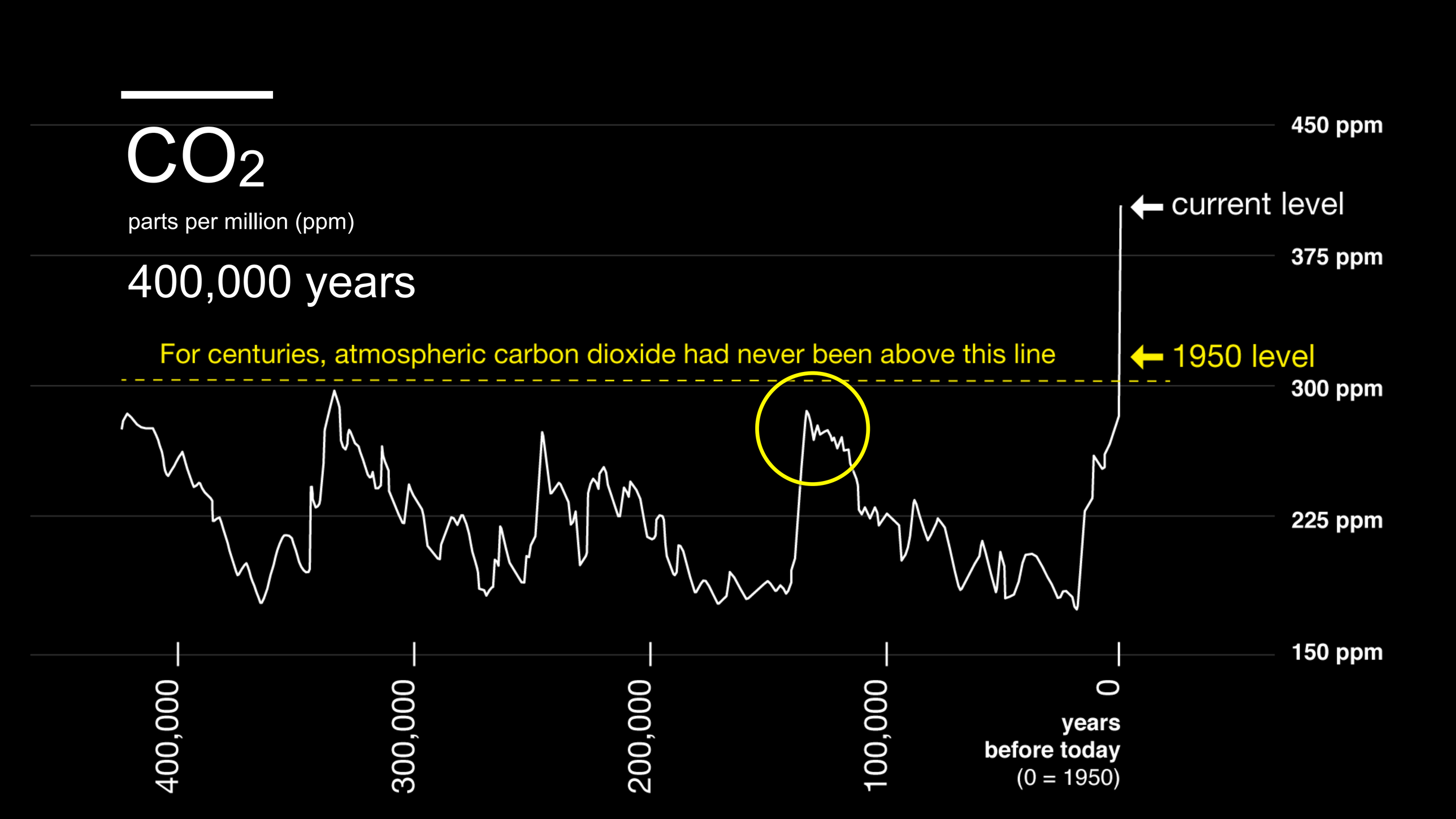

DRAWDOWN


SWIX

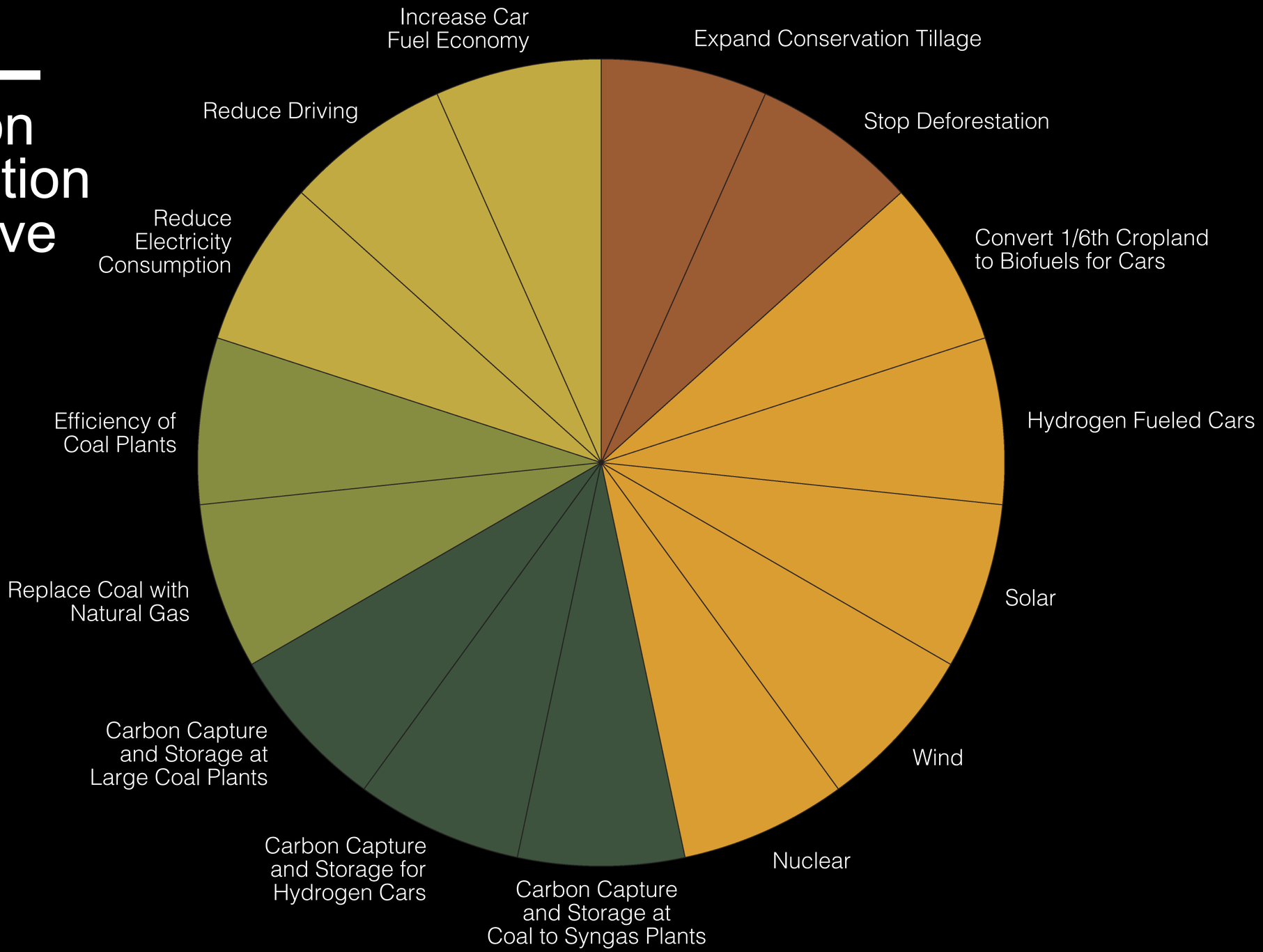

U.S. AIR FORCE
3302


CO_2
parts per million (ppm)
400,000 years
For centuries, atmospheric carbon dioxide had never been above this line
current level
1950 level
450 ppm
375 ppm
300 ppm
225 ppm
150 ppm
400,000
300,000
200,000
100,000
0
years
before today
(0 = 1950)

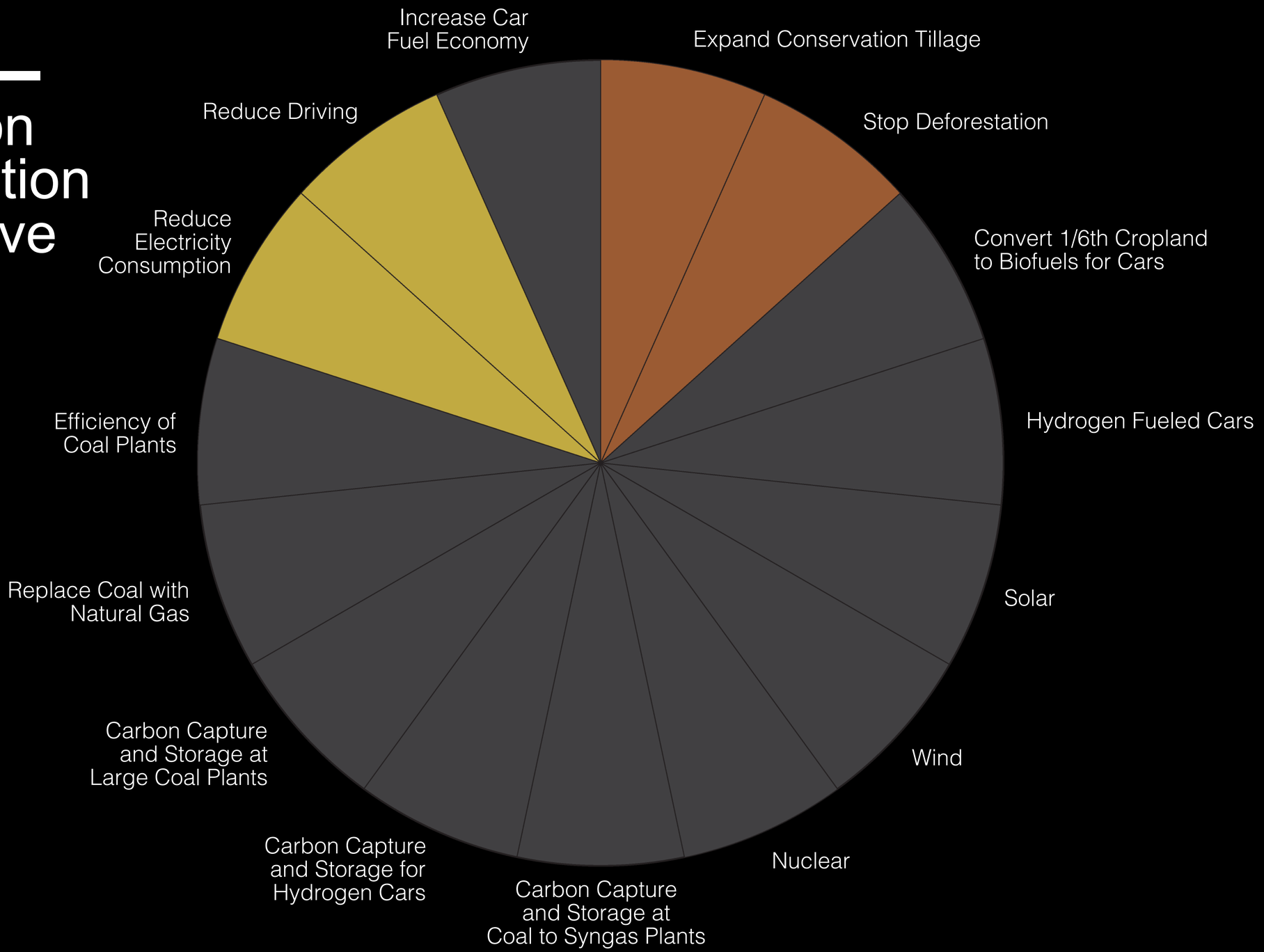
Article 2, UN Framework Convention on Climate Change

"The ultimate objective of this Convention is to achieve stabilization of greenhouse gas concentrations…within a sufficient time to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened…"

Carbon Mitigation Initiative



Carbon Mitigation Initiative



A Coalition

Leo Burke
University of Notre Dame

Mary Evelyn Tucker, PhD
Yale University

Andy Revkin
The New York Times

Molly Jahn, PhD
University of Wisconsin

Per Espen Stoknes
Author, Economist

Michael Mann, PhD
Penn State University

Dan Wieden
Wieden + Kennedy

Mark Mykleby
U.S. Navy

Spencer Beebe
Ecotrust

Karen O'Brien, PhD
University of Oslo

Peggy Liu
JUCCCE

Michael Pollan
Author, Professor

David Addison
Virgin Earth Challenge

André Heinz
Heinz Foundation

Kerry Kennedy
Robert F Kennedy Center

James Boyle
Sustainable Roundtable

Edward Davey
The Prince of Wales' International Sustainability Unit

John Elkington
Volans Ventures

Maria Fujihara
Brazil Green Bldg Council

Dan Kammen, PhD
UC Berkeley

Sir Jonathon Porritt
Forum for the Future

Tom Steyer
NextGen Climate

Jules Kortenhorst
Rocky Mountain Institute

Sarah Bergmann
Pollinator Pathways

Adam Chambers, PhD
USDA Natural Resources Conservation Service

Joylette Portlock, PhD
Communitopia

Clayton Thomas-Muller
Idle no More

Mehjabeen Abidi-Habib, PhD
Government College University in Lahore

Bill McKibben
350.org

Chris Pyke, PhD
IPCC

Brendan Mackey, PhD
Griffith University, Australia

Gisele Bundchen
Luz Foundation

Cutler Cleveland, PhD
Boston University

What do we do? We do the math.

NUMBERS

WHAT YOU WILL SEE ON THE PAGE

Behind every one of the solutions in Drawdown are hundreds of pages of research and rigorous mathematical models developed by some very bright minds. Each solution includes an introduction that draws on history, science, key examples, and the most current information available. Every description is supported by a detailed technical assessment available on our website for further exploration. Each entry also features a summary of output from the models, including a ranking of the solution by its emissions-reduction potential. We enumerate how many gigatons of greenhouses gases are avoided or removed from the atmosphere, as well as the total incremental cost to implement the solution, and the lifetime cost or—in most cases—savings. In the models, we rely on peer-reviewed science for inputs. In some areas, such as land use and farming, there is a plethora of anecdotal facts and figures, some of which we refer to but do not use in our calculations.

At the end of the book, you will find a summary table presenting the combined impact of solutions, grouped by sector.

RANKING OF SOLUTIONS

There are several ways one can rank solutions: how cost-effective they are; how quickly they can be implemented; or how beneficial they are to society. All are interesting and useful methods with which to interpret the results. For our purposes, we rank solutions based on the total amount of greenhouse gases they can potentially avoid or remove from the atmosphere. The rankings are global. The relative importance of one solution may differ depending on geography, economic conditions, or sector.

GIGATONS OF CARBON DIOXIDE REDUCED

Carbon dioxide may get the most press, but it isn't the only greenhouse gas. Other heat-trapping gases include methane, nitrous oxide, fluorinated gases, and water vapor. Each has long-term impacts on global temperatures, depending on how much of it is in the atmosphere, how long it remains there, and how much heat it absorbs or radiates back out during its lifetime. Based on these factors, scientists can calculate their global warming potential, which makes it possible to have a "common currency" for greenhouse gases, translating any given gas into its equivalent in carbon dioxide.

Each solution in *Drawdown* reduces greenhouse gases by avoiding emissions and/or by sequestering carbon dioxide already in the atmosphere. The degree to which a given solution has a bearing on greenhouse gases is translated into gigatons of carbon dioxide removed between 2020 and 2050. Taken together, they represent the total reduction of greenhouse gases that could be achieved by 2050, compared to a fixed reference case, a world where very little changes.

But what is a gigaton? To appreciate its magnitude, imagine 400,000 Olympic-sized pools. That's about a billion metric tons of water, or 1 gigaton. Now multiply that by 36, yielding 14,400,000 pools. Thirty-six billion gigatons is the amount of carbon dioxide emitted in 2016.

TOTAL SAVINGS AND COST PER CAPITA

The total cost of each solution in this book is the amount needed to purchase, install, and operate it over thirty years. By comparing this to what we typically would spend on food, fuel for cars, heating and cooling for our homes, etc., we determined the net costs or savings from investing in a given solution.

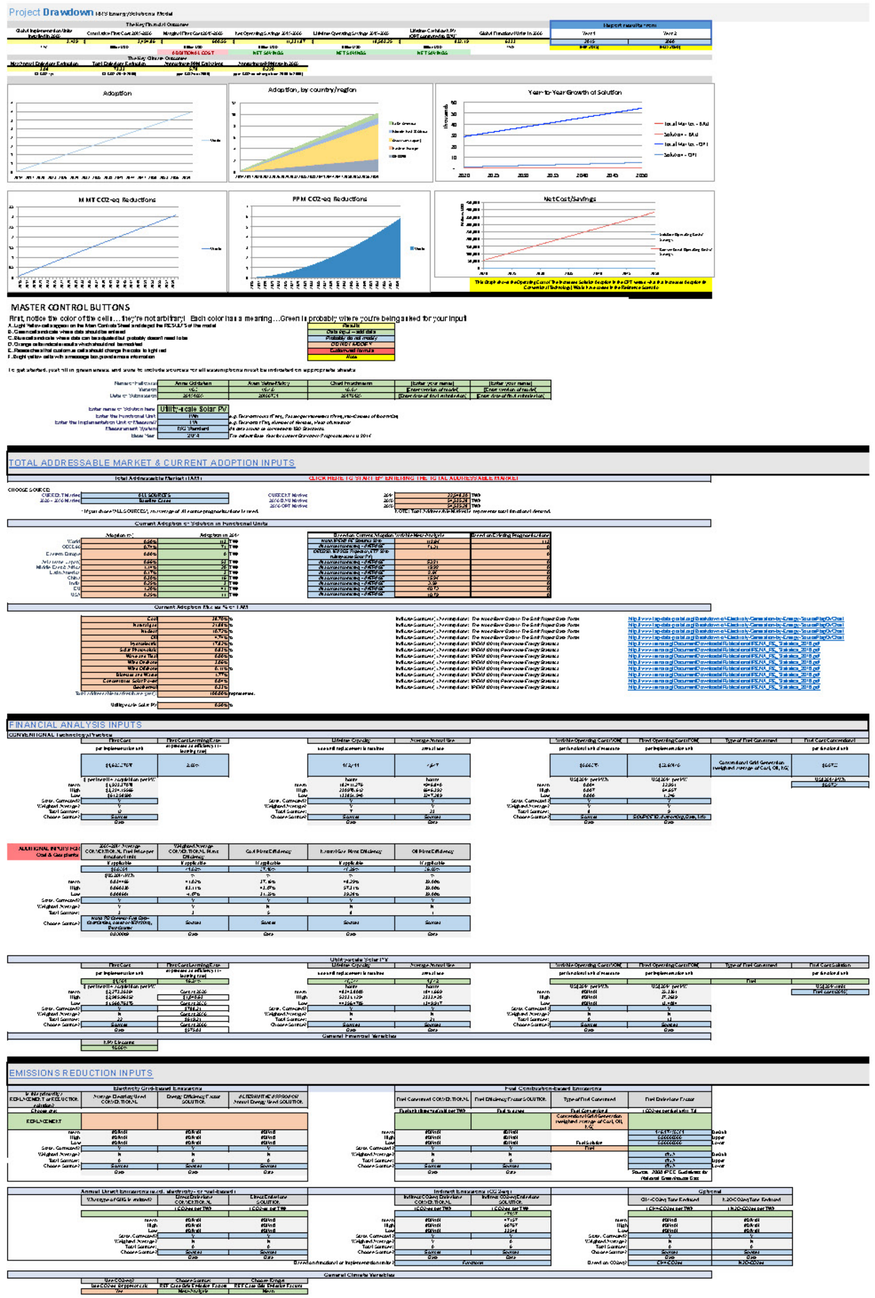
We err on the side of being conservative. That means assuming costs associated with the solution that are on the high end, and then keeping them relatively constant from 2020 to 2050. Because technologies are changing rapidly and will vary in different parts of the world, we expect the actual cost to be less and the amount of savings higher. Even taking a conservative approach, however, the solutions tend to offer an overwhelming net savings. For some solutions though, the costs and savings are incalculable, as in the cost to save a specific rainforest or support girls' education.

How much are we willing to spend to achieve results that benefit all of humanity? In the back of the book, we break down the net cost and savings on an individual level. The cost per capita of a solution is based on the estimated global population from 2020 to 2050. This calculation reveals the cost-effectiveness of the solutions presented. When considering the scale of benefits, the potential profits and savings, and the investments needed if conditions remain the same, the costs become negligible. The payback period for most solutions is relatively short in time.

TO LEARN MORE

The solutions presented in *Drawdown* are only a summary of the full research conducted to support our findings. A more detailed outline of our approach and assumptions can be found in the section "Methodology." We also provide a full description of our research at drawdown.org—how all the data were generated, sources used, and assumptions made.

As you read the book, what will become apparent is how sensible and empowering these solutions are. Rather than a lengthy technical manual, impenetrable to all save experts who have spent their lives immersed in the science behind these technologies, *Drawdown* aims to be accessible to anyone who wants to know what we, collectively, can do and the role each one of us might play. -Chad Frischmann



GEOTHERMAL

#18
RANK BY 2050

16.6 GT
REDUCED CO2

($155B)
NET COST

$1.02T
NET SAVINGS

GEOTHERMAL

#18
RANK BY 2050

16.6 GT
REDUCED CO2

($155B)
NET COST

$1.02T
NET SAVINGS

GEOTHERMAL

#18
RANK BY 2050

16.6 GT
REDUCED CO2

($155B)
NET COST

$1.02T
NET SAVINGS

GEOTHERMAL

#18
RANK BY 2050

16.6 GT
REDUCED CO2

($155B)
NET COST

$1.02T
NET SAVINGS

IMPROVED RICE CULTIVATION

#24
RANK BY 2050

11.34 GT
REDUCED CO2

-
NET COST

$519.1B
NET SAVINGS

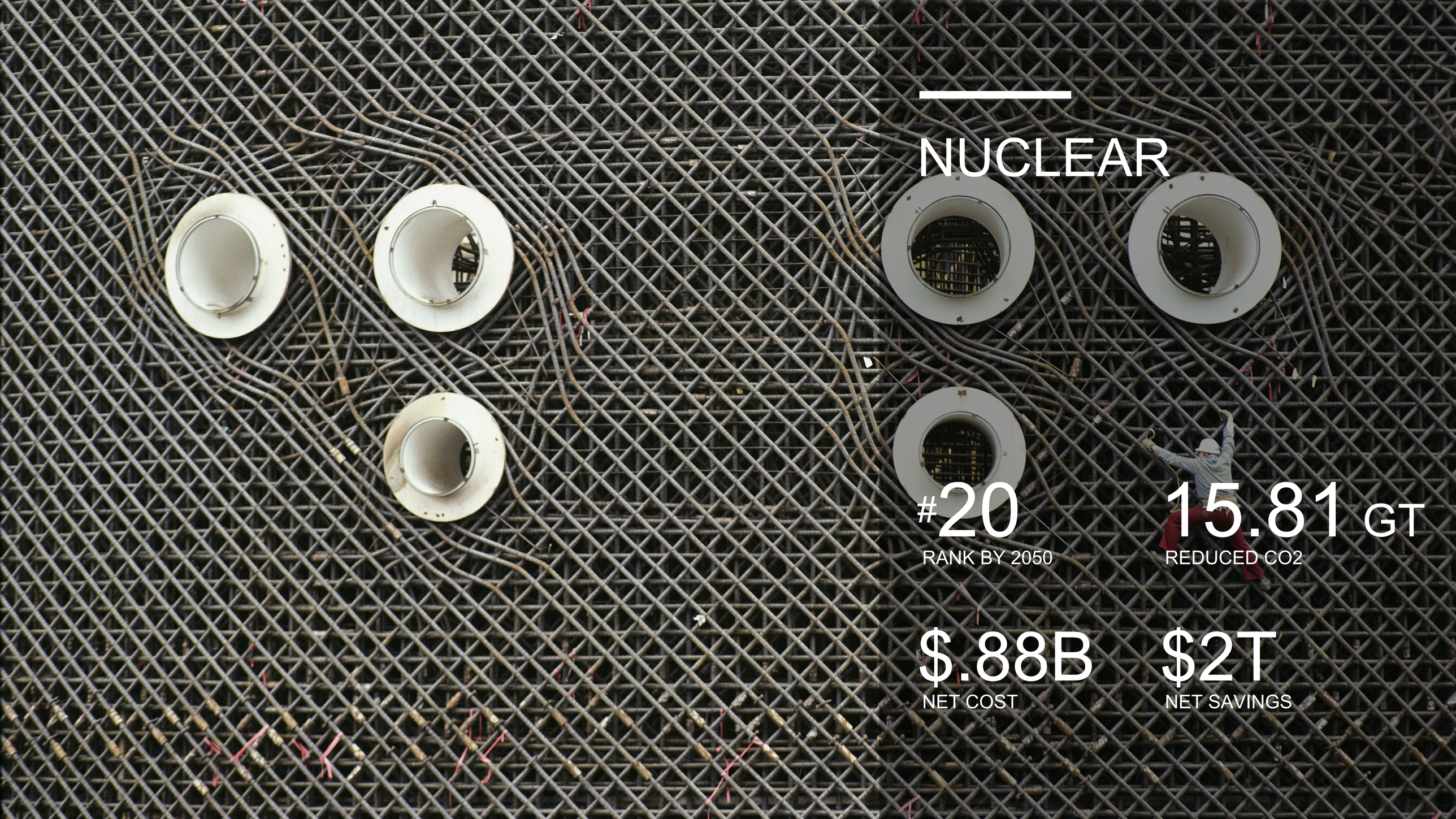
WIND TURBINES (OFFSHORE)

#22
RANK BY 2050

14.1 GT
REDUCED CO2

$572B
NET COST

$274.6B
NET SAVINGS



NUCLEAR

#20
RANK BY 2050

15.81 GT
REDUCED CO2

$.88B
NET COST

$2T
NET SAVINGS

ROOFTOP SOLAR

#10
RANK BY 2050

24.6 GT
REDUCED CO2

$453B
NET COST

$3.46T
NET SAVINGS

FOREST PROTECTION

#38
RANK BY 2050

6.2 GT
REDUCED CO2

896.2 GT
CO2 PROTECTED

REGENERATIVE AGRICULTURE

#11
RANK BY 2050

23.15 GT
REDUCED CO2

$57.2B
NET COST

$1.93T
NET SAVINGS

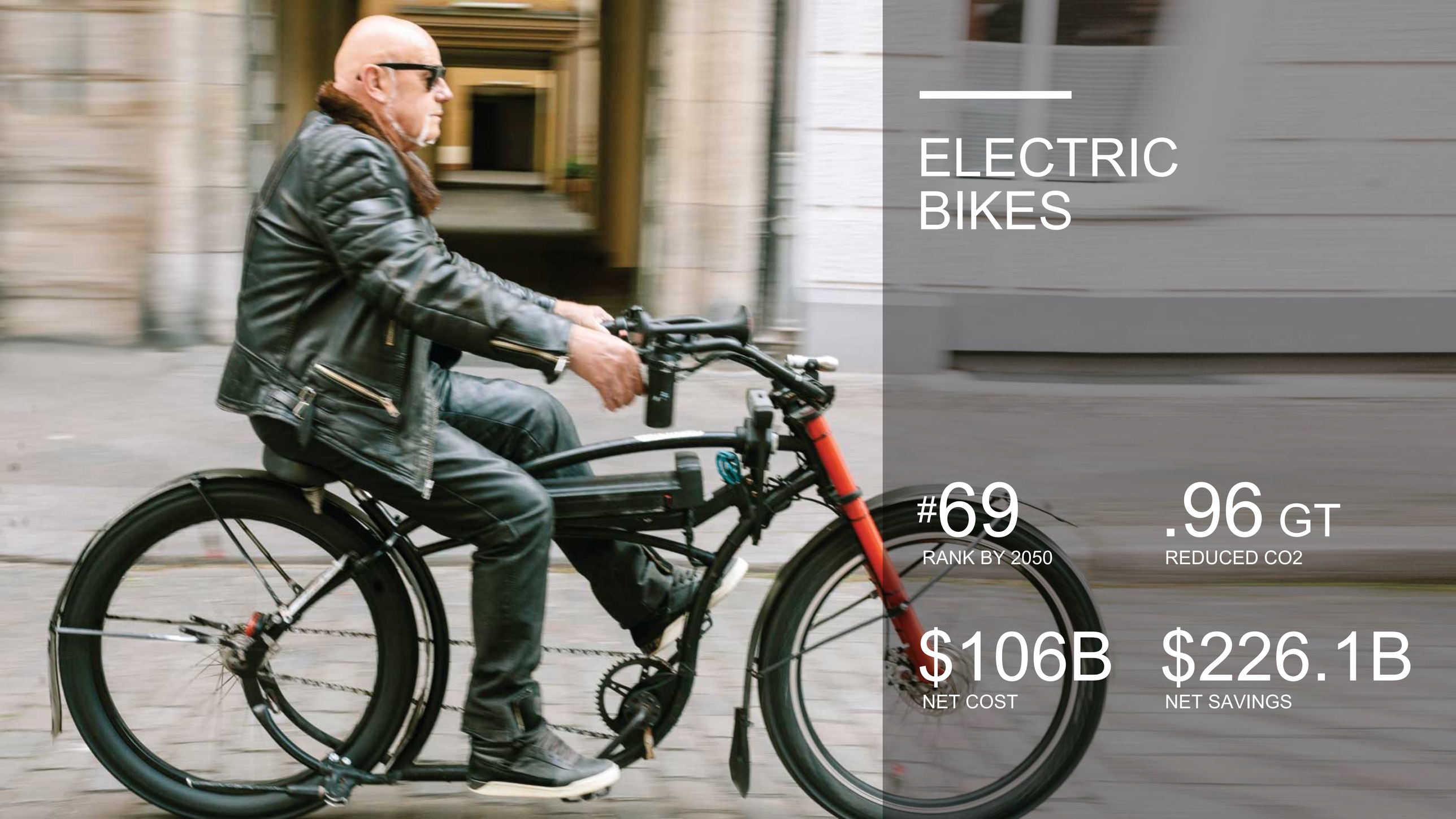
HOUSEHOLD RECYCLING

#55
RANK BY 2050

2.77 GT
REDUCED CO2

$367B
NET COST

$71.1B
NET SAVINGS



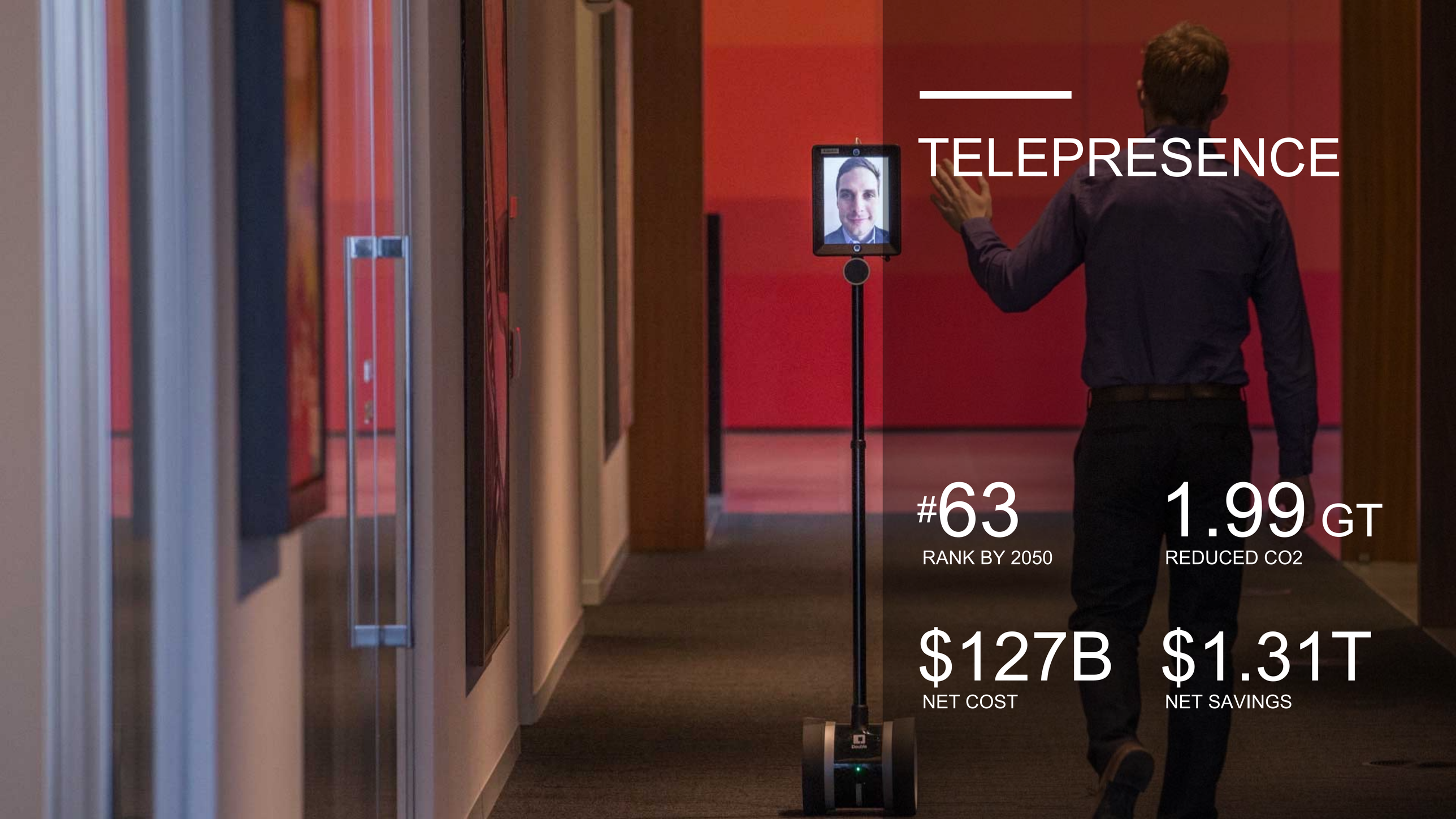
ELECTRIC BIKES

#69
RANK BY 2050

.96 GT
REDUCED CO2

$106B
NET COST

$226.1B
NET SAVINGS



TELEPRESENCE

#63
RANK BY 2050

1.99 GT
REDUCED CO2

$127B
NET COST

$1.31T
NET SAVINGS

MANAGED GRAZING

#19
RANK BY 2050

16.34 GT
REDUCED CO2

$50.5B
NET COST

$735.3B
NET SAVINGS

MARINE PERMACULTURE

HYDROGEN-BORON FUSION

REPOPULATING THE MAMMOTH STEPPE

BUILDING WITH WOOD


A COW WALKS
ONTO A BEACH

What surprised us?

TOP 20

RANK	SOLUTION	SECTOR	REDUCED CO2
1	**Refrigerant Management**	Materials	89.74 GT
2	**Wind Turbines - Onshore**	Energy	84.60 GT
3	**Reduced Food Waste**	Food	70.53 GT
4	**Plant-Rich Diet**	Food	66.11 GT
5	**Tropical Forests**	Land Use	61.23 GT
6	**Educating Girls**	Women and Girls	59.60 GT
7	**Family Planning**	Women and Girls	59.60 GT
8	**Solar Farms**	Energy	36.90 GT
9	**Silvopasture**	Food	31.19 GT
10	**Rooftop Solar**	Energy	24.60 GT
11	**Regenerative Agriculture**	Food	23.15 GT
12	**Temperate Forest**	Land Use	22.61 GT
13	**Peatlands**	Land Use	21.57 GT
14	**Tropical Staple Tree Crops**	Food	20.19 GT
15	**Afforestation**	Land Use	18.06 GT
16	**Conservation Agriculture**	Food	17.35 GT
17	**Tree Intercropping**	Food	17.20 GT
18	**Geothermal**	Energy	16.60 GT
19	**Managed Grazing**	Food	16.34 GT
20	**Nuclear**	Energy	16.09 GT

REDUCED FOOD WASTE

#3
RANK BY 2050

70.53 GT
REDUCED CO2

PLANT-RICH DIET

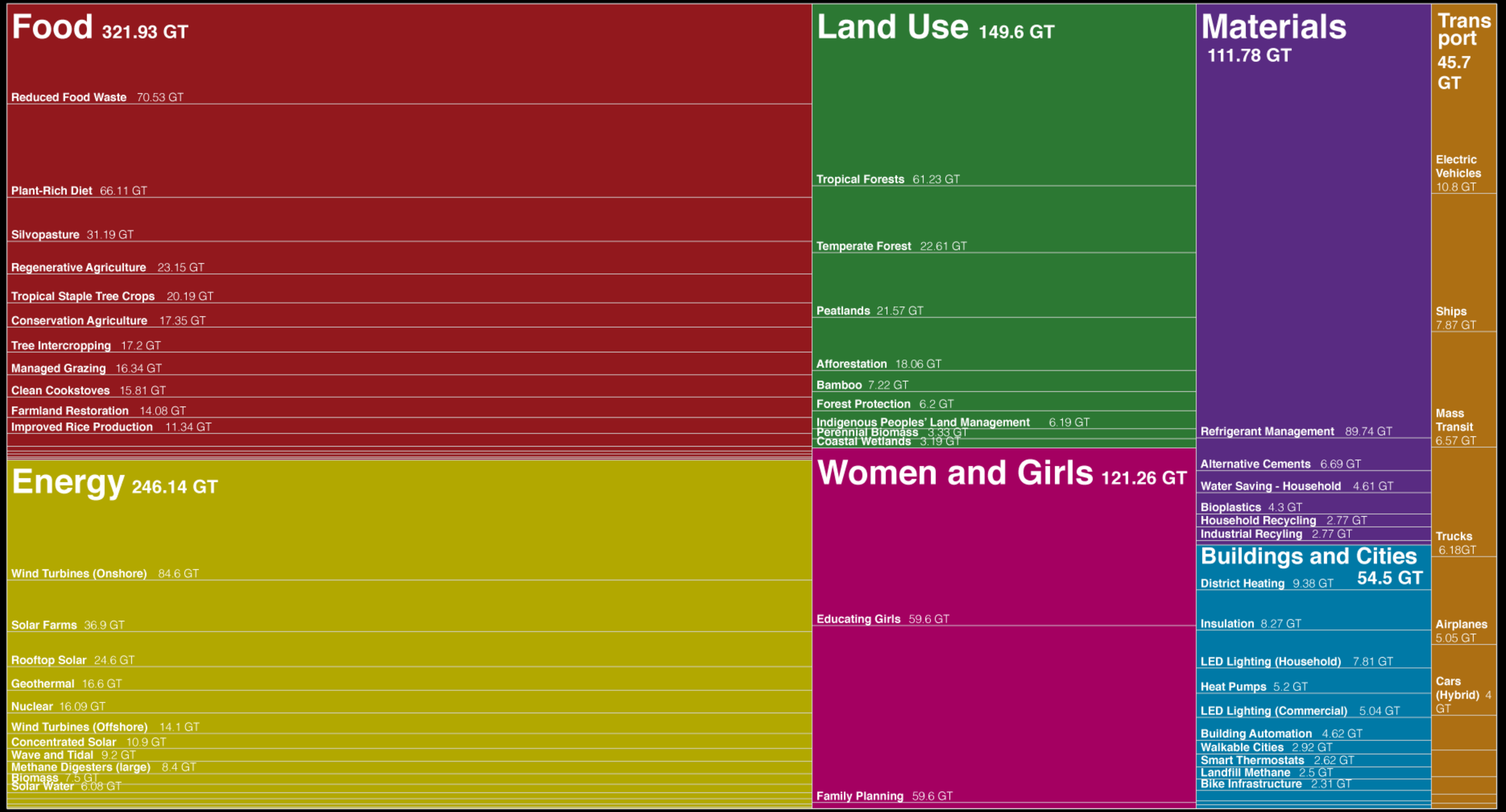
#4
RANK BY 2050

66.11 GT
REDUCED CO2

TOP 20

Food is 8 of top 20

RANK	SOLUTION	SECTOR	REDUCED CO2
1	**Refrigerant Management**	Materials	89.74 GT
2	**Wind Turbines (Onshore)**	Energy	84.60 GT
3	**Reduced Food Waste**	Food	70.53 GT
4	**Plant-Rich Diet**	Food	66.11 GT
5	**Tropical Forests**	Land Use	61.23 GT
6	**Educating Girls**	Women and Girls	59.60 GT
7	**Family Planning**	Women and Girls	59.60 GT
8	**Solar Farms**	Energy	36.90 GT
9	**Silvopasture**	Food	31.19 GT
10	**Rooftop Solar**	Energy	24.60 GT
11	**Regenerative Agriculture**	Food	23.15 GT
12	**Temperate Forest**	Land Use	22.61 GT
13	**Peatlands**	Land Use	21.57 GT
14	**Tropical Staple Tree Crops**	Food	20.19 GT
15	**Afforestation**	Land Use	18.06 GT
16	**Conservation Agriculture**	Food	17.35 GT
17	**Tree Intercropping**	Food	17.20 GT
18	**Geothermal**	Energy	16.60 GT
19	**Managed Grazing**	Food	16.34 GT
20	**Nuclear**	Energy	16.09 GT


Food 321.93 GT
Reduced Food Waste 70.53 GT
Plant-Rich Diet 66.11 GT
Silvopasture 31.19 GT
Regenerative Agriculture 23.15 GT
Tropical Staple Tree Crops 20.19 GT
Conservation Agriculture 17.35 GT
Tree Intercropping 17.2 GT
Managed Grazing 16.34 GT
Clean Cookstoves 15.81 GT
Farmland Restoration 14.08 GT
Improved Rice Production 11.34 GT
Energy 246.14 GT
Wind Turbines (Onshore) 84.6 GT
Solar Farms 36.9 GT
Rooftop Solar 24.6 GT
Geothermal 16.6 GT
Nuclear 16.09 GT
Wind Turbines (Offshore) 14.1 GT
Concentrated Solar 10.9 GT
Wave and Tidal 9.2 GT
Methane Digesters (large) 8.4 GT
Biomass 7.5 GT
Solar Water 6.08 GT
Land Use 149.6 GT
Tropical Forests 61.23 GT
Temperate Forest 22.61 GT
Peatlands 21.57 GT
Afforestation 18.06 GT
Bamboo 7.22 GT
Forest Protection 6.2 GT
Indigenous Peoples' Land Management 6.19 GT
Perennial Biomass 3.33 GT
Coastal Wetlands 3.19 GT
Women and Girls 121.26 GT
Educating Girls 59.6 GT
Family Planning 59.6 GT
Materials 111.78 GT
Refrigerant Management 89.74 GT
Alternative Cements 6.69 GT
Water Saving - Household 4.61 GT
Bioplastics 4.3 GT
Household Recycling 2.77 GT
Industrial Recyling 2.77 GT
Buildings and Cities 54.5 GT
District Heating 9.38 GT
Insulation 8.27 GT
LED Lighting (Household) 7.81 GT
Heat Pumps 5.2 GT
LED Lighting (Commercial) 5.04 GT
Building Automation 4.62 GT
Walkable Cities 2.92 GT
Smart Thermostats 2.62 GT
Landfill Methane 2.5 GT
Bike Infrastructure 2.31 GT
Transport 45.7 GT
Electric Vehicles 10.8 GT
Ships 7.87 GT
Mass Transit 6.57 GT
Trucks 6.18GT
Airplanes 5.05 GT
Cars (Hybrid) 4 GT

TOP 20

Land Use is 4 of top 20

RANK	SOLUTION	SECTOR	REDUCED CO2
1	**Refrigerant Management**	Materials	89.74 GT
2	**Wind Turbines (Onshore)**	Energy	84.60 GT
3	**Reduced Food Waste**	Food	70.53 GT
4	**Plant-Rich Diet**	Food	66.11 GT
5	**Tropical Forests**	Land Use	61.23 GT
6	**Educating Girls**	Women and Girls	59.60 GT
7	**Family Planning**	Women and Girls	59.60 GT
8	**Solar Farms**	Energy	36.90 GT
9	**Silvopasture**	Food	31.19 GT
10	**Rooftop Solar**	Energy	24.60 GT
11	**Regenerative Agriculture**	Food	23.15 GT
12	**Temperate Forest**	Land Use	22.61 GT
13	**Peatlands**	Land Use	21.57 GT
14	**Tropical Staple Tree Crops**	Food	20.19 GT
15	**Afforestation**	Land Use	18.06 GT
16	**Conservation Agriculture**	Food	17.35 GT
17	**Tree Intercropping**	Food	17.20 GT
18	**Geothermal**	Energy	16.60 GT
19	**Managed Grazing**	Food	16.34 GT
20	**Nuclear**	Energy	16.09 GT

TOP 20

Energy is 5 of top 20

RANK	SOLUTION	SECTOR	REDUCED CO2
1	Refrigerant Management	Materials	89.74 GT
2	**Wind Turbines - Onshore**	Energy	84.60 GT
3	Reduced Food Waste	Food	70.53 GT
4	Plant-Rich Diet	Food	66.11 GT
5	Tropical Forests	Land Use	61.23 GT
6	Educating Girls	Women and Girls	59.60 GT
7	Family Planning	Women and Girls	59.60 GT
8	**Solar Farms**	Energy	36.90 GT
9	Silvopasture	Food	31.19 GT
10	**Rooftop Solar**	Energy	24.60 GT
11	Regenerative Agriculture	Food	23.15 GT
12	Temperate Forest	Land Use	22.61 GT
13	Peatlands	Land Use	21.57 GT
14	Tropical Staple Tree Crops	Food	20.19 GT
15	Afforestation	Land Use	18.06 GT
16	Conservation Agriculture	Food	17.35 GT
17	Tree Intercropping	Food	17.20 GT
18	**Geothermal**	Energy	16.60 GT
19	Managed Grazing	Food	16.34 GT
20	**Nuclear**	Energy	16.09 GT
22	Wind Turbines - Offshore	Energy	14.10 GT

TOP 20

Materials is the top solution

RANK	SOLUTION	SECTOR	REDUCED CO2
1	**Refrigerant Management**	Materials	89.74 GT
2	**Wind Turbines (Onshore)**	Energy	84.60 GT
3	**Reduced Food Waste**	Food	70.53 GT
4	**Plant-Rich Diet**	Food	66.11 GT
5	**Tropical Forests**	Land Use	61.23 GT
6	**Educating Girls**	Women and Girls	59.60 GT
7	**Family Planning**	Women and Girls	59.60 GT
8	**Solar Farms**	Energy	36.90 GT
9	**Silvopasture**	Food	31.19 GT
10	**Rooftop Solar**	Energy	24.60 GT
11	**Regenerative Agriculture**	Food	23.15 GT
12	**Temperate Forest**	Land Use	22.61 GT
13	**Peatlands**	Land Use	21.57 GT
14	**Tropical Staple Tree Crops**	Food	20.19 GT
15	**Afforestation**	Land Use	18.06 GT
16	**Conservation Agriculture**	Food	17.35 GT
17	**Tree Intercropping**	Food	17.20 GT
18	**Geothermal**	Energy	16.60 GT
19	**Managed Grazing**	Food	16.34 GT
20	**Nuclear**	Energy	16.09 GT

EDUCATING GIRLS

#6
RANK BY 2050

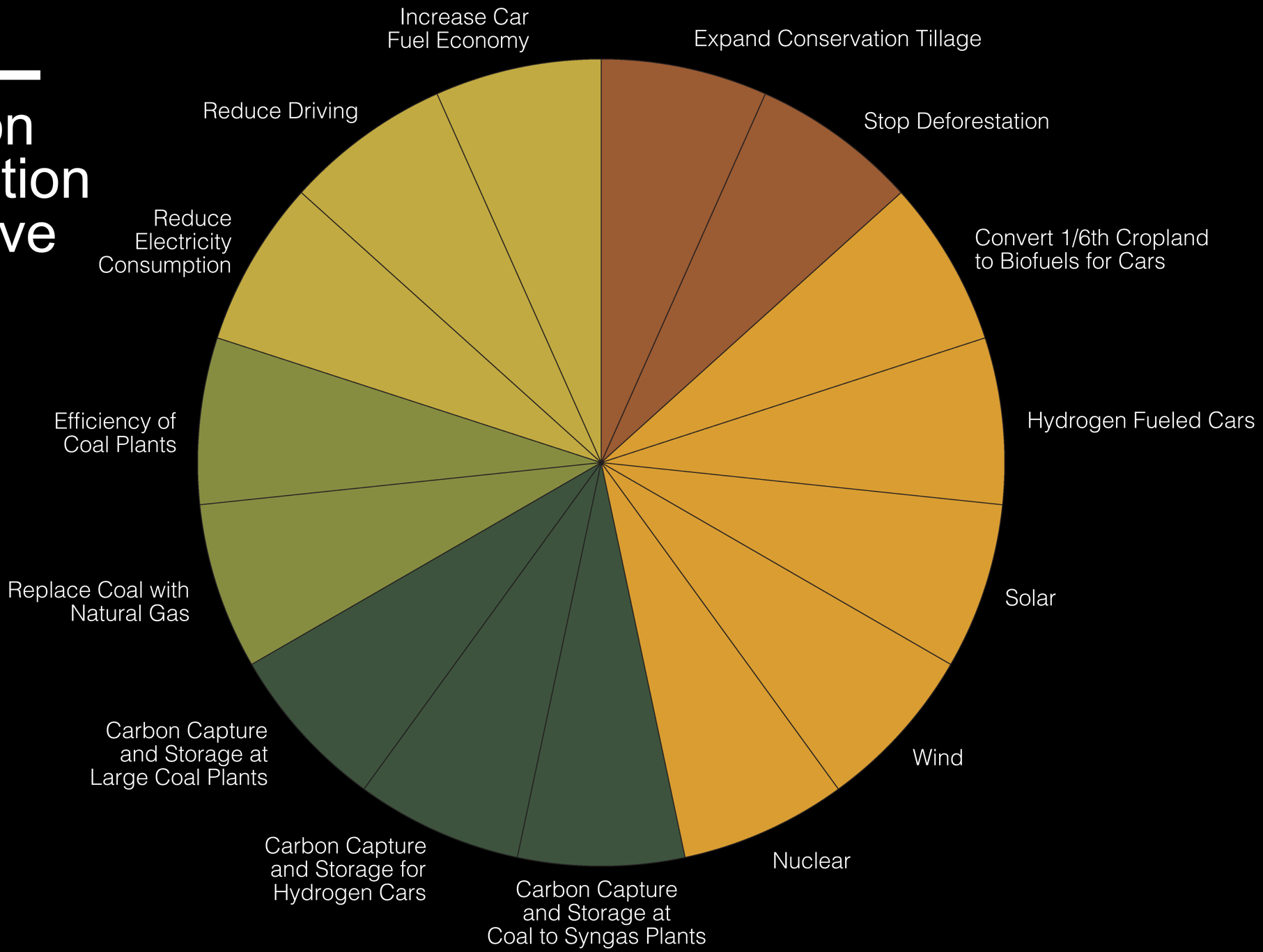
59.60 GT
REDUCED CO2

TOP 20

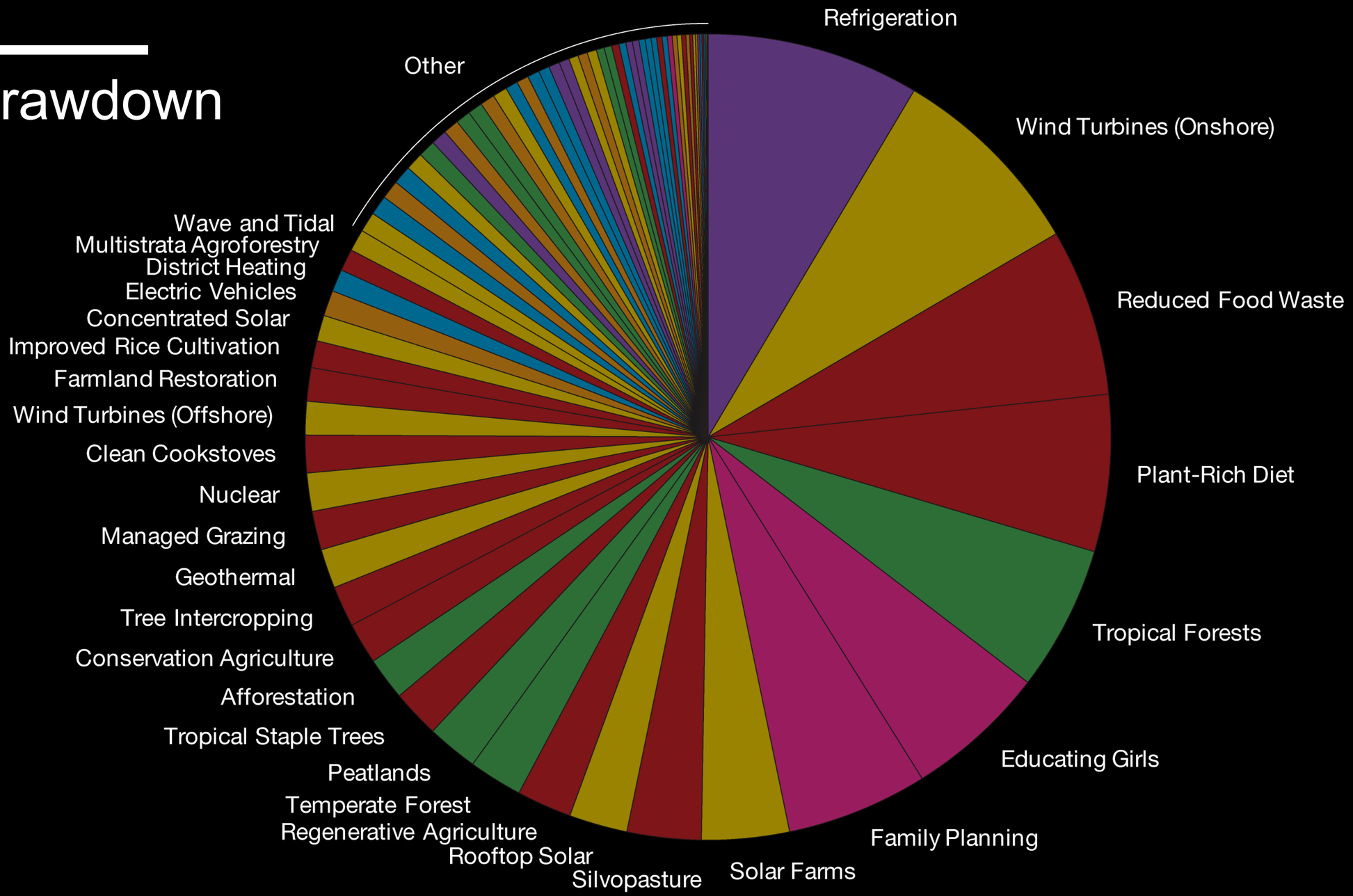
Women and girls: when combined: the #1 solution.

RANK	SOLUTION	SECTOR	REDUCED CO2
1	**Refrigerant Management**	Materials	89.74 GT
2	**Wind Turbines (Onshore)**	Energy	84.60 GT
3	**Reduced Food Waste**	Food	70.53 GT
4	**Plant-Rich Diet**	Food	66.11 GT
5	**Tropical Forests**	Land Use	61.23 GT
6	**Educating Girls**	Women and Girls	59.60 GT
7	**Family Planning**	Women and Girls	59.60 GT
8	**Solar Farms**	Energy	36.90 GT
9	**Silvopasture**	Food	31.19 GT
10	**Rooftop Solar**	Energy	24.60 GT
11	**Regenerative Agriculture**	Food	23.15 GT
12	**Temperate Forest**	Land Use	22.61 GT
13	**Peatlands**	Land Use	21.57 GT
14	**Tropical Staple Tree Crops**	Food	20.19 GT
15	**Afforestation**	Land Use	18.06 GT
16	**Conservation Agriculture**	Food	17.35 GT
17	**Tree Intercropping**	Food	17.20 GT
18	**Geothermal**	Energy	16.60 GT
19	**Managed Grazing**	Food	16.34 GT
20	**Nuclear**	Energy	16.09 GT

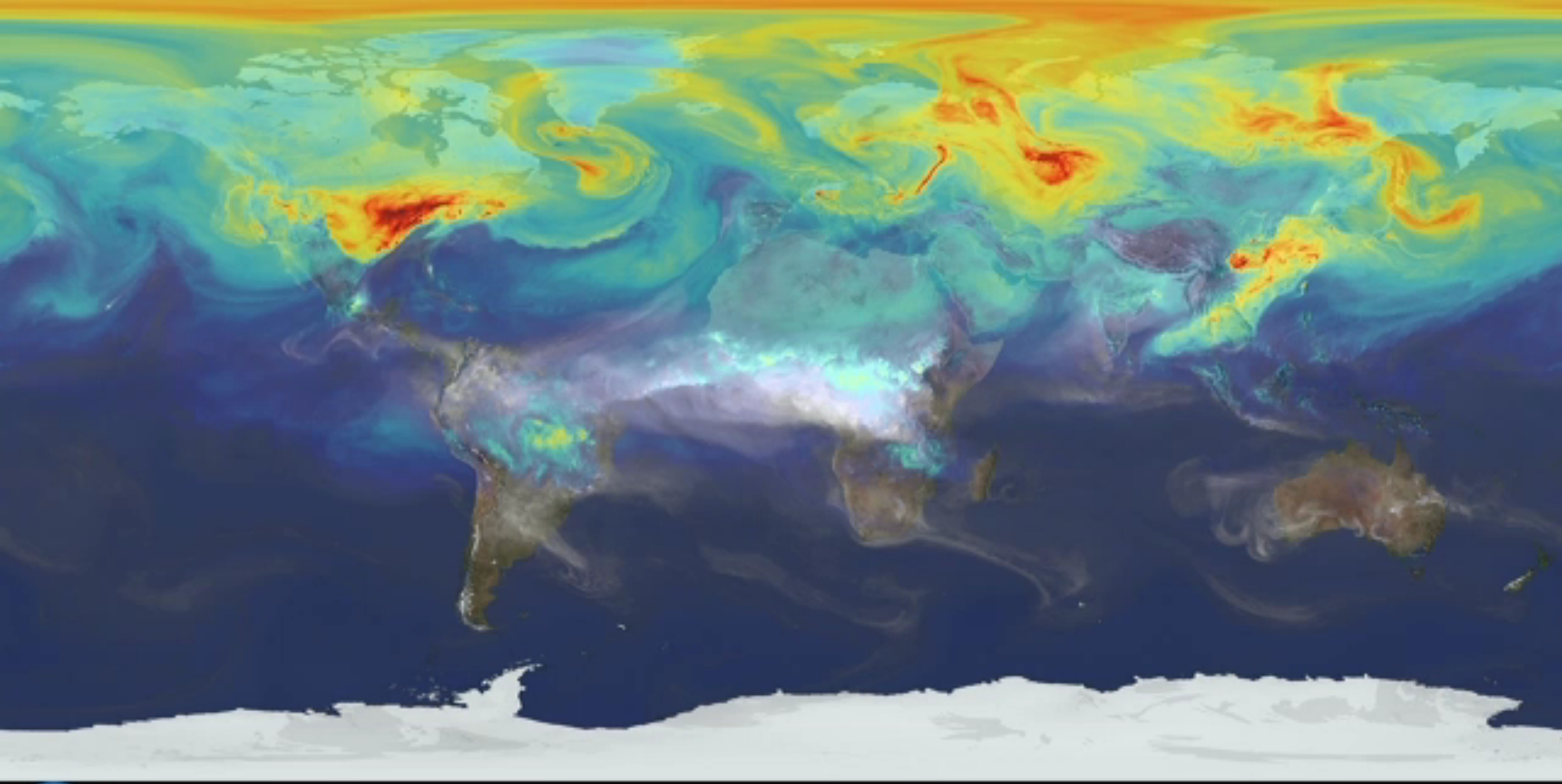
Carbon Mitigation Initiative



Drawdown


Refrigeration
Wind Turbines (Onshore)
Reduced Food Waste
Plant-Rich Diet
Tropical Forests
Educating Girls
Family Planning
Solar Farms
Silvopasture
Rooftop Solar
Regenerative Agriculture
Temperate Forest
Peatlands
Tropical Staple Trees
Afforestation
Conservation Agriculture
Tree Intercropping
Geothermal
Managed Grazing
Nuclear
Clean Cookstoves
Wind Turbines (Offshore)
Farmland Restoration
Improved Rice Cultivation
Concentrated Solar
Electric Vehicles
District Heating
Multistrata Agroforestry
Wave and Tidal
Other

Is Drawdown possible?

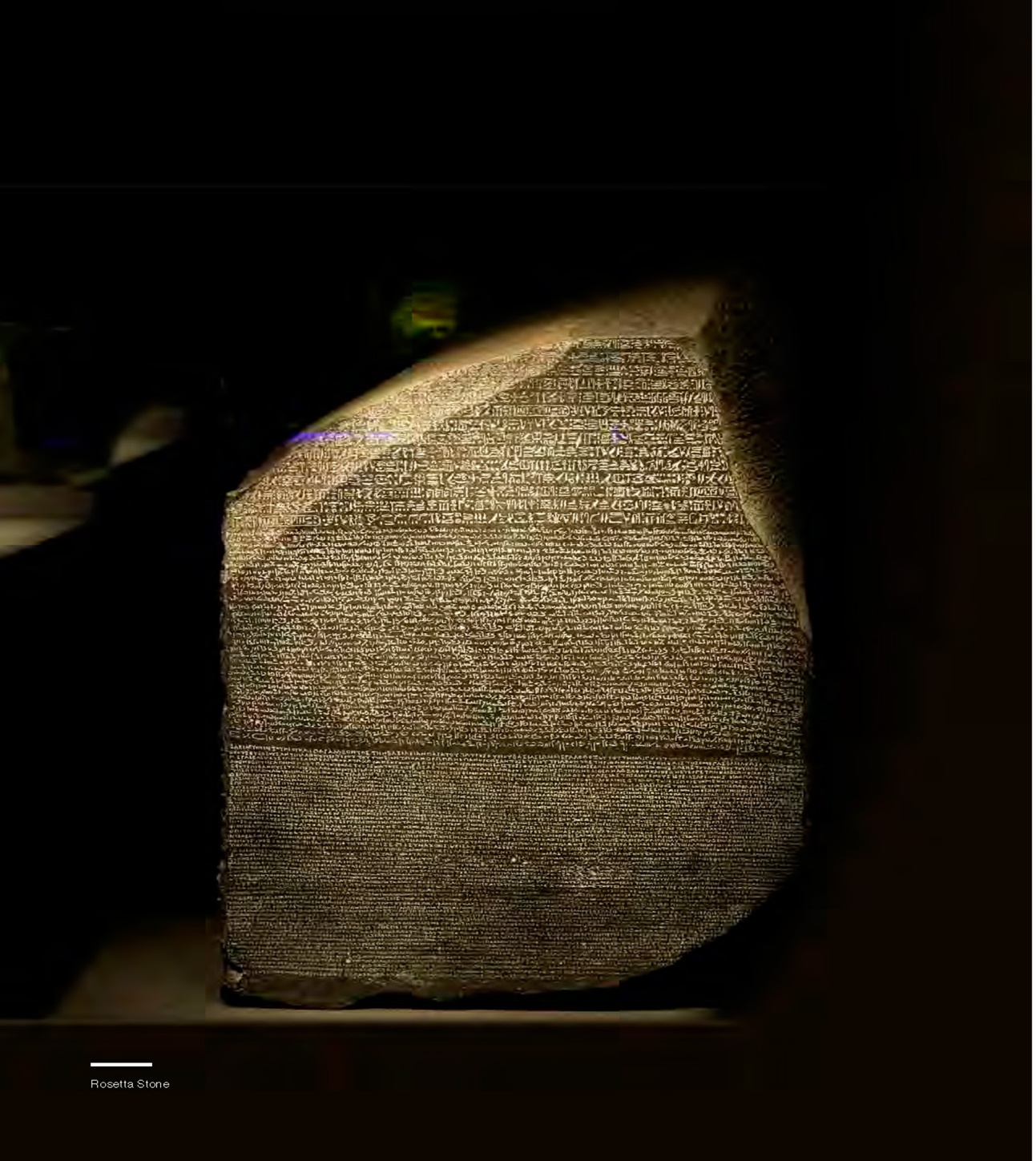

NASA
2006 / 01 / 01
Global Modeling and Assimilation Office
Carbon Monoxide Column Abundance [1.0e18 molec cm-2]
0.0 0.6 1.2 1.8 2.4 3.0 3.6 4.2 4.8 5.4 6.0
Carbon Dioxide Column Concentration [ppmv]
377 379 381 383 385 387 389 391 393 395

DRAWDOWN

THE MOST COMPREHENSIVE PLAN EVER PROPOSED TO REVERSE GLOBAL WARMING

EDITED BY PAUL HAWKEN


PLAN



Rosetta Stone

LANGUAGE

Confucius wrote that calling things by their proper name is the beginning of wisdom. In the world of climate change, names can sometimes be the beginning of confusion. Climate science contains its own specialized vocabulary, acronyms, lingo, and jargon. It is a language derived by scientists and policy makers that is succinct, specific, and useful. However, as a means of communication to the broader public, it can create separation and distance

I remember my economics professor asking for a definition of Gresham's Law and how I rattled off the answer mechanically. He looked at me—none too pleased, though the answer was correct—and said, now explain it to your grandmother. That was much more difficult. The answer I gave the professor would have made no sense to her. It was lingo. So it is with climate and global warming. Very few people actually understand climate science, yet the basic mechanism of global warming is pretty straightforward.

We have endeavored to make *Drawdown* understandable to people from all backgrounds and points of view. We have endeavored to bridge the climate communication gap by the words we choose, the analogies we avoid, the jargon we stay away from, and the metaphors we employ. As much as possible, we refrain from acronyms and lesser-known climate terminology. We spell out *carbon dioxide* instead of abbreviating it. We write *methane*, not CH4.

Let's consider an example. In November 2016, the White House released its strategy for achieving deep decarbonization by mid-century. From our perspective, *decarbonization* is a word that describes the problem, not the goal: we decarbonized the earth by removing carbon in the form of combusted coal, gas, and oil, as well as through deforestation and poor farming practices, and releasing it into the atmosphere. When the word *decarbonization* is used, as it was by the White House, it refers to replacing fossil fuel energy with clean, renewable sources. However, the term is often employed as the overarching goal of climate action—one that is unlikely to inspire and more likely to confuse.

Another term used by scientists is negative emissions. This term has no meaning in any language. Imagine a negative house, or a negative tree. The absence of something is nothing. The phrase refers to sequestering or drawing down carbon from the atmosphere. We call that sequestration. It is carbon positive, not negative. This is another example where climate-speak removes itself from common parlance and common sense. Our goal is to present climate science and solutions in language that is accessible and compelling to the broadest audience, from ninth graders to pipe fitters, from graduate students to farmers.

We also avoid using military language. Much of the rhetoric and writing about climate change is violent: the war on carbon, the fight against global warming, and frontline battles against fossil fuels. Articles refer to slashing emissions as if we had machetes. We understand the use of these terms because they convey the gravity of what we face and the tightening window of time to address global warming. Yet, terms such as *combat, battle,* and *crusade* imply that climate change is the enemy and it needs to be slayed. Climate is a function of biological activity on earth, and physics and chemistry in the sky. It is the prevalent weather conditions over time. Climate changes because it always has and will, and variations of climate produce everything from seasons to evolution. The goal is to come into alignment with the impact we are having on climate by addressing the human causes of global warming and bringing carbon back home.

The term *drawdown* needs explanation as well. The word is conventionally used to describe the reduction of military forces, capital accounts, or water from wells. We use it to refer to reducing the amount of carbon in the atmosphere. However, there is an even more important reason for the use of the word: drawdown names a goal that has been hitherto absent in most conversations about climate. Addressing, slowing, or arresting emissions is necessary, but insufficient. If you are traveling down the wrong road, you are still on the wrong road if you slow down. The only goal that makes sense for humanity is to reverse global warming, and if parents, scientists, young people, leaders and we citizens do not name the goal, there is little chance it will be achieved.

Last, there is the term *global warming*. The history of the concept goes back to the 19th century when Eunice Foote (1856) and John Tyndall (1859) independently described how gases trap heat in the atmosphere and how changes in the concentration of gases would alter the climate. The term *global warming* was first used by geochemist Wallace Broecker in a 1975 *Science* article entitled "Climatic Change: Are We on the Brink of a Pronounced Global Warming?" Before that article, the term used was *inadvertent climate modification*. Global warming refers to the surface temperature of the earth. Climate change refers to the many changes that will occur with increases in temperature and greenhouse gases. That is why the U.N. climate agency is called the Intergovernmental Panel on Climate Change—the IPCC, and not the IPGW. It studies the comprehensive impacts of climate change on all living systems. What we measure and model in *Drawdown* is how to begin the reduction of greenhouse gases in order to reverse global warming. -Paul Hawken

Is there a business case?

SUMMARY OF SOLUTIONS BY OVERALL RANKING

	Solution	Sector	TOTAL ATMOSPHERIC CO2-EQ REDUCTION (GT)	NET COST (BILLIONS US $)	NET SAVINGS (BILLIONS US $)
1	Refrigerant Management	Materials	89.74	N/A	-$902.77
2	Wind Turbines (Onshore)	Energy	84.60	$1,225.37	$7,425.00
3	Reduced Food Waste	Food	70.53	N/A	N/A
4	Plant-Rich Diet	Food	66.11	N/A	N/A
5	Tropical Forests	Land Use	61.23	N/A	N/A
6	Educating Girls	Women and Girls	59.60	N/A	N/A
7	Family Planning	Women and Girls	59.60	N/A	N/A
8	Solar Farms	Energy	36.90	-$80.60	$5,023.84
9	Silvopasture	Food	31.19	$41.59	$699.37
10	Rooftop Solar	Energy	24.60	$453.14	$3,457.63
11	Regenerative Agriculture	Food	23.15	$57.22	$1,928.10
12	Temperate Forests	Land Use	22.61	N/A	N/A
13	Peatlands	Land Use	21.57	N/A	N/A
14	Tropical Staple Trees	Food	20.19	$120.07	$626.97
15	Afforestation	Land Use	18.06	$29.44	$392.33
16	Conservation Agriculture	Food	17.35	$37.53	$2,119.07
17	Tree Intercropping	Food	17.20	$146.99	$22.10
18	Geothermal	Energy	16.60	-$155.48	$1,024.34
19	Managed Grazing	Food	16.34	$50.48	$735.27
20	Nuclear	Energy	16.09	$0.88	$1,713.40
21	Clean Cookstoves	Food	15.81	$72.16	$166.28
22	Wind Turbines (Offshore)	Energy	14.10	$572.40	$274.57
23	Farmland Restoration	Food	14.06	$72.24	$1,342.47
24	Improved Rice Cultivation	Food	11.34	N/A	$519.06
25	Concentrated Solar	Energy	10.90	$1,319.70	$413.85
26	Electric Vehicles	Transport	10.80	$14,148.03	$9,726.40
27	District Heating	Buildings and Cities	9.38	$457.07	$3,543.50
28	Multistrata Agroforestry	Food	9.28	$26.76	$709.75
29	Wave and Tidal	Energy	9.20	$411.84	-$1,004.70
30	Methane Digesters (Large)	Energy	8.40	$201.41	$148.83
31	Insulation	Buildings and Cities	8.27	$3,655.92	$2,513.33
32	Ships	Transport	7.87	$915.93	$424.38
33	LED Lighting - Household	Buildings and Cities	7.81	$323.52	$1,729.54
34	Biomass	Energy	7.50	$402.31	$519.35
35	Bamboo	Land Use	7.22	$23.79	$264.80
36	Alternative Cement	Materials	6.69	-$273.90	N/A
37	Mass Transit	Transport	6.57	N/A	$2,379.73
38	Forest Protection	Land Use	6.20	N/A	N/A
39	Indigenous Peoples' Land Management	Land Use	6.19	N/A	N/A
40	Trucks	Transport	6.18	$543.54	$2,781.63
41	Solar Water	Energy	6.08	$2.99	$773.65
42	Heat Pumps	Buildings and Cities	5.20	$118.71	$1,546.66
43	Airplanes	Transport	5.05	$662.42	$3,187.80
44	LED Lighting - Commercial	Buildings and Cities	5.04	-$205.05	$1,089.63
45	Building Automation	Buildings and Cities	4.62	$68.12	$880.55
46	Water Saving - Home	Materials	4.61	$72.44	$1,800.12
47	Bioplastic	Materials	4.30	$19.15	N/A
48	In-Stream Hydro	Energy	4.00	$202.53	$568.36
49	Cars	Transport	4.00	-$598.69	$1,761.72
50	Cogeneration	Energy	3.97	$279.25	$566.93
51	Perennial Biomass	Land Use	3.33	$77.94	$541.89
52	Coastal Wetlands	Land Use	3.19	N/A	N/A
53	System of Rice Intensification	Food	3.13	N/A	$677.83
54	Walkable Cities	Buildings and Cities	2.92	N/A	$3,278.24
55	Household Recycling	Materials	2.77	$366.92	$71.13
56	Industrial Recyling	Materials	2.77	$366.92	$71.13
57	Smart Thermostats	Buildings and Cities	2.62	-$74.16	$640.10
58	Landfill Methane	Buildings and Cities	2.50	-$1.82	$67.57
59	Bike Infrastructure	Buildings and Cities	2.31	-$2,026.97	$400.47
60	Composting	Food	2.28	-$63.72	-$60.82
61	Smart Glass	Buildings and Cities	2.19	$932.30	$325.10
62	Women Smallholders	Women and Girls	2.06	N/A	$87.60
63	Telepresence	Transport	1.99	$127.72	$1,310.59
64	Methane Digesters (Small)	Energy	1.90	$15.50	$13.90
65	Nutrient Management	Food	1.81	N/A	$102.32
66	High-Speed Rail	Transport	1.52	-$1,038.42	$368.13
67	Farmland Irrigation	Food	1.33	$216.16	$429.67
68	Waste-to-Energy	Energy	1.10	$36.00	$19.82
69	Electric Bikes	Transport	0.96	$106.75	$226.07
70	Recycled Paper	Materials	0.90	$573.48	N/A
71	Water Distribution	Buildings and Cities	0.87	$137.37	$903.11
72	Biochar	Food	0.81	N/A	N/A
73	Green Roofs	Buildings and Cities	0.77	$1,393.29	$988.46
74	Trains	Transport	0.52	$808.64	$313.86
75	Ridesharing	Transport	0.32	N/A	$185.56
76	Micro Wind	Energy	0.20	$36.12	$19.90
77	Energy Storage (Distributed)	Energy	N/A	N/A	N/A
77	Energy Storage (Utilities)	Energy	N/A	N/A	N/A
77	Grid Flexibility	Energy	N/A	N/A	N/A
78	Microgrids	Energy	N/A	N/A	N/A
79	Net Zero Buildings	Buildings and Cities	N/A	N/A	N/A
80	Retrofitting	Buildings and Cities	N/A	N/A	N/A
	Totals		**1,051.01**	**$27,405.68**	**$73,874.52**


DRAWDOWN