

CURE100 Master Plan

Draft version 16, last updated July 9, 2020



“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 2018

“This is our planet. This is our time to fight for it.”

- Climate.ny.gov, February 2020

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

- Greta Thunberg, school strike “Cry for Help” speech to Swedish Parliament, September 2018

“Climate change is a global problem. Yet ... looming catastrophic deadlines mean that local communities no longer have the luxury of sitting on the sidelines and waiting for national or international actors to ‘solve the problem.’ [W]e need to localize the fight against climate change.”

- Philipstown GHG Inventory Report, May 2020

“Our future is at stake. That’s why New York State is committed to the most aggressive clean energy and climate agenda in the country.”

- New York Climate Action Council

“If human societies do not get off fossil fuels within this decade, we will be operating in continual crisis mode – responding to increased typhoons, hurricanes, wildfires, and emerging infectious diseases.”

- IPCC 2019 report 10-year urgent warning

“Be the change that you want to see in the world.”

- Mahatma Gandhi

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1. Introduction

This document is the Master Plan for CURE100 (**C**ommunities **U**nited to **R**educe **E**missions **100%**) a not-for-profit 501(c)(3) corporation based in New York State.

1.1. Background

In keeping with the United Nations Intergovernmental Panel on Climate Change (IPCC) report issued in October of 2018¹, we seek to achieve global net zero Greenhouse Gas (GHG) emissions by 2040 to prevent overshoot beyond 1.5°C of global warming. We recognize the urgency of the crisis and the danger of multiple environmental tipping points if we fail. The report makes it clear that successful pathways involve *drastic emission reductions in the short-term*, and there is no wiggle room to allow for a slow start (see Figure 1). Hence, we have two top-tier goals: 50% net GHG reduction by 2030 and 100% net GHG reduction by 2040. All goals must be measurable, quantified and validated.

Today, global emissions are a little over 40 billion metric tons of carbon dioxide equivalent (CO₂e) annually – we seek to reduce this to net zero by 2040 by achieving a reduction of 2 billion metric tons per year. As of this writing, CO₂ in the atmosphere is 417.16 parts per million (ppm)², whereas for the sake of our planet and our health we need to bring this down to 350 ppm – this can only happen if we “bend the curve,” i.e., pull more carbon out of the atmosphere than we put into it.

Different countries have less and more work cut out for them to achieve net zero, and different resources that they can apply to the problem (see Figure 2³). Developing countries have a chance to leapfrog to a vibrant low-carbon economy. However, the methods used by CURE100 are universal and apply anywhere in the world. The IPCC stresses a quick start to this journey. In the short-term, we believe that there is “low-hanging fruit” that we can go after, due to the wasteful nature of our emissions today. In the medium-term, improved technology, lower prices and better expertise will accelerate the transformation. In the long-term, we believe that legislation will kick in to complete our transformation to 100% emissions-free living for all.

In New York specifically, decarbonization is supported by strong legislation and policy levers in the New York Climate Leadership and Community Protection Act (CLCPA)⁴ and a proposed “Freedom From Fossil

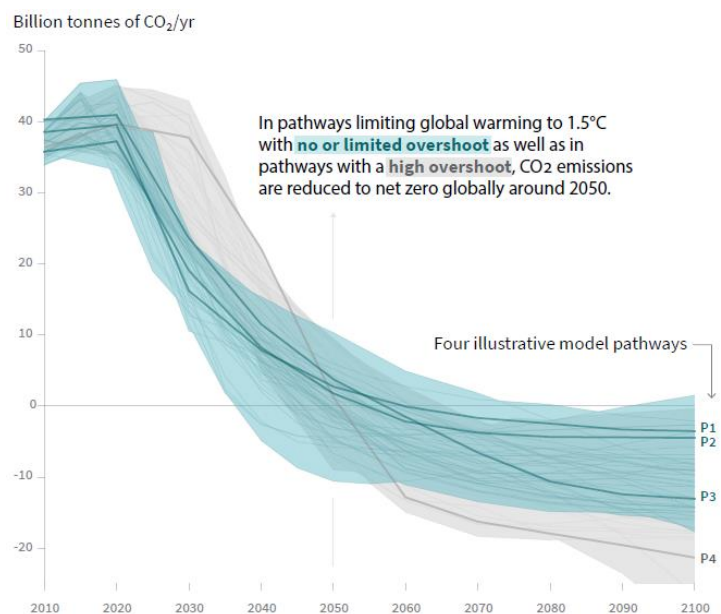


Figure 1 Global total net CO₂ emissions, grey pathways are unsuccessful in preventing 1.5°C overshoot

¹See <https://www.ipcc.ch/sr15/>

² See <https://www.co2.earth/>

³ See <https://www.economicshelp.org/blog/10296/economics/top-co2-polluters-highest-per-capita/>

⁴ See <https://climate.ny.gov/>

Fuel” act.⁵ We need to ride these winds of change and collaborate with the New York State Energy Research and Development Authority (NYSERDA)⁶ and New York State Department of Environmental Conservation (NYSDEC)⁷ to accelerate change at the local level.

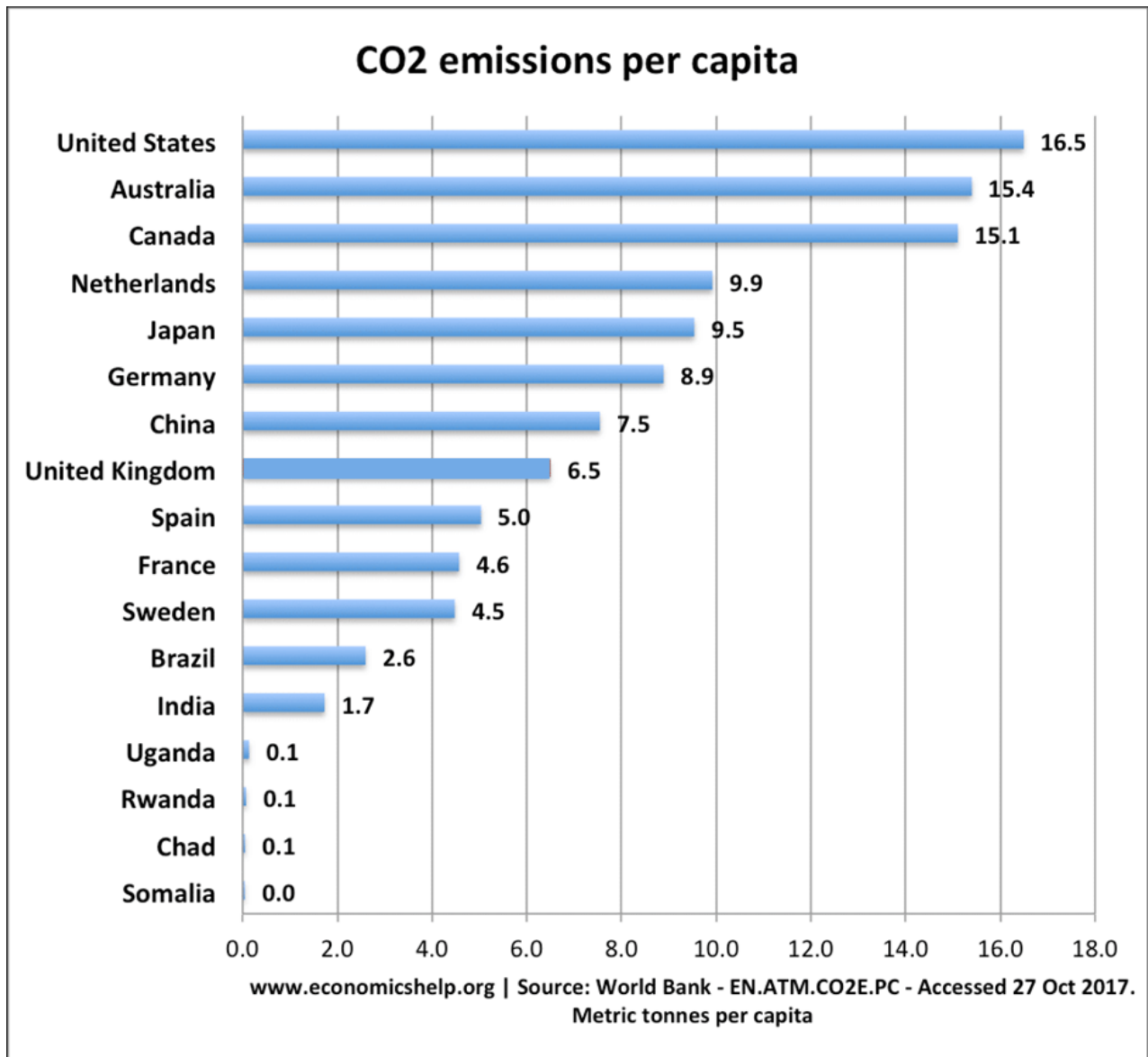


Figure 2 Per capita annual emissions (in metric tons) in selected countries

1.2. Mission statement

CURE100 is a not-for-profit consortium of communities that seeks to reduce global Greenhouse Gas (GHG) emissions to net zero by 2040, or 5% reduction per year, through a combination of advocacy,

⁵ See <https://www.nysenate.gov/newsroom/press-releases/jen-metzger/senator-jen-metzger-and-assemblywoman-nily-rozic-sponsor-freedom>

⁶ See <https://www.nyserda.ny.gov/>

⁷ See <https://climatesmart.ny.gov/>

education and campaigns at the local and global levels. These local and global communities will help each other to take urgent climate action to stave off the worst effects of climate change.

1.3. History

Croton100⁸ is a not-for-profit community-based volunteer organization in Croton on Hudson, NY (zip code 10520) launched in February 2020. Its mission is to reduce emissions in zip code 10520 to net zero by 2040, 5% per year.

The concept of Croton100 was so compelling that like-minded neighboring towns and communities expressed a desire to participate without having to “reinvent the wheel.” In particular, Croton100 developed a web-based application, the “Carbon Tracker,”⁹ which helps households quantify their annual carbon impact. The application uses a questionnaire that enables families to calculate their own household’s contributions to emissions based on answering questions about their home, transportation habits and lifestyle. It allows residents to compare their personalized carbon impact in various categories like transportation, food and electricity to the zip code average¹⁰. The reference numbers provide perspective and answer such questions as “Are we lower and better on some carbon sources, but higher and worse than our neighbors on others?”

The Carbon Tracker software may be licensed to not-for-profits at no cost. Neighboring communities were excited about this software to help residents create decarbonization plans and track carbon reduction at a community level. A logical way to achieve these goals was to rename Croton100 to CURE100 and amend the bylaws of CURE100 to allow for multiple chapters (of which Croton100 itself would be the first). Starting chapters would forever be called *charter chapters* of CURE100. The consortium concept provides five distinct advantages:

1. Chapters can start up quickly and inexpensively without waiting for 501(c)(3) non-profit certification from the IRS or attempting to line up and purchase insurance. The 501(c)(3) status is typically required for fundraising and licensing certain software like the Carbon Tracker.
2. Chapters can receive collateral, best practices, sharing of web sites, software applications, videos, expertise, campaign ideas, resources, etc., from CURE100.
3. CURE100 can take advantage of the best talent and resources from among its chapters, and then spread those best practices to all other chapters. Thus, members will have the opportunity to create impacts far beyond the borders of their towns.
4. There is strength and energy in numbers, particularly in an uphill battle like this one. We must interconnect people and communities worldwide so they can increase their aggregate power to drive change.



Figure 3 CURE100 mascot... the Decarbonizer bunny keeps going, and going, and going

⁸ See <https://www.croton100.org>

⁹ See <https://croton100.org/carbon-tracker>

¹⁰ See <https://coolclimate.berkeley.edu/> which we use (along with other data sources) to provide zip code averages for any zip code in the U.S.

5. To gain efficiency and make the most of meager volunteer resources, local campaigns can be run regionally instead of by individual communities.

1.4. Partnering with the public sector

CURE100 works closely with -- but separately from -- public sector entities. We urge chapters to do the same. The benefits of this approach are numerous:

- Leverage support from public sector organizations (state agencies, counties, cities, towns and villages).
- Provide continuity for CURE100 across political transitions in the public sector.
- Develop consistency and constancy to execute a very long-term plan.
- Ability to raise funds for CURE100 from private, nonprofit and public sector sources.
- Move with a sense of urgency and purpose, far faster than legislation can be enacted or, in some cases, than government efforts can move.

2. Chapter structure and autonomy

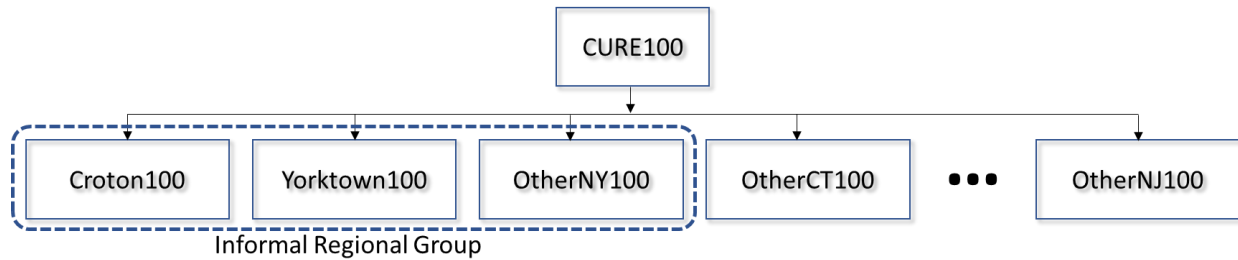


Figure 4 CURE100 is a consortium of community organizations

As shown in Figure 4, Croton100 will itself be the first charter chapter of CURE100, along with Yorktown100 immediately thereafter. Chapters that join CURE100 at the time of launch will be called *charter chapters*. Over time, we expect multiple communities to join the consortium. Some of these communities could form informal “Regional Groups” as shown in the dotted oval in the Figure. For example, all communities in New York would benefit from understanding New York State policies and incentives, but these would not be relevant outside of New York.

The chapter structure will be a loose federation in which each chapter manages its own finances, chooses its own campaigns, accounts for its community’s carbon reduction, takes responsibility for its own governance and acts with a great deal of autonomy. Chapters will typically have their own boards. However, the chapters must have certain required elements in their mission, values, code of conduct, carbon accounting methodology and operations, which will be explained in a subsequent section of this document.

3. Branding

We propose the name “CURE100” to indicate that we are fighting a planetary affliction (that of excessive carbon), and the “100” in the name denotes the march toward 100% emissions-free living by 100% of the population. We are interested in reducing 100% of the net emissions economy-wide, not just municipal operations or not just in the electricity sector. We are interested in involving 100% of residents, households, businesses and facilities in this march to net zero. The health of our planet and future generations depends 100% on the success of this mission.

A proposed CURE100 logo is shown in Figure 5 on the right. The idea is to use the same thematic elements as the Croton100 logo, so that it is clear that Croton100 is a chapter of CURE100. A high-resolution version is included in Appendix A, with gratitude to Croton resident Deb Hayn for her outstanding artwork.



Figure 5 Proposed CURE100 logo

All chapters will be required to have “100” in their name to indicate their affiliation. A typical name would be the community name followed by “100” such as “Yorktown100.” Using a logo consistent with that of CURE100 would be optional but encouraged.

4. Shared values

It is very important for a new organization to write down its values. They will guide us in difficult situations. Some of the values below come from our experience with Croton100, some from various leaders' quotes and some from other environmental organizations. We believe it is important to set down values at the outset and ask chapters to adopt this set of values. We expect the values to be revisited from time to time, so this should be treated as a living document.

1. Our goal is nothing short of changing the world. We think globally and act locally.
2. We seek a world for future generations that is cleaner, healthier and economically more vibrant. We believe this can be achieved by a truly circular economy¹¹ where everything is sustainable and there is no waste.
3. We care deeply about our planet and all its creatures, and believe it is our duty to protect them.
4. We are singularly focused on carbon reduction and we strive to do it well.
5. We unite behind the science and scientists – we believe in the enlightenment provided by science, knowledge, education and awareness.
6. We are a data-driven organization. We believe in quantification, measurement and validation.
7. We always give carbon a seat at the table. Carbon first, egos and politics last.
8. We are non-partisan. We do not endorse any political party or political candidate. We believe that reducing carbon is a matter of good common sense for all people of every political persuasion. We seek to create as inclusive a tent as possible for our carbon-reduction mission, reflecting the “100” in our name.
9. We strive to be respectful and collaborative, while boldly and aggressively pursuing carbon reduction.
10. We share our work and ideas. We value openness and transparency. Open and honest communication is the lynchpin of our leadership and underlies all of our activities.
11. We are not judgmental. We will help people understand their carbon footprint and how to lower it and try not to shame anyone in the process.
12. We believe in the power of neighbors influencing neighbors to reduce emissions. We believe in the power of partnership.
13. We think and act with a sense of urgency. We seek to be rapid, far-reaching and unprecedented in our actions every single day.
14. We live the change that we seek in the world. We must be shining examples of decarbonization in our respective communities.
15. We understand that we are in this journey for the long haul. This is an uphill marathon, not a sprint.

¹¹ See <https://croton100.org/blog/f/from-a-vicious-cycle-to-a-virtuous-cycle>

5. Methodology

At its heart, CURE100 is a carbon-reduction organization. We believe in individual responsibility and community action to make progress. Thus, our chapters focus on an individual community and run quantified decarbonization campaigns at a local level. In Section 5.1, we present our macroeconomic view of the coming societal transformation. Then Section 5.2 describes our overall methodology using Croton-on-Hudson (zip 10520) as an example. The role of the Carbon Tracker software is discussed in Section 5.3, while Section 5.4 enumerates examples of decarbonization campaigns that can be replicated across chapters. This Section concludes with “Health and pocketbook considerations” in Section 5.5.

5.1. Macroeconomic view of the coming societal transformation

The 21st century will witness a series of profound macro-economic decoupling forces.

Strong historical data from the past century shows a tight coupling: the more advanced and prosperous an economy, the more energy that economy uses. Unfortunately, this coupling sets up a vicious cycle. We optimize our economic policies to maximize wealth, leading to higher consumption, a larger Gross Domestic Product (GDP), with growth in total goods and services. More goods and services imply more energy use – more manufacturing, more miles driven, more gasoline consumed, more electricity, more natural gas, all leading to ever-higher emissions of greenhouse gases. In the fossil fuel economy of the last century, the unbridled growth of emissions results from a vicious cycle (see Figure 6) pushing us to the brink of environmental catastrophe with its concomitant health, extreme weather and climate instability problems. We appear to have concluded that increased wealth can only be achieved with higher emissions, or at minimum that a strong correlation exists between wealth and emissions.

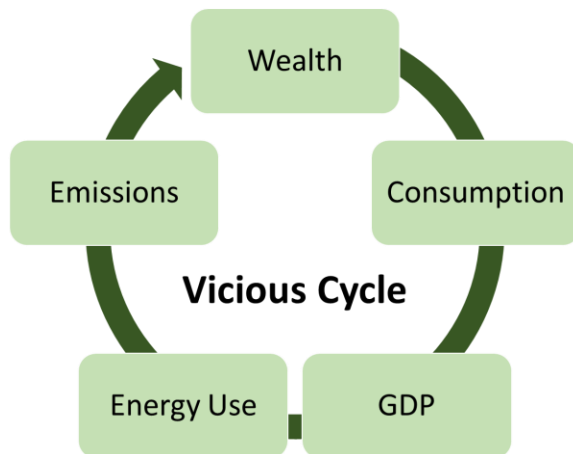


Figure 6 Macroeconomic vicious cycle

Our policies and consumption behaviors must evolve to convert this vicious cycle to a virtuous cycle.

We must ask ourselves: Are we optimizing the right metrics?¹² Is unbridled pursuit of wealth without regard to environmental and societal impacts the right goal? Is increased consumption always good? Do more goods and services always need more energy? Does more energy always mean more emissions?

Every nexus in the “Vicious Cycle” must be systematically decoupled! Let us for a moment replace “Wealth” by “Quality of Life”

(see Figure 7). Isn’t “quality of life”¹³ the right metric that better represents inherent tradeoffs? Optimizing quality of life doesn’t mean limitless consumption, but rather sustainable production and

¹² See <https://markets.businessinsider.com/news/stocks/why-gdp-is-imperfect-metric-for-measuring-economic-strength-alternatives-2019-8-1028647964> and <https://www.newstatesman.com/politics/economy/2019/06/why-we-urgently-need-real-alternative-gdp-economic-measure>

¹³ See <https://gnhusa.org/genuine-progress-indicator/>, <http://www.oecdbetterlifeindex.org/about/better-life-initiative/> and <https://ethical.net/politics/gdp-alternatives-7-ways-to-measure-countries-wealth/>

consumption, toward a truly circular economy in which every material gets re-used or recycled and nothing wasted. Ideally, we will improve our quality of life while optimizing its circularity! When it comes to energy use, we must do more with less (consider that LEDs are 6 times more efficient than incandescent bulbs, Electric Vehicles up to 5x more efficient than gas vehicles, heat pumps 4 times more efficient than furnaces). The requisite energy must be produced with zero emissions from essentially limitless renewable sources. The latter is achievable, as noted in numerous articles elsewhere, by a combination of solar, wind, battery storage and beneficial electrification. We have the technology to do this rapidly¹⁴, but do we have the will to redefine the metrics that we will optimize?

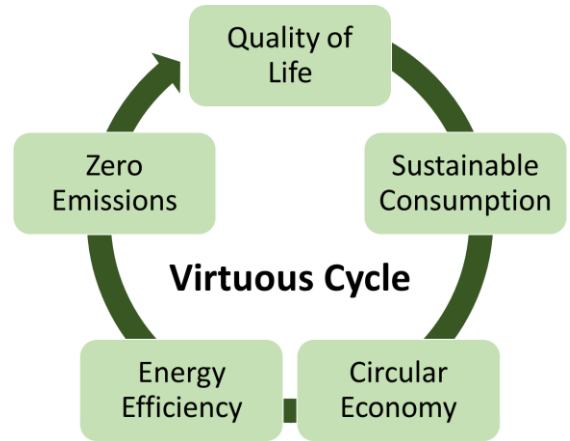


Figure 7 Macroeconomic virtuous cycle

The virtuous cycle provides the positive feedback that will ensure a higher quality of life while protecting the environment to give all humans the clean air, clean water and stable climate they deserve. There are multiple virtuous sub-cycles within the bigger virtuous cycle. One example is that as we move to plant-based diets, emissions will reduce while human health improves. Another example is that heat pumps will improve indoor air quality with attendant health benefits. As we move away from burning fossil fuels, there will be fewer particulate emissions in the air, vastly reducing asthma, emphysema, lung cancer and cardiovascular disease. The circular economy will reduce landfills, eliminate incineration of waste, and prevent uncontrolled amounts of garbage and plastic ending up in our rivers and oceans.

The solution is to make these virtues as measurable and evident as money is in today’s vicious cycle. Today’s economy considers these quality of life issues mere “externalities” – they need to be front and center as first-order metrics in the virtuous cycle.

By our consumption choices and behaviors, each of us has a part to play in this transformation. Policy makers, regulators and legislators at all levels in all countries bear a high responsibility to move us quickly from a vicious cycle to a virtuous cycle before it is too late. CURE100’s mission is to accelerate this transformation through a grassroots movement of decarbonizers.

5.2. The example of Croton-on-Hudson, NY (zip code 10520)

The average household emissions in zip code 10520 are shown in Figure 8.

The seven pillars in the figure represent “carbon sources.” The pillars are divided into “Big hitters,” “Day-to-day” and “Partners.” In each category, carbon can be reduced by simple and inexpensive “low-hanging fruit,” medium-term improvements, and longer-term improvements to achieve truly net zero. We rely on a carbon “step-down” methodology that is explained in detail in Appendix B.

The “Zip code overhead” pillar represents the carbon emissions from non-residential sources like offices, businesses, houses of worship, public spaces and municipal operations. These carbon emissions are

¹⁴ See <https://e360.yale.edu/features/how-renewable-energy-could-emerge-on-top-after-the-pandemic>

apportioned equally like a tax on all households, so as to bring these emissions into the realm of personal responsibility and keep up the pressure on decarbonization in this sector.

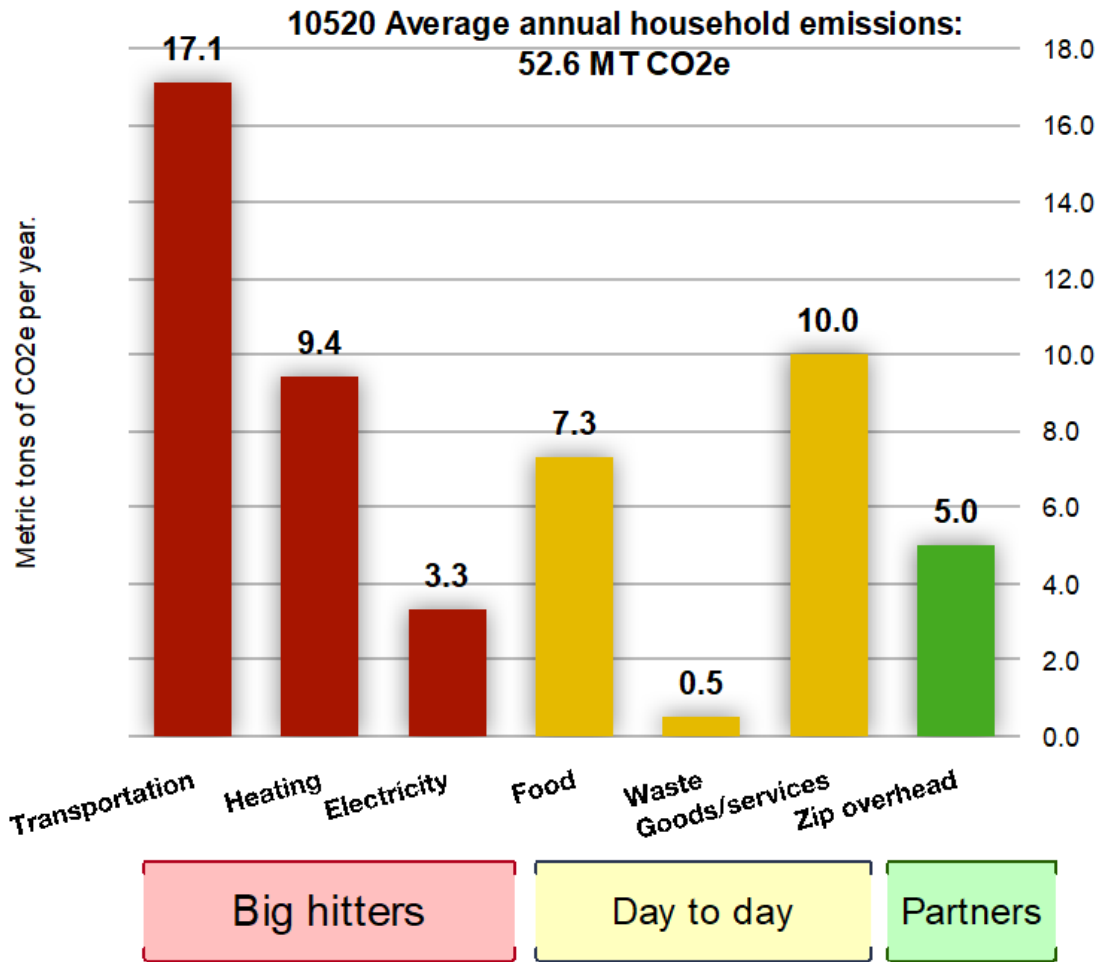


Figure 8 Annual average household emissions in Croton-on-Hudson, NY (zip code 10520)

The overall decarbonization methodology is simple:

1. Help residents establish their baseline carbon impact, while providing reference zip code average amounts to put the numbers in context.
2. Help residents to create decarbonization plans, with three elements:
 - a. Short-term, easy, inexpensive improvements.
 - b. Medium-term improvements to get to 50% carbon reduction by 2030.
 - c. Longer-term improvements necessary to achieve net zero carbon.
 Planting seeds of future change early is extremely important.
3. Keep track of improvements at the household and community levels.
4. Revisit and re-plan campaigns on a yearly basis.

5.3. Role of the Carbon Tracker software application

To support the above methodology, CURE100 has developed a Carbon Tracker app¹⁵ to establish and continually update each participating household's carbon footprint. CURE100 will provide a customized version or access to such version on each chapter's website. The application is an intuitive web-based tool. It can be used on any platform (smartphone, tablet, laptop) with any modern browser, and it serves multiple purposes:

1. Provides a comprehensive and quantified household carbon footprint calculation.
2. Creates awareness of the biggest contributors to carbon footprint.
3. Dispels myths and provides clarity.
4. Allows for household and community-level tracking of carbon reductions.
5. Creates a convenient framework for planning future decarbonization.



The Carbon Tracker relies on multiple studies and data sets in the public domain.¹⁶ While we recognize that we can only reduce what we measure in an objective and transparent manner, we understand that accounting for every ton of carbon emission is tricky and complex. We should not let perfection stand in the way of progress. The Carbon Tracker represents a carefully chosen tradeoff between accuracy and simplicity. The Tracker's questionnaire identifies the largest sources of emissions for each household.

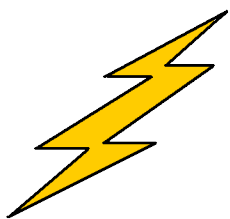
As such, many of the carbon reporting requirements on chapters explained in the next section will be automated via the software application and a concomitant data lake, which play a central role in our methodology. The data lake will allow extensive cross-community data mining and establishment of correlations, which in turn will provide scientific insights and drive ongoing improvements in how campaigns are designed and targeted.

5.4. Sample carbon-reduction campaigns

CURE100 will only be successful if we try numerous carbon-reduction campaigns, refine them, choose the best, replicate in all chapters, and then rinse and repeat. Of course, these campaigns should be tailored to local conditions and regulations.

Below is a brief list of ten active campaigns¹⁷ being undertaken by Croton100 to provide examples of the types of campaigns possible. The beauty of CURE100 is that the work of developing campaigns, creating collateral, expertise to run the campaigns, and learnings can quickly be shared across all chapters. This sharing is a requirement of being a part of CURE100.

5.4.1. Operation Thunderbolt



The key idea in Operation Thunderbolt is to establish a Community Choice Aggregation (CCA) program so that residents get 100% clean power as an opt-out default. In other words, unless existing residents or new accounts make an affirmative choice to choose an Energy Service Company (ESCO), they will get a negotiated 100% clean power source. In this manner, a significant fraction of

¹⁵ See <https://croton100.org/carbon-tracker>

¹⁶ See <https://croton100.org/blog/f/croton100-carbon-tracker-peering-behind-the-curtain>

¹⁷ See <https://croton100.org/campaigns>

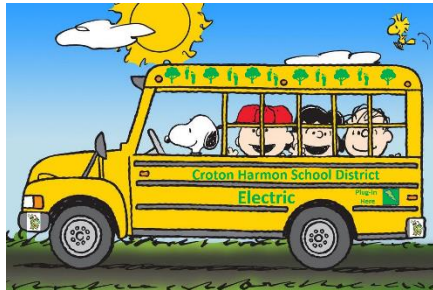
residential use can be moved to clean power at the community level in a flash. (No pun intended.)

5.4.2. Promoting Green Power

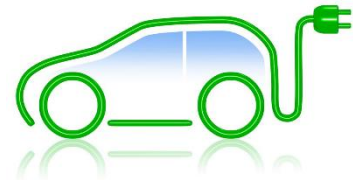
The key idea in this campaign is to serve as an aggregator for larger electricity users, the so-called EL-9 rate class. With sufficient interest, these large commercial accounts can be moved to a 100% clean energy supplier while generating savings for the customers as well as a stream of funding for a CURE100 chapter per kWhr consumed. The commercial segment, of course, is very sensitive to electricity prices, so the plan hinges on being able to find a suitable clean energy supplier for the aggregated demand.



5.4.3. Electric Vehicle Campaigns



Since the transportation sector is one of our biggest emitters, this campaign addresses an important aspect of decarbonization. The campaign promotes knowledge and awareness of electric vehicles, charging options, subsidies and rebates. An important dimension of this campaign is to convince school districts to electrify their school



bus fleets. See the Resources tab of Croton100¹⁸ for more information.

5.4.4. Operation Office Hours

The purpose of “Office Hours” is to guide residents in small groups through using the Carbon Tracker software to establish their baseline carbon emissions profiles. Even through COVID-19, we have been successful in a weekly virtual edition of Office Hours. Before the end of the session, residents are encouraged to make their short-term, medium-term and long-term decarbonization plans.



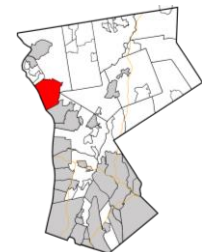
5.4.5. Operation Couch Carbon Cutting



The idea behind “Couch Carbon Cutting” is to give residents simple things they can do from the comfort of their couch,¹⁹ such as a simple phone call to order inexpensive LED bulbs through utility-offered programs, or switching to biodiesel B20 for their oil furnaces, or switching to a Community Choice Aggregation (CCA) or renewable Energy Service Company (ESCO), or scheduling a home energy audit.²⁰

5.4.6. Operation Zip Code Overhead

The goal of this campaign is to systematically reduce emissions from public spaces like municipal operations, businesses and houses of worship by 5% a year. While the decarbonization techniques are similar to residences, the approach is different, and we find plenty of low-hanging fruit, such as houses of worship that are poorly insulated or have inefficient and aging heating and cooling equipment.



¹⁸ See <https://croton100.org/resources>

¹⁹ See <https://croton100.org/couch%2C-cutting-carbon>

²⁰ See <https://croton100.org/blog/f/when-you-save-energy-you-save-money>

5.4.7. Operation Data Digger



The main purpose of this campaign is to keep track of decarbonization activities across the community. Data is collected from various sources including Census data, Carbon Tracker data, NYSERDA (or other agency) subsidy records and local vendors. All this data is collected in a data lake for analysis and reporting, and will feed into the annual decarbonization reports. While the Carbon Tracker is geared toward measuring household carbon emissions, this campaign seeks to integrate all carbon reduction activities into the community-wide quantification system.

5.4.8. Sustainability Actions

This campaign primarily provides community engagement. Sustainability actions consist of 4 themes: diet modification, gardening, composting and pollinator pathways. While only diet modification has the promise of yielding meaningful carbon reductions, the idea is to pull in like-minded people, have them create a profile in the Carbon Tracker and then interest them in other carbon-reduction techniques.



5.4.9. Operation Heat Smart

This campaign seeks to reduce carbon impact from heating and cooling by low-hanging fruit and substantive solutions. We recommend free home energy audits which may lead to improving insulation or installing programmable thermostats, while substantive solutions comprise air-source and ground-source heat pumps. Education about heat pumps and knowledge of subsidies and tax incentives are critical to this campaign.

5.4.10. Operation Matrix Multiplier

Operation Matrix Multiplier is a catch-all term for engaging residents in one carbon-reducing activity, and then (via the Carbon Tracker) getting them interested and inspired in voluntarily decarbonizing in other ways. The matrix has groups of people (e.g., library book groups) in rows and carbon-reduction activities (e.g., LED bulbs) in columns, and we track the carbon-reduction targets and actuals in the cells of the matrix.



5.5. Health and pocketbook considerations



How do we convince people to participate in these campaigns? Answer: What's good for the planet is good for its residents. A common theme in our "step-down" methodology is that decarbonizing actions will improve the environment AND improve health (primarily in the form of reduced particulate emissions) AND save money! Some actions require almost no up-front investment, while others require an up-front investment that pays for itself over time.

Here are relevant pocketbook considerations for steps that residents, businesses and facilities can take, from simple to more involved:

- Avoiding food waste is a simple matter of being thoughtful in planning meals and grocery shopping. The savings can add up over time, to say nothing of reducing emissions that would be expended for the needless cultivation, harvesting, transportation and processing of wasted food.

- Practicing low carbon diets like “Meatless Mondays” and “Vegan Wednesdays” that contribute to long-term health and also save money.
- Undergoing a home efficiency audit that is available for free courtesy of the local utility in most parts of the country. Many items identified by such audits (e.g., better caulking of windows, insulating attics, fixing door jambs, installing exhaust fans, better windows) pay for themselves in a matter of one season, and low-cost financing is often available for such repairs.
- Investing in solar panels makes a homeowner eligible for a credit from NYSEERDA, as well as an income tax credit from both New York State and the federal government. Net out-of-pocket costs are typically recovered in about 7 years in the form of reduced utility bills, and after that, electricity produced for the lifetime of the panels is a free gift from the Sun.
- Signing up for community solar whereby a third-party operates a solar farm which can typically generate 10% electricity savings for residents from day one. These programs are ideal for renters who have their own electric meter, homeowners whose properties are too shady for solar, or people who cannot take on the investment of their own solar installation.²¹
- Installing a more efficient HVAC (Heating, Ventilation and Air Conditioning) system means energy savings every single season. Ground-source heat pumps also qualify for a 30% federal tax credit. The Total Cost of Ownership (TCO) of a more efficient furnace or heat pump system is lower than a traditional oil furnace taking into account initial cost plus maintenance plus fuel cost over the lifetime of the equipment.
- Moving to a hybrid or electric vehicle saves money! While the initial cost may be higher in some cases, consider that the TCO of a Tesla Model 3 works out to no more than a Camry or Accord once you include fuel cost over the lifetime of the car. Internal combustion engines have many more moving parts than electric vehicles which have no engine, no transmission and no exhaust system, resulting in lower maintenance and repair costs for electric vehicles. To say nothing of avoiding oil changes...

CURE100 chapters need to be in a position to advise residents in detail about available subsidies, recommended brand and vendor choices, and return-on-investment calculations so that residents can make informed decisions. Also, CURE100 will have buying power to negotiate special prices from vendors/suppliers.

²¹See <https://ecogyenergy.com/croton-community-solar> and <https://sustainablewestchester.org/solar/>

6. How chapters work

6.1. Chapter benefits

CURE100 exists to make its chapters successful. CURE100 is successful only if its chapters are successful. We want to make it quick, smooth and frictionless for a chapter to begin its carbon-reduction work. We also want the chapter to obtain maximum leverage from Croton100's collateral materials, resources, documents, spread-sheets, software, social media content, website, know-how and campaigns. Every chapter receives from CURE100 the following:

1. Not-for-profit status: The new entity gets this status immediately once it becomes a chapter of CURE100. Therefore, it can begin fund-raising and issue not-for-profit receipts within IRS guidelines. Checks can be made out to the chapter name and banking/accounting is fully handled by each chapter, subject to some reporting responsibilities in Section 6.2.
2. Insurance: Every time a chapter is added, CURE100 has to check with our insurance carrier to expand coverage as necessary, which will of course add some incremental cost. Coverage typically includes general liability, cyber security, Directors and Officers insurance, etc. Insurance will allow the chapter to immediately host events at the local community center, municipal building or school. The details of the insurance policy will be provided to each chapter. Individual chapters are responsible for understanding and adhering to the insurance policy.
3. Website: Each new chapter will have a choice of purchasing its own domain, or getting a sub-domain under CURE100 (e.g., www.CURE100.org/anytown100). The chapter web site will be free to point to certain key pages of the CURE100 website.
4. Software: The new chapter will immediately get access to the Carbon Tracker app by signing a free software sublicense. The app can then be customized and installed on the chapter web page via a launch page and launch button.
5. Know-how: CURE100 will share best practices and lessons learned with all chapters. This will be in the form of a Knowledge Base of documents and expertise that evolves over time.

6.2. Chapter responsibilities

Each chapter has the following responsibilities:

1. Adoption of pledge, values and mission: Each chapter must substantially adopt CURE100's pledge²², values (see Section 4) and mission statement (see Section 1.2). The CURE100 pledge is reproduced in Appendix C. A chapter may adopt additional values or additional dimensions of mission but cannot remove any CURE100 values or mission elements. A chapter is permitted to reword the pledge, but it must substantially capture the spirit of the CURE100 pledge. If CURE100 changes the mission, pledge or values, it must extensively consult chapters before passing changes by a majority board vote, and chapters in turn must accept such duly instituted changes.
2. Annual dues: If CURE100 is reasonably well funded, the goal will be to keep the dues to zero. However, there may be annual dues in certain years to cover insurance, web hosting, software development, and legal and administrative costs that exceed CURE100's own fund-raising.
3. Naming: Every chapter must have "100" in the name to perpetuate the brand. A typical name is "Anytown100" but names like "Sustainable Anytown 100" are also permissible.

²² See <https://croton100.org/pledge> and Appendix C

4. Know-how: Each chapter must contribute to maintaining and enhancing the Knowledge Base by sharing its expertise, experiences and best practices. This sharing will be a mandatory part of annual reporting.
5. Growth: Each chapter must help with the formation of additional future chapters.
6. Carbon reporting: Each chapter must set a detailed carbon target at the beginning of each year and report actual carbon reduction at the end of the year. As a practical matter, once the Carbon Tracker and concomitant data lake evolve to their full potential, we expect these reporting requirements to be automated. By mining the data, CURE100 will know which chapters are doing well and need a pat on the back, and which need help, and what campaigns are most likely to succeed. Some of the “learning” and “sharing” across chapters will be accomplished by this data mining process.
7. Financial reporting: See Section 0.
8. Code of conduct: Must abide by a written code of conduct in order to continue to be a CURE100 chapter. Please see Appendix D.
9. Legal: Each chapter must agree to abide by CURE100’s bylaws, listed in Appendix E.

6.3. Governance

Each chapter is designed to be autonomous and have the authority to tailor its efforts and governance to the local situation. Each chapter will have its own web landing page, its own social media handles and its own social media presence. While (neighboring) chapters can share events and volunteers, they are under no obligation to do so. Each chapter thus chooses its own campaigns and how to execute them, organizes its own events and volunteer meetings, and engages with local governments and agencies in a way that it deems best. Each chapter can also issue publications and press releases that conform to the Code of Conduct in Appendix D without permission from CURE100.

7. Funding issues

CURE100 is a not-for-profit 501(c)(3) corporation. It will raise funds by various means:

- Private donations.
- Grants based on submitting grant proposals to foundations, trusts, government agencies, not-for-profits, donor-advised funds and other funding sources.
- Corporate donations and sponsorships.
- Success and referral fees for customer acquisition for solar farms, electricity community choice aggregation programs, smart charging rewards programs or other customer aggregation initiatives.

These funds will be used for insurance, events, campaigns, advertising, promotions, legal fees, software development, web hosting, administrative staff, educational programs, travel and other expenses.

The idea is to provide the maximum possible help to chapters with the minimum possible financial burden. If CURE100 secures adequate funding, there will be no dues from chapters, otherwise, there will be minimal annual dues to cover costs. Thus, it is up to each chapter to decide whether or not to raise funds (over and above dues if any), and how they want to spend such funds (whether for events, campaigns, education, hiring staff, travel, etc.). The only requirement is annual reporting to CURE100 in a templated format for tax filing purposes, described in Appendix F.

8. Miscellaneous considerations

8.1. Procedures for onboarding chapters

We are developing a checklist and onboarding sequence of activities for new chapters in Appendix G.

8.2. International chapters

We are open to the creation of international chapters. There is already some interest in the Japan and India. Such interest could develop into international chapters. Of course, the local chapters in these countries would be in a different category in a few ways:

1. They have to obtain their own not-for-profit status and insurance as necessary.
2. They will likely form an informal regional group.
3. The Carbon Tracker app presently provides average household carbon values only for zip codes in the U.S. Perhaps international chapters can help us to make the tool truly global.
4. Their carbon reporting requirements are unchanged, but they are exempt from financial reporting since they file their own taxes as necessary.

9. Conclusions

CURE100 is a consortium of local and global communities that help each other to take urgent climate action to stave off the worst effects of climate change. What could be more compelling and empowering? Please get in touch with us at admin@croton100.org if you would like to be a chapter of CURE100.

Appendix A: High-resolution logo

See Figure 9 for a high-resolution version of CURE100's proposed logo.



Figure 9 Proposed CURE100 logo

Appendix B: “Step Down” Methodology for Emissions Reduction

The CURE100 methodology relies on “step down” activities wherein each of us can take small or big steps down the carbon ladder in each pillar or source of carbon such as transportation, electricity, heating, etc. This section describes the various step-down opportunities available to us.

Vehicle transportation

Making use of the EPA carbon footprint calculator, we consider an average car that is driven 11,398 miles per year at an average fuel economy of 21.6 mpg, emitting 4.765 metric tons of CO₂ per year. This leads to the following table of emission reduction opportunities.

Type of car	Mileage (mpg)	CO ₂ emissions (tons/year)	CO ₂ reduction from previous line (tons/year)
Large SUV (GMC Savana or Chevy Express)	11.9	8.650	N/A
Family car	21.6	4.765	3.885
Hybrid	43.2	2.383	2.383
Plug-in hybrid	86.4	1.191	1.191
Fully electric	∞ (assuming clean electricity)	0	1.191

Emissions “step down” by choice of vehicle is illustrated in Figure 10.

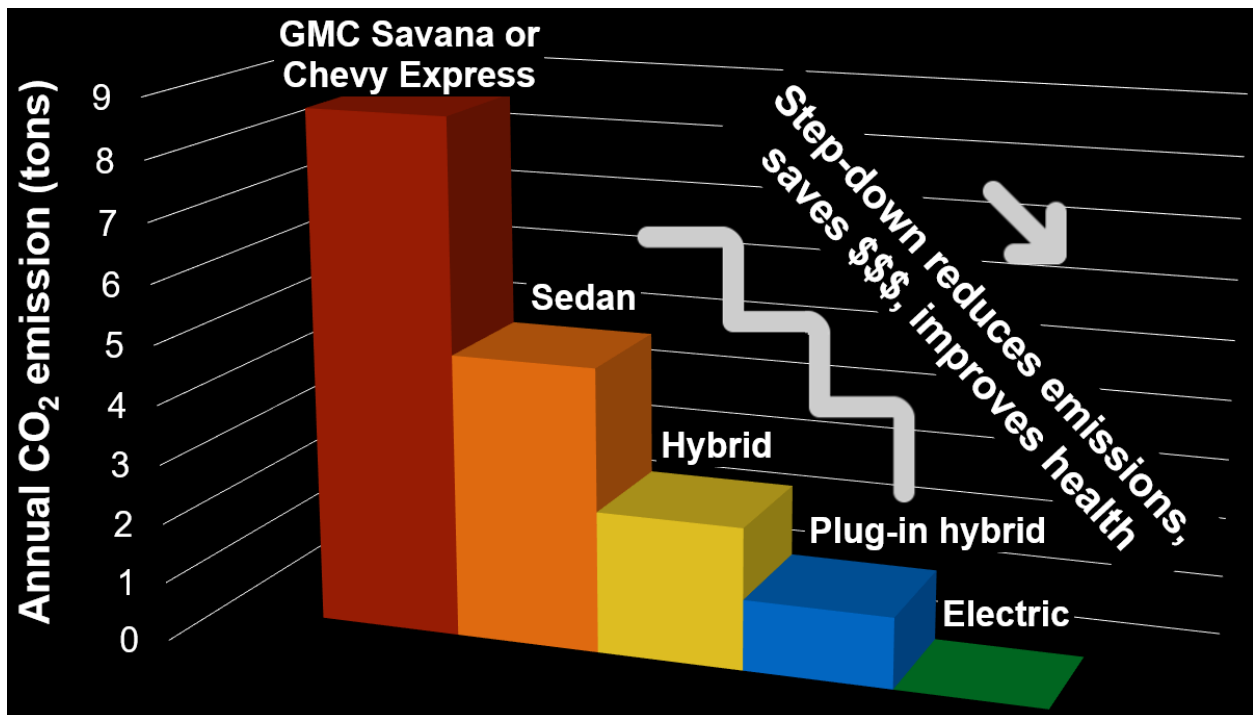


Figure 10 Emissions “step down” from vehicle choices

Airline transportation

Airline transportation is particularly deleterious to the environment because of burning jet fuel at a high altitude. Taking this into account, the carbon emission from a passenger seat on commercial airlines is

approximately 133 kg per hour of flying in economy class and 400 kg per hour of flying in business or first class (since more fuel ascribed to each passenger in business or first class because more space is occupied).²³ Thus, we derive a table like the one below and a step-down chart as shown in Figure 11.

Class	Type (round trip)	Average duration (hours)	CO ₂ emissions (tons/year)	CO ₂ reduction from previous line (tons/year)
Business/first	Super-long haul	15 x 2	12.0	N/A
Business/first	Long haul	7 x 2	5.6	6.4
Economy	Super-long haul	15 x 2	4.0	1.6
Business/first	Short haul	3 x 2	2.4	1.6
Economy	Long haul	7 x 2	1.9	0.5
Economy	Short haul	3 x 2	0.8	1.1

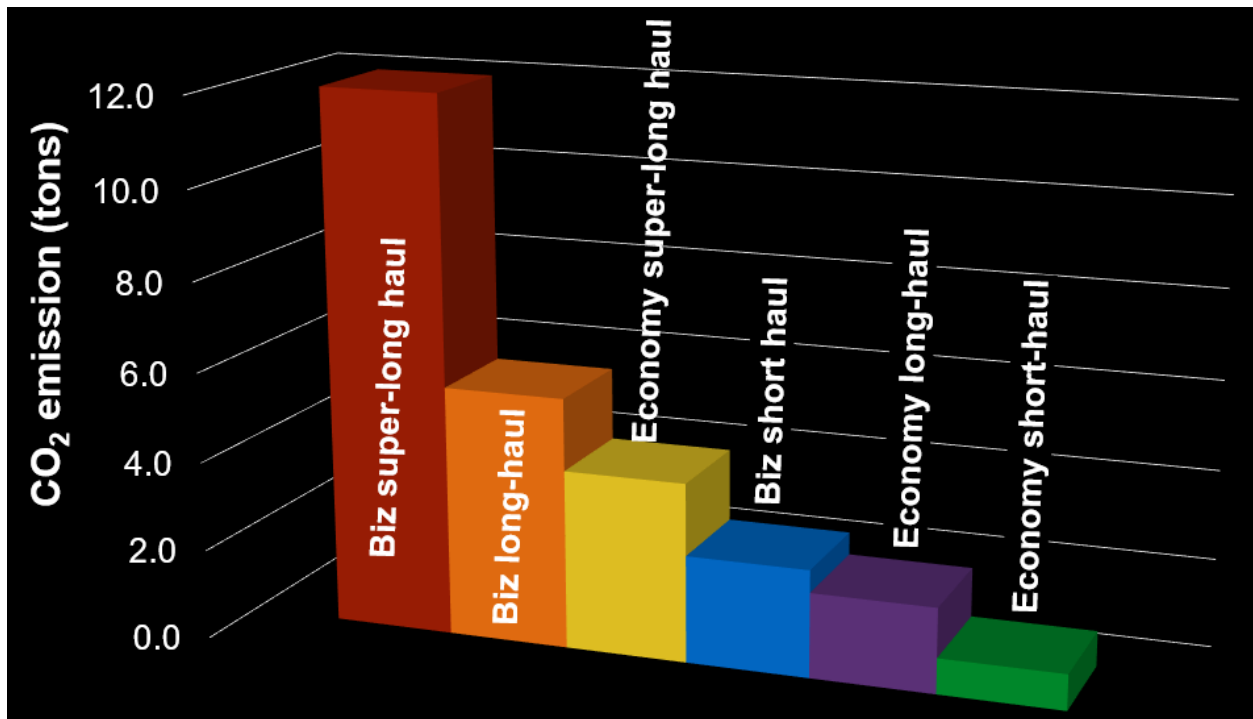


Figure 11 Emissions from a single airline flight round trip

Home heating

The average home (area 2,392 square feet) uses 66,000 cubic feet of natural gas or 551 gallons of fuel oil for heating or 464 gallons of propane annually. This leads to the following table of emission reduction opportunities.

Type of heating	Consumption	CO ₂ emissions (tons/year)	CO ₂ reduction from previous line (tons/year)
Fuel oil	551 gallons	5.652	N/A
Fuel oil with biodiesel 20% (B-20)	551 gallons	4.815	0.837

²³ See <https://www.carbonindependent.org/22.html>

Natural gas	66,000 cubic feet	3.587	1.228
Propane	464 gallons	2.621	0.966
Heat pump	0 (assuming clean electricity)	0	2.621

Emissions “step down” by heating choices is illustrated in Figure 12. The benefits of natural gas are nullified by leakage in the gas pipeline system and the fact that unburned methane is a powerful greenhouse gas causing 80 times the heat-trapping harm of CO₂ in a 20-year period.

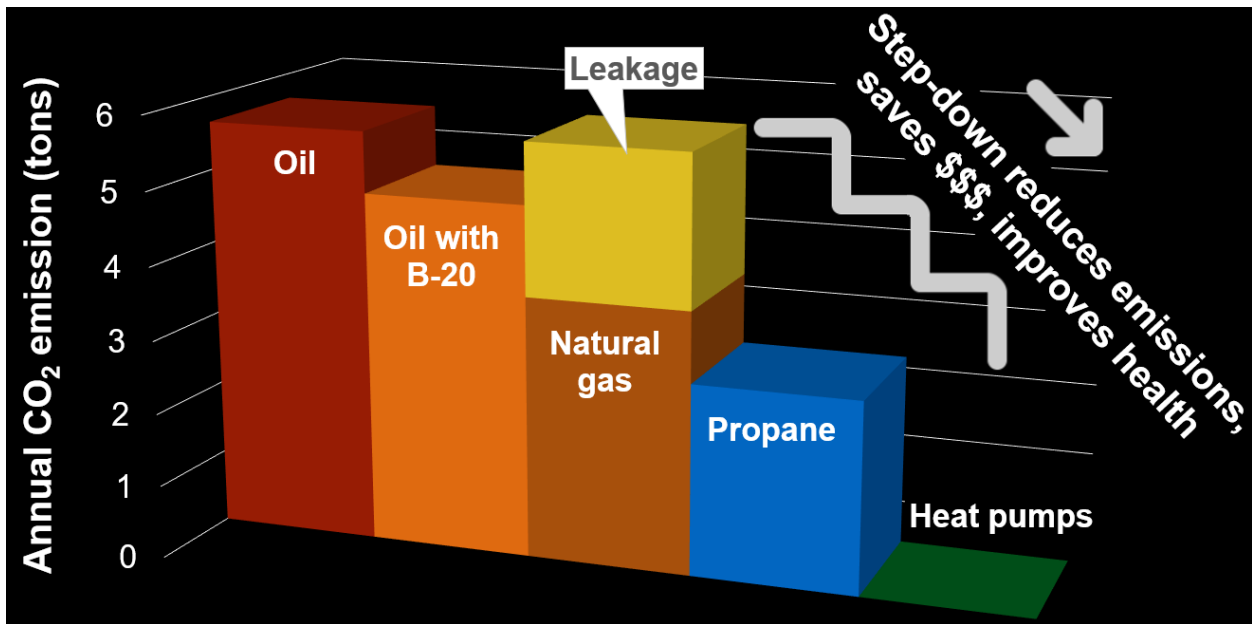


Figure 12 Emissions “step down” from heating choices

Electricity

The average U.S. home uses 11,320 kWh of electricity per year for an average household size of 2.57 members. This leads to the following table of emission reduction opportunities.

Type of electricity	Percent clean electricity	CO ₂ emissions (tons/year)	CO ₂ reduction from previous line (tons/year)
Dirty electricity from grid or diesel generators	0%	6.373	N/A
Cleaner grid	(say) 25%	4.780	1.593
Community choice aggregation	(say) 50%	3.187	1.593
Solar panels	(say) 75%	1.593	1.593
Clean (any source or a combination)	100%	0	1.593

Emissions “step down” from electricity choices is illustrated in Figure 13.

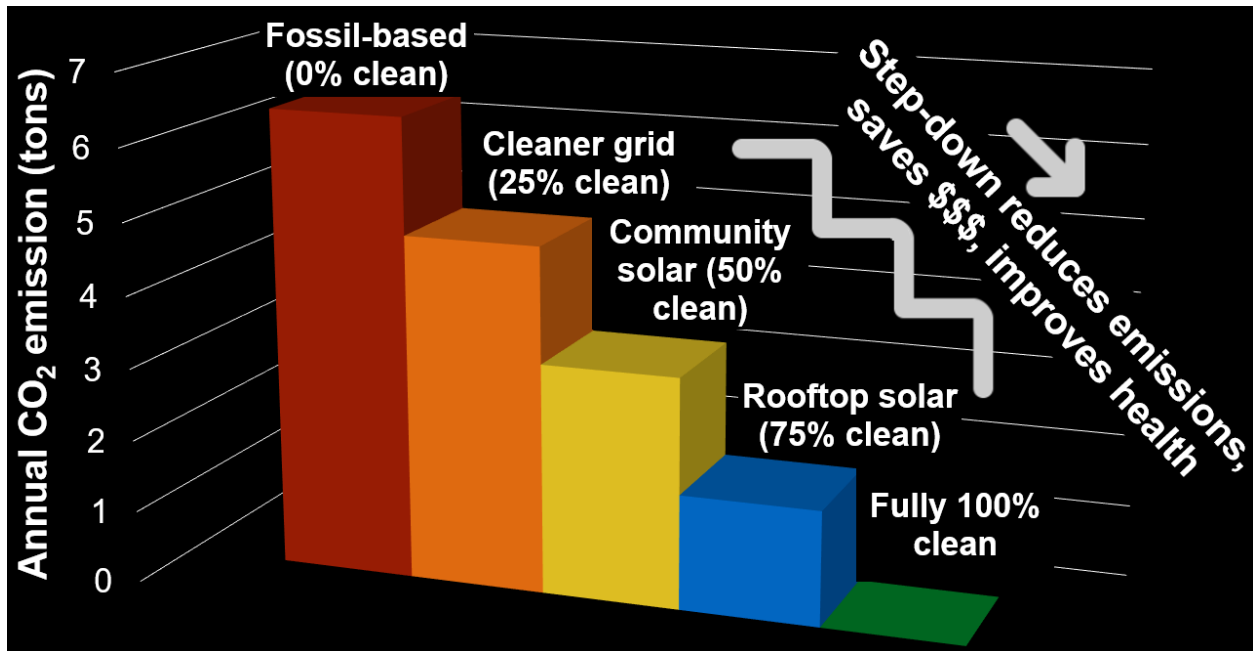


Figure 13 Emissions “step down” from electricity choices

Food

Red meat has the highest carbon impact after taking into account land use, feedstock, food processing, transportation and waste²⁴. An average American diet comes in at 2.5 tons of emissions impacts per year, while a meat diet that excludes red meat, excludes all meat (vegetarian) and excludes dairy (vegan) yields successively higher carbon savings, as show in the table below and illustrated in Figure 14.

Diet	CO ₂ emissions (tons/year)	CO ₂ reduction from previous line (tons/year)
Meat lover	3.3	N/A
Average	2.5	0.8
No beef	1.9	0.6
Vegetarian	1.75	0.15
Vegan	1.55	0.2

²⁴ See <http://shrinkthatfootprint.com/food-carbon-footprint-diet>

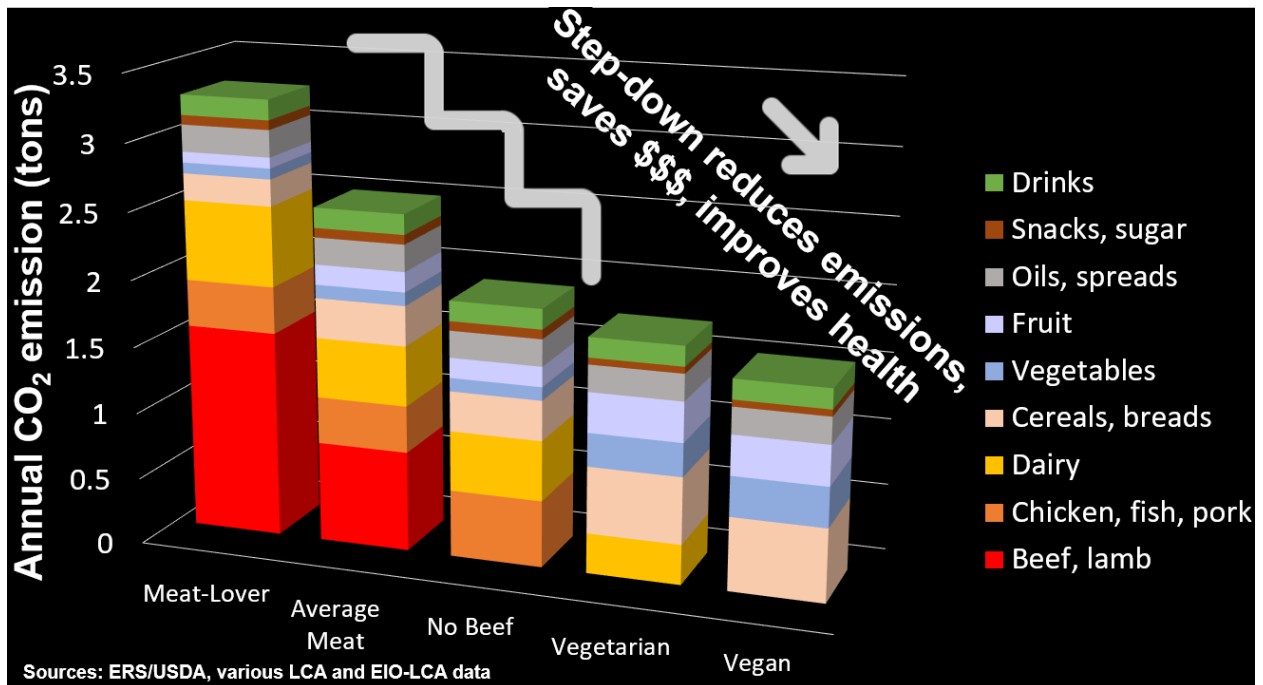


Figure 14 Emissions “step down” from diet choices

Waste

The average household generates 808.4 kg of CO₂ (about 8/10 of a metric ton) per household annually by the way waste is processed. Every bit of waste reduction counts to reduce emissions as shown in the table below.

Type of recycling	CO ₂ emissions (tons/year)	CO ₂ reduction from previous line (tons/year)
None	0.808	N/A
Newspapers only	0.676	0.132
Newspapers + metal	0.572	0.104
Newspapers + metal + plastic	0.530	0.042
Newspapers + metal + plastic + magazines	0.498	0.032
Newspapers + metal + plastic + magazines + glass	0.469	0.030

Emissions “step down” from recycling choices is illustrated in Figure 15.

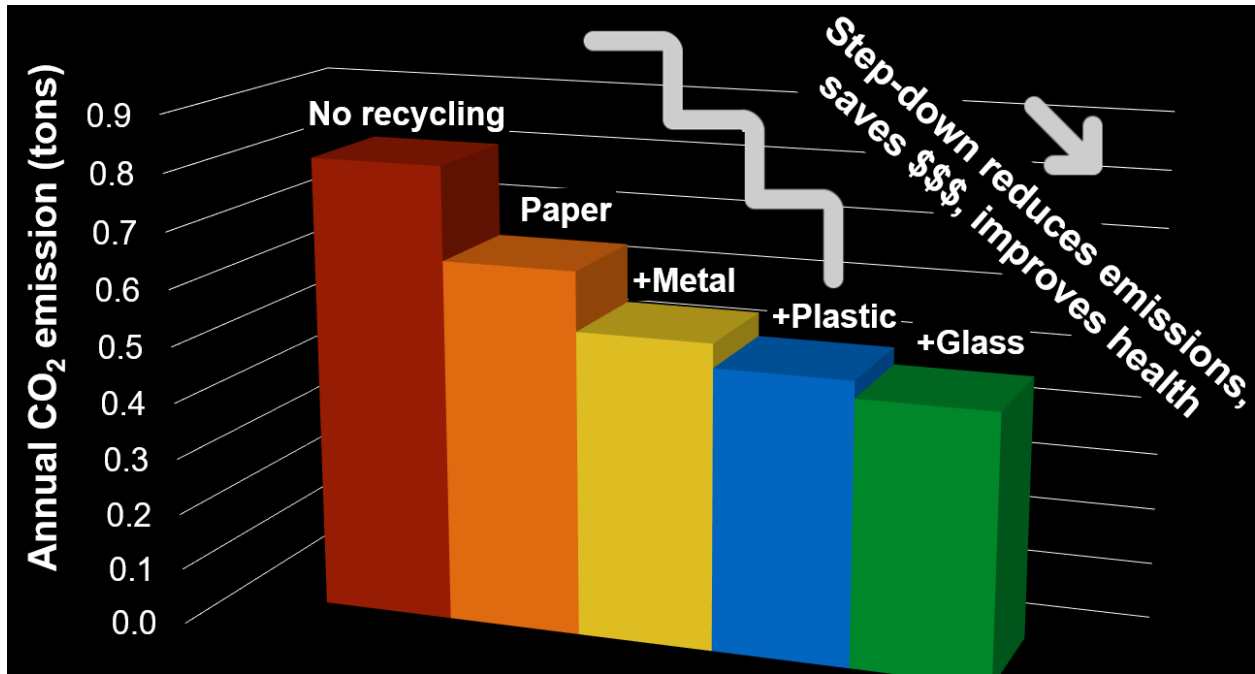


Figure 15 Emissions “step down” from recycling choices

It is interesting to note that almost every emission “step-down” also saves money. This is particularly true in the case of transportation, heating and electricity when one considers “Total Cost of Ownership” over the lifetime of the vehicle or furnace/heat pump or solar panels.

Appendix C: CURE100 pledge

I am concerned about the serious risks that climate change poses for present and future generations.

With my signature I agree to take the following actions:

I pledge to join CURE100 to reduce greenhouse gas emissions in my community to net zero by 2040.

I promise to do my best to reduce the greenhouse gas emissions caused by me and to cut my personal climate footprint by half within ten years or faster.

To achieve the target, I will pay attention to the climate footprint of my energy use, traveling, eating, consumption habits, household appliances and financial savings. I will make low-carbon choices wherever possible.

I pledge to consider addressing my unavoidable climate footprint by offsetting emissions which I cannot reduce, to become climate neutral now.

I will share my experiences in making cleaner choices with my family, friends, neighbors, colleagues and politicians, and encourage them to sign the pledge, too.

By signing the CURE100 Pledge modeled after the Global Climate Pledge, I'm sending a message to the decision makers, companies, my community and to all levels of society, to implement ambitious policies and practices which prevent the harmful effects of climate change and to secure the living conditions of mankind. I am proud to be included in the honor roll below.

Appendix D: Code of Conduct

Chapters agree to the following code of conduct, which is a living document that will be updated from time-to-time.

1. A chapter shall not do anything to jeopardize CURE100's not-for-profit status.
2. A chapter shall not do anything to make it more difficult for CURE100 to obtain insurance.
3. A chapter shall not do anything to disparage the reputation of CURE100.
4. In any publications or media representations, each chapter must clearly state that it is an independently run chapter of CURE100. Beyond this, no explicit approval is required for publicity or press releases.

Appendix E: Bylaws

We will include CURE100's bylaws here.

Appendix F: Annual Financial Reporting

Each chapter must submit their annual financial report for the previous tax year no later than March 15 of each year so that CURE100 can file taxes by April 15. This reporting must be provided in a regimented and templated format, which will be described here later.

Appendix G: Onboarding Checklist and Sequence of Activities

A list of activities during onboarding of a new chapter will be included here when this section is written. Everything from incorporation requirements to naming to website development to signing the Carbon Tracker license to customizing and installing the Carbon Tracker to mission statement to accepting the terms and conditions to implementing the pledge.