http://www.buildingdecarb.org/>

2- Sustainable Mobility

- Phase out fossil fuel powered vehicles starting no later than 2025
- 80%+ of Caltrans \$ to sustainable modes of transportation, not freeways, by 2025



Zero Emissions Vehicles & charging stations growing-- but need much more!

- ZEVs =5% (655k) of CA cars (14.5m)
- 33.4% increase from Oct 2018 to Oct 2019
- Must double current CA goal to reach 10 million ZEVs by 2030



<https://www.latimes.com/business/story/2019-12-01/electric-vehicle-sales-in-california-on-the-rise-but-is-it-enough-to-reach-the-5-million-goal-by-2030>

3- Healthy Lands and Waters

- Sequester 100+ MMT CO₂e annually in healthy soils and vegetation annually by 2030--starting by 2021
 - Carbon farming, ranching & gardening
 - Habitat restoration on land and coast



Carbon Farming, Marin



Kelp forests



Point Blue STRAW project

<https://www.marincarbonproject.org/carbon-farming>
<https://www.carboncycle.org/carbon-farming/>
<https://www.pointblue.org/our-work/restoration/>

Carbon farming potential sequestration at scale

Example: 21m acres = >20 MMT/year CO₂e for 20 years

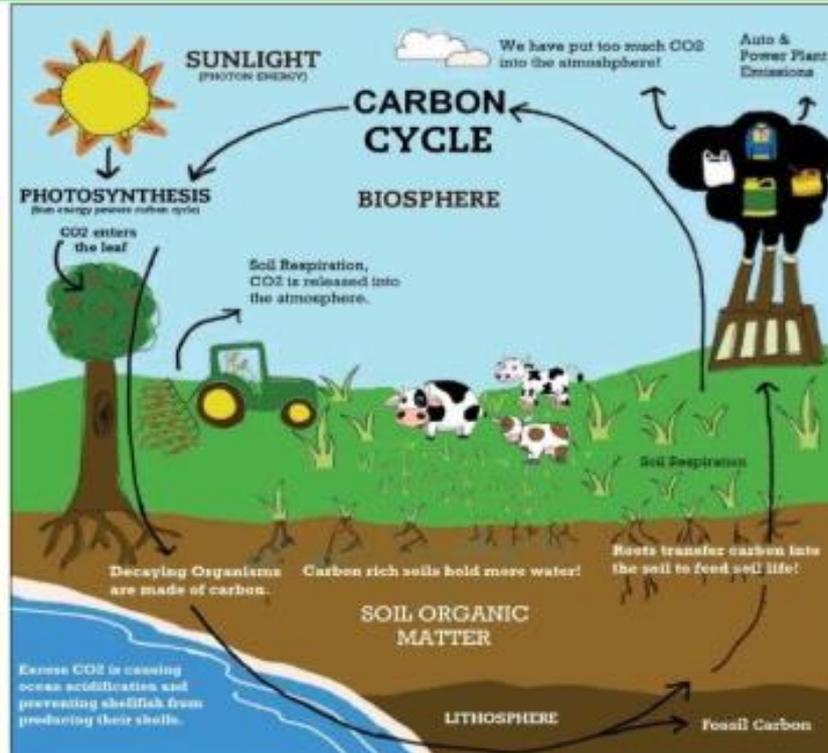
CARBON FARM PLANNING in Marin

Assistance is available for farmers and ranchers!
Plan for carbon sequestration and climate adaptation conservation practices with Marin RCD!

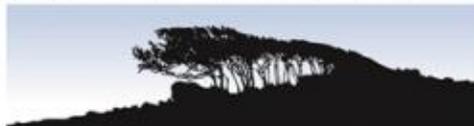
Potential List of Conservation Practice(s)* in a Carbon Farm Plan:

- Compost Application • Anaerobic Digester
- Silvopasture/ Shrub & Tree Establishment
 - Windbreak/ Shelterbelt/ Hedgerow
 - Riparian and Wetland Restoration
 - Filter Strips • Grassed Waterways
 - Forage & Biomass Planting
 - Rangeland Management
- Prescribed Grazing and Range Planting
 - Nutrient Management
- Residue & Tillage Management, No-Till
 - Cover Crops

*NRCs Standard Conservation Practices



MARIN RESOURCE



CONSERVATION DISTRICT

MARIN CARBON PROJECT

Carbon Cycle Institute

the
climate
center

4- Climate-Safe Communities

- Fund implementation of resilience plans in all California counties and cities by 2025
- Implement *clean* energy community microgrids with EV storage, starting with critical facilities in lower income communities by 2021



<https://microgridknowledge.com/tribal-microgrid/>

PG&E planned new methane gas back-up generators

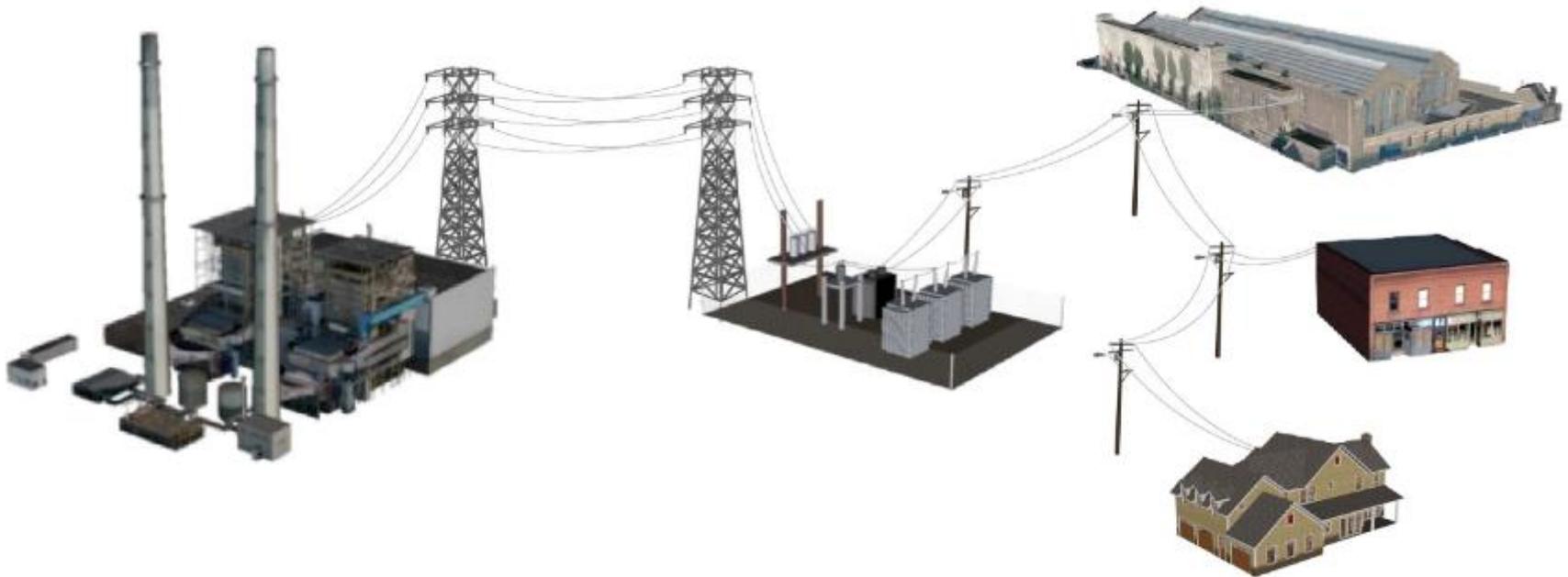
PG&E Substations for DGEMS Phase

Substation	Peak Load	Land Info (Sq ft.)		Latitude	Longitude
		Potential Land/Site Identified	Outside Substation Fence		
SAN RAFAEL	69.9	Y	62,000	37.9706527	-122.5272077
HIGHWAY	50.0	Y	85,000	38.16608965	-122.2535906
MOLINO	33.8	N		38.42533288	-122.8322634
ALTO	31.8	Y	96,500	37.89839799	-122.5249516
LAS GALLINAS A	33.4	N		38.02238116	-122.5381475
FORT BRAGG A	13.8	Y	15,000	39.43477268	-123.7994643
IGNACIO	30.5	Y	1,260,000	38.07665096	-122.5404603
WILLITS	15.2	Y	46,772	39.40556241	-123.3270646
CARQUINEZ	11.9	Y	63,600	38.09103762	-122.2483861
GREENBRAE	23.5	Y	50,000	37.93799601	-122.5143516
WINDSOR	22.3	Y	130,000	38.565927	-122.832315
KONOCTI	14.5	Y	61,570	38.93235913	-122.741004
BRUNSWICK	60.3	Y	71,330	39.23103074	-121.0349999
UKIAH	17.5	Y	73,181	39.14314429	-123.1918136
CLEAR LAKE	14.1	N		39.00783962	-122.8939866
TYLER	15.3	Y		40.13838296	-122.20884
CLOVERDALE	16.5	Y		38.79725991	-123.0103812
HIGHLANDS	24.7	Y	30,000	38.93702324	-122.6089758
MIDDLETOWN	15.5	Y	36,189	38.75277959	-122.6087491
BIG RIVER	4.0	N		39.31138519	-123.7865885



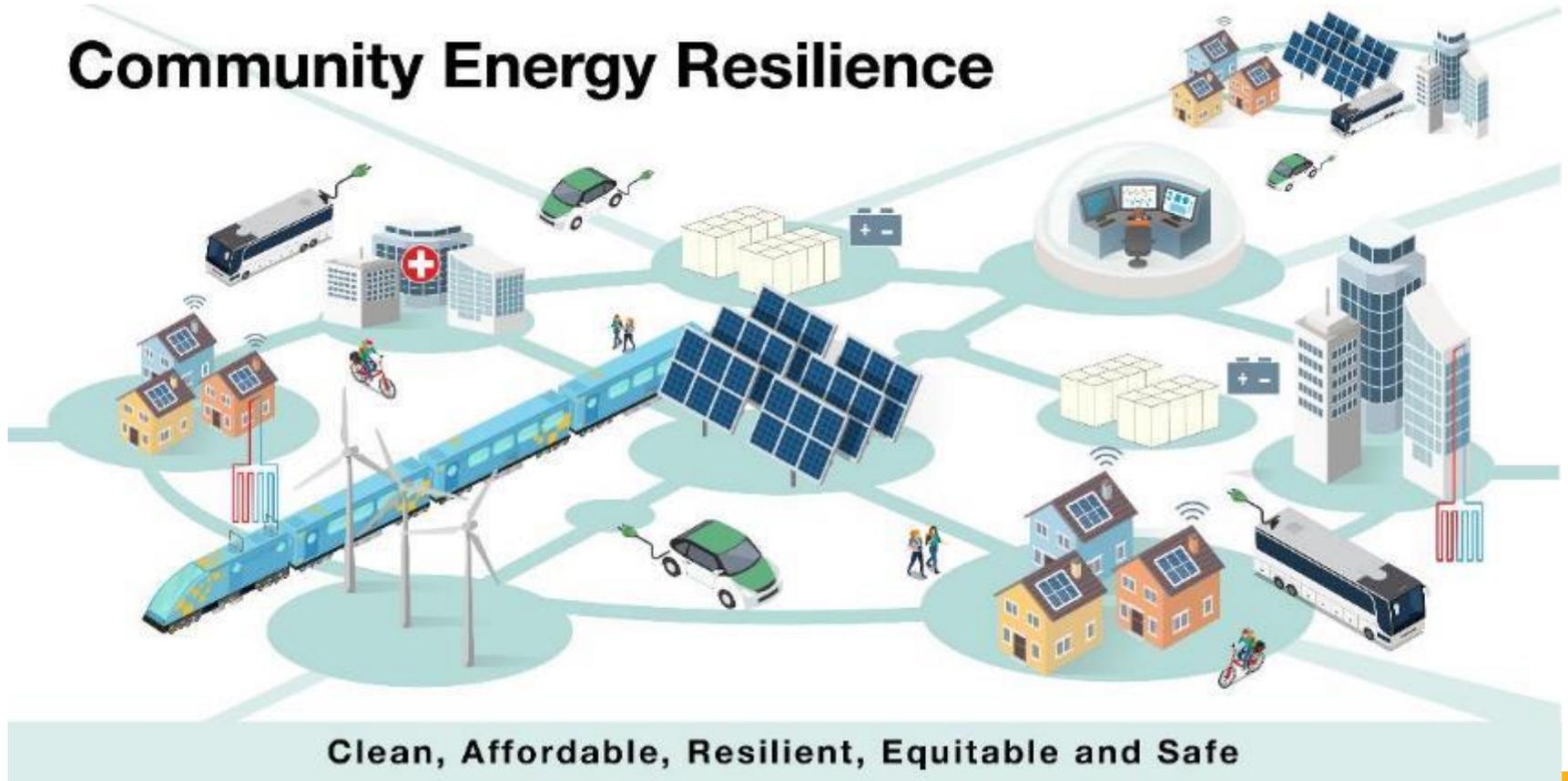
Instead of perpetuating a 100-year old grid architecture...

..Vulnerable transmission network prone to failure and likely to start wildfires..



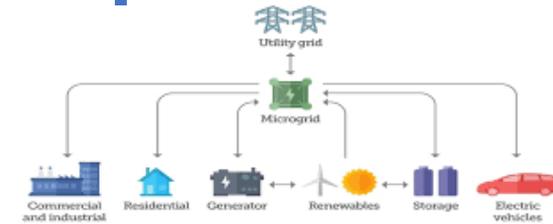
...let's build a new integrated, decentralized grid

Community Energy Resilience

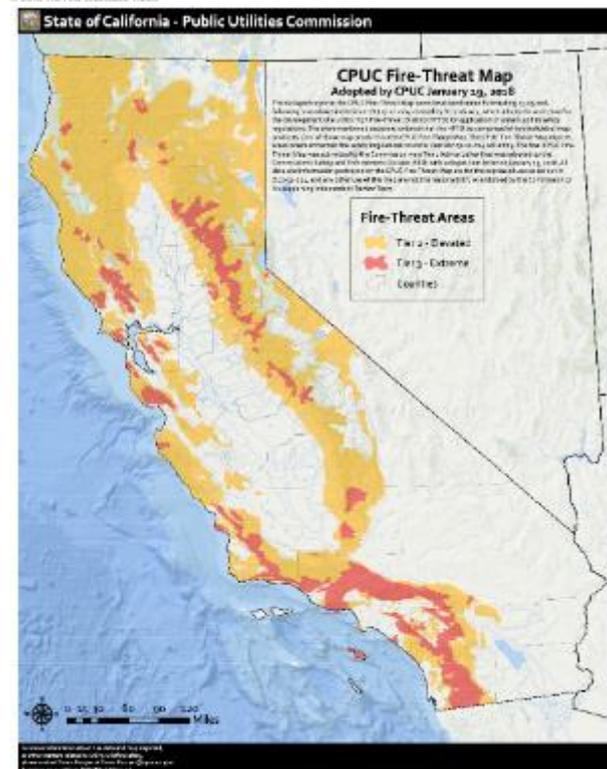


...starting with critical facilities serving lower income communities and homes for medically dependent

- 49 major state government buildings
- 92 refrigerated food warehouses
- 147 digital TV transmitters
- 225 local emergency operational centers
- 273 AM towers
- 535 urgent care facilities
- 570 hospitals
- 728 colleges and universities
- 1,013 law enforcement facilities
- 1,751 passenger transportation terminals
- 1,193 cell towers
- 3,182 nursing homes
- 3,139 emergency medical service facilities
- 3,209 fire stations & equipment depots
- 10,465 public schools
- 12,388 child care centers



Source: LG CNS
© 2016, The Pew Charitable Trusts



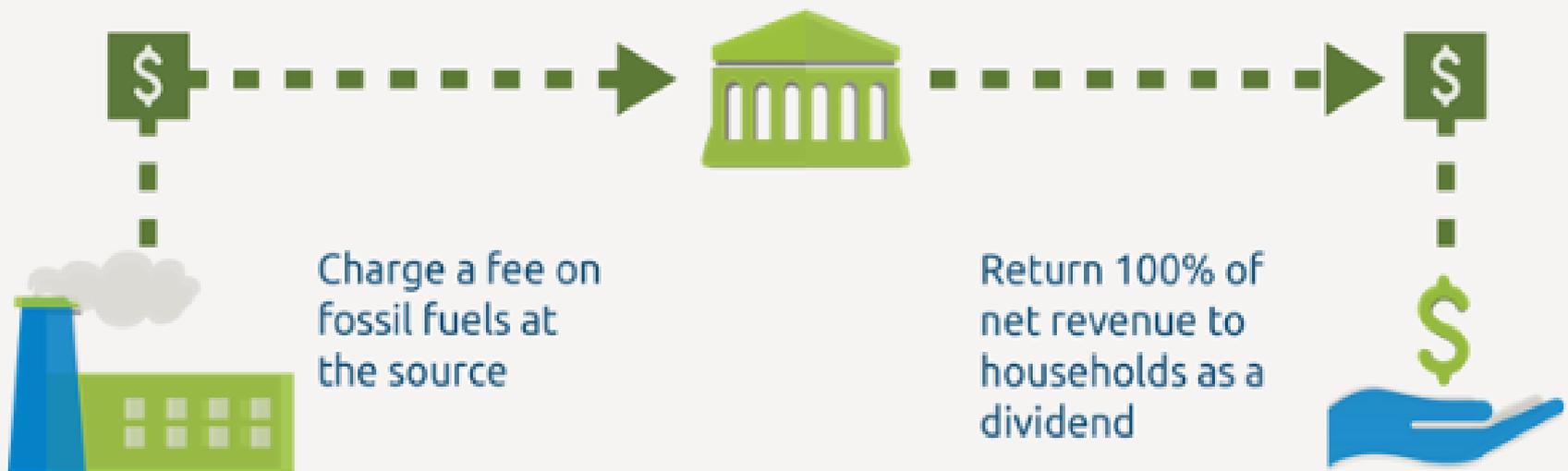
5- Funding Climate Action

- New progressive financing mechanisms to produce additional \$20+ billion/year specifically for climate action
 - Frequent flyer fee e.g., \$2.4 billion from \$10 per passenger x 240 million (in CA in 2018)
 - Green bonds
 - Progressive carbon taxes (e.g., fee and dividend)



Carbon Fee & Dividend: Charge for Pollution, Return Funds to Economy

A carbon fee & dividend policy



Good For The Economy/Society

Economists' Statement on Carbon Dividends:

- Polluting Cannot Be Free!
- Climate, health and regulatory benefits greatly exceed any costs.

From Citizens Climate Lobby/Jerry Hinkle
HR 763 Energy Innovation and Carbon Dividend Act

As Appeared In

THE WALL STREET JOURNAL.

THURSDAY, JANUARY 27, 2011

Drafted Co-Signatories Include (full list on reverse):

3500+ U.S. Economists

4 Former Chairs of the Federal Reserve (All)

27 Nobel Laureate Economists

15 Former Chairs of the Council of Economic Advisers

Economists' Statement on Carbon Dividends

Global climate change is a serious problem calling for immediate national action. Guided by sound economic principles, we are united in the following policy recommendations.

I. A carbon tax offers the most cost-effective lever to reduce carbon emissions at the scale and speed that is necessary. By correcting a well-known market failure, a carbon tax will send a powerful price signal that harnesses the invisible hand of the marketplace to steer economic actors towards a low-carbon future.

II. A carbon tax should increase every year until ambitious reductions goals are met and be revenue neutral to avoid debates over the size of government. A consistently rising carbon price will encourage technological innovation and large-scale infrastructure development. It will also accelerate the diffusion of carbon-efficient goods and services.

III. A sufficiently robust and gradually rising carbon tax will replace the need

for various carbon regulations that are less efficient. Substituting a price signal for cumbersome regulations will promote economic growth and provide the regulatory certainty companies need for long-term investment in clean-energy alternatives.

IV. To prevent carbon leakage and to protect U.S. competitiveness, a border carbon adjustment system should be established. This system would enhance the competitiveness of American firms that are more energy-efficient than their global competitors. It would also create an incentive for other nations to adopt similar carbon pricing.

V. To maximize the fairness and political viability of a rising carbon tax, all the revenue should be returned directly to U.S. citizens through equal lump-sum rebates. The majority of American families, including the most vulnerable, will benefit financially by receiving more in "carbon dividends" than they pay in increased energy prices.

Climate-Safe California

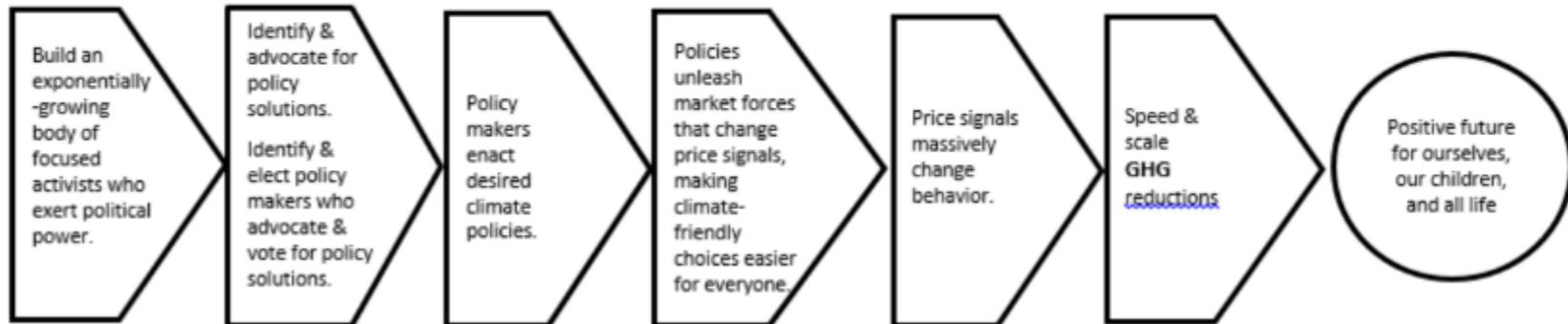
Clean, Healthy, Equitable, Resilient and Affordable



HOW will we ensure California becomes a global leader in rapid decarbonization?

The Climate Center's Theory of Change

ACTIVISTS → POLICY CHANGE → MARKET FORCES → BEHAVIOR CHANGE → IMPACT



Build an unprecedented cross-sectoral coalition of climate advocates demanding accelerated, equitable climate policies to unleash market forces so all can participate in the clean energy economy, for speed & scale GHG reductions

Phase I (2020):

- Establish and support a diverse statewide Rapid Decarbonization Partnership
- Develop science-based pathways & policies
- Establish legislative advocacy presence in Sacramento
- Identify and mobilize climate opinion leaders and other influencers
- Mobilize target communities through house meetings and social media
- Launch a strategic communications effort

We can– and are– making a difference!



**Be bold, take risks and innovate for
a healthy, equitable future**

**Demand that California commit to 80%
below 1990 levels by 2030 and net negative
emissions soon after**



Contact Governor Newsom at: <https://govapps.gov.ca.gov/gov40mail/>

Ask your state legislators to support Community Energy Resilience



Fund *Community Energy Resilience Planning*

- New effort to provide funding and expert support to all California local governments to plan and implement local energy resilience
- Prioritize lower income communities

Enact Utility Reform: Transition to Open Access Distribution System Operator Model

- Transition to a distribution “wires-only” utility that provides a platform for decentralized energy and independent clean energy sales
- Make electric distribution utilities a more resilient, decentralized future grid

And support AB 345: Environmental Justice – regulating oil & gas operations

Renewable energy now doubling every 5.5 years globally; 4x more than 10 years ago

- Solar 26x more than 10 yrs ago
- Clean energy w/ hydropower = 26.3% of total electricity produced globally



Global Trends in Renewable Investment 2019

<http://fs-unep-centre.org/research/report>

Johan Rockström et al. **A roadmap for rapid decarbonization.** *Science*, 2017; 355 (6331): 1269

DOI: [10.1126/science.aah3443](https://doi.org/10.1126/science.aah3443)

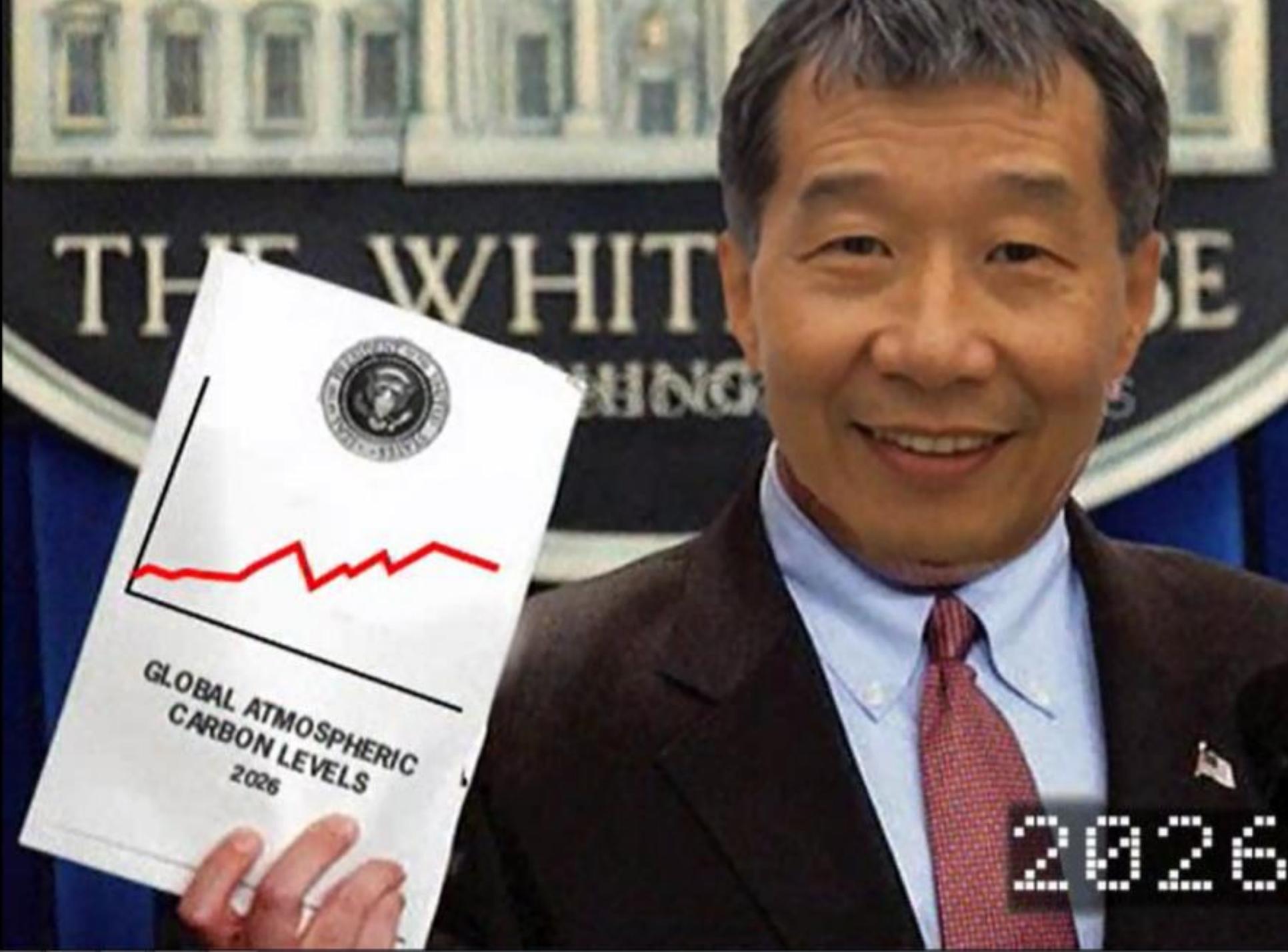
30 major cities globally have peaked their GHG emissions



Credit: Mrtom-uk

Oct 2019: Global GHGs must peak by 2020 in order to limit global temperature rise to 1.5°C.

<https://www.businessgreen.com/news/3082404/c40-30-major-cities-have-already-peaked-their-emissions>



THE WHITE HOUSE
OFFICE OF THE DIRECTOR



GLOBAL ATMOSPHERIC
CARBON LEVELS
2026

2026

CA first state to reach net negative emissions

CA kickstarts nation & world into speed & scale climate action

February 2030



The background is a dark, deep blue space. A bright, glowing blue streak of light, resembling a comet or a nebula, curves across the upper half of the frame. In the lower right quadrant, a small white arrow points upwards towards a tiny, isolated blue dot.

“Look again at that dot.
That's here. That's home.
That's us. On it everyone
you love, everyone you
know, everyone you ever
heard of, every human
being who ever was, lived
out their lives.... To me, it
underscores our
responsibility to deal more
kindly with one another,
and to preserve and cherish
the pale blue dot, the only
home we've ever known.”

*Carl Sagan, Pale Blue Dot: A
Vision of the Human Future
in Space*

Thank you!

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www.theclimatecenter.org