Proposal to Build a Planet Dashboard Website

By Glenn Weinreb

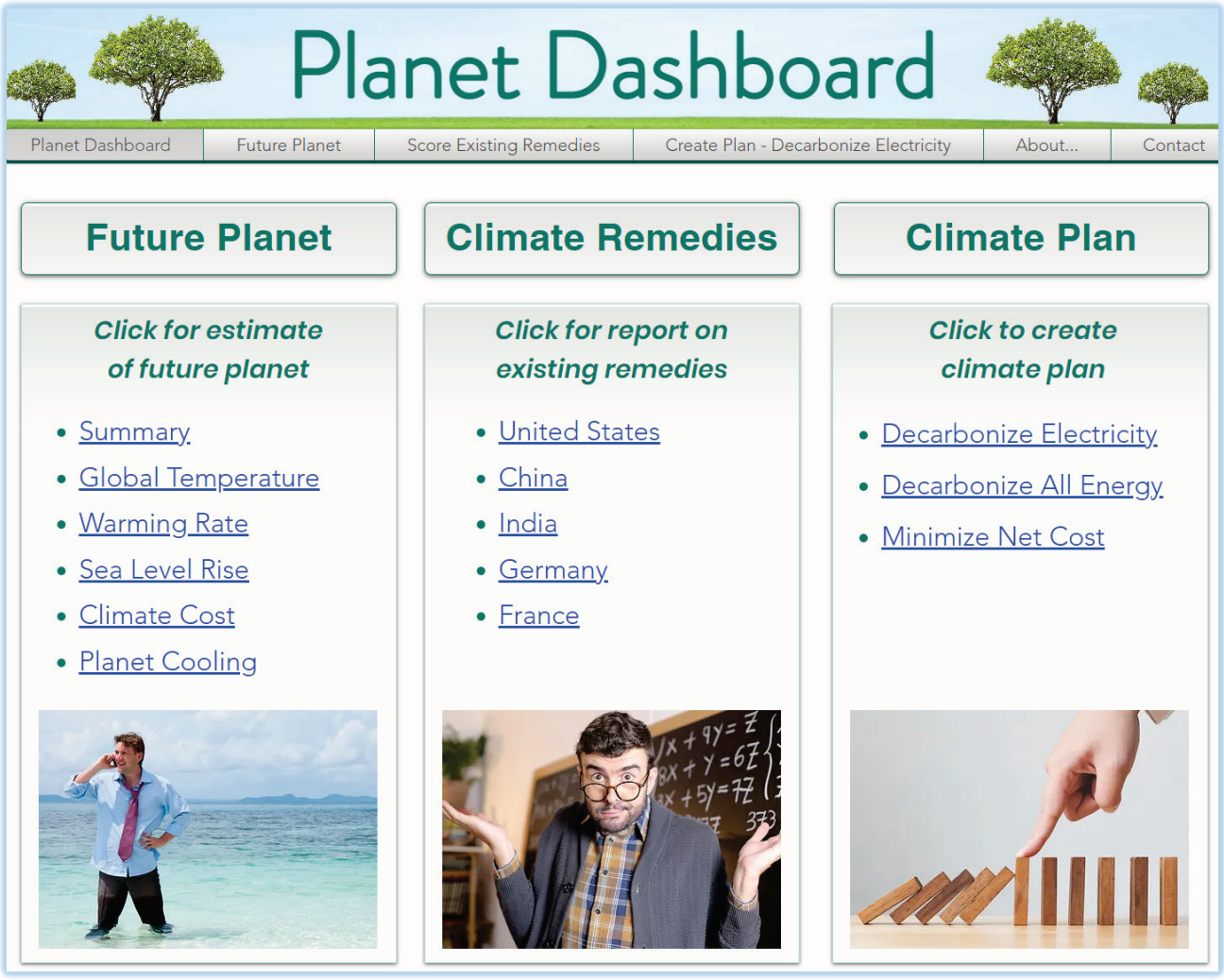

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Table of Contents

1. Executive Summary

To survive climate change, the public needs to understand the problem, and the solution. This is difficult to describe in a document, for a variety of reasons. Therefore, we propose a planet dashboard website be built that breaks the climate problem down into three parts:

Part 1) Future Planet:	Summarize planet problem with several graphs
Part 2) Climate Remedies:	Quantify impact of existing so-called climate remedies
Part 3) Climate Plan:	Generate plans that reduce CO_2 emissions

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Part 1 - Future Planet

The Future Planet part of the website summarizes the climate problem with several graphs. These show what is expected to happen to the planet, each year, over the next hundred years or so. This includes global temperature increase, sea level rise, food production decrease, planet cooling needed to block cascading tipping points, cost of that cooling, and amount of money lost due to global warming.

These graphs are generated by climate models. Unfortunately, selecting a model is inherently confusing. Therefore, models are selected and managed by top scientists, and the website user selects a scientist, not a model. For example, one website user might trust the leader of the IPCC, while another user trusts the leader of NOAA.

The website user also specifies how many years they expect our society to emit carbon dioxide (e.g. 30, 40, 60 or 120 years). Many economists expect this to be over 100 years, while climate activists prefer less than 40 years.

After the user selects a climate scientist, and a decarbonization profile, the graphs appear. These are important, since they help one better understand the climate problem. And they illustrate how, when and why we might block tipping points by reflecting sunlight back into outer space.

Part 2 - Score Existing Climate Remedies

From an economics perspective, decarbonization involves initiatives that reduce carbon dioxide emissions. Each initiative has a cost to society, and an amount of carbon dioxide that is reduced. One can divide these two numbers to calculate the dollars needed to reduce emission by one ton of carbon dioxide.

For example, when a homeowner places solar panels on their home, it typically cost over $100 to reduce carbon dioxide emissions by one ton of CO_2. Alternatively, when building a solar farm or wind farm, it typically cost $20 per ton.

The climate remedy part of the website scores existing initiatives and displays the results in a summary table. Within this table, initiatives are listed in rows, while columns show cost to society ($), carbon dioxide reduced ($mtCO_2$), and cost per ton of carbon dioxide reduced ($/$mtCO_2$).

The table is sorted by cost per ton; therefore, the most cost effective programs are shown at the top. In theory, lawmakers can increase the program size for initiatives at the top, and decrease the program size for less cost effective initiatives.

This website supports multiple nations, since everyone needs to decarbonize. Not just one nation.

Part 3 - Create Climate Plan

It is unlikely lawmakers would support major changes to their economy without a detailed climate plan. These plans do *not* exist; however, they could be generated with a little software, and existing economic models (e.g. NEMS).

The proposed website creates a climate plan after the user specifies a strategy. For example, the website user might want to "Decarbonize nation Z, over X years, at lowest cost, in lowest cost order, with additional costs passed onto consumers."

The website would then produce a climate plan, which would be a list of initiatives that are implemented each year, over the next few decades. For each initiative, the following would be estimated: cost ($), carbon dioxide reduced ($mtCO_2$), and cost per ton of carbon dioxide reduced ($/$mtCO_2$).

Climate Solution Videos

The following videos provide background material for the Planet Dashboard website.

How Much Does it Cost to Fix the Climate Problem? (CS11)
https://www.youtube.com/watch?v=Q0TyImEEk9I

Policy Tools are Needed to Tackle Climate Change (CS8)
https://www.youtube.com/watch?v=gwPMe29F8Ag

How to Resolve Climate Change at the Lowest Cost to Society (CS7)
https://www.youtube.com/watch?v=VBSsRb4SeoI

How Much Would a Green Grid Actually Cost? (CS2)
https://www.youtube.com/watch?v=ociw32DZCSo

The Politics of Climate Change (CS5)
https://www.youtube.com/watch?v=UJ72hDDguyc

The Easiest Way for Government to Tackle Climate Change (CS3)
https://www.youtube.com/watch?v=QvlOVtCi-qw

How to Decarbonize the Making of Materials & Chemicals (CS10)
https://www.youtube.com/watch?v=nqGALLC-R1k

Do We Need a New Climate R&D Laboratory? (CS12)
https://www.youtube.com/watch?v=mIMFC6OM7RY

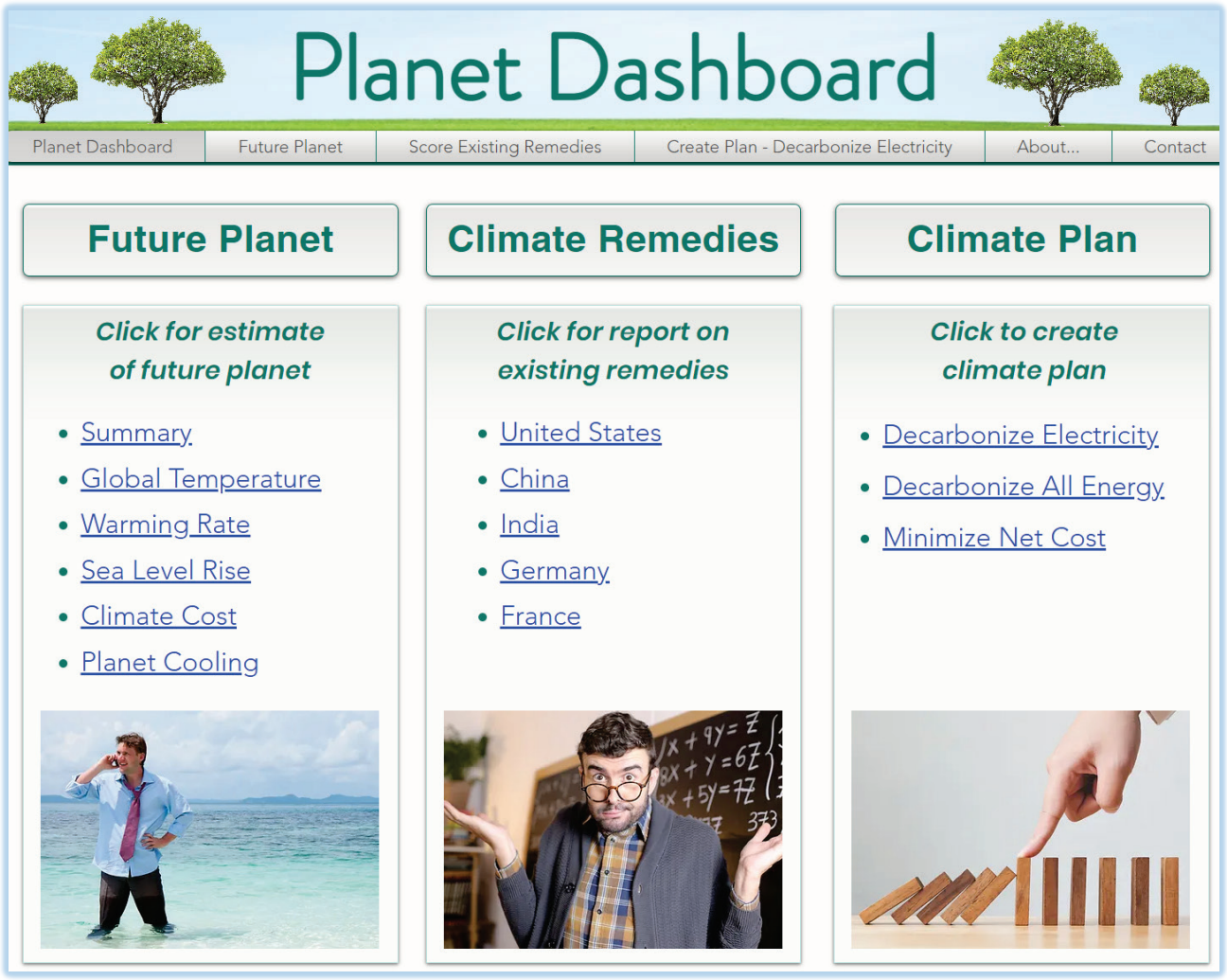
Articles at EE Times | Climate Solutions

The following articles provide background material for the Planet Dashboard website.

- How Much Does it Cost to Fix the Climate Problem?
- Do We Need a New Climate R&D Laboratory?
- Why Spraying Sulfur into the Sky is Not Crazy

Prototype Website

To help developers get started, we built a non-functional website shell that demonstrates the planet dashboard concept. To see this, visit https://manhattan2hq.wixsite.com/planet-dashboard.



2. Magic Dust

Approximately 30 years ago climate scientists stated the world needs to stop emitting carbon dioxide (CO_2) into atmosphere, or "bad things" will happen. However, if we magically stopped in one day, bad things would still occur. We will examine this more carefully, after a brief review of climate science.

Global Warming

According to measurements, the average temperature of our planet increased approximately 1.5°C over the last 150 years. This is commonly referred to as "global warming".

Global Warming *Rate*

The amount of global temperature increase over time is referred to as the "global warming *rate*", and it is often depicted in units of degrees Celsius increase per decade (°C/decade). This was measured at 0.18°C/decade between 1970 and 2010. And over the last 10 years, this rate increased 50% to 100%, to somewhere between 0.27°C/decade and 0.36°C/decade.

Global Warming Components

Global warming is driven by multiple components that add together, as illustrated below.

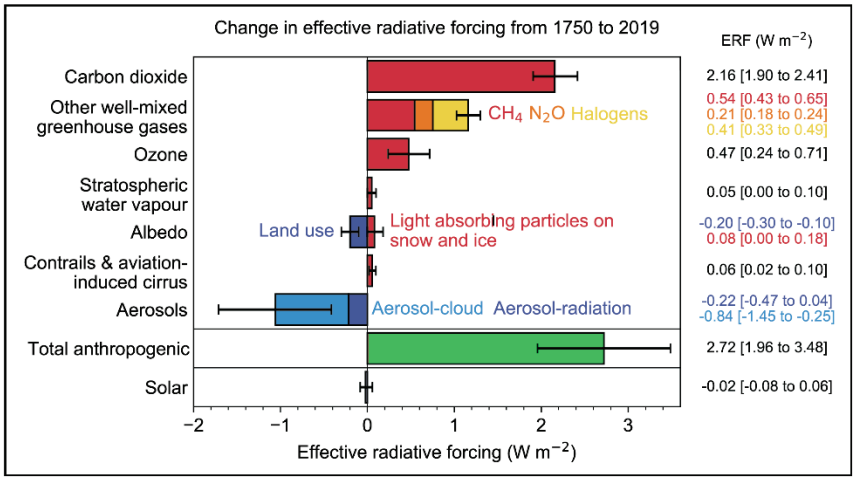


Figure 1: Sources of global warming and cooling in units of Watts per square meter of Earth surface area. Source: IPCC AR6 WG1 Figure 7.6.

As one can see, some components increase global warming (red), whereas others decrease global warming (blue). These combine to get total warming (green).

Each of the above bars are like blankets around the planet, where blanket thickness is roughly proportional to the global warming rate (e.g. temperature *increase* per decade).

What Would Happen if CO_2 Emissions Stopped Tomorrow?

OK, back to carbon dioxide. Let's imagine we sprinkle magic dust on our planet to fully replace fossil fuel with renewables and nuclear power, all in one day.

How would this change the above picture?

The top bar would stop growing, and instead would slowly decrease over many decades as CO_2 naturally falls out of the sky. And the total, shown above in green, would slowly decrease as well, instead of slowly increase. In other words, the driver of global warming (i.e. the green bar) would change little due to the reservoir of additional CO_2 that had accumulated over the last 150 years.

What Would Happen if Additional CO_2 in Atmosphere Disappeared Tomorrow?

OK, now let's sprinkle more magic dust to remove that additional CO_2. In other words, the length of the carbon dioxide bar is set to zero.

Now what happens?

Unfortunately, warming would continue due to other components such as melting arctic sea ice and thawing permafrost. The former would increase the above Albedo bar, and the latter would increase the above Other Gases bar. {????}

What Would Happen if Global Warming Stopped Tomorrow?

OK, now let's add *more* magic dust to fix the global temperature to 1.5°C relative to that which we had 150 years ago.

Now what?

Unfortunately, bad things would continue to occur, yet more slowly. These include the melting of Greenland and Antarctica due to the additional heat, sea level rise due to melt water, slowing of ocean currents due to fresh melt water, less moisture in soil due to reduced ocean currents, and less food production due to less moisture in soil. {????}

What to do?

Fixing the climate problem is more complicated than "Reduce CO_2".

To fix this, we probably need to reflect a tiny percentage of sunlight back into outer space. This would cause the above blue cooling bar to increase, and cause the green bar to become negative. In other words, it would convert global warming to global cooling, stop sea level rise, and maintain ocean currents vital to our planet's ecosystems.

For details on how to fix the climate problem, see the following articles:

- How Much Does it Cost to Fix the Climate Problem?
- Do We Need a New Climate R&D Laboratory?

- Why Spraying Sulfur into the Sky is Not Crazy

Magic Dust

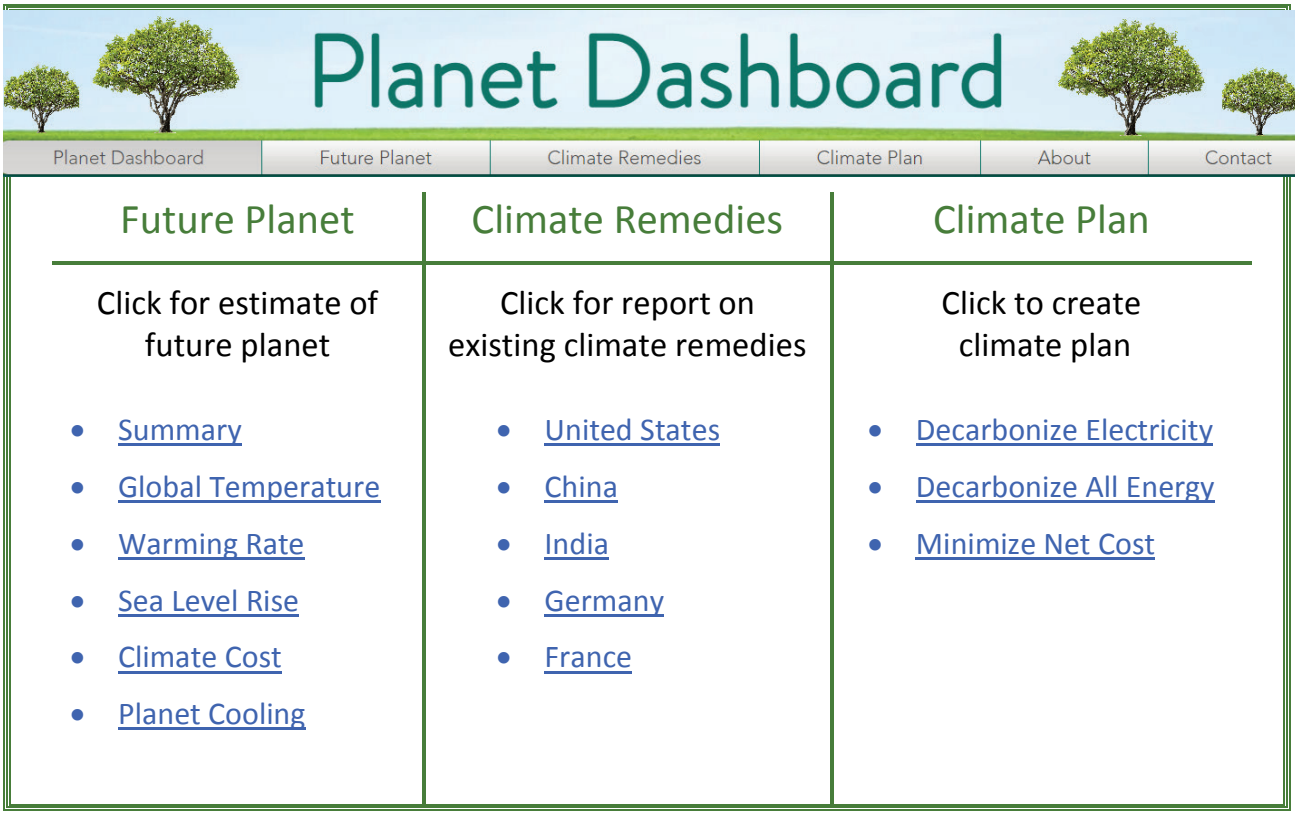
The "Future Planet" webpages support magic dust, to help the public understand that CO_2 is the tip of the climate iceberg. More specifically, this would enable the user to see the impact of: (a) setting CO_2 emissions to zero (starting today), (b) setting anthropogenic CO_2 in atmosphere to zero, and (c) setting global warming *rate* to zero.

3. Planet Dashboard Website

The main website page provides links to the three parts, as illustrated below. These include: (1) Future Planet, (2) Score Existing Climate Remedies, and (3) Create Climate Plan. Remedies and Plan relate to specific nations; whereas Future Planet relates to climate science.

To help developers get started, we built a non-functional website shell that demonstrates the planet dashboard concept. To see this, visit https://manhattan2hq.wixsite.com/planet-dashboard.

The below image was made with Microsoft Word, and can therefore be changed easily.



4. Part 1 - Future Planet

Overview

As noted in the executive summary, the Future Planet part of the website summarizes the climate problem with several graphs. These show what is expected to happen to the planet, each year, over the next hundred years or so. This includes global temperature increase, sea level rise, food production decrease, planet cooling needed to block cascading tipping points, cost of that cooling, and amount of money lost due to global warming.

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After the user selects a climate scientist, and a decarbonization profile, the graphs appear. These are important, since they help one better understand the climate problem. And they illustrate how, when and why we might block tipping points by reflecting sunlight back into outer space.

Components Graphs

The user can either look at a Summary with multiple Primary graphs, or view components that make up each Primary graph. For example, global temperature increase is the sum of temperature increase from carbon dioxide, temperature increase from melting sea ice, temperature increase from thawing permafrost, etc. Component graphs are helpful since they illustrate what is expected to happen when, where, and to what extent. And this helps communicate expected sequence of events.

Tipping Points

Tipping points are activated by heat, and after being activated, they create more heat. In other words, they activate each other, and are therefore like dominos. For example, melting North Pole sea ice is expected to cause snow on Greenland to melt, which will reduce ocean currents, which will decrease moisture in soil, which will reduce food production.

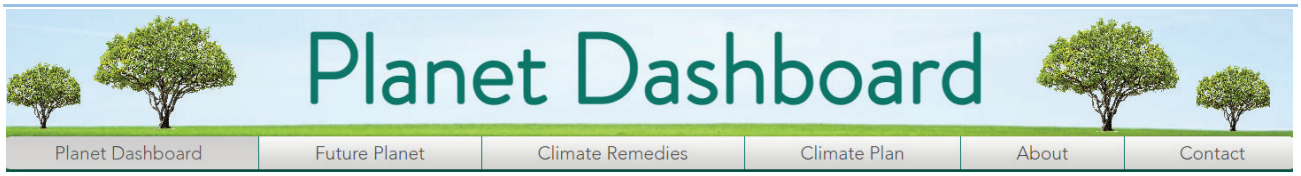
Blocking Tipping Points

The planet dashboard calculates the cost to block cascading tipping points, and plots this as a function of time. This helps the user compare the cost of cooling the planet, with the cost of *not* cooling the planet. For details, see *Why Spraying Sulfur into the Sky is Not Crazy*.

Webpage: Future Planet / Summary

This webpage summarizes the planet problem with multiple graphs, as illustrated below.

The user selects a climate scientist, number of years of CO_2 emissions, date range for graphs (e.g. 2000 to 2100), and magic dust (described earlier).



[Future Planet/Remedy/Plan] [Summary/Temp Increase/Warming Rate/..]

Climate Scientist:	[select name] {i}
CO_2 Emissions:	[30/40/60/120 years] {i}
Date Range:	<StartYear> to <StopYear> {i}
Magic Dust:	[none/stop CO_2 emissions/remove CO_2 from air/stop warming] {i}

Graph: Average Global Temperature Relative to 150 years ago (°C)

Graph: Sea Level Rise (meters)

Graph: Land suitable for growing corn (% relative to 2020)

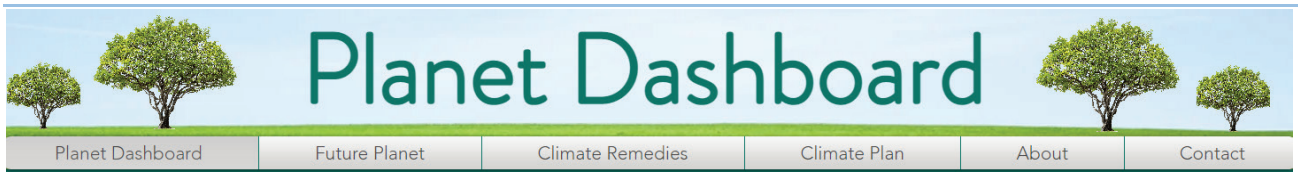
Graph: Cost of harm due to climate change ($/year)

Graph: Amount of cooling needed to block tipping points (% of sunlight reflected)

Graph: Cost of cooling needed to block tipping points ($/year)

Webpage: Future Planet / Global Temp Increase

This webpage shows the total global temperature increase, relative to 150 years ago, along with components that make up that total.



[Future Planet/Remedy/Plan] [Summary/Global Temp Increase/Warming Rate/..]

Climate Scientist:	[select name] {i}
CO_2 Emissions:	[30/40/60/120 years] {i}
Date Range:	<StartYear> to <StopYear> {i}
Magic Dust:	[none/stop CO_2 emissions/remove CO_2 from air/stop warming] {i}

Graph: TOTAL - Average Global Temperature Relative to 150 years ago (°C)

Graph: COMPONENT - Temp increase due to CO_2

Graph: COMPONENT - Temp increase due to methane

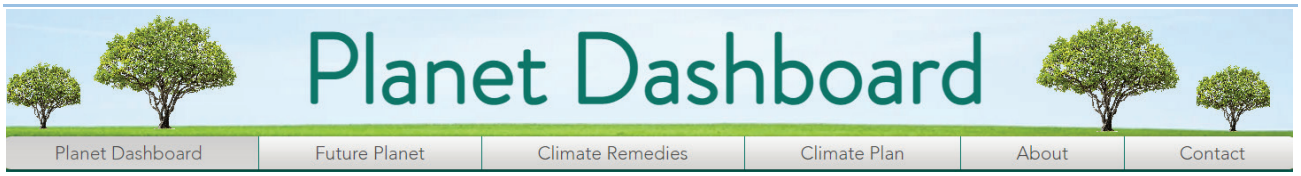
Graph: COMPONENT - Temp decrease due to sunlight reflecting off aerosols

Graph: COMPONENT - etc.

Webpage: Future Planet / Global Warming Rate

This webpage shows the total global warming *rate* (°C/decade) along with components that make up that total.

Global warming rate is roughly proportional to earth equilibrium imbalance (EEI), which is similar to radiative forcing. If EEI was 1W/m^2 for example, then some of this energy would flow into ocean water and some into air, and this ratio might change over time. Therefore, rate of change of surface temperature over land and water is *roughly* proportional to EEI, yet not directly proportional.



[Future Planet/Remedy/Plan] [Summary/Temp Increase/Global Warming Rate/..]

Climate Scientist:	[select name] {i}
CO_2 Emissions:	[30/40/60/120 years] {i}
Date Range:	<StartYear> to <StopYear> {i}
Magic Dust:	[none/stop CO_2 emissions/remove CO_2 from air/stop warming] {i}

Graph: TOTAL - Rate of Global Temperature Increase (°C/decade)

Graph: COMPONENT - Rate due to CO_2

Graph: COMPONENT - Rate due to methane

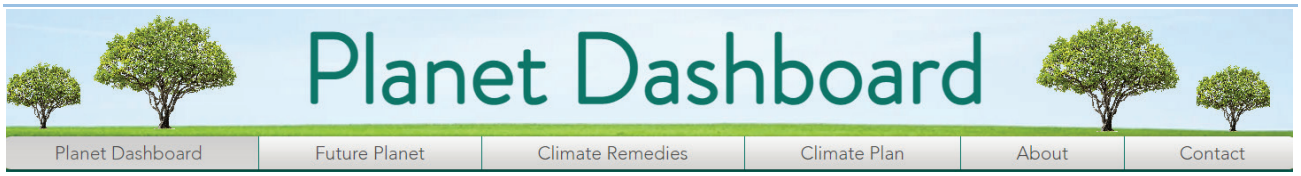
Graph: COMPONENT - Rate due to sunlight reflecting off aerosols (negative °C/decade)

Graph: COMPONENT - etc.

Webpage: Future Planet / Sea Level Rise

This webpage shows total sea level rise, relative to 150 years ago, along with components that make up that total.

Multiple meters of sea level rise is expected between 2050 and 2150.



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Climate Scientist:	[select name] {i}
CO_2 Emissions:	[30/40/60/120 years] {i}
Date Range:	<StartYear> to <StopYear> {i}
Magic Dust:	[none/stop CO_2 emissions/remove CO_2 from air/stop warming] {i}

Graph: TOTAL - Sea level rise (m)

Graph: COMPONENT - Sea level rise due to melting Greenland

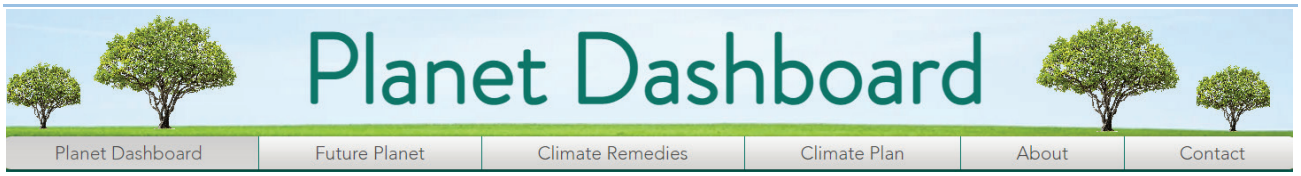
Graph: COMPONENT - Sea level rise due to melting West Antarctica Ice Sheet (WAIS)

Graph: COMPONENT - Sea level rise due to melting East Antarctica

Graph: COMPONENT - etc.

Webpage: Future Planet / Cost of Harm due to Climate Change

This webpage shows total cost of harm due to climate change worldwide ($/year), along with components that make up that total.



[Future Planet/Remedy/Plan] [Summary/Temp Increase/Cost of Harm/..]

Climate Scientist:	[select name] {i}
CO_2 Emissions:	[30/40/60/120 years] {i}
Date Range:	<StartYear> to <StopYear> {i}
Magic Dust:	[none/stop CO_2 emissions/remove CO_2 from air/stop warming] {i}

Graph: TOTAL - Cost of harm due to climate change, worldwide ($/year)

Graph: COMPONENT - Money lost due to sea level rise

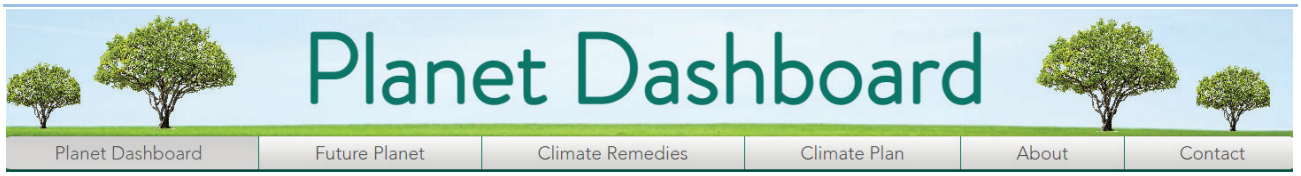
Graph: COMPONENT - Money lost due to more intense storms

Graph: COMPONENT - Money lost due to higher food prices, due to less moisture in soil

Graph: COMPONENT - etc.

Webpage: Future Planet / Planet cooling needed to block cascading tipping points

This webpage shows planet cooling needed to block cascading tipping points (i.e. % of sunlight that is reflected back into outer space), and cost of that cooling ($/year).



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Climate Scientist:	[select name] {i}
CO_2 Emissions:	[30/40/60/120 years] {i}
Date Range:	<StartYear> to <StopYear> {i}

Graph: Planet cooling needed to block cascading tipping points (i.e. % of sunlight reflected back into outer space).

Graph: Cost of planet cooling ($/year)

5. Part 2 - Score Existing Climate Remedies

Overview

As noted in the executive summary, from an economics perspective, decarbonization involves initiatives that reduce carbon dioxide emissions. Each initiative has a cost to society, and an amount of carbon dioxide that is reduced. One can divide these two numbers to calculate the dollars needed to reduce emission by one ton of carbon dioxide.

For example, when a homeowner places solar panels on their home, it typically cost over $100 to reduce carbon dioxide emissions by one ton of CO_2. Alternatively, when building a solar farm or wind farm, it typically cost $20 per ton.

The climate remedy part of the website scores existing initiatives and displays the results in a summary table. Within this table, initiatives are listed in rows, while columns show cost to society ($), carbon dioxide reduced ($mtCO_2$), and cost per ton of carbon dioxide reduced ($/$mtCO_2$).

The table is sorted by cost per ton; therefore, the most cost effective programs are shown at the top. In theory, lawmakers can increase the program size for initiatives at the top, and decrease the program size for less cost effective initiatives.

This website supports multiple nations, since everyone needs to decarbonize. Not just one nation.

Energy Economics

We will now summarize energy economics, and how it relates to CO_2 emissions.

CO_2 is emitted into atmosphere when fossil fuel is burned.

There are there primary types of fossil fuel: coal, natural gas, and oil-based products.

For each type of fuel, within each nation, there is a consumption per year, and a wholesale price. One can multiply these to calculate the cost to consumer, and this adds to the cost of goods and services. For example, if coal sells for $30 per ton wholesale and a nation consumes 1 billion tons a year, then total wholesale cost would be $30B, and this adds to the cost of goods and services.

$$\begin{aligned} \text{Non-Green Energy Costs} &= (\text{Coal}_{\text{consumption}} \times \text{Coal}_{\text{price}}) \\ &+ (\text{Oil}_{\text{consumption}} \times \text{Oil}_{\text{price}}) \\ &+ (\text{NaturalGas}_{\text{consumption}} \times \text{NaturalGas}_{\text{price}}) \end{aligned}$$

Electricity generated without emitting CO_2 is referred to as "Green Electricity" and typical sources include solar, wind, hydro and nuclear. The amount of electricity generated, multiplied by the wholesale price, adds to a nation's cost of goods and services.

$$\text{Green Energy Cost} = (\text{ElectricityGeneratedByRenewablesAndNuclear} \times \text{ElectricityPrice})$$

Energy cost to society is roughly the sum of three components:

$$\begin{aligned} \text{Energy Cost to Society} &= \text{Money spent by gov't for energy/climate related activities} \\ &+ \text{Non-Green Energy Cost} \\ &+ \text{Green Energy Cost} \end{aligned}$$

A known amount of carbon dioxide is emitted into the atmosphere for each unit of fossil fuel that is burned. For example, 2.75 grams of carbon dioxide is emitted into atmosphere for each gram of natural gas that is burned. The weight increases since natural gas (CH_4) mixes with oxygen (O_2) in atmosphere to form water (H_2O) and carbon dioxide (CO_2). Fossil fuel consumption is well known (e.g. number of tons of coal burned each year in any given nation); therefore, one can easily calculate CO_2 emissions.

CO_2 Emissions	=	$(Coal_{consumption}$	x $Coal_{CO2\text{-}per\text{-}unit})$
	+	$(Oil_{consumption}$	x $Oil_{CO2\text{-}per\text{-}unit})$
	+	$(NaturalGas_{consumption}$	x $NaturalGas_{CO2\text{-}per\text{-}unit})$

One can use an economic model (e.g. NEMS) to estimate the above values for future years (i.e. fossil fuel price/quantity, electrical power generation price/quantity per source). Also, one can simulate an economy with no climate initiatives, and simulate an economy with one initiative. And then subtract these two to calculate the cost (i.e. Energy Cost to Society) and impact (i.e. CO_2 emissions reduced) of the initiative.

Good Climate Initiatives

If gov't required power companies to decarbonize the grid by 2035, for example, then builders of solar farms and wind farms would compete with each other and drive down costs. This is an example of lowest cost decarbonization at large scales.

Green stuff typically costs more than non-green stuff, therefore Green Energy Costs would increase, Non-Green Energy Costs would decrease, and CO_2 emissions would decrease. Also, the price of natural gas would decrease due to less natural gas consumption, and this would offset the additional cost of green stuff.

Bad Climate Initiatives

In some cases, initiatives do not reduce CO_2. For example, if an initiative blocks tree farmers from harvesting trees from one forest, and the trees are instead harvested elsewhere, then CO_2 emissions would not change (provided costs at alternative site are similar).

In some cases, initiatives incur a high cost to society. For example, if oil drilling permits are blocked, then the price of oil increases due to less supply, and the additional cost of oil is spread out over all consumers. This results in a small amount of CO_2 reduction, at a high cost to society.

Companies pay organizations several dollars for a document that says their money reduced CO_2 emissions by one ton. These documents are often used to claim "net zero" CO_2 emissions, and these documents are often fraudulent. If a CEO has the choice between real net zero and less profit, and fraudulent net zero and more profit, it is their job maximize shareholder value and select the latter.

The Folly of Decarbonization

Many so-called climate initiatives are not effective, or not cost effective. This is because people sell climate to make money, and the impact of their efforts are rarely quantified. In theory, a planet dashboard website could help change this.

Lowest Cost Decarbonization

If one wants to decarbonize at the lowest cost to society, consider the following videos.

How to Resolve Climate Change at the Lowest Cost to Society (CS7)
https://www.youtube.com/watch?v=VBSsRb4SeoI

The Easiest Way for Government to Tackle Climate Change (CS3)
https://www.youtube.com/watch?v=QvlOVtCi-qw

How to Decarbonize the Making of Materials & Chemicals (CS10)
https://www.youtube.com/watch?v=nqGALLC-R1k

How Much Does it Cost to Fix the Climate Problem? (CS11)
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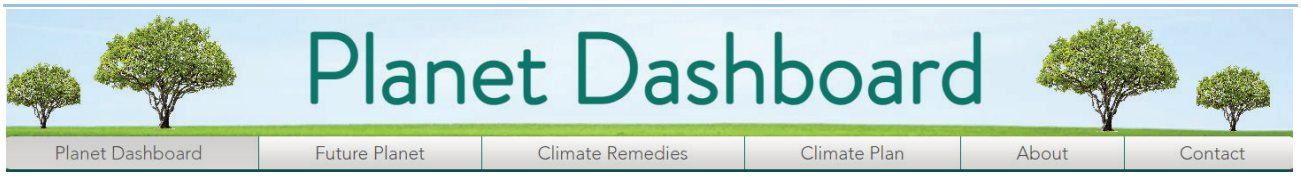
Webpage: Remedy / Score Existing Climate Remedies

This webpage scores existing initiatives and displays the results in a summary table. Within this table, initiatives are listed in rows, while columns show cost to society ($), carbon dioxide reduced ($mtCO_2$), and cost per ton of carbon dioxide reduced ($/$mtCO_2$).

For details on how the data is calculated, the user clicks on a row. This displays a list of components that make up the displayed cost value, and a list of components that make up the displayed CO_2 reduced value. Also, one can click for more information such as sources of various coefficients.



[Future Planet/Remedy/Plan] [Summary/Temp Increase/Score Existing Climate Remedies/..]

Nation:	[select nation] {i}

Table: Summarize cost and impact of existing climate initiatives.

	Cost ($)	CO_2 Reduced ($mtCO_2$)	Cost-per-ton ($/$mtCO_2$)
Initiative #1			
Initiative #2			
...			
Initiative #N			
Total			

6. Part 3 - Create Climate Plan

Overview

As noted in the executive summary, it is unlikely lawmakers would support major changes to their economy without a detailed climate plan. These plans do *not* exist; however, they could be generated with a little software, and existing economic models (e.g. NEMS).

The proposed website creates a climate plan after the user specifies a strategy. For example, the website user might want to "Decarbonize nation Z, over X years, at lowest cost, in lowest cost order, with additional costs passed onto consumers."

The website would then produce a climate plan, which would be a list of initiatives that are implemented each year, over the next few decades. For each initiative, the following would be estimated: cost ($), carbon dioxide reduced ($mtCO_2$), and cost per ton of carbon dioxide reduced ($/$mtCO_2$).

Objectives

To create a plan, the website user must: (1) specify an objective, (2) specify several parameters that drive that objective, and (3) click the "Calculate" button. There are three primary objectives to choose from, listed below.

a. Fully decarbonize electrical power at nation Z, over X years, at lowest cost to society, in lowest cost order, with additional costs passed onto consumers.

b. Fully decarbonize all energy consumption at nation Z, over X years, at lowest cost to society, in lowest cost order, with additional costs passed onto consumers. "All energy" refers to the consumption of coal, natural gas and oil-based products. These are used to generate electricity, move vehicles, make materials/chemicals, and heat buildings via natural gas.

c. Minimize net cost due to climate change.

Climate Plan

As mentioned previously, a climate plan would be calculated after clicking the "Calculate" button.

A table of initiatives would be displayed for each year in the future, where initiatives appear in rows, and important parameters in columns (e.g. cost, CO_2 reduced, cost per ton). Also, the website user could click on an initiative for details.

A summary table would show total cost to society, in units of dollars per citizen, per year. These costs would appear as an increase in the cost of goods and services. An example is shown to the right. For details, see this video.

	Year 1	Year 2	Year 3	...	Year 10	...	Year 20	...	Year 30
Planet Cooling R&D	$5	$5	$5	...	$5	...	$5	...	$5
Planet Cooling Op.				...	$27	...	$27	...	$27
Green Premium	$10	$20	$30	...	$142	...	$445	...	$727
More R&D	$30	$30	$30	...	$30	...	$30	...	$30
TOTAL	$45	$55	$67	...	$204	...	$507	...	$789

(a) Create Plan to Fully Decarbonize Electrical Power Generation

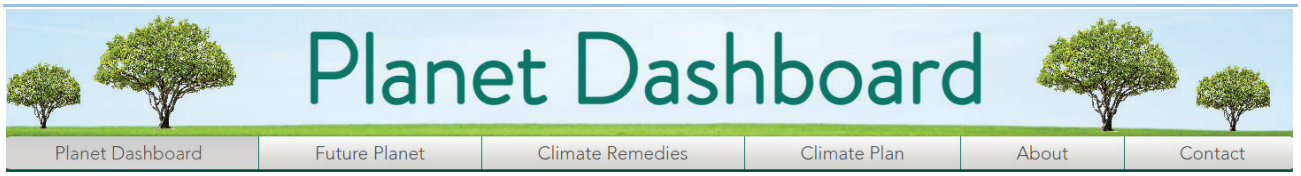
In theory, a gov't could require power companies to fully decarbonize the electrical power grid by a specific date. Builders of solar farms and wind farms would then compete, and drive down costs. This would implement large scale decarbonization, at lowest cost to society, with 100% economic efficiency. For details, see the following video:

> **How Much Would a Green Grid Actually Cost?**
> https://www.youtube.com/watch?v=ociw32DZCSo

It is unlikely lawmakers would support this without a detailed report on how this might affect jobs and revenue to specific regions. This is complex and has subsequently been placed into a separate document:

> **Open-Source Proposal to Develop Electrical Power Decarbonization Tool**
> https://www.aplantosavetheplanet.org/study

Below is a concept illustration of this webpage.



[Future Planet/Remedy/Plan] [Decarbonize Electricity/Decarbonize All Energy/Minimize Cost Due to Climate Harm/..]

Objective: Create plan to fully decarbonize electrical power grid, at lowest cost to society, in lowest cost order, with additional costs passed onto consumers.

Nation:	[select nation] {i}
# of years:	[# of years to fully decarbonize electrical power grid] {i}
Policy Option #1:	[...] {i}
Policy Option #2:	[...] {i}
Policy Option #3:	[...] {i}

{Click button to create plan}

(b) Create Plan to fully Decarbonize All Energy

This webpage creates a plan to decarbonize all energy; whereas the previous webpage focused only on electrical power generation. "All energy" refers to coal, natural gas and oil-based products. These are used to generate electricity, move vehicles, make materials/chemicals, and heat buildings via natural gas. For details, see the following:

How Much Does it Cost to Fix the Climate Problem? (CS11)
https://www.youtube.com/watch?v=Q0TyImEEk9I

How to Decarbonize the Making of Materials & Chemicals (CS10)
https://www.youtube.com/watch?v=nqGALLC-R1k

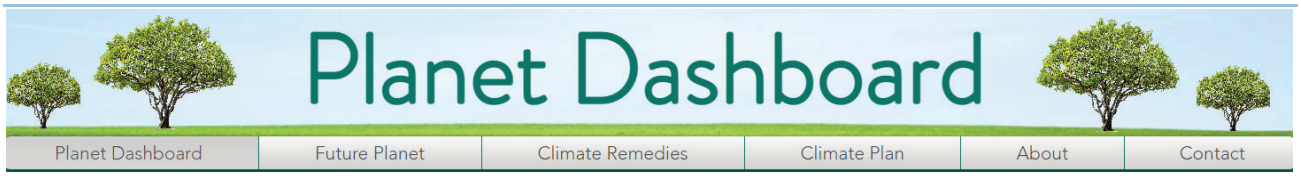
Policy Tools are Needed to Tackle Climate Change (CS8)
https://www.youtube.com/watch?v=gwPMe29F8Ag

How to Resolve Climate Change at the Lowest Cost to Society (CS7)
https://www.youtube.com/watch?v=VBSsRb4SeoI

The Politics of Climate Change (CS5)
https://www.youtube.com/watch?v=UJ72hDDguyc

The Easiest Way for Government to Tackle Climate Change (CS3)
https://www.youtube.com/watch?v=QvlOVtCi-qw

Below is a concept illustration of this webpage.



[Future Planet/Remedy/Plan] [Decarbonize Electricity/Decarbonize All Energy/Minimize Cost Due to Climate Harm/..]

Objective: Create plan to fully decarbonize all energy consumption, at lowest cost to society, in lowest cost order, with additional costs passed onto consumers.

Nation:	[select nation] {i}
# of years:	[# of years to fully decarbonize all energy consumption] {i}
Policy Option #1:	[...] {i}
Policy Option #2:	[...] {i}
Policy Option #3:	[...] {i}

{Click button to create plan}

(c) Create Plan to Minimize Cost of Climate Harm

This webpage creates a plan to solve the entire climate problem, which is defined as harm due to climate change. This plan minimizes the net cost of climate change, which is the cost to fix the problem, plus the cost of the harm (e.g. sea level rise, higher food prices).

The user specifies an inflation rate that is used to convert future costs to today's dollars (i.e. NPV calculation).

This webpage uses a climate model; therefore the user must specify a climate scientist who had previously set up a climate model. For details, see Part 1 Future Planet, described previously.

We can solve the carbon dioxide problem by replacing coal, oil and gas; with solar, wind, hydro and nuclear. However, this will probably not solve the tipping point problem. We seem to be tipping too fast. Therefore, we probably need to reflect a tiny percentage of sunlight back into outer space. There are several ways to do this, one of which is to inject sulfur into the atmosphere, above where airplanes typically fly. For details, see *Why Spraying Sulfur into the Sky is Not Crazy*.

This webpage creates a climate plan for one nation, and changing atmosphere reflectivity is a global activity. Therefore, the website user specifies percent of total planet cooling cost shouldered by the selected nation. For example, a climate plan for the US might have the US paying for half.

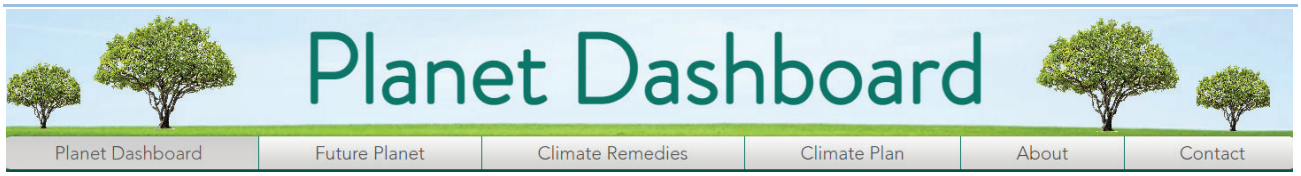
For details, see the following videos.

How Much Does it Cost to Fix the Climate Problem? (CS11)
https://www.youtube.com/watch?v=Q0TyImEEk9I

Do We Need a New Climate R&D Laboratory? (CS12)
https://www.youtube.com/watch?v=mIMFC6OM7RY

How to Resolve Climate Tipping Points (CS9)
https://www.youtube.com/watch?v=x6wE6AOVPxw

Below is a concept illustration of this webpage.



[Future Planet/Remedy/Plan] [Decarbonize Electricity/Decarbonize All Energy/Minimize Cost Due to Climate Harm/..]

Objective: Create plan to solve the entire climate problem, which is defined as harm due to climate change. This plan minimizes the net cost of climate change, which is the cost to fix the problem, plus the cost of the harm.

Nation:	[select nation] {i}
Climate Scientist:	[select name] {i}
Inflation Rate:	[expected %/yr inflation, used to convert future $ to today's $] {i}
Planet Cooling %:	[% of planet cooling cost shouldered by selected nation] {i}
Policy Option #1:	[...] {i}
Policy Option #2:	[...] {i}
Policy Option #3:	[...] {i}

{Click button to create plan}

7. Scientist Control Panel

As mentioned previously, top climate scientists would be invited to select a climate model, and to specify parameters that drive that model. And then the website user would select a scientist, not a model (since models and parameters that drive them are confusing). To support this, the planet dashboard website would need to provide a way for scientists to register, login, and specify parameters.

Description Text Editor

Participating scientists might not be comfortable with description text display above and below each graph. Therefore, they would probably want to edit this text, to more clearly explain the data. Also, they would probably want to create description pages with text, and provide links to these pages. This would enable them to more clearly explain the climate problem, and the solution.

8. Website User Interface

Export	User clicks Export button to export data to picture png file or data to csv text file.
{i}	User clicks {i} information icon to see more information.

9. Website URL's

Website URL's adhere to a reasonable structure:

Part 1 - Future Planet

www.domain.org/	planet/	scientist/	summary global-temperature global-warming-rate sea-level-rise cost-of-harm cooling-needed

Part 2 - Score Existing Climate Remedies

www.domain.org/	remedy/	nation/	…

Part 3 - Create Climate Plan

www.domain.org/	plan/	nation/	decarbonize-electrical-power decarbonize-all-energy minimize-net-cost

10. References

Prototype Website

https://manhattan2hq.wixsite.com/planet-dashboard

Editor for Prototype Website

https://editor.wix.com/html/editor/web/renderer/edit/4d419681-1b89-484c-8c33-e5b3831d42bd?metaSiteId=2a1726b7-be5c-43e0-908a-2044acbc48be

Earth's Energy Budget

https://en.wikipedia.org/wiki/Earth%27s_energy_budget

Radiative Forcing

https://en.wikipedia.org/wiki/Radiative_forcing

11. Document History

This document draws its inspiration from a book entitled *A Plan to Save the Planet* by Glenn Weinreb. For a free PDF file of this book, visit www.APlanToSaveThePlanet.org/pdf

For YouTube videos by Weinreb, see www.YouTube.com/@GlobalClimateSolutions

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To the author's knowledge, the concepts discussed in this document are public knowledge and no patents are pending.

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For original files, visit www.APlanToSaveThePlanet.org/website

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