BE A CLIMATE WARRIOR

ACCEPTING A NECESSARY CULTURAL SHIFT

ERIC WRIGHT

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To my Grandmother, Carolyn Wright,

who has always called me her "Nature Boy."

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Eric Wright

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Global warming is one of the most extensively studied and widely discussed topics in human history. Due to the vastness of this subject, the incessant barrage of information via news and social media, and the fossil fuel industry's surreptitious manufacturing of misinformation, many feel simultaneously overwhelmed by and lost in the issue. On the other hand, some do not and many fail to understand *what* is being lost or realize how far we have wandered into unsustainability. If you are trying to make a difference and help our climate and environment, how can you be sure of the best starting points? Or if you already feel you live quite sustainably, are you certain you and your community function in a manner that is anywhere approaching true sustainability? Perhaps you can't answer this question without first agreeing on a definition of *true sustainability*. This will be discussed later.

I created this book to cast a blacklight over your life and your connection to society and the planet that sustains us, illuminating the carbon-scrubbing and earth-healing opportunities that lurk everywhere. Many of us are relatively unaware of the sources of our greenhouse gas emissions and how we can reduce them. Some of us are even skeptical about whether one person's actions can make a difference in the grand scheme of climate change. We may acknowledge our *individual* capacity to impact the world around us is limited, but this does not justify the great mistake of doing nothing. No matter how minuscule an individual action or organizational step change may be, if multiplied by a magnitude of millions, that change is certainly impactful. Regarding climate change, your actions are more important than you might think, particularly in the near term.

Through this book, I hope to motivate you to alter some of your behaviors, and perhaps even some of your aspirations, for the benefit of our climate. Together we can crowdsource greenhouse gas emission reductions. Although an unrealistic expectation, if every American were to integrate the 30 actions from this book into their everyday lives, we would collectively reduce our nation's annual greenhouse gas emissions by roughly 38%. For comparison, this would be equivalent to decarbonizing the entirety of our commercial, residential, and electric power sectors.

Similarly, if more individuals in the United States, and elsewhere, were to embrace the concepts and perspectives shared in this book, we would stand a better chance of transforming the private sector and ameliorating the damage we are inflicting on our planet in a timely manner. Such ambitions won't be realized without millions of us deepening our awareness of climate change and society and fighting over the next many years to change our trajectory. A deeper awareness of the status and pace of global ecological issues can give us purpose while strengthening our relationship with the natural world. It can compel us to leverage our careers and lifestyles to help transform society from its current condition into a more sustainable civilization. The necessary changes are both profoundly political and personal. Ultimately, our problem with our climate, like with so many other issues, is a byproduct of the struggle between private and social interests on individual, organizational, and international scales.

Ignoring individual accountability for now, there is so much pessimism surrounding climate change because the world seems to have been crystallized to preserve existing profit and power structures regardless of the environmental and social costs. These structures are not unbreakable; in fact, they are quite fluid. This fluidity, or potential for dissolution, is reflected in current political and social campaigns led by stakeholders in the fossil fuel industry and other major industries. Many stakeholders fear the popular vote and know public perception and public will can drive socially and environmentally just regulatory transformations that threaten certain revenue streams and business models. However, if public will is lacking or voters are suppressed, this creates a suitable environment for regulatory paralysis and detrimental business activities. Whether price gouging for prescription drugs, spewing dangerous carcinogenic pesticides, facilitating labor exploitation and human rights abuses, or broadcasting assiduously filtered and highly misleading news and information to morph the worldview of a targeted segment of the population, certain affairs cause the public to question whether the corporations responsible are improving or hindering our society. We must work to put the businesses hindering society in check and not let ourselves be deceived by narratives and cultural phenomena constructed out of concern for continued profit.

For example, it may be difficult to precisely measure the effects of fossil-fueled propaganda, let alone accept that maybe we too have been influenced by it. Its overall effect, however, is more apparent when viewed holistically as the harsh dissonance between the pace of climate change and the pace of climate action. Despite the urgency and severity of climate change, there is a relative lack of concern and behavior change among the general public. Much of this can be

attributed to propaganda and disinformation; however, there is a more pervasive sociological issue.

For far too many, enough is never enough, and this discontentment can lead to unending pursuits for excessively lavish and convenience-driven lifestyles and materialistic self-fulfillment. And by excessively lavish, I do not mean life in a mansion with four sports cars and a heated pool, but rather, a lifestyle that encompasses much of America's middle class. As we will discuss later in the book, we need to start thinking more seriously about what the Earth can reasonably provide and what that looks like apportioned among 8 billion people. In its never-ending quest for more, humankind has pinned itself in a corner. Many of us are confronted by the reality that our current way of life and our current perception of the world around us may be dramatically off-kilter from what it needs to be to achieve true sustainability. Many of us either live or strive for lifestyles incompatible with a livable future. I hope we are able to come to this realization and change on our own terms rather than being shocked into change by an ecological fallout. We *can* evolve beyond the destructive production and consumption patterns ingrained in our culture. But can we do it fast enough?

To be very clear, we are working under an extremely tight deadline to achieve carbon neutrality and then reverse historical emissions. Our race has marched forward like a bulldozer, and now we are faced with the aggregate of centuries of accumulated ecological burdens. Yet we have just a few decades remaining to transform our global civilization. This is so little time to accomplish something of such great magnitude. Humanity's planetary impact is a climatological and geological anomaly, standing out from the Pleistocene and Holocene and being permanently recorded in geologic records. Not only are we witnesses of the most crucial moment in human history, but also one of the most significant moments in Earth's history. This moment is humankind's greatest challenge—safeguarding our planet from ourselves. We must somehow prevent ecological ruin, preserve biodiversity, and regulate the atmosphere of our poverty-stricken, overpopulated planet. And this is the pivotal decade.

Today, immoderation and nearsightedness come at an incalculable cost. The present human experience is creating a mountain of suffering and loss for all species and future generations. Business as usual is an exchange of enduring prosperity for permanent repercussions tied to one fleeting moment in history. Contemplating the situation objectively, there is no question that these repercussions outweigh current consumer desires, conveniences, and pleasures. In acting for our exclusive benefit we are selfishly squeezing every last drop out of our planet, squandering the bounty of billions of years of planetary

stabilization and evolution while ignoring our place in the greater whole. We are indeed a part of something so much greater than ourselves. The failure to realize this is a terrible disease. The ability to realize this, however, signifies a fundamental respect for others and other species, and a deep appreciation of the immeasurable beauty and value of the natural world. Although lying dormant within many, I believe this deep respect and appreciation glows in enough of us to steer society in the right direction. Our rate of progress will depend on how driven we are by these momentous circumstances.

We should feel the crushing weight of our climate predicament because how we act in this moment determines the challenges our children and grandchildren will face, and the habitability of future Earth. And that future Earth is not distant; it is likely the Earth you will still be living on. Due to our collective neglect, we are indeed flirting with a disaster encompassing all of creation. We have a responsibility. Knowing this and being aware of our status as Earth's ascendant species behooves all who strive to live virtuously to act. Regardless of whether you are Christian, Muslim, Hindu, Buddhist, a pantheist, a philosopher of consciousness, agnostic, or something else, we humans will fail on a level that pervades our spiritualities and the physical world if we continue living unsustainably and destabilizing the Earth's climate system. No entity other than humankind will intervene to solve humankind's greatest challenge. We cannot allow ourselves to continue neglecting this wonderful world to which we belong.

We have already lost the environmentally stable past from which we and all species evolved. Environmental extremes are being altered, amplified, and redistributed at a pace beyond the adaptive capacity of most plants and animals. Many aquatic and terrestrial species (including humans) are noticeably shifting poleward to escape the warming climate. Of great concern is the fact that agriculture supports one-quarter of our global workforce, but unpredictable, harsh, and simply different conditions brought by climate change will make it difficult to grow crops in the places we always have. Hot and arid conditions are already forcing some humans to flee to habitable regions where they can continue to grow food. When suitable conditions to grow food disappear, populations are forced to migrate, exacerbating "geopolitical risks."

What we now face is a potential cascade of climate catastrophes affecting all of society. Yet, global demand for fossil fuel is still growing to this day. Climate change's spectrum of destruction and erosion of global GDP will continue to amplify, *possibly* reaching a point where society agrees fossil fuels were a net detriment to humanity. No one is arguing that fossil fuels did not enable us to construct our current civilization, but we have now reached the point where

this source of energy is causing significant destruction.

There is no time for delay, despite the mixed messaging from those opposed to expediting climate solutions. At this stage, we can't afford to continue transitioning away from fossil fuels gradually. We have been transitioning gradually for a few decades. Although there is currently no panacea for our difficulties, we are far behind where we could be today had we been governing private interest more effectively and implementing existing solutions more extensively. Now is the time for action to secure a livable future. If we make significant headway over the next decade, remaining within a reasonable global carbon budget while positioning ourselves to achieve carbon neutrality by mid-century, we will likely enjoy a relatively stable future. If, instead, we continue down our current path and take longer to achieve net zero emissions, we will shackle ourselves to a turbulent future in a world more than 2.0°C (3.6°F) warmer than preindustrial times. If a human's body temperature changes by that same amount, it can be catastrophic. The Earth should be thought of as a massive biological organism vulnerable to similar magnitudes of change.

To avoid the grim consequences of our emissions, we must rapidly reduce them NOW. These consequences can be forestalled by an army of many making several *immediate* changes that, when aggregated, can have a significant impact on our planet. These changes, however, must extend beyond personal behavior change into the arenas of politics and community engagement. Global greenhouse gas emissions can be reduced through individual actions, but global carbon neutrality cannot be achieved if society fails to gain control of corporations and repair public perception of the urgency of the climate crisis. It is this sense of urgency that is so important. At times, even I feel my own sense of urgency may be inadequate, despite all I do and don't do, knowing what the future may have in store for us. I fear the possibility of finding myself later in life, looking out with regret at a severely degraded world, unable to at least say, "Well, I tried my best to help." If you believe your perception is accurate, you can surely see those around you who lack an adequate sense of urgency. We are everywhere.

Much of our population has become so divorced from nature they view it as something to overcome and exploit rather than something we are part of and work in symbiosis with. The former, oversimplified perspective tends to be held by those with more of a hierarchical, red-in-tooth-and-claw, purely competitive worldview. This perspective is ingrained in the Western ego. Although it may sound idealistic, the latter perspective is indeed the way of the natural world. Many people tend to dwell on the violent and predatory macrolevel episodes within Mother Nature while overlooking the countless mutually beneficial,

interdependent, coadaptive relationships between species. Perhaps this is because much of the beauty of nature isn't immediately apparent or even visible at the macrolevel. Upon further inspection, we have begun to understand the balance and harmony of systems and relationships in nature. Some great examples are the codependence of pollinators and plants and of plants and fungi. Another example is the disturbing truth that most of the cells in your body are not your own, are not under your control, and do not contain your DNA, but rather are cells of other species—fungi, bacteria, and other microorganisms—working miraculously as part of the hidden machine sustaining you. We can't take full credit for what we accomplish.

Because everything is so interconnected, and because the climate regulates life on Earth, we can be certain basking in the urgency and reducing our emissions will have profound benefits beyond our understanding. We are all undoubtedly enveloped by Mother Nature and still surviving. Our food production is dependent on the weather and climate, our energy consumption fluctuates with the seasons, our homes and furniture are born of the forest, and our lives are eternally interconnected with nature. Even modern politics has been sculpted by climate change and surprisingly, climate change has divided us. Some of our disagreements stem organically from the differing needs and perspectives of urban vs rural populations and of wealthy vs poorer populations. Certain lifestyles and livelihoods are more at odds with the changes that must be made. However, climate change and other contemporary issues necessitate changes that threaten the stability or existence of certain institutions. Many of these institutions, fighting to preserve outdated systems and ways of thinking, are themselves deliberate perpetrators of the great divide in the United States and elsewhere. Rather than remain crippled by this divide, it is more natural to find common ground as an interconnected species exposed to our shared impacts on Mother Nature and each other.

Collectively, we tend to take combative attitudes toward one another, and there is much room for improvement in the ability of generations, nations, and individuals to communicate with each other. Regardless of our ideals and the unique struggles faced by different populations, we must all understand that our race will never escape nature. Although many have embraced lifestyles relatively insulated from the forces of nature and the very feeling of survival itself, this will continue to come at the expense of the future well-being of all humans and ecosystems until we become reasonably sustainable. Today, humanity must govern its decisions and industries to avoid a global collapse. Such a challenge should not sustain a great political divide but rather motivate us to unite to

increase our likelihood of success and, perhaps, develop sophisticated reforms to our current systems of governance. Certain reforms may be necessary to safeguard a robust democracy that can ensure the worst potential scenarios of late capitalism do not play out. These worst-case scenarios are short-run extrapolations of current tragedies harbored by our modern capitalist society, such as wealth inequality and global warming. These issues will break us if it remains feasible for companies to evade needed regulations, for the superwealthy to continue accumulating wealth while shirking social responsibility, and for individuals to pursue lives of limitless materialism.

The stage is set and it's time to act. You can be a warrior fighting to reduce your emissions and to enhance corporate and public commitment to aggressive emission reductions. Climate change is everyone's business. You can help build the solutions to global warming through your decisions and actions. You can evolve while aiding the evolution of corporate leaders, elected officials, technology, and industry. You can help accelerate this mass transformation by persuading others to join your efforts. All of us must band together, leverage social pressure, and confront the systemic issues perpetuated by our current capitalist economy.

I brought this book to life to help individuals reduce their footprints and interface with society to benefit our climate and the natural world. This manuscript serves as a personal climate change guidebook and toolkit, providing you with knowledge and mechanisms through which you can mitigate global warming and reduce your impact on our precious planet.

The book contains two primary elements. Half of the chapters include excerpts and stories designed to empower individuals to strengthen their involvement and establish broader roles in the climate battle. The other "action series" chapters present 30 recommended actions that contain practical advice for how Americans can reduce their individual carbon footprints by over one-third. The values of each of the 30 actions in this book are based on the *average* American's carbon footprint and lifestyle; however, no one is exactly average. Your exact footprint may be dramatically different. Luckily, you have a way of finding out exactly what your emissions are and how much you can reduce them.

In my free time over the past few years, I created a personal carbon footprint calculator, developed a website, and wrote this book to enable individuals to understand their emissions and see the benefits of changes they are willing to make. The 30 actions in this book are the same as the 30 actions on the

website CarbonCurb.com.[i] Online, you can use the carbon footprint calculator to calculate your *unique* personal emissions and interactively reduce them using the 30 actions. You can also use the website to share your story with others and get them thinking about their emissions. As part of your climate toolkit, the website makes this book more interactive and gives you a deeper understanding of how your lifestyle contributes to global warming.

The average American has roughly twice the carbon footprint of the average European and three times the carbon footprint of the average human. This book focuses primarily on Earth's problem children and thus, things the typical American should do to become more climate friendly. However, the actions in this book are relevant to all individuals with larger carbon footprints, regardless of nationality.

Be a Climate Warrior provides you with an array of 'weapons', tactics, and personal solutions, arming you with the knowledge and motivation necessary to join the ranks of the many climate warriors with a newfound flame of ambition—ambition to curb and eliminate emissions while simultaneously pushing society towards a greener future. It's time to awaken the climate warrior within you. Start flexing your climate muscles and shedding those extra pounds of carbon. You're officially headed into battle.

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i *CarbonCurb.com provides a practical and evolving tool for climate-conscious individuals. You can use the website to calculate your unique footprint, reduce your footprint with the 30 actions, and encourage others to do the same.*

With the right knowledge, it's not hard to understand how we are altering the atmosphere of our planet. If everyone understood the scale of the impact of human activity on the climate, then we wouldn't be arguing about whether we should act or not. Unfortunately, much of the public is lacking basic proficiency in climate science. Climate misinformation and disinformation campaigns backed by the fossil fuel industry rely on this knowledge gap. Many people remain largely unaware of the vastness of the energy sector and perceive the Earth and its atmosphere as too enormous to be affected by anthropogenic emissions. Truly understanding the physical scale of the amount of fuel we burn, the emissions we release, and the Earth's climate system removes the abstractness of the threat to our planet. The following information aims to bring some clarity to our situation.

To begin, the atmosphere is thinner than you might think. If the entire mass of the atmosphere were converted into an equivalent mass of water and distributed around the planet, it would be only 33 feet deep. At sea level, there are only 14.7 pounds of atmosphere above each square inch of the Earth's surface. Most of this atmospheric mass is compressed near the planet's surface. Over 8% of the atmosphere lies below the top of the tallest building in the world, the Burj Khalifa. If you were to climb to about 5 km (about 3 miles) above sea level, you'd be standing above half of the molecules in the atmosphere. The summit of Mt. Everest is above nearly 70% of the Earth's atmospheric mass. At 50 km (31 miles) of altitude, a little more than a marathon distance, you'd be above 99.9% of the atmosphere.[1] The atmosphere is not a limitless vat for pollution.

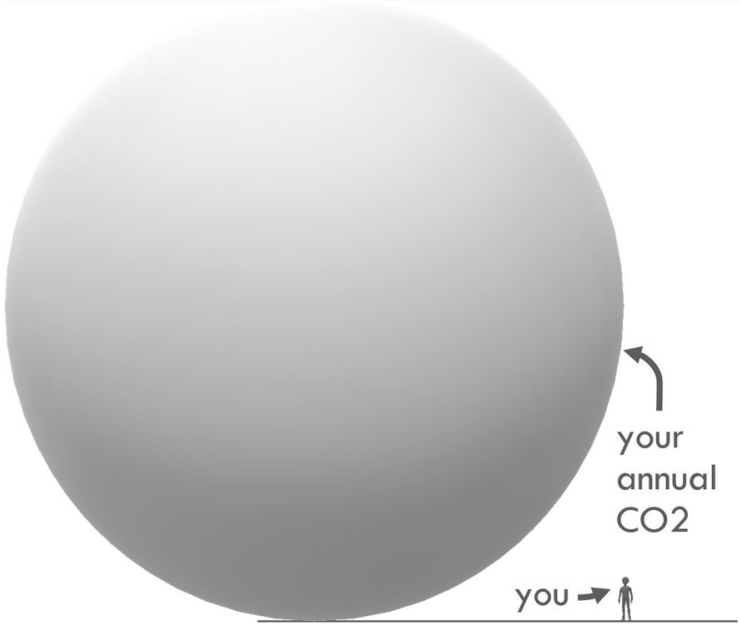
Global warming is driven primarily by carbon dioxide (CO2) emissions because of the sheer quantity of CO2 emitted by industry, automobiles, and other sources. However, CO2 is just one of several greenhouse gases accumulating in the atmosphere due to human activity. Greenhouse gases (CO2, methane, nitrous oxide, and others) are trace gases comprising less than one-tenth of 1% of Earth's atmosphere and play an important role in regulating the Earth's temperature. To describe the greenhouse effect, I like to use an analogy other than the function of a greenhouse.

Consider X-rays. X-rays have very short wavelengths that, unlike visible light, can pass through most tissues in the human body. Since bones contain

calcium and are denser than most other tissues in the body, they block some of the X-rays from passing through, and the resulting 'shadows' appear as bones in the X-ray image. The two-dimensional images created by X-rays are similar to a shadow cast by a tree on a sunny day. The electromagnetic radiation from the Sun, some of which we perceive as visible light, cannot pass through the tree. Similarly, ultraviolet radiation, which has shorter wavelengths than visible light, cannot pass through zinc oxide, titanium dioxide, and other ingredients in sunscreen. The unique physical properties of different types of matter determine how they interact with different wavelengths on the electromagnetic spectrum.

Sunlight interacts differently with the atmosphere than it does with the surface of our planet. Most of the sunlight reaching the Earth does not heat the atmosphere directly; it passes through it. The Sun heats the Earth's surface, and the Earth's surface then heats the atmosphere through direct contact and radiation. This is why the atmosphere gets colder as you go up and why there are snow-capped mountains. The Earth's atmosphere traps heat from the Sun that would otherwise escape into space because the atmosphere is more transparent to wavelengths of incoming solar radiation than to wavelengths of outgoing infrared radiation from the Earth's surface. Greenhouse gases allow sunlight to pass through them to heat the Earth's surface, and some of this energy that the Earth's surface has absorbed is re-emitted into the atmosphere at longer wavelengths of infrared radiation. Greenhouse gases are not transparent to these longer infrared wavelengths; they absorb and reflect the radiation back down to the Earth's surface. These gases regulate the Earth's temperature by enabling the planet to receive more incoming energy from sunlight than is radiated back to space. Without any greenhouse gases, Earth's average surface temperature would be approximately 0°F, in contrast to the current average surface temperature of about 59°F. So, we should be thankful for a certain amount of greenhouse gases, but an excess of them causes the atmosphere to retain too much energy.

Not surprisingly, overloading the natural balance of greenhouse gases in our atmosphere directly affects global temperature. The volume of greenhouse gas we are adding to our atmosphere is not insignificant, even at the individual level. The visual below will help you understand your emissions—the emissions attributable to the lifestyle of just *one* person.



This is the volume occupied by the annual CO2 emissions of the average American citizen. This bubble, or sphere, is over 80 feet tall and holds a volume equivalent to three-and-a-half Olympic-size swimming pools. Keep this visual of the average American's annual emissions in the back of your mind as you read the rest of this chapter. It'll help you gauge the scale of your emissions relative to the scale of human activity and understand that our planet is not so large. Try to imagine the above visual of one American's annual emissions multiplied by 30 years and by the 330 million citizens in the U.S.

Each year, the U.S. burns through hundreds of millions of tons of fossil fuels. The CO2 emissions from burning all this fuel weigh more than the original fuel source; each carbon atom in the fuel bonds with two oxygen atoms in the air during combustion to create CO2. The CO2 emissions that result from burning coal weigh twice as much as the coal did to begin with. Similarly, the CO2 emissions that result from burning a gallon of gasoline weigh roughly three times as much as the original gallon of gas.[2] A 2022 Ford F-150 has a fuel tank capacity of 23 gallons. One gallon of gasoline weighs about six pounds. This means using one tank of gas produces over 400 pounds of CO2. If the fuel tank is refilled about once every week, the Ford owner is emitting over 20,000 pounds of CO2 per year just for transportation.

In total, the U.S. emits billions of tons of CO2 every year.[3] Billions of tons of any solid material must occupy an incredible amount of space. Imagine the volume occupied by billions of tons of gas. Pretend we were to build a wall

around the U.S. Now, let's pretend we captured just one year's worth of our nation's CO2 emissions and poured all that CO2 inside our national wall. If that single year's worth of CO2 were to be kept at ground level and distributed uniformly across all the land in the U.S. (including Alaska, Hawaii, Puerto Rico, and all territories), we would be standing in a "pond" of CO2 over a foot deep.[ii] That foot of CO2 is from just one year of CO2 emissions, but CO2 stays in the atmosphere for several centuries. If we include U.S. emissions since 1990, our pond of CO2 would be 30 feet deep.

All this gas is building up in our atmosphere along with emissions from other nations. Human activity has altered our atmosphere's chemical makeup and raised Earth's temperature by at least 1.1°C (2.0°F).[4,5] Consider, again, the sensitivity of the human body to temperature change. The two degrees of warming we have observed is a significant change for our planet. A single-degree change in average temperature can mean the difference between life and death for many creatures. A single-degree change in global average temperature is the difference between ice and ocean, multicolored corals and white skeletons, bearable hurricanes and insufferable major hurricanes, crop production and famine, forest and ash, and so much more. As Earth's global mean surface temperature continues to increase, more and more creatures will perish and systems will collapse. Aside from increasing the temperature of our planet, we humans are causing many other profound changes to Earth's biosphere. Part of the reason our impacts are so significant is because our planet is so heavily populated.

There are 8 billion humans on our blue, brown, and green spaceship. Our planet's equatorial circumference is approximately 25,000 miles or over 40,000 kilometers. If all humans were to stand in a single-file line on the Earth's equator we would encircle our planet more than 100 times. If the inhabitable areas of the 150,000,000 square kilometers of land on Earth were divided equally, each human would own a modest 100 by 100-meter area, roughly the size of a soccer field. You could run to your nearest neighbors in seconds. If humans were distributed evenly over the entire planet (across the continents and oceans) we would still be within earshot of each other. There's not a whole lot of space reserved for each individual on Earth. Would you be able to sustainably replicate your current standard of living if confined to your designated 100-by-100-meter area? Would you be able to procure enough food, shelter, and resources without having to

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ii *This calculation is based on the density of CO2 at standard temperature and pressure.*

encroach on your neighbors' plots?

Climate change and environmental degradation have become global issues primarily because of the vastness of human civilization and our enormous population. We have expanded from our islands of civilization and now seek to protect our remaining islands of wilderness. Humans have made monumental achievements and far surpassed the survival threshold that had limited population growth before humans evolved. To truly prove our intelligence and realize our full potential, we must show we have a global consciousness and strategically avert a disaster of our creation.

Energy and resource conservation, and energy and resource efficiency, are tools we can leverage to rapidly reduce emissions and loss of natural habitats, with the former being the most impactful change we can make immediately. Advancements in renewable energy and energy-efficient technologies can have profound benefits, but society simply cannot function sustainably without conservation. Through conservation, we directly avoid the emissions and impacts associated with the consumption of energy and resources. We must conserve electricity, fuel, materials, and food, and we must reduce our consumption of non-essential products to minimize our environmental impacts. Conservation isn't just good for the climate and Earth's ecosystems; it is necessary for the welfare of society as a whole. To protect our planet's and society's future, we must acknowledge the fallacy of perpetual economic growth, dissociate our happiness from materialism, and combat climate change and environmental degradation as a unified international force. We can achieve much of this through individual, incremental adjustments.

Consider everyone you know who expresses concern about the climate crisis yet continues to make minimal sacrifices, using single-use containers, driving a mile or less when walking or biking is an option, and keeping their homes at that perfect temperature year-round. Is this cognitive dissonance reasonable? You may *currently* be one of these people. You can likely do so much more than you are currently doing to reduce your personal emissions and help our climate, but some inexplicable force seems to be holding so many of us back. The hardest part of becoming a climate warrior is establishing inertia. You can establish inertia through this book and with the personal carbon footprint calculator on CarbonCurb.com. This book and the website are designed to help you understand the emission reductions you can achieve through small lifestyle changes. You can discover how far you stand from carbon neutrality.

Simply having a benchmark and an awareness of your progress is a huge motivator, but there are benefits to reducing your footprint beyond minimizing

your contribution to global warming. A climate-friendly lifestyle is also a more affordable lifestyle. Reducing your carbon footprint requires reducing your consumption of fuel, electricity, and products, and thus leads to a lower-cost lifestyle. Individuals who significantly reduce their emissions using the 30 actions, presented categorically in each action series throughout this book, will save hundreds to thousands of dollars per year. If you take control of your emissions by changing your consumption habits and living a more carbon-aware lifestyle, you will help the climate and your pocket.

Nearly every activity, commute, purchase, and decision you make affects your contribution to greenhouse gas emissions and global warming. So, where do you start? If you are the average American, what are the sources of your personal emissions? The two largest components of your footprint are embedded emissions and personal transportation emissions, constituting roughly one-third and one-fifth of your annual emissions, respectively.

Embedded emissions are the greenhouse gas emissions involved in bringing a product or service to market. This includes all emissions generated through raw material extraction and farming, procurement/processing of resources, manufacturing goods, and transporting and selling the final products. For example, a diamond ring has lots of embedded carbon outside of what is within the stone. The embedded carbon in a diamond ring includes emissions from the energy-intensive mining and processing of materials, storing and transporting the materials, cutting the stone, casting the ring, creating packaging for the ring, and even putting the final product on display in a commercial building that takes electricity from a fossil-powered grid. Embedded emissions are EVERYWHERE and constitute the largest emissions category in the average American's footprint. As another example of embedded emissions, roughly one-quarter to one-third of the lifecycle emissions of your home are not from you and your housemates' everyday energy consumption but from the initial emissions embedded in the materials your home is made of. This includes upstream emissions from logging and forest degradation, processing and transporting lumber, mining metals, manufacturing shingles, producing cement, energy and fuel use during construction, and more. There is nothing climate- or eco-friendly about an extremely efficient, geothermally-regulated, solar-powered, 3,000-square-foot single-family home. Oversized houses require gluttonous amounts of resources and energy to build, maintain, and fill with stuff, and their outsized resource demands unnecessarily degrade our planet.

If you are a heavy consumer, meaning you believe you purchase more "things" than you need, or if you live a generally more lavish lifestyle, then

embedded emissions likely make up the largest share of your footprint by far, even more than your transportation-related emissions. If you are the average American, the next largest portions of your footprint (after personal transportation emissions) are residential emissions associated with activities at home and agricultural emissions from the food you eat. Certain sources of emissions are difficult to avoid on the individual level, but there are significant opportunities for you to reduce your emissions by changing a few things around your home. Additionally, agricultural emissions make up roughly 17% of your footprint, yet the food-related actions in this book account for 26% of the emissions you can save in total with the 30 actions. There are many reasonable changes we can make to curb our emissions.

The following pages provide a breakdown of the average American's footprint and the emissions they can save by following the advice in this book. The emissions information throughout this book is presented in terms of kilograms (kg) and metric tons (MT) of carbon dioxide equivalent (CO2e).[iii] This makes it easy to compare emissions from various categories, which may contain different kinds of greenhouse gases. For example, lots of your agricultural emissions are in the form of methane and nitrous oxide rather than CO2.

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iii *One metric ton is equal to 1,000 kilograms, or 2,205 pounds. Carbon dioxide equivalent, or CO2e, is the equivalent amount of CO2 emissions with the same global warming potential as other greenhouse gases.*

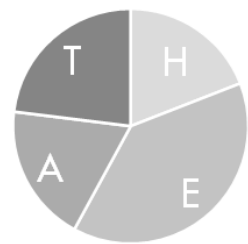
The Average American's Annual Carbon Footprint

Category		Component	(kg CO2e)
H	Home	Heating	720
		Indoor appliances & devices	520
		Miscellaneous & outdoor equipment	460
		Cooling	430
		Water heating	410
		Lighting	110
E	Embedded	Healthcare and personal care	1,600
		Household furnishings, equipment, & supplies	1,280
		Pets, apparel, & other miscellaneous	1,040
		Home embedded emissions	810
		Vehicle embedded emissions	670
A	Agricultural	Red meat	1,120
		Other meat, dairy, fish, & eggs	990
		Plant-based foods	530
T	Transport	School, social, personal, & recreational	1,180
		Work commute	840
		Shopping, errands, & other	830
		Flying	350
Other:	*Public infrastructure, military, water, & other public services*		*2,110*

Total Carbon Footprint: **16,000**

The Average American's HEAT Signature

H	Home	2,650 kg CO2e
E	Embedded	5,400 kg CO2e
A	Agricultural	2,640 kg CO2e
T	Transport	3,200 kg CO2e



The figure above shows the major categories and subcategories of the average American's annual emissions. The major categories are emissions at home (H), embedded emissions (E), agricultural emissions (A), and transport emissions (T). Together, these four categories are referred to as your HEAT signature. As you can see, embedded emissions and personal transport emissions are the most prominent categories in the average American's HEAT signature. It is worth noting that the embedded emissions category shown above includes a great deal of emissions attributed to freight transport and shipping. If the transport emissions category included freight transport and shipping, it would be much larger. The above figure also shows several more subcategories, or components, of emissions within the HEAT signature. The footprint

components decrease in magnitude from top to bottom. You may notice emissions related to healthcare and personal care are quite high. The energy and resources that flow through hospital and healthcare systems, and that are required for research and during the manufacturing of the personal care products and medicine we consume, cause a great deal of emissions in the U.S. Similarly, military operations, public infrastructure, water supply, and other public services contribute greatly to our collective emissions. Take a moment to let all the information in the above figure soak in. This is the starting point, or benchmark, for emission reductions. We can use this as a diagnostic tool to prescribe the most practical and effective solutions for individuals to reduce their emissions.

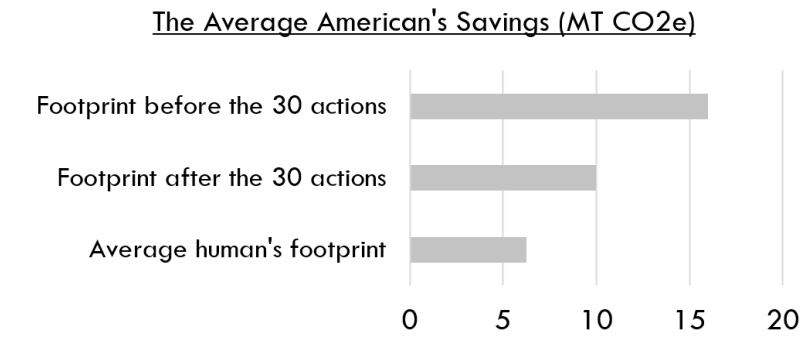
The 30 actions displayed in the next figure and discussed in each action series were selected by considering weighted factors of cost, convenience, environmental benefit, and greenhouse gas emission reduction potential. Generally speaking, the 30 actions avoid things that are currently not implementable for the majority of Americans or that require significant investment. My goal was to identify some of the most *practical* actions that still have a worthwhile impact on the typical American's carbon footprint. Based on a national average annual per capita footprint of 16 metric tons (MT) (16,000 kg or over 35,000 pounds), if the average American incorporated all 30 actions into their life, they would decrease their annual emissions by roughly 6 MT, or 38%. By taking this journey, you can dramatically reduce your contribution to global warming.

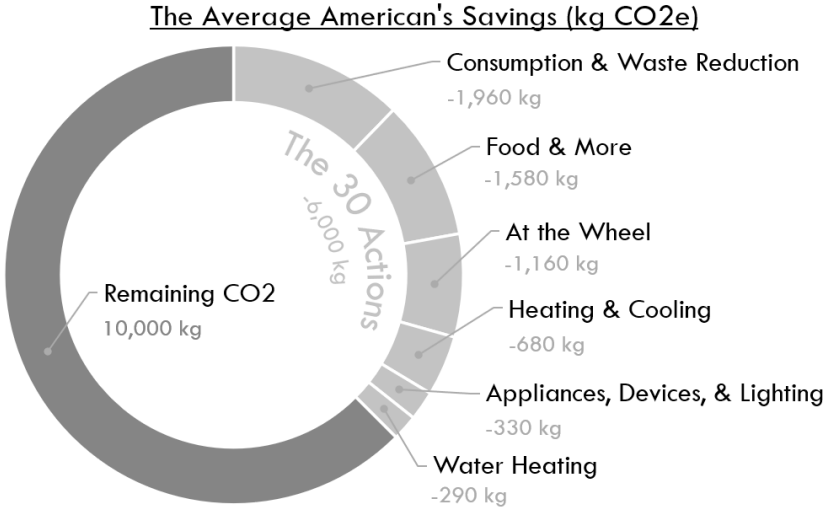
The 30 Actions

Annual Emission Reductions for the

Action		
Vote for your future. Vote for our planet.		
Be frugal and only buy quality products you need.		
Carpool to work and consolidate other trips.		
No red meat. Instead, have other meat or fish.		
[illegible]		

There are two figures below. The first figure compares an average American's emissions before and after adopting all 30 actions with the emissions of the average human. The second figure shows the emissions each action series will save the average American, and how much CO2 will remain in their footprint after adopting all 30 actions.





You have an opportunity to significantly reduce your present impact on our planet's climate. With every action you adopt, your lifestyle will become less carbon-intensive. Each action and series in this book will help you understand how to effectively reduce your annual greenhouse gas emissions. You can further enhance your understanding of your unique personal footprint and the impacts of your lifestyle choices by completing CarbonCurb's calculator and selectively toggling different actions on and off to reduce your footprint. The calculator is just as much a learning tool as it is a customized menu of recommended behavioral changes specific to your current circumstances.

While taking the journey through this book, you may realize it might not be feasible for you to complete *every* action, even though the actions were designed to be reasonably achievable rather than overly ambitious or expensive. This book is not just about understanding the effects of your lifestyle choices on our climate and understanding how your emissions might compare to the average American's emissions. Your experience in this book is equally focused on understanding climate change and society in general so that you may learn to

enhance your role in the climate battle through your career and your interactions with others.

Through the rest of this book, you will develop your sense of how to continuously adapt and alter your lifestyle to minimize your carbon and ecological footprints while also learning from the stories and additional information presented between each series. The journey to becoming a climate warrior is not instantaneous, but rather a long-term commitment. Together we can make significant personal carbon reductions and help accelerate our planet toward carbon neutrality. Without further ado, proceed to the training field, read each of the following excerpts, and adopt each of the 30 actions. Strengthen your role in the climate battle. Live a more climate-fit lifestyle. You better get in shape because society and your fellow climate warriors are counting on you!

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Just as we are standing on the shoulders of centuries of industrial progress and greenhouse gas emissions, we are standing on the shoulders of the work done by millions of engineers, researchers, climate scientists, and countless other individuals committed to stabilizing the Earth's climate. They are the lighthouse, informing society and guiding us safely to our destination. Without them, this book would not exist.

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