kilde: [Fast Forward to 2040. Life on a Warmer Planet | by Danny Pilkenton | Medium]

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Fast Forward to 2040

Life on a Warmer Planet

Will our world still be this awesome in 2040? My favorite view may have already changed since I took this photo some 30 years ago. Yosemite Valley from Tunnel View by the author.

What will life on a warmer planet be like for all of us? One thing is certain, life, as we know it today, will be very different by 2040. The science of a warming planet is undeniable, even if the cause is still debated by a few deniers. Our planet has warmed by at least 1.0°C

(depending on the reference point used) and will probably pass 1.5°C before 2040, possibly much sooner.

IPCC's 6th Assessment Report: The Physical Science Basis

There are several bold statements (by political standards) in the most recent IPCC report. Unfortunately, these IPCC reports continue to use "qualified" phrases (e.g., *likely*, *very likely*, *medium confidence*, *high confidence*) that allow the conclusions to be debated, challenged, or just dismissed. Their most definite term is "*virtually certain*," only used 11 times in the "Summary for Policymakers."

In this essay, I will describe what I believe to be *virtually certain*. I understand the science and I have seen how many governments fail to act until the consequences are devastating; and, in the case of climate change, irreversible.

Consequences that the IPCC considers *virtually certain* or with *high confidence*:

It is virtually certain that human-caused CO2 emissions are the main driver of current global acidification of the surface open ocean.

It is virtually certain that hot extremes (including heatwaves) have become more frequent and more intense across most land regions since the 1950s, while cold extremes (including cold waves) have

become less frequent and less severe, with high confidence that human-induced climate change is the main driver of these changes.

It is virtually certain that the Arctic will continue to warm more than global surface temperature, with high confidence above two times the rate of global warming.

Continued ice loss over the 21st century is virtually certain for the Greenland Ice Sheet and likely for the Antarctic Ice Sheet.

In 2019, atmospheric CO2 concentrations were higher than at any time in at least 2 million years (high confidence), and concentrations of CH4 and N2O were higher than at any time in at least 800,000 years (very high confidence).

Global surface temperature has increased faster since 1970 than in any other 50-year period over at least the last 2000 years (high confidence).

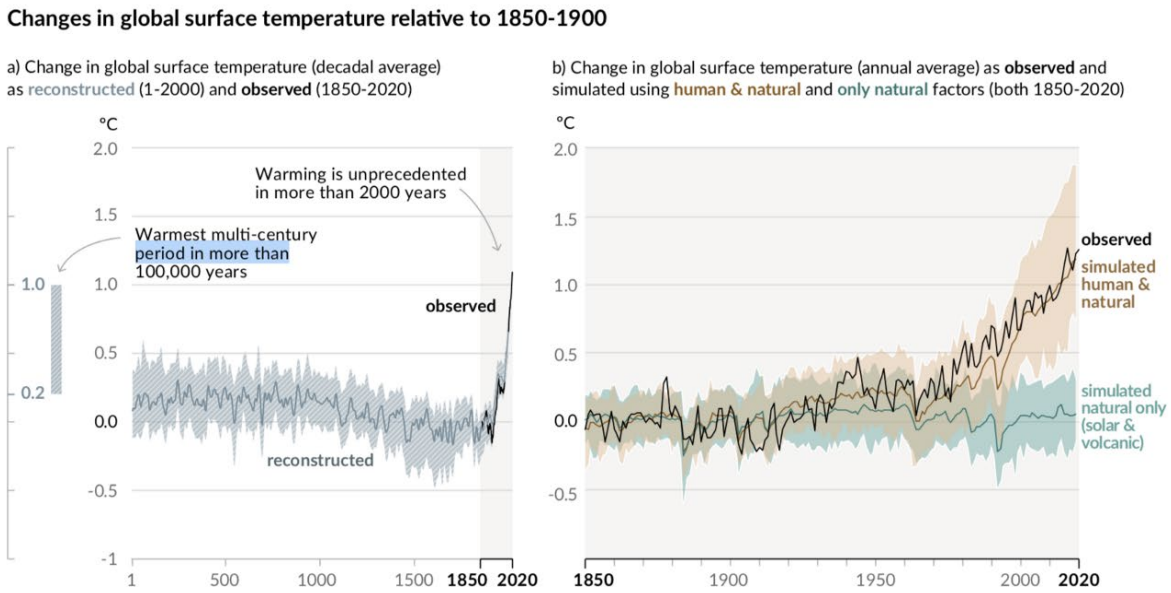

Figure SPM.1: History of global temperature change and causes of recent warming. From the [IPCC's 6th Assessment Report: The Physical Science Basis (Summary for Policymakers)]

You can access the [Summary for Policymakers] and search for these terms to read the details of their conclusions. Searching this report for these terms will give you a better understanding of the magnitude of the crisis. In my humble opinion, most of the events described in this report are *virtually certain* by 2100, if not much sooner.

Also worth exploring in the 6th Assessment Report is Section B. Possible Climate Futures. It should be clear that 1.5°C will be exceeded in the near future as illustrated in Section B.1:

B.1: Global surface temperature will continue to increase until at least the mid-century under all emissions scenarios considered. Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO2 and other greenhouse gas emissions occur in the coming decades.

You can skip the plots of emissions per year expressed in giga-tonnes.

What The Heck is a Gigaton of Carbon?
Climate scientists fail to communicate in relatable terms.
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Instead, take a good look at Table SPM.1:

	Near term, 2021–2040		Mid-term, 2041–2060		Long term, 2081–2100	
Scenario	Best estimate (°C)	*Very likely* range (°C)	Best estimate (°C)	*Very likely* range (°C)	Best estimate (°C)	*Very likely* range (°C)
SSP1-1.9	1.5	1.2 to 1.7	1.6	1.2 to 2.0	1.4	1.0 to 1.8
SSP1-2.6	1.5	1.2 to 1.8	1.7	1.3 to 2.2	1.8	1.3 to 2.4
SSP2-4.5	1.5	1.2 to 1.8	2.0	1.6 to 2.5	2.7	2.1 to 3.5
SSP3-7.0	1.5	1.2 to 1.8	2.1	1.7 to 2.6	3.6	2.8 to 4.6
SSP5-8.5	1.6	1.3 to 1.9	2.4	1.9 to 3.0	4.4	3.3 to 5.7

Table SPM.1: Changes in global surface temperature, which are assessed based on multiple lines of evidence, for selected 20-year time periods and the five illustrative emissions scenarios considered. From the IPCC's 6th Assessment Report: The Physical Science Basis (Summary for Policymakers)

What I believe to be virtually *certain* by 2040:

The failure of governments to act and their failure to meet the pledges made at all of the recent COP (Conference of the Parties) meetings will result in a minimum of IPCC AR6 Scenario SSP2–4.5 and possibly worse. This will mean 1.5°C of warming will be passed before 2040 and maybe much sooner. Then 2.0°C of warming will occur sometime after 2040 and certainly by 2050.

No matter where you live, you will be affected by climate change.

Heat domes will be annual events, not the thousand-year events as they have been described recently. Massive forest fires will no longer be "seasonal" and could explode at any time.

A critical issue missed by so many is that instability is the most dramatic consequence of climate change. The unstable polar jet stream will cause unpredictable swings in rainfall patterns several times each year. Heavy rains one week followed by weeks of dry winds that parch the already desiccated landscape turning surviving foliage into a tinderbox that could ignite at any moment.

A warmer atmosphere can hold more moisture resulting in massive storms and significant flooding. Crop losses from too much rain too fast will become common.

Global warming does not mean that it is warmer everywhere. Besides extreme warm periods, major winter storms will occur, often in locations that currently have mild winters. Our weather will become difficult to predict. Weather prediction models will fail because they are based on the previous 30 years of data that no longer matches reality.

Hurricanes that were once "seasonal" will occur worldwide, with minimal warning, and will be much more significant, resulting in larger storm surges. Coastal populations will be unable to tolerate their frequency and cannot rebuild from the previous storm's destruction before the next storm hits. As a result, there will be massive displacements of people from storm zones worldwide.

Anyone that lives near an ocean, anywhere in the world, will feel the direct effect of rising sea levels. Saltwater intrusion will continue to destroy buildings and infrastructure. Real estate markets will collapse in some regions, making it impossible to sell homes; those who haven't moved will lose their life savings in uninhabitable real estate. Their only choice will be to move and leave everything behind: scenes reminiscent of the "dust bowl" days of the 1930s. A whole new generation of dislocated and poverty-stricken Americans will be camping on the streets of cities where they are not welcome. Property crimes will skyrocket.

Freshwater melting from Greenland's glacier will cause the "Atlantic Meridional Overturning Circulation" (aka Gulf Stream) to shut down, disrupting weather patterns throughout North America and Europe. Agriculture will be disrupted, contributing to localized famines.

The warming of the oceans combined with ocean acidification from the absorption of CO2 will kill most if not all of the world's coral reefs. This will result in a total disruption of fisheries and fishermen's livelihoods. Just another contribution to worldwide famines and the displacement of populations.

Many regions, particularly the deserts of Mexico and the American Southwest, will become uninhabitable due to drought and extreme heat. Another displaced population of climate refugees will be looking for a new home in a more habitable climate.

Displacement caused by global warming will result in wars: wars over resources, land, and the “invasion” by “outsiders.” Hate crimes will skyrocket. The additional pressure of immigration from tropical regions will stress all middle latitude nations, resulting in unemployment, massive poverty, and famine.

Sea-level rise will completely eliminate island nations that have been unable to mitigate the increase fast enough. Even in 2020, the Maldives started massive infrastructure projects that will be too late. By 2040 several island nations will have abandoned their natural home and moved to continental lands, no longer an island nation and maybe no longer a nation at all.

And these are only a few of the many possible consequences. If you want to understand all of the terrifying possibilities, read The Uninhabitable Earth by David Wallace Wells. The author makes our current climatic anomalies look like an amusement park joy ride.

It doesn’t need to be this way!

While the timing of these events is *not absolutely certain*, the science predicting these consequences is indisputable. These consequences of global warming have been known since the 1970s. The misinformation (and outright deception) by those who profit from “business as usual” has delayed the essential response to our climate crisis: a delay with irreversible consequences.

There is still time to act, but that time is running out fast. Every delay makes the necessary response that much more daunting. The time to take action is now. The atmosphere has already been permanently changed. The 1.5°C of warming is already baked into our future climate. The only choices will be adaptation and mitigation:

Climate Change: Mitigation vs. Adaptation
How will we respond to our warming planet?
dannypilkenton.medium.com

The actual cost of using fossil resources must be reflected in the price of those resources: a carbon tax on all products that depend on fossil resources. And all fossil fuel subsidies must be removed: it makes no sense to subsidize the destruction of our world. Lower-cost alternatives, renewable energy sources, are already available and would be much more affordable because of their minimal carbon taxes.

We must not forget that renewable energy is not free, and any remaining fossil energy must be devoted to designing, developing, and producing renewable, green energy resources.

Corporate profits and shareholder wealth must no longer come at the expense of our lives. Instead, businesses and governments must realize that solving our climate crisis can be a profitable business. Individual actions can help, but it is up to our governments to take drastic measures necessary to address this crisis.

Recommended Reading

For a very different view of 2040 explore this awesome website: whatsyour2040 where *hope springs eternal.*

Take a look at the "lists" on my medium profile. I have collected some of the best writing on how we can adapt before it is too late. These authors offer guidance that is readable, straightforward, and offer actions that are achievable now.

There are many books on climate change and global warming. These are the ones I recommend for understanding the problem and learning what can be done now before it is too late:

Under the Sky We Make by Kimberly Nicholas is an outstanding summary of our climate crisis and what we all can do to make a difference.

Six Degrees: Our Future on a Hotter Planet by Mark Lynas and his follow-up Our Final Warning: Six Degrees of Climate Emergency provide insight into our possible (probable) future.

Sources and More Info

IPCC's 6th Assessment Report: The Physical Science Basis—Summary for Policymakers

Global Trends 2040 report from Office of the Director of National Intelligence

Carbon Brief: Analysis: When might the world exceed 1.5C and 2C of global warming?

Carbon Brief: an extensive and impressive interactive site with loads of information.

Global Footprint Network: Climate Change

Another point of view: Below 1.5°C: a breakthrough roadmap to solve the climate crisis

Observation-based early-warning signals for a collapse of the Atlantic Meridional Overturning Circulation