

ACHIEVING DRAWDOWN

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DRAWDOWN is the point when greenhouse gas levels in the atmosphere start to decline.

We believe stopping and beginning to **reverse global warming** is possible, with solutions that exist today.

PROBLEM

FEAR

CONFLICT

SOLUTIONS
POSSIBILITY
COLLABORATION

**OPPORTUNITIES
TO CREATE THE
FUTURE WE WANT**

100 SOLUTIONS TO REVERSE GLOBAL WARMING BY 2050

RANKED BY IMPACT

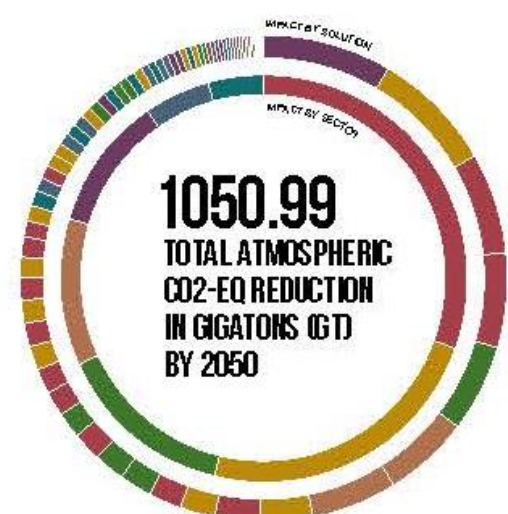
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DRAWDOWN IS THAT POINT IN TIME WHEN THE CONCENTRATION OF GREENHOUSE GASES IN THE ATMOSPHERE BEGINS TO DECLINE ON A YEAR-TO-YEAR BASIS.



Project Drawdown is the most comprehensive plan ever proposed to reverse global warming. Our organization did not make or devise the plan—we found the plan because it already exists. We gathered a qualified and diverse group of researchers from around the world to identify, research, and model the 100 most substantive, existing solutions to address climate change. What was uncovered is a path forward that can roll back global warming within thirty years. It shows that humanity has the means at hand. Our work is to accelerate the knowledge and growth of what is possible. We chose the name Drawdown because if we do not name the goal, we are unlikely to achieve it.

EACH SOLUTION REDUCES GREENHOUSE GASES BY AVOIDING EMISSIONS AND/OR BY SEQUESTERING CARBON DIOXIDE ALREADY IN THE ATMOSPHERE.



REPLACE

REDUCE

RESTORE

2020-2050 Solutions 20/80

SOLUTIONS

Refrigerant Management
Wind Turbines (Onshore)
Reduced Food Waste
Plant-Rich Diets
Tropical Forest Restoration
Universal Education
Family Planning
Solar Farms
Silvopasture
Rooftop Solar
Regenerative Annual Cropping
Temperate Forest Restoration
Peatland Protection
Tropical Staple Tree Crops
Afforestation
Conservation Agriculture
Tree Intercropping
Geothermal
Managed Grazing
Nuclear

SECTOR

Materials
Electricity
Food
Food
Land Use
Health & Education
Health & Education
Electricity
Food
Electricity
Food
Land Use
Land Use
Food
Land Use
Food
Food
Electricity
Food
Electricity

REDUCED CO₂-eq

89.74 GT
84.60 GT
70.53 GT
66.11 GT
61.23 GT
51.48 GT
51.48 GT
36.90 GT
31.19 GT
24.60 GT
23.15 GT
22.61 GT
21.57 GT
20.19 GT
18.06 GT
17.35 GT
17.20 GT
16.60 GT
16.34 GT
16.09 GT

2020-2050 Solutions 20/80

Renewable Electricity Systems

are a *necessary set of solutions*, but only account for ~25% of global emissions.

SOLUTIONS

Refrigerant Management

Wind Turbines (Onshore)

Reduced Food Waste

Plant-Rich Diets

Tropical Forest Restoration

Universal Education

Family Planning

Solar Farms

Silvopasture

Rooftop Solar

Regenerative Annual Cropping

Temperate Forest Restoration

Peatland Protection

Tropical Staple Tree Crops

Afforestation

Conservation Agriculture

Tree Intercropping

Geothermal

Managed Grazing

Nuclear

SECTOR

Materials

Electricity

Food

Food

Land Use

Health & Education

Health & Education

Electricity

Food

Electricity

Food

Land Use

Land Use

Food

Land Use

Food

Food

Electricity

Food

Electricity

REDUCED CO₂-eq

89.74 GT

84.60 GT

70.53 GT

66.11 GT

61.23 GT

51.48 GT

51.48 GT

36.90 GT

31.19 GT

24.60 GT

23.15 GT

22.61 GT

21.57 GT

20.19 GT

18.06 GT

17.35 GT

17.20 GT

16.60 GT

16.34 GT

16.09 GT

2020-2050 Solutions 20/80

Food systems
solutions can be
the most impactful
decisions we make
everyday. **What**
and how we
produce and
consume matters.

SOLUTIONS	SECTOR	REDUCED CO2-eq
Refrigerant Management	Materials	89.74 GT
Wind Turbines (Onshore)	Electricity	84.60 GT
Reduced Food Waste	Food	70.53 GT
Plant-Rich Diets	Food	66.11 GT
Tropical Forest Restoration	Land Use	61.23 GT
Universal Education	Health & Education	51.48 GT
Family Planning	Health & Education	51.48 GT
Solar Farms	Electricity	36.90 GT
Silvopasture	Food	31.19 GT
Rooftop Solar	Electricity	24.60 GT
Regenerative Annual Cropping	Food	23.15 GT
Temperate Forest Restoration	Land Use	22.61 GT
Peatland Protection	Land Use	21.57 GT
Tropical Staple Tree Crops	Food	20.19 GT
Afforestation	Land Use	18.06 GT
Conservation Agriculture	Food	17.35 GT
Tree Intercropping	Food	17.20 GT
Geothermal	Electricity	16.60 GT
Managed Grazing	Food	16.34 GT
Nuclear	Electricity	16.09 GT

2020-2050 Solutions 20/80

Land Use
solutions protect,
restore, and expand
natural sinks that
drawdown carbon
every year.

SOLUTIONS

Refrigerant Management
Wind Turbines (Onshore)
Reduced Food Waste
Plant-Rich Diets
Tropical Forest Restoration
Universal Education
Family Planning
Solar Farms
Silvopasture
Rooftop Solar
Regenerative Annual Cropping
Temperate Forest Restoration
Peatland Protection
Tropical Staple Tree Crops
Afforestation
Conservation Agriculture
Tree Intercropping
Geothermal
Managed Grazing
Nuclear

SECTOR

Materials 89.74 GT
Electricity 84.60 GT
Food 70.53 GT
Food 66.11 GT
Land Use 61.23 GT
Health & Education 51.48 GT
Health & Education 51.48 GT
Electricity 36.90 GT
Food 31.19 GT
Electricity 24.60 GT
Food 23.15 GT
Land Use 22.61 GT
Land Use 21.57 GT
Food 20.19 GT
Land Use 18.06 GT
Food 17.35 GT
Food 17.20 GT
Electricity 16.60 GT
Food 16.34 GT
Electricity 16.09 GT

REDUCED CO2-eq

2020-2050 Solutions 20/80

Land + Food

taken together is the most impactful set of solutions. This *fundamentally shifts traditional thinking* on climate action.

SOLUTIONS

Refrigerant Management

Wind Turbines (Onshore)

Reduced Food Waste

Plant-Rich Diets

Tropical Forest Restoration

Universal Education

Family Planning

Solar Farms

Silvopasture

Rooftop Solar

Regenerative Annual Cropping

Temperate Forest Restoration

Peatland Protection

Tropical Staple Tree Crops

Afforestation

Conservation Agriculture

Tree Intercropping

Geothermal

Managed Grazing

Nuclear

SECTOR

Materials

Electricity

Food

Food

Land Use

Health & Education

Health & Education

Electricity

Food

Electricity

Food

Land Use

Land Use

Food

Land Use

Food

Food

Electricity

Food

Electricity

REDUCED CO₂-eq

89.74 GT

84.60 GT

70.53 GT

66.11 GT

61.23 GT

51.48 GT

51.48 GT

36.90 GT

31.19 GT

24.60 GT

23.15 GT

22.61 GT

21.57 GT

20.19 GT

18.06 GT

17.35 GT

17.20 GT

16.60 GT

16.34 GT

16.09 GT

An aerial photograph of a rural landscape featuring a mix of green and golden-brown agricultural fields. A small pond is visible in the upper left, and a cluster of farm buildings, including a large red barn, is situated in the upper center. A dense line of trees runs along the bottom of the frame. The text "REGENERATIVE ANNUAL CROPPING" is overlaid in white on a dark rectangular background in the center.

REGENERATIVE ANNUAL CROPPING

An aerial photograph of a hillside covered in multistrata agroforestry. The landscape is a mix of green grass, young trees, and banana plants. In the background, a dense forest line sits atop the hill under a cloudy sky. A semi-transparent dark rectangle is centered over the middle of the image, containing the text 'MULTISTRATA AGROFORESTRY' in white, bold, sans-serif capital letters.

MULTISTRATA AGROFORESTRY

A photograph of a herd of cows in a forest clearing. The cows are of various breeds, including red, black and white, and brown and white. They are standing on a grassy area with fallen leaves. In the background, there are many trees with green and yellow leaves, suggesting an autumn setting. A large, mossy rock is visible in the foreground on the right. The word "SILVOPASTURE" is overlaid in white text on a dark semi-transparent background in the center of the image.

SILVOPASTURE



PLANT-RICH DIETS



**REDUCED
FOOD WASTE**




FOREST RESTORATION



BAMBOO PRODUCTION

A photograph of an indigenous man sitting on a dark, rocky outcrop. He is wearing a large, vibrant headdress made of red and blue feathers. He has traditional body paint on his arms and legs, and is wearing blue shorts. He is looking off to the side with a slight smile. The background is a vast, lush green forest covering rolling hills under a cloudy sky.

INDIGENOUS PEOPLES' FOREST MANAGEMENT

An underwater photograph showing a dense school of small, silvery fish swimming through green seaweed. The scene is illuminated by natural light filtering down from the surface, creating a vibrant blue and green environment. The fish are concentrated in the center and left, with some swimming towards the right. The seaweed stalks are visible on the left and right sides, with long, narrow leaves. A semi-transparent dark rectangle is overlaid in the center, containing the text 'MARINE PERMACULTURE' in white, bold, sans-serif capital letters.

MARINE PERMACULTURE

ASPARAGOPSIS TAXIFORMIS



Is Drawdown possible?

———— 2020-2050

PLAUSIBLE SCENARIO

Drawdown
~2070

SOLUTIONS

Refrigerant Management
Wind Turbines (Onshore)
Reduced Food Waste
Plant-Rich Diet
Tropical Forests
Universal Education
Family Planning
Solar Farms
Silvopasture
Rooftop Solar
Regenerative Agriculture
Temperate Forest
Peatlands
Tropical Staple Tree Crops
Afforestation
Conservation Agriculture
Tree Intercropping
Geothermal
Managed Grazing
Nuclear

SECTOR

Materials
Electricity
Food
Food
Land Use
Health & Education
Health & Education
Electricity
Food
Electricity
Food
Land Use
Land Use
Food
Land Use
Food
Food
Electricity
Food
Electricity

REDUCED CO₂-eq

89.74 GT
84.60 GT
70.53 GT
66.11 GT
61.23 GT
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36.90 GT
31.19 GT
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22.61 GT
21.57 GT
20.19 GT
18.06 GT
17.35 GT
17.20 GT
16.60 GT
16.34 GT
16.09 GT

———— 2020-2050

DRAWDOWN SCENARIO

Drawdown
~2050

SOLUTIONS

Wind Turbines (Onshore)
Refrigerant Management
Tropical Forest Restoration
Reduced Food Waste
Plant-Rich Diets
Solar Farms
Universal Education
Family Planning
Silvopasture
Rooftop Solar
Afforestation
Temperate Forest Restoration
Peatland Protection
Regenerative Annual Cropping
Tropical Staple Tree Crops
Geothermal
Tree Intercropping
Concentrated Solar
Electric Vehicles
Clean Cookstoves

SECTOR

Electricity
Materials
Land Use
Food
Food
Electricity
Health & Education
Health & Education
Food
Electricity
Land Use
Land Use
Land Use
Food
Food
Electricity
Food
Electricity
Transportation
Food

REDUCED CO₂-eq

146.47 GT
96.49 GT
89.00 GT
83.02 GT
78.65 GT
64.57 GT
51.48 GT
51.48 GT
47.50 GT
43.06 GT
41.61 GT
34.70 GT
33.50 GT
32.23 GT
31.50 GT
28.09 GT
26.91 GT
26.01 GT
25.26 GT
24.32 GT

———— 2020-2050

OPTIMUM SCENARIO

Drawdown
~2040

SOLUTIONS

Wind Turbines (Onshore)
Tropical Forest Restoration
Refrigerant Management
Reduced Food Waste
Plant-Rich Diets
Silvopasture
Solar Farms
Electric Vehicles
Universal Education
Family Planning
Tropical Staple Tree Crops
Temperate Forest Restoration
Afforestation
Rooftop Solar
Tree Intercropping
Peatland Protection
Regenerative Annual Cropping
Farmland Restoration
Bamboo
Managed Grazing

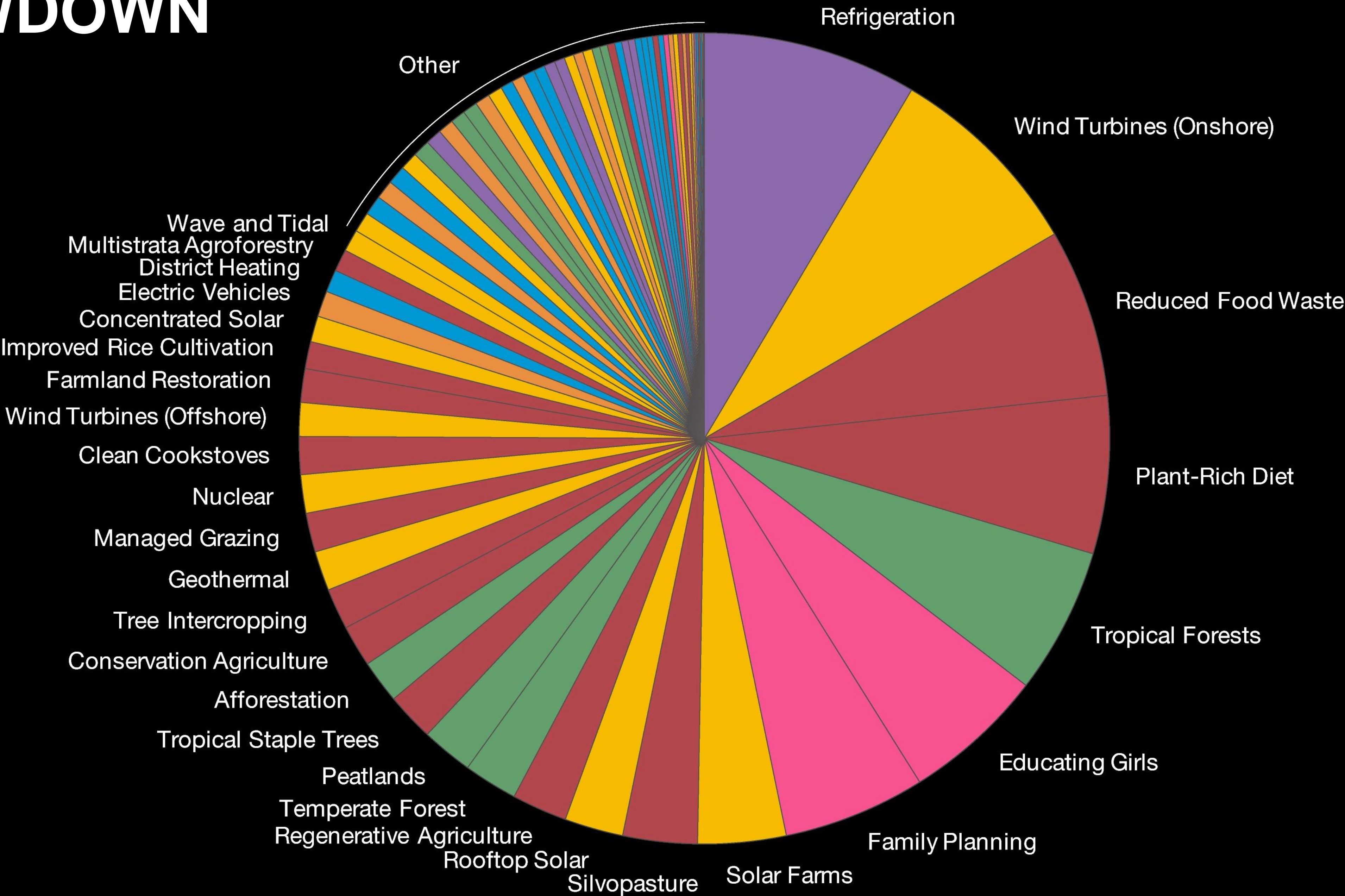
SECTOR

Electricity
Land Use
Materials
Food
Food
Food
Electricity
Transportation
Health & Education
Health & Education
Food
Land Use
Land Use
Electricity
Food
Land Use
Food
Food
Land Use
Food

REDUCED CO₂-eq

139.31 GT
105.61 GT
96.49 GT
93.72 GT
87.03 GT
63.81 GT
60.48 GT
52.38 GT
51.48 GT
51.48 GT
46.70 GT
42.63 GT
41.61 GT
40.34 GT
36.62 GT
36.59 GT
32.07 GT
30.49 GT
28.63 GT
27.65 GT

THE DRAWDOWN SYSTEM



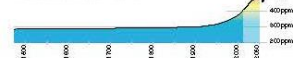
DRAWDOWN

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RANKED BY IMPACT

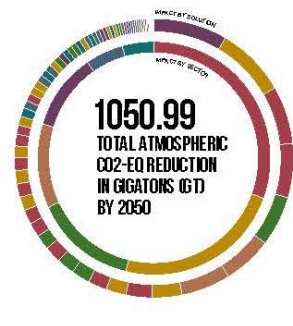
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Forest Biomass #15 18.06 Gt Reduced CO2	Renewable Biomass #43 5.05 Gt Reduced CO2	Carbon Sequestration #36 6.69 Gt Reduced CO2	Artificially Assisted Technology #35 7.22 Gt Reduced CO2	Autonomous Vehicles #59 2.31 Gt Reduced CO2
Food Biomass #72 0.81 Gt Reduced CO2	Renewable Biomass #47 4.30 Gt Reduced CO2	Renewable Biomass #45 4.62 Gt Reduced CO2	Renewable Biomass #49 4.00 Gt Reduced CO2	Renewable Biomass #21 15.81 Gt Reduced CO2
Renewable Biomass #50 3.97 Gt Reduced CO2	Renewable Biomass #60 2.25 Gt Reduced CO2	Renewable Biomass #25 10.90 Gt Reduced CO2	Renewable Biomass #16 17.55 Gt Reduced CO2	Renewable Biomass #27 9.38 Gt Reduced CO2
Women and Girls #6 59.60 Gt Reduced CO2	Renewable Biomass #69 0.98 Gt Reduced CO2	Renewable Biomass #73 0.77 Gt Reduced CO2	Renewable Biomass #67 1.33 Gt Reduced CO2	Renewable Biomass #39 0.19 Gt Reduced CO2
Renewable Biomass #23 14.06 Gt Reduced CO2	Renewable Biomass #38 6.00 Gt Reduced CO2	Renewable Biomass #18 10.60 Gt Reduced CO2	Renewable Biomass #77 11.24 Gt Reduced CO2	Renewable Biomass #48 4.00 Gt Reduced CO2
Renewable Biomass #42 5.20 Gt Reduced CO2	Renewable Biomass #56 2.77 Gt Reduced CO2	Renewable Biomass #31 6.27 Gt Reduced CO2	Renewable Biomass #44 5.04 Gt Reduced CO2	Renewable Biomass #33 7.81 Gt Reduced CO2
Renewable Biomass #76 0.07 Gt Reduced CO2	Renewable Biomass #19 10.34 Gt Reduced CO2	Renewable Biomass #78 10.28 Gt Reduced CO2	Renewable Biomass #37 6.07 Gt Reduced CO2	Renewable Biomass #30 5.40 Gt Reduced CO2
Renewable Biomass #28 10.28 Gt Reduced CO2	Renewable Biomass #79 10.09 Gt Reduced CO2	Renewable Biomass #20 10.09 Gt Reduced CO2	Renewable Biomass #65 1.11 Gt Reduced CO2	Renewable Biomass #64 1.11 Gt Reduced CO2

SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS	SUSTAINABLE DEVELOPMENT GOALS

OPPORTUNITIES
TO CREATE THE
FUTURE WE WANT

BUILDING A REGENERATIVE FUTURE



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