CROTON CLIMATE ACTION

NEXT STEPS

Care for Creation Ministry | Holy Name of Mary | croton100.org

Agenda

1	2	3
Environmental crisis	Croton100 mission	Carbon playbook

Limiting global warming to 1.5 °C would require rapid, far-reaching and unprecedented changes in all aspects of society.

- IPCC Summary for Policymakers, October 8, 2018

The climate and the biosphere don't care about our politics and our empty words for a single second.

- Greta Thunberg, Climate Activist

Greenhouse gases are the culprit – how much?

Global annual CO_2e = 43.1B metric tons[1]
Global population = 7.756B[2]

Per capita CO_2e = 5.6 tons
"Solve" climate change ≈ 3 tons[3]

US per capita CO_2e = 16.6 tons[4]

China per capita CO_2e = 7.0 tons[4]

France per capita CO_2e = 5.5 tons[4]

India per capita CO_2e = 2.0 tons[4]

Kenya per capita CO_2e = 0.3 tons[5]

Croton on Hudson per capita = 20 tons[6]
Imperative by 2030 = 10 tons[7]
Imperative by 2040 ≈ 3 tons[3]
We can do it!!!

[1]Scientific American, December 4, 2019
[2]worldometers.info
[3]ecocivilization.info and UN Dept. of Economic and Social Affairs
[4]Global Carbon Project https://www.globalcarbonproject.org/carbonbudget/19/presentation.htm
[5]World Bank
[6]Berkeley Coolclimate Study https://coolclimate.berkeley.edu/maps
[6]IPCC report https://www.ipcc.ch/sr15/

Executive summary of IPCC 2018 report

Q: When will we reach 1.5 °C of warming if we do nothing?

A: Around 2035.

Q: What are the risks of overshoot beyond 1.5 °C?

A: More dire than we previously thought. *Elevated risk* of *irreversible damage* from more extreme weather, sea-level rise, ice melt, ocean impacts (acidification, coral reef bleaching, de-oxygenation, coastal flooding) which will have serious deleterious impacts on crop yields, human health, species, livestock, diseases, property… *positive feedback past tipping points*

Q: Can we prevent overshoot?

A: Yes, there are *specific pathways* to minimize the probability of overshoot.

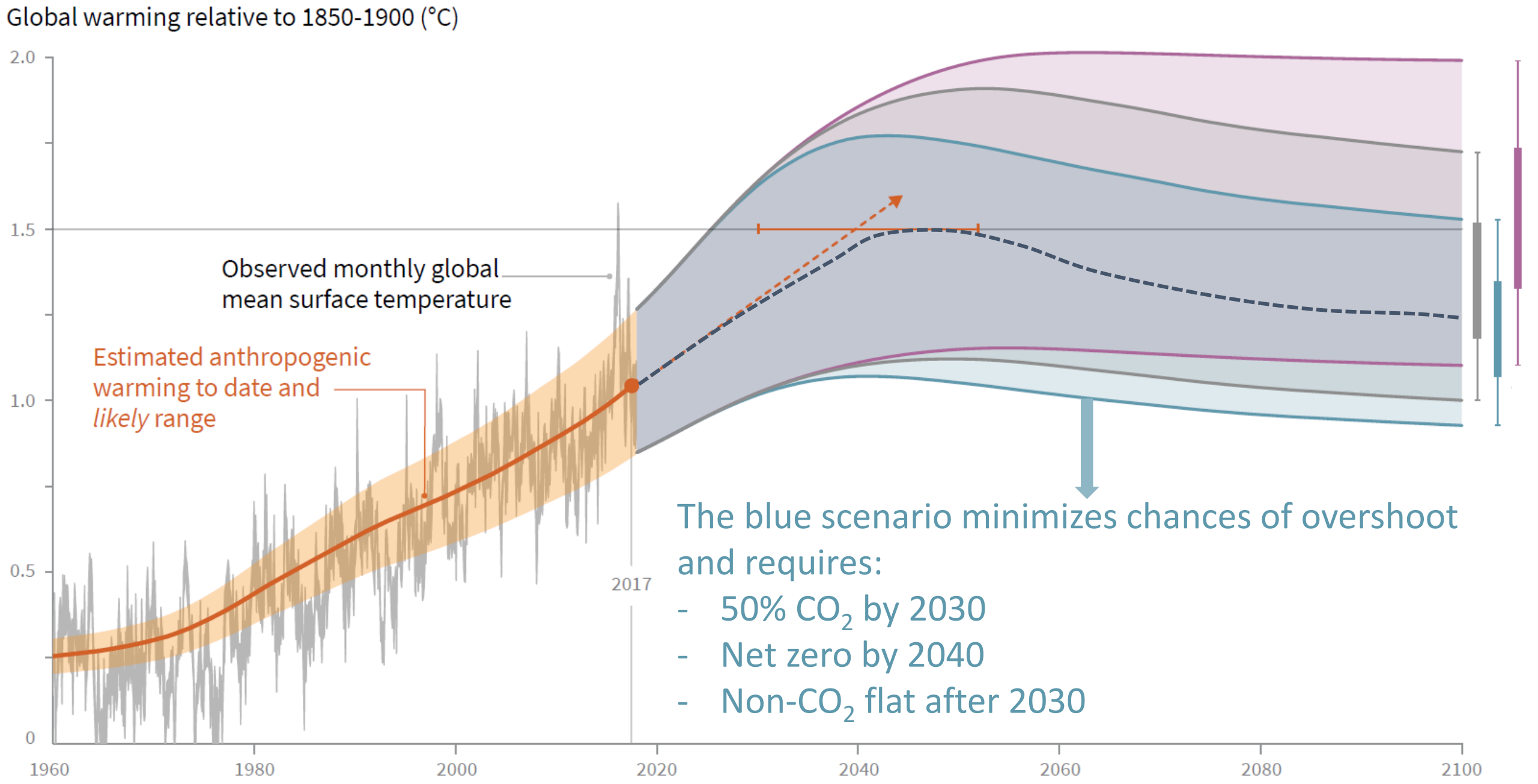
- 50% net CO_2 reductions by 2030; a slow start is not acceptable, no wiggle room!
- 100% net CO_2 reductions by 2040

77% of the problem

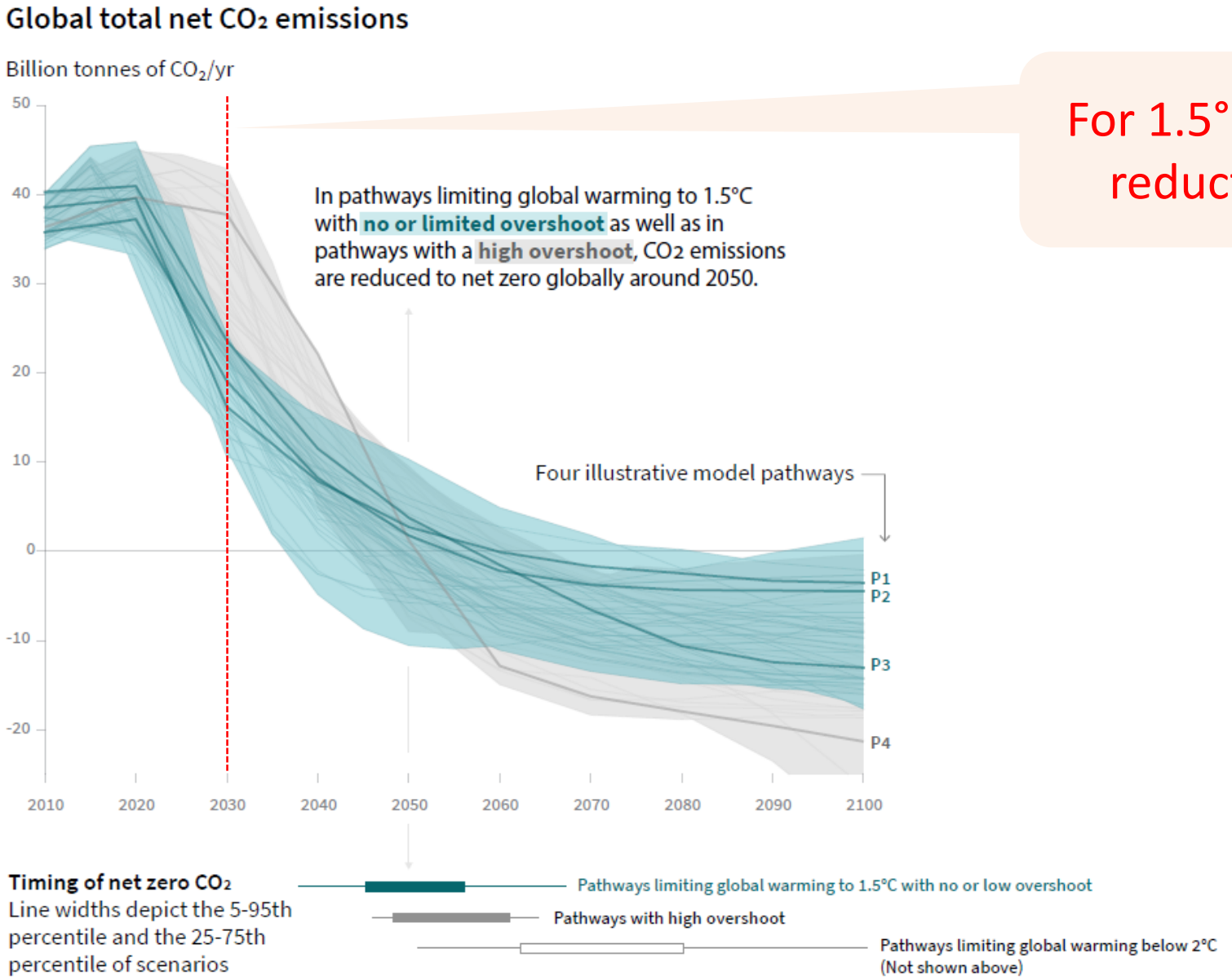
- More modest reductions of non-CO2 radiative forcing (methane, nitrous oxide, halocarbons, black carbon) by AFOLU (Agriculture Forestry and Land Use) mitigation

23% of the problem

Scenario “plumes” of likely warming



Do we have wiggle room?

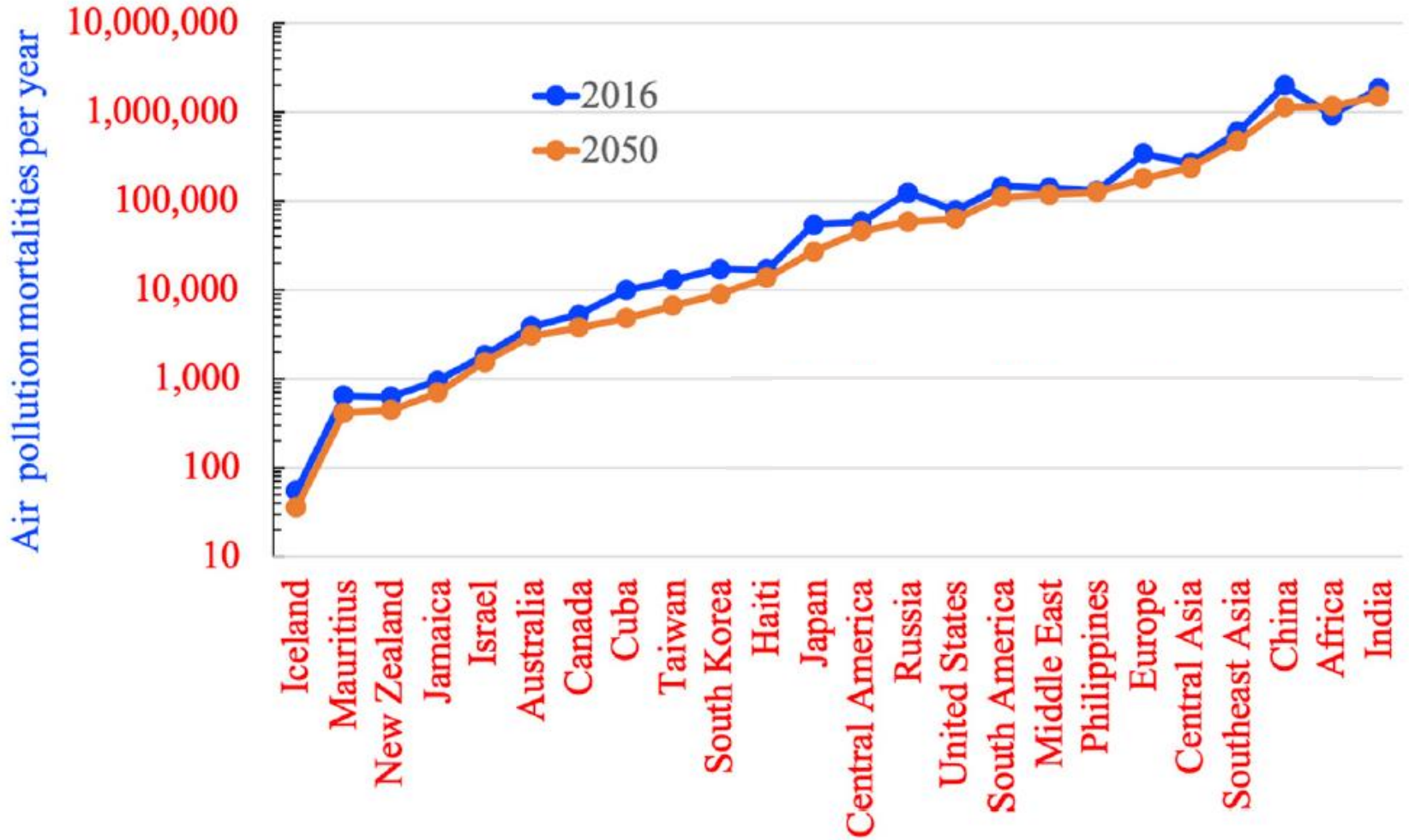


For 1.5°C: 50% reduction!

Table of likely impacts

Domain	1.5 °C	2°C	Comments
Extreme weather	Heat, precipitation, drought	Increased severity and frequency	Obvious
Sea-level rise by 2100	10.5 – 30.8", 80M impacted	4" more	Impacts 10M additional people!
Greenland ice sheet	Less damage	More damage	Could be *irreversibly* lost!
Species habitat	6% of insect, 8% of plants, 4% of vertebrates will lose >50% of geographic range	Increases to 18% of insects, 16% of plants, 8% of vertebrates, 6th extinction	105,000 species studied! Also more forest fires, invasive species, …
Permafrost		Additional 1.5 – 2.5M km^2 lost	
Oceans	Coral reefs, de-oxygenation, acidity	More destruction of coral reefs, less oxygen, more acidity	Coral reefs already likely irreversibly damaged
Arctic ice-free summer	Once per century	Once per decade	
Poverty		+Several hundred million	Lower crop yields
Food and livestock	Adversely impacted	Worse due to water stress, disease	
Health		Much worse air quality	

Health impacts



- 70,000 air pollution mortalities in the U.S., 6.8M worldwide, 90% due to fossil fuel burning!
- Just health care costs will pay for 91% of the transition to clean energy[1]

[1]M. Z. Jacobson *et al*, "Impacts of Green New Deal Energy Plans on Grid Stability, Costs, Jobs, Health and Climate in 143 Countries," One Earth, December 2019

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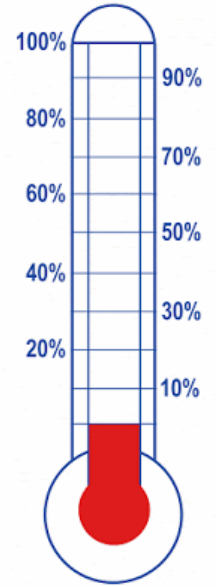
It is in those very moments when everything looks hopeless
that we have a real chance to grow into something better:
what the caterpillar calls the end of the world, we call a butterfly!

- Lao Tzu / Richard Bach

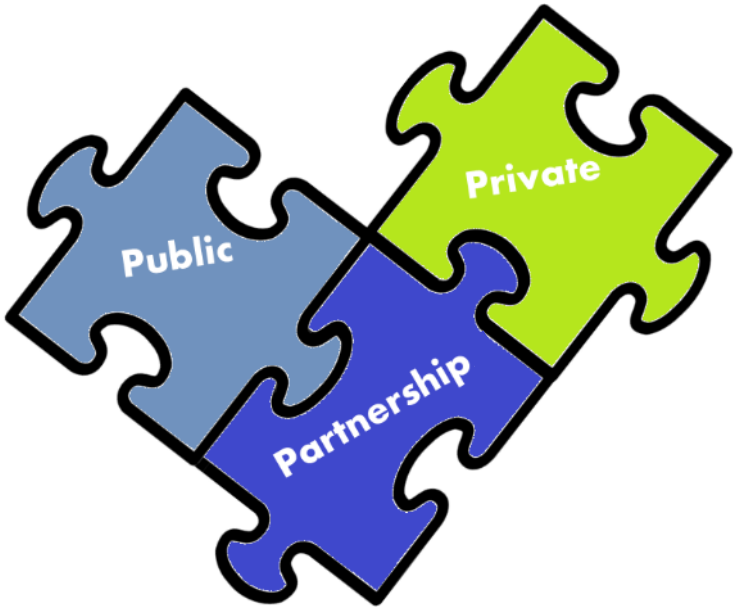
Croton100 plan on a page

Croton100 mission



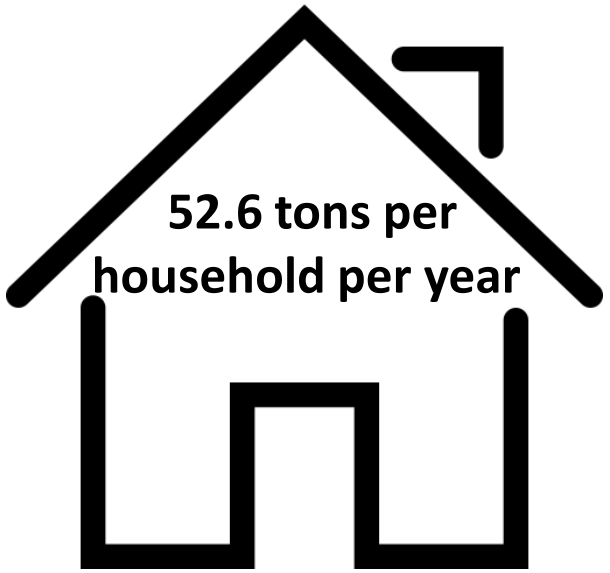
Draw down

- Croton100 is a community-based grass-roots not-for-profit; we will target 100% of the emissions, 100% of the people, 100% of local businesses, 100% of public spaces…
- Scope
  - Zip code 10520 (12,810 population, 5,540 housing units)
  - Economy-wide, not just electricity
  - Economy-wide, not just municipal operations
- Every day of inaction means another 700+ tons of Croton emissions in the atmosphere
- We need to show urgent leadership… why?
  - For ourselves, our health and our well-being
  - For future generations
  - For all sentient beings and all creatures
  - For the planet and all its residents
- How? Neighbors working with neighbors to inform, educate and quantifiably drive down emissions
- We would like to scale the approach beyond Croton



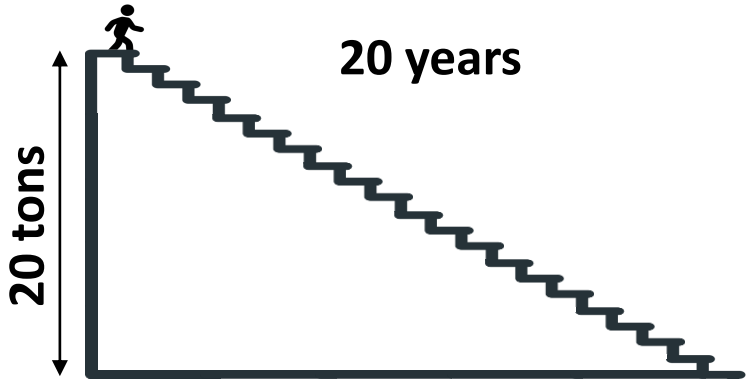
Overall goal

Croton emissions



2.6 people per household

20 tons per
person per year



1 ton of reduction
per person per year

Croton100 progress to date

- Launched and registered in October 2019
- Created a climate action master plan
- Created a web site
- Applied for not-for-profit status in December 2019
- Building many partnerships
  - School and students
  - Village of Croton, Town of Cortlandt
  - Houses of worship
  - Library
  - Local politicians
  - Lions Club, Rotary
  - Scouts
  - Environmental organizations
- Over 50 volunteers, numerous well-attended volunteer meetings
- Launch event planned in February 2020
- Carbon playbook developed
- Playbook approach has already saved 90+ tons of annual emissions!

Emissions progress to date

#	Date	Carbon before	Carbon after	Carbon savings	Comments
1	10/29/2019	31.235	28.768	2.467	Insulated hot water pipes+attic, bio-diesel, CCA
2	11/16/2019	58.476	53.618	4.858	Solar panels operational
3	11/17/2019	39.660	27.179	12.481	Considering ground source heat pumps
4	11/21/2019	47.022	33.662	13.360	Ground source heat pumps operational
5	11/24/2019	91.988	91.988	0.000	
6	11/24/2019	46.699	46.699	0.000	
7	11/26/2019	104.202	104.202	0.000	
8	12/10/2019	35.592	35.592	0.000	
9	12/12/2019	56.971	46.106	10.865	Considering ground source heat pumps
10	12/12/2019	37.894	37.894	0.000	
11	12/15/2019	43.316	43.316	0.000	
12	12/27/2019	160.505	160.505	0.000	
13	12/27/2019	79.184	66.748	12.436	Renovating entire house (heat pumps)
14	12/29/2019	33.372	28.254	5.118	New solar panels in backyard
15	12/29/2019	68.044	63.788	4.256	Considering heat pumps
16	12/29/2019	72.002	52.247	19.755	Considering ground source heat pumps
17	12/30/2019	34.770	29.450	5.320	Airline flight offsets
18	1/4/2020	57.305	57.305	0.000	
19	1/4/2020	46.343	46.343	0.000	Considering solar panels
20	1/5/2020	45.632	45.632	0.000	
21	1/8/2020	44.615	39.891	4.724	Diet changes + less travel
		1182.872	**1087.232**	**95.640**	**Totals not including library**
		56.327	**51.773**	**4.554**	**Averages not including library**

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I think that the only way to prevent the radical alteration of our planet is to commit to a radical alteration of our own behavior.

- Charles Blow, New York Times

Do you know your carbon impact?

Do you know your name and social security number?

Do you know your birthday?

Do you know your age?

Do you know your street address?

Do you know your 4-digit PIN?

Do you know your laptop or smartphone password?

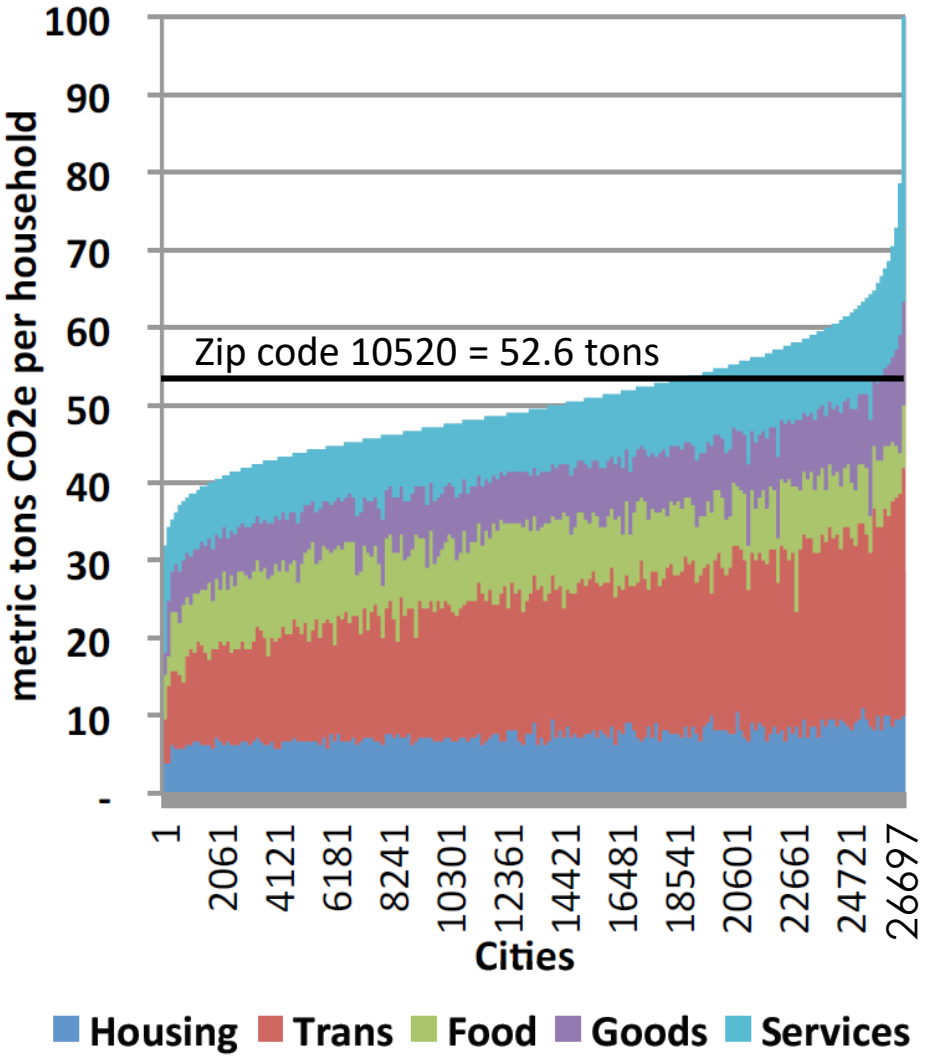
Do you check your bank balance once a month? Credit card statement?

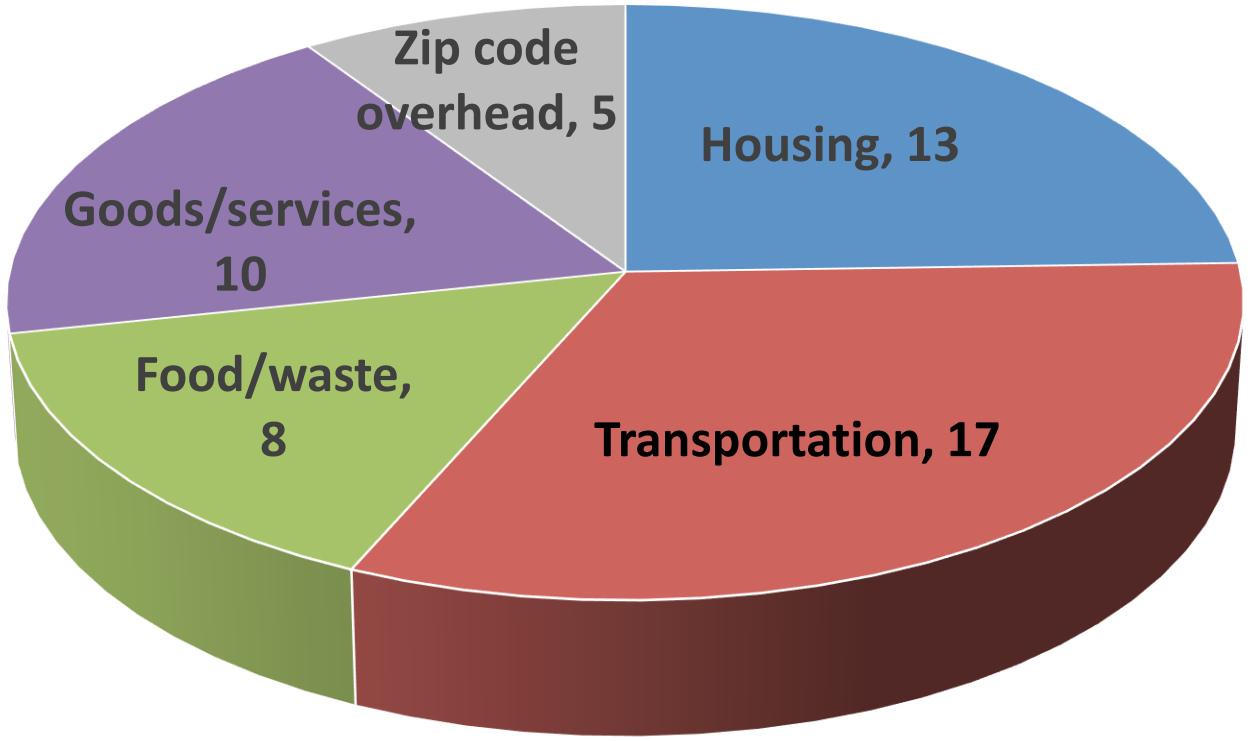
Do you know your blood pressure? Cholesterol? Triglycerides?

If you had diabetes, would you be checking your blood sugar often?

If carbon emission is the compelling challenge of our times, you must know and track your carbon impact

Zip code 10520 emissions





https://coolclimate.berkeley.edu/maps

Christopher M. Jones and Daniel M. Kammen, Spatial Distribution of U.S. Household Carbon Footprints Reveals Suburbanization Undermines Greenhouse Gas Benefits of Urban Population Density. *Environ. Sci. Technol.*, 2013, dx.doi.org/10.1021/es4034364

What is the Croton100 playbook?

Answer: it is a carbon calculator

- In the form of a spreadsheet today, coming out as a mobile app at launch in late February 2020
- It is a vehicle that permits quantified conversations about carbon
- Six themes: transportation, heating, electricity, waste/food, goods/services, zip code overhead

Purpose 1: Quantify household carbon impact

- You cannot reduce and track something that is not measured scientifically
- Increases awareness, dispels myths and misconceptions

Purpose 2: Look for immediate emission reductions

- Simple things people can do to help the planet

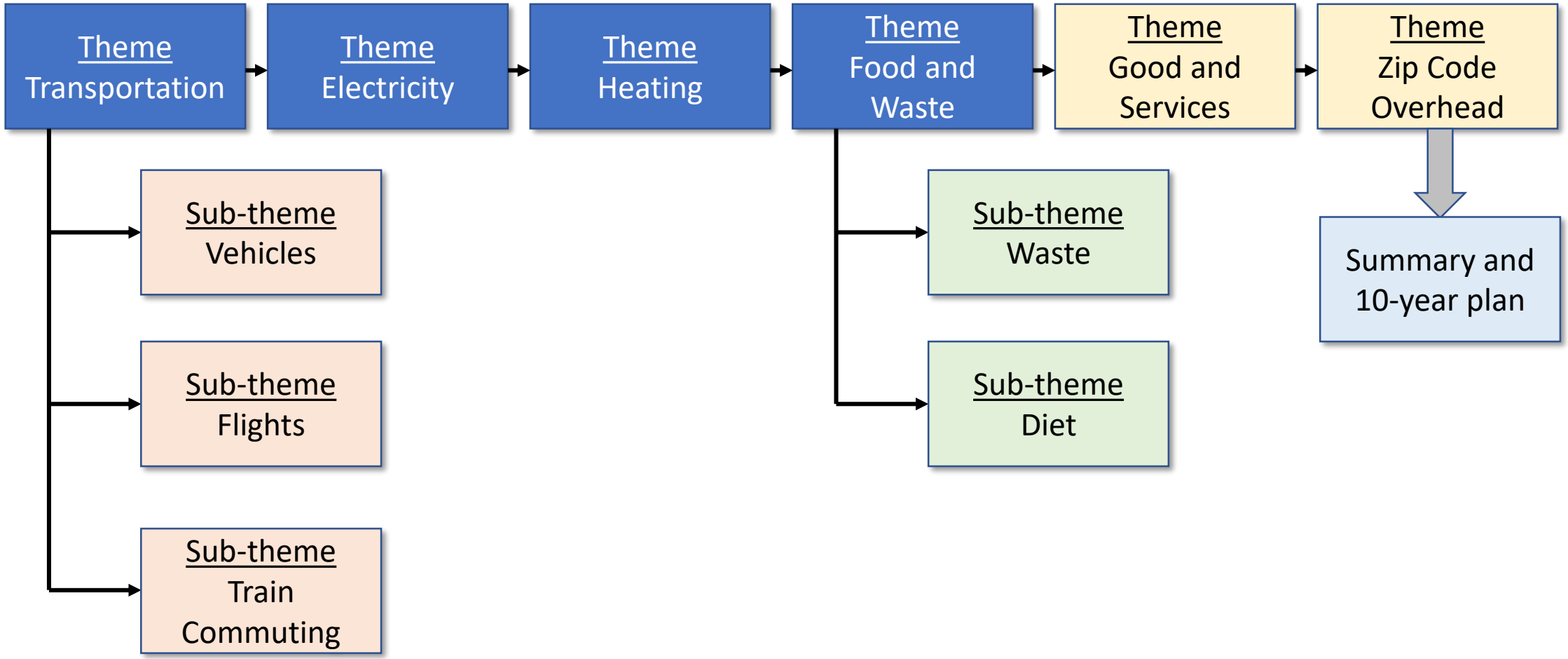
Purpose 3: Plant a seed for long-term emission reductions

- Make a 10-year plan to reduce carbon footprint in half
- Only 2 or 3 “car years” between now and 2040
- Only 1 “HVAC year” between now and 2040

Purpose 4: Allow residents to track their progress (in relation to other residents and the rest of the village)

- You are not alone! Residents share their stories and experiences with each other…
- Gamification

What's it like to "step on a carbon scale?"

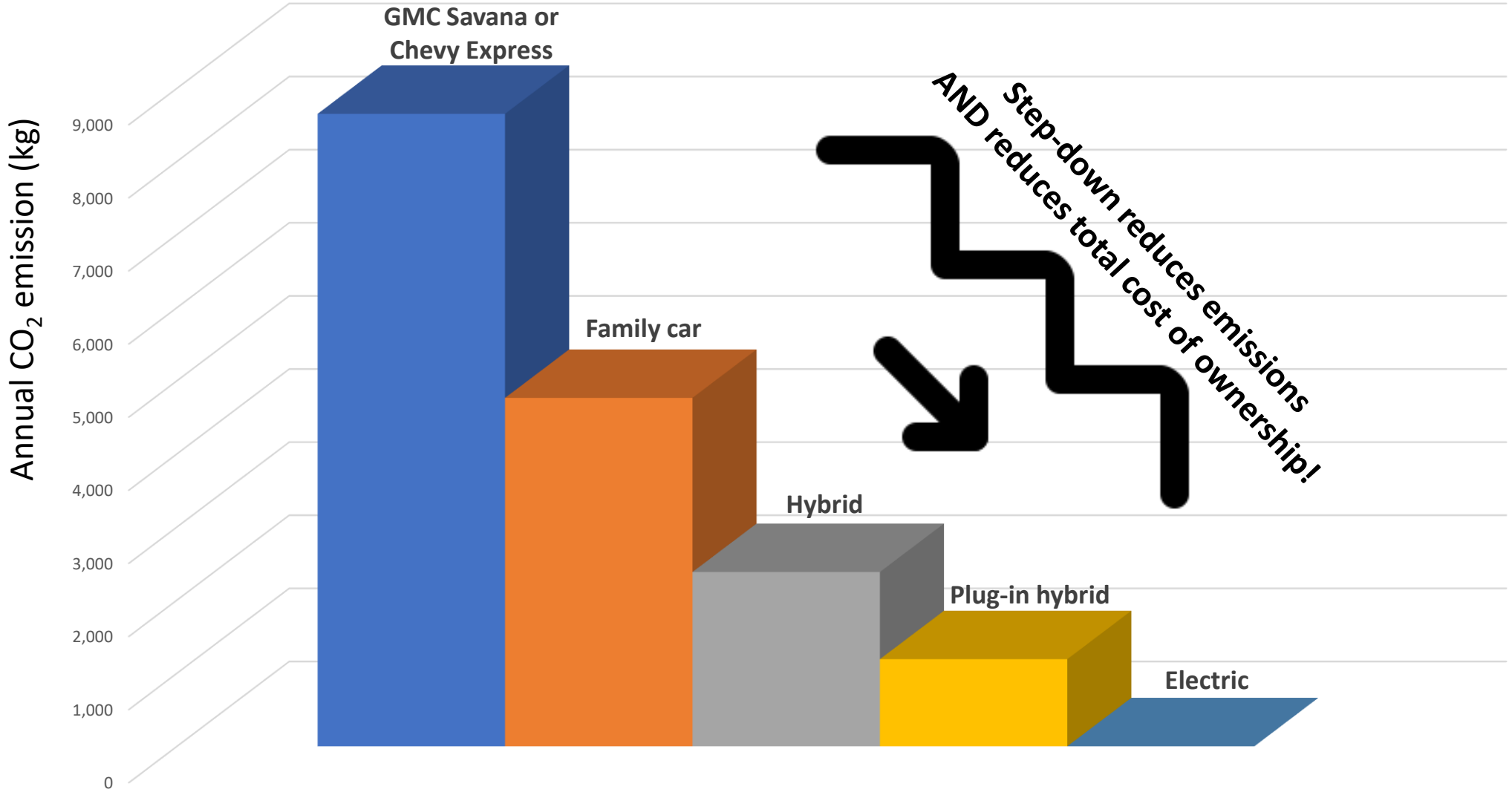


Theme: Transportation / Sub-theme: Vehicles

Question	Answer	Carbon
How many vehicles?	2	
Vehicle #1 year	2007	
Vehicle #1 make	GMC	
Vehicle #1 model	Yukon XL 4WD	
Vehicle #1 miles driven per year	16,000	
Vehicle #1 miles per gallon	14.00	10.160
Vehicle #2 year	2016	
Vehicle #2 make	Toyota	
Vehicle #2 model	Prius Prime	
Vehicle #2 miles driven per year	10,000	
Vehicle #2 miles per gallon	125.00	0.711

Carpool, combine multiple trips, use public transportation, walk, bike, electric bike
Inflate tires properly, maintain engine properly, drive sedately
Avoid idling
Unload items from the car before your next trip

Drive an efficient vehicle!



Theme: Transportation / Sub-theme: Flights

Number of short-haul flights economy	4	1.596
Number of long-haul flights economy	2	1.862
Number of super-long flights economy	2	3.990
Number of short-haul flights biz/first	4	4.800
Number of long-haul flights biz/first	2	5.600
Number of super-long flights biz/first	2	12.000

Jet fuel exhaust emitted at 35,000 feet is particularly harmful
Consider buying carbon offsets

Theme: Transportation / Sub-theme: Train commuting

Number of round-trip GCT commutes per year	220	
Average miles of each round-trip commute	65	
Fraction of trips during peak hours	90%	0.798
Savings over driving		4.716

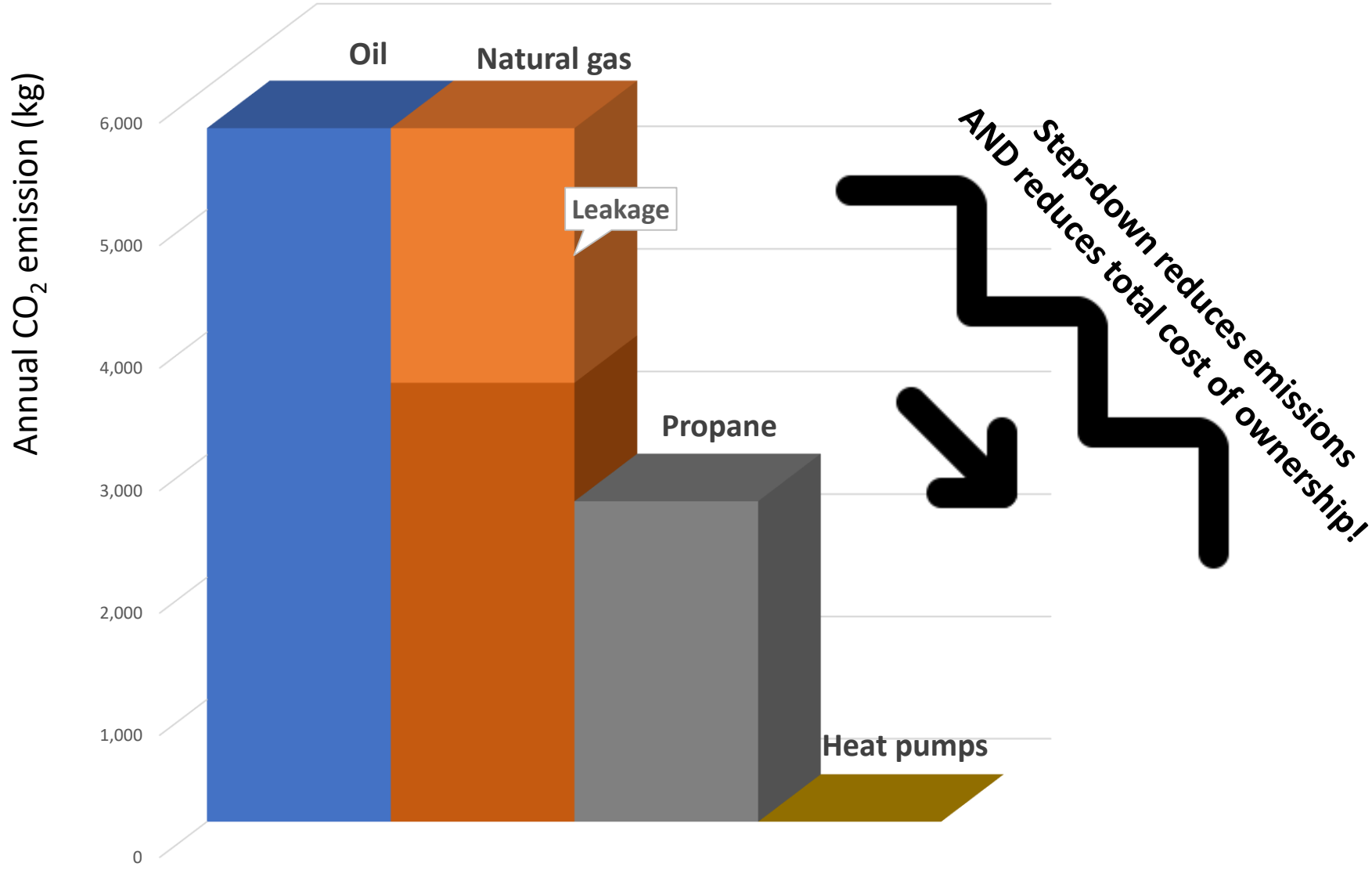
Train commuting is very carbon-efficient!

Theme: Heating

Question	Answer	Carbon
What is your fuel source for heating?	Oil	
What is your fuel source for cooking?	Electric	
What is your fuel source for grilling, if any?	Electric	
How is heat distributed in your house?	Forced air	
Do you have duct work for forcing air?	Yes	
How is hot water produced in your house?	Oil	
Annual gallons of oil	551.0	
Fraction of bio-diesel in heating oil	20%	4.815
Emissions savings from bio-diesel		0.837

Choose B20 for heating oil (bio-diesel 20%)
Smart thermostats
Insulate hot water pipes
Don’t block registers/vents with carpets or furniture
Free energy audit
Insulate properly, especially doors, windows, attic, crawl space
Close fireplace chimney flue when not in use

Efficient home heating



Theme: Electricity

Question	Answer	Carbon
Who is your utility?	Con Edison	
Who is your Electricity Service Company (ESCO)	Con Edison Solutions	
How many kWhrs do you use per year?	11,320	
What fraction is clean?	0%	3.203
Total carbon		**3.203**

Community Choice Aggregation opt-in (Constellation New Energy)
Solar panels
LED bulbs
Energy Star appliances
Wash some loads in cold water
Hang dry some loads on a line or drying rack
Conserve water
Put monitors, computers, TVs on a sleep timer
Prevent phantom charging

Theme: Waste and Food

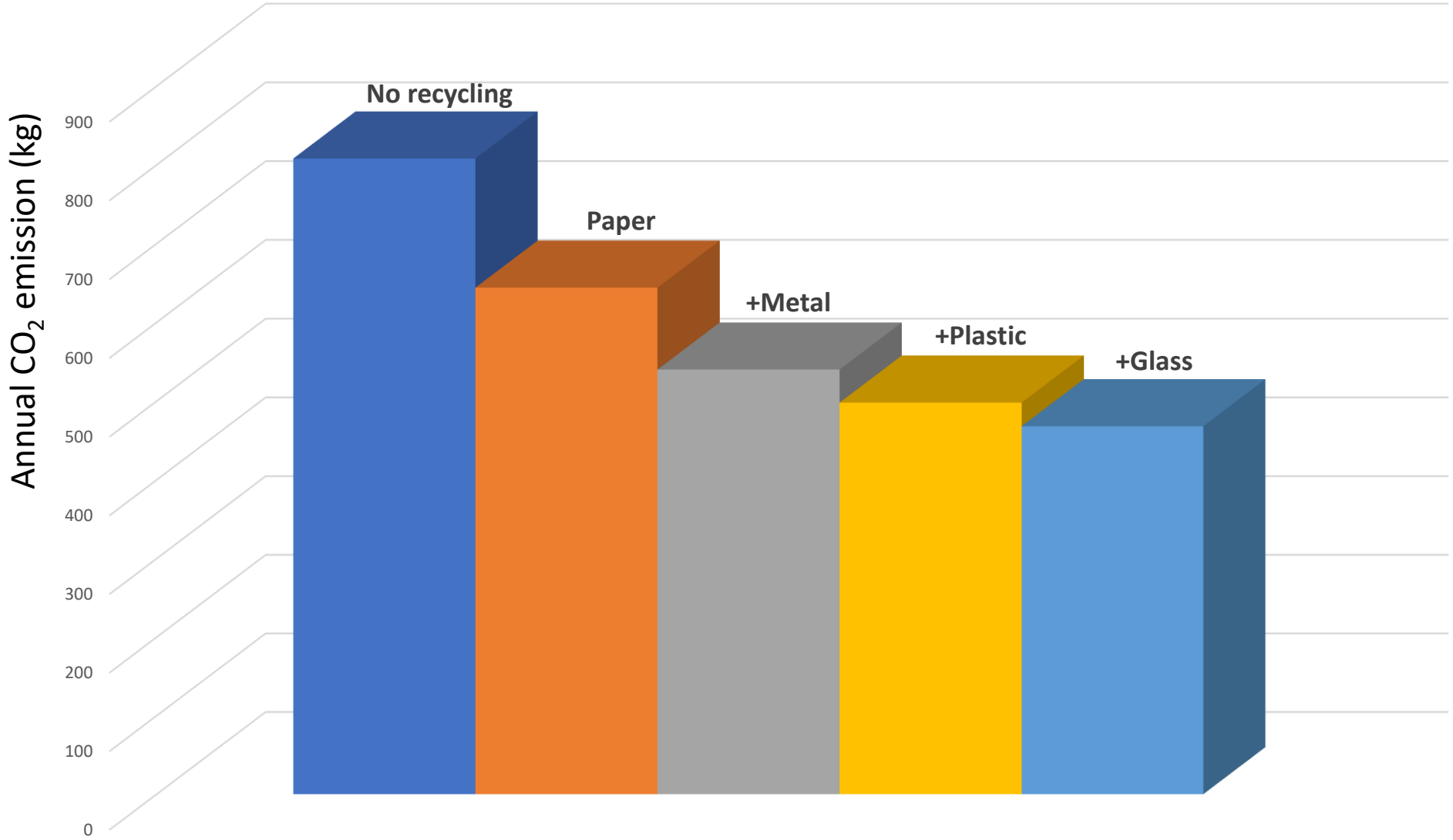
Question	Answer	Carbon
No recycling		0.806
Newspaper only	Yes	-0.132
Metal only	Yes	-0.104
Plastic only	Yes	-0.041
Magazines only	Yes	-0.032
Glass only	Yes	-0.030
Total from waste		**0.467**

Person #1 diet	Meat lover	3.300
Person #2 diet	Average meat	2.500
Person #3 diet	No beef	1.900
Person #4 diet	Vegetarian	1.700
Person #5 diet	Vegan	1.500

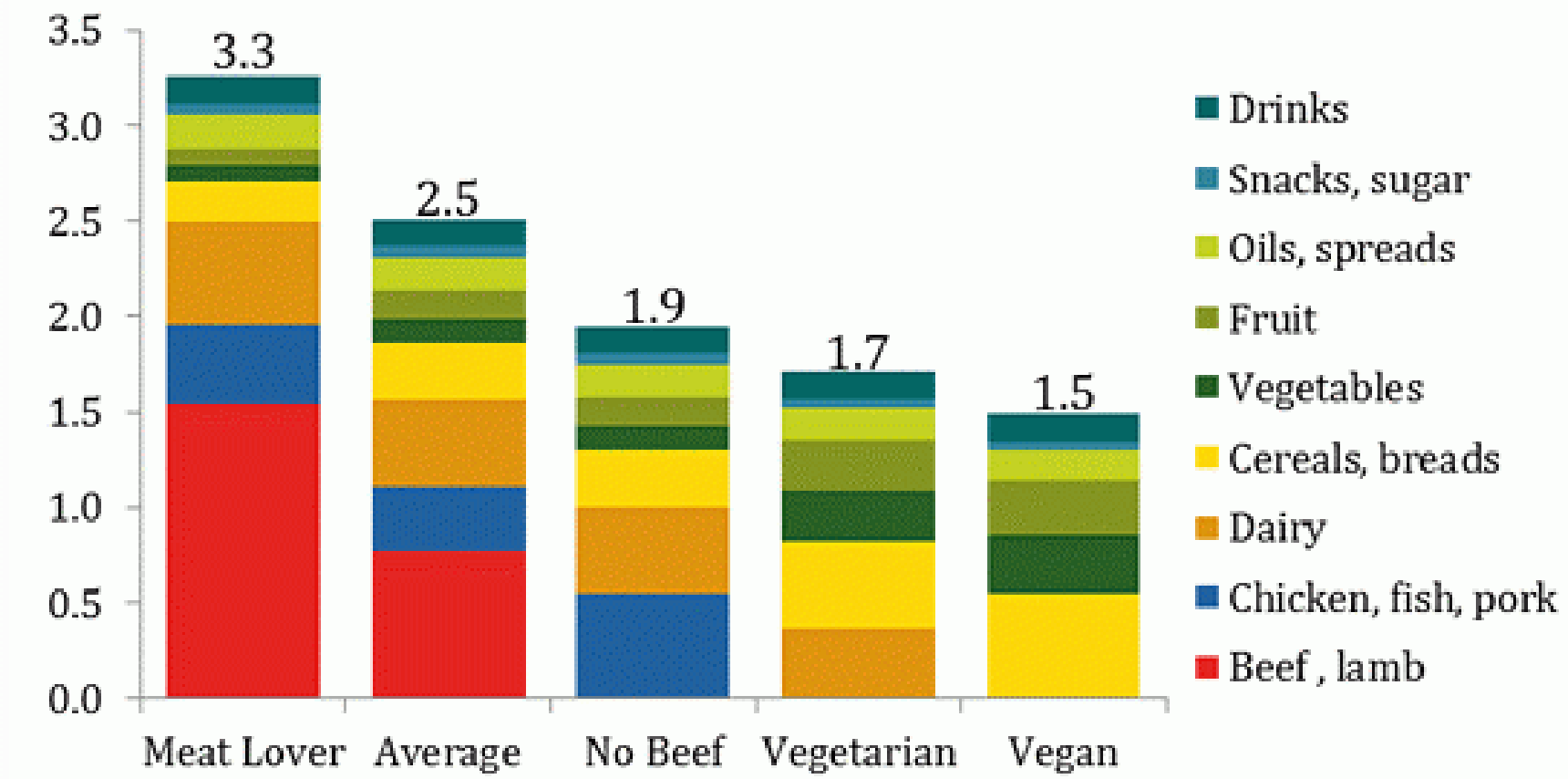
Minimize trash
Avoid single-use plastic (straws, bags, cups)
Compost organic waste
Mulch leaves

Plan grocery shopping and meals; don't waste food
Try "meatless Mondays" or "vegan Wednesdays"

Emissions reductions from waste and recycling



Emissions reductions from diet (tons CO_2e per person)



Note: All estimates based on average food production emissions for the US. Footprints include emissions from supply chain losses, consumer waste and consumption.. Each of the four example diets is based on 2,600 kcal of food consumed per day, which in the US equates to around 3,900 kcal of supplied food.

Sources: ERS/USDA, various LCA and EIO-LCA data

Shrink That Footprint

Themes: Goods, services, zip code overhead

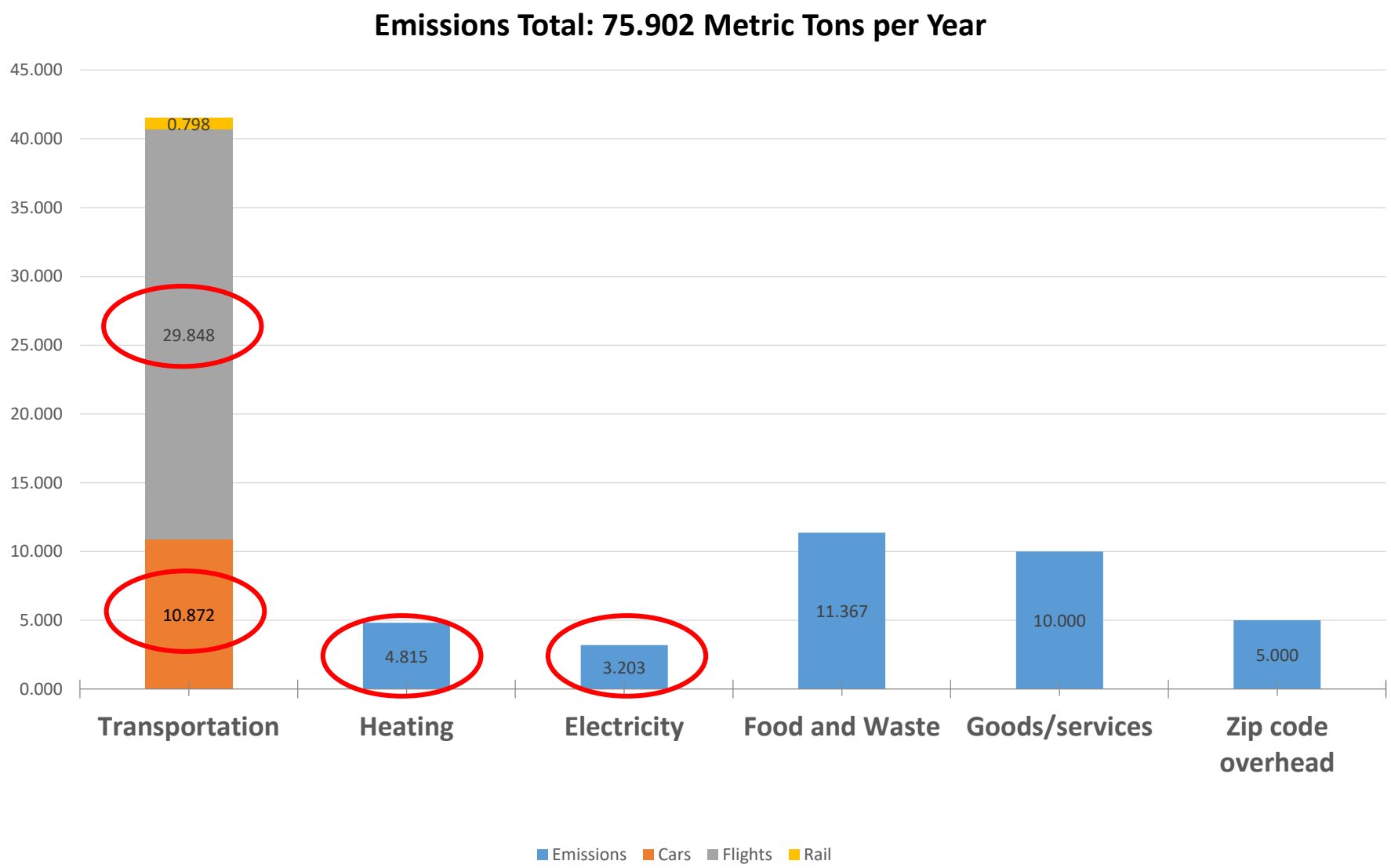
Goods and services (10 tons)

- Divest fossil fuel stocks
- Check your investment accounts for high ESG (Environmental, Social and Governance) scores; every mutual fund and publicly traded stock has an ESG score published by Morningstar
- Buy local goods and services
- Buy goods with less packaging
- Buy sustainable clothing brands

Zip code overhead (5 tons)

- Houses of worship
- Shops, banks, offices
- Municipal operations
- Metro North facilities

Summary and planning for 50% reduction by 2030



Conclusions and call for help

- In Croton, we emit 52.6 tons per household
- We need to cut it in ½ by 2030, and achieve net zero by 2040
- Asks
  - Sign up for a playbook (e-mail admin@croton100.org) to quantify your own household's carbon footprint
  - The mobile app will keep track of your carbon history for you
  - Make a 10-year plan to cut your footprint in half by 2030
  - Attend our launch celebration on February 29 at the High School Auditorium from 10:00 a.m. to noon
  - Use croton100.org as a resource; contact us at admin@croton100.org
  - Take our pledge at croton100.org/pledge
  - Volunteer: we meet at the Black Cow on the first and third Monday of every month at 7:00 p.m.
    - Help us to improve the playbook
    - Help us to administer the playbook
    - Help us to develop partnerships
    - Help us to organize effective events
    - Help us to get the word out
    - Help us to scale the approach beyond Croton
  - Donate
  - Give carbon a seat at the table in all your decisions, big and small
- We can do it!

Launch

save the date

croton100 launch celebration
saturday, february 29, 10-noon
at croton harmon high school

Bringing together public-private partnerships to reduce carbon emissions to net zero by 2040 in the 10520 Croton community. For more information about Croton100, please visit **croton100.org**

leaping to a greener future now

Be the change you want to see in the world.

- Mahatma Gandhi