

WHAT DO YOU KNOW ABOUT GLOBAL WARMING?



1850

2020

We are the first generation to feel the impact of climate change and **the last to be able to do anything about it.**

44th president of the United States
Barack Obama



The climate change caused by human activity is unprecedentedly dramatic. Most of the world's leading scientific organisations have published public statements in support of this position. The consensus among scientists is 97% – this is more than when it comes to the theory of evolution.

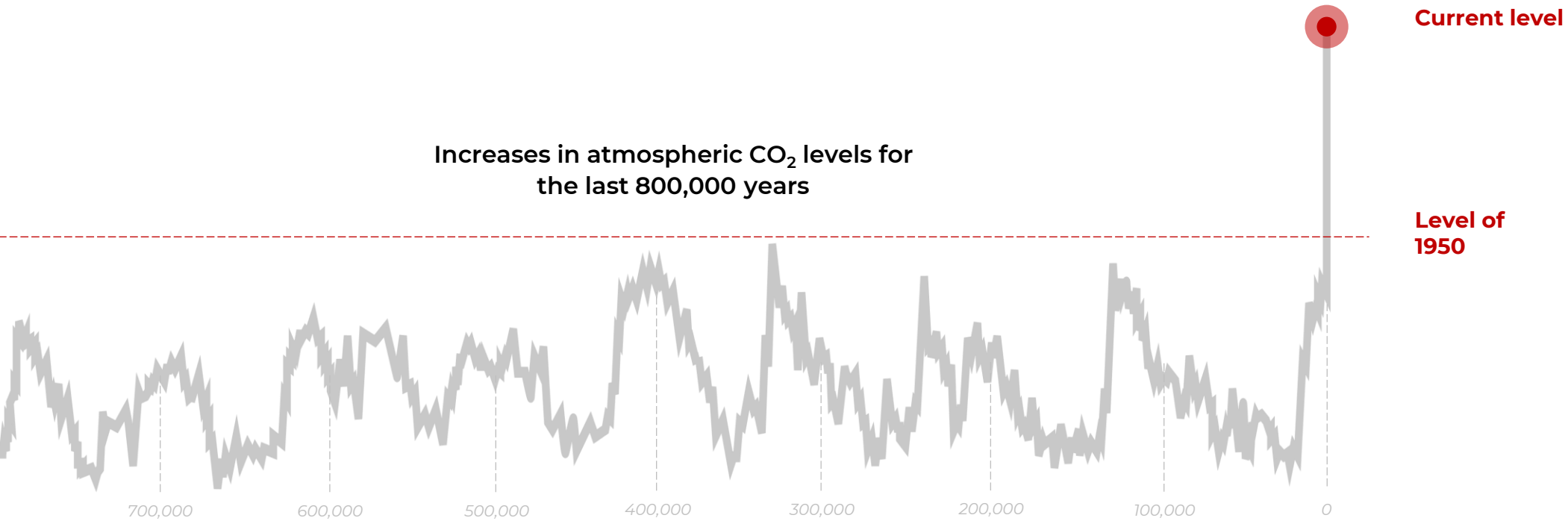
[Scientific Consensus: Earth's Climate is Warming](#)

“**Scientific evidence of global warming is indisputable**”

[IPCC Climate Change 2013: The Physical Science Basis](#)

(prepared by a team of climate change experts with 1,300 independent scientists from around the world)

There have been climate changes in the past,
but never at such **tremendous** speed



NASA, 2020

Climate change is one of the greatest threats facing humanity, with far-reaching and devastating impacts, Climate impacts affect all regions of the world and cut across all sectors of society.

[The Global Commission on Adaptation: A Global Call For Leadership On Climate Resilience 2019](#)

The Commission is led by Ban Ki-moon, 8th Secretary-General of the United Nations, Bill Gates, Co-chair of the Bill & Melinda Gates Foundation and Kristalina Georgieva, CEO, World Bank. It is guided by 34 Commissioners, consisting of leaders from political, business, multilateral, and scientific worlds; and it is convened by 20 countries. The Commission is co-managed by World Resources Institute and the Global Center on Adaptation.

The biggest threat to the economy

The World Economic Forum, Davos, 2019

9th Secretary-General of the United Nations
Antonio Guterres





REASONS





Human activities

Primarily the burning of **fossil fuels (coal, oil, gas)** and other human activities that increase the share of greenhouse gases in the atmosphere – carbon dioxide (CO₂), methane (CH₄) and others.

The share of greenhouse gases in the atmosphere is increasing every year.



Radiation

The part of the sun's radiation that used to return to space remains enclosed on the planet and heats it up (greenhouse effect).

Radiation is accumulating and the amount of enclosed heat energy is increasing.

- [IPCC Climate Change 2013: The Physical Science Basis](#)
 - [IOPscience Environmental Research Letters](#)
 - [NASA: The Causes of Climate Change](#)
 - [Our World in Data: Emissions by sector](#)



Energy

The energy has become so abundant that the planetary compensation systems are no longer able to cope. As a result, the entire planet began to heat up.

With large-scale, global changes of temperature, **every fraction of a degree** counts. Rapid, powerful warming, which has nothing else to compensate for, causes natural systems to unbalance and the environment to change.

In 2015, 197 countries signed the Paris Agreement, pledging to keep global warming within **1.5°C** or well below **2°C** by jointly reducing CO₂ emissions. For the first time in history, all the world's leading countries have come together to address the issue of climate change.

[The United Nations: The Paris Agreement](#)

Even if all the countries-signatories to the Paris Agreement fulfil their national pledges, this would still lead to a much greater warming than agreed, of the order of **3.2°C** above pre-industrial levels.

We need to take **more effective** measures or we will face serious climatic changes.

[Unprecedented climate events: Historical changes, aspirational targets, and national commitments, 2018](#)

Countries do not fulfil their obligations to reduce greenhouse gas emissions, and climatic changes proceed at a much faster rate than scientists expected

[World Meteorological Organization
The Global Climate 2019](#)

Emissions continue to rise, despite scientific warnings and political commitments

[The United Nations
Emissions Gap Report 2019](#)

Never has the gap between climate reality and climate action been wider

[The United Nations
Climate Change Annual Report 2019](#)

For comparison: during the last ice age, when the USA was covered with more than 1,000 metres of ice, the global average temperature was **only 6°C lower than it is today.**

[Nature: Glacial cooling and climate sensitivity revisited 2020](#)





CONSEQUENCES



Since the pre-industrial era, global temperature has already risen by **1.1°C**.

- [NASA's Goddard Institute for Space Studies \(GISS\)](#)
 - [AGU: Improvements in the GISTEMP Uncertainty Model](#)
-

In **10** years' time this will be **1.5°C**, which will have a critical impact on the most fragile ecosystems, species and societies. However, this is already happening and we cannot change it.

- [IPCC Global Warming of 1.5°C 2019](#)
- [The United Nations: Emissions Gap Report 2019](#)

The 1.5°C scenario is **already underway**



Pollution and mortality

Every 6 death in the world and every 8 in Europe are associated with environmental pollution, primarily air pollution. This is 15 times more than because of wars and all forms of violence combined.

- [The Lancet: Commission on pollution and health](#)
- [European Environment Agency: Report No 21/2019](#)



Cataclysms and natural disasters

In the last 20 years, natural disasters – floods, droughts, hurricanes, earthquakes, forest fires – have become twice as frequent. Over the last 50 years their number has increased five times.

- [Universal Ecological Fund: The Truth about Climate Change 2016](#)
- [The United Nations: the human cost of disasters 2020](#)
- [World Meteorological Organization: State of Climate Services 2020](#)



Droughts and heat waves

In the last 20 years, 19 were the hottest ever observed.

- [BMO, NASA, NOAA 2020](#)

The area of drylands is growing by 1% per year. The number of extremely hot days and their temperature, frequency and intensity of droughts and heat waves are increasing.

- [IPCC Climate Change and Land 2020](#)

The 1.5°C scenario is **already underway**



New diseases and toxins

Around 30% of permafrost will melt in the next 50 years, which could lead to the release of ancient viruses and bacteria as well as large amounts of mercury in the food chain.

- [IPCC The Ocean and Cryosphere in a Changing Climate 2019](#)
- [Nature: Climate policy implications of nonlinear decline of Arctic land 2019](#)
- [Permafrost Stores a Globally Significant Amount of Mercury 2018](#)
- [Giant DNA viruses National Academy of Sciences \(PNAS\) 2014](#)



Destruction of ecosystems and extinction

6% of all insects (the most sensitive species are vital for pollination of agricultural crops), 8% of plants and 4% of vertebrates will not be able to adapt and will lose most of their habitat in the next 30-50 years (probably become extinct).

- [The United Nations: Emissions Gap Report 2019](#)
- [IPCC Global Warming of 1.5 °C 2019](#)
- [UEA: The projected effect on insects, vertebrates, and plants 2018](#)

1 million species are on the verge of extinction due to human activities.

- [The United Nations: Climate Change Annual Report 2019](#)



Warming of the ocean

Since 1993, the rate of ocean warming and the frequency of heat waves has more than doubled, leading to the death of sea lions, whales, molluscs and dolphins and as a result to the destruction of the ocean ecosystem.

Within 80 years, the upper layers of the ocean will begin to warm up 2-4 times faster and the frequency of heat waves will increase by 20 times.

- [IPCC The Ocean and Cryosphere in a Changing Climate 2019](#)
- [ABC Net: Marine heatwaves 2019](#)

The 1.5°C scenario is **already underway**



Sea level

Glaciers are melting 7 times faster than 30 years ago, and sea level is rising 5 times faster. Within 30-80 years, cities and settlements with around 140 million inhabitants will be flooded.

- [Nature: Sea-level rise and coastal flooding 2019](#)
- [IPCC The Ocean and Cryosphere in a Changing Climate 2019](#)

30% of the world's sandy beaches will be underwater in 80 years due to sea level rise and erosion of over 60 metres.

- [Nature: Sandy coastlines under threat of erosion 2020](#)



Acidity and acidification of the ocean

Ocean acidification has increased by 26% since the beginning of the industrial era. Water is becoming too corrosive for shellfish species, mussels, molluscs, plankton, coral reefs, sharks and others.

- [World Meteorological Organization: The Global Climate 2015-2019](#)

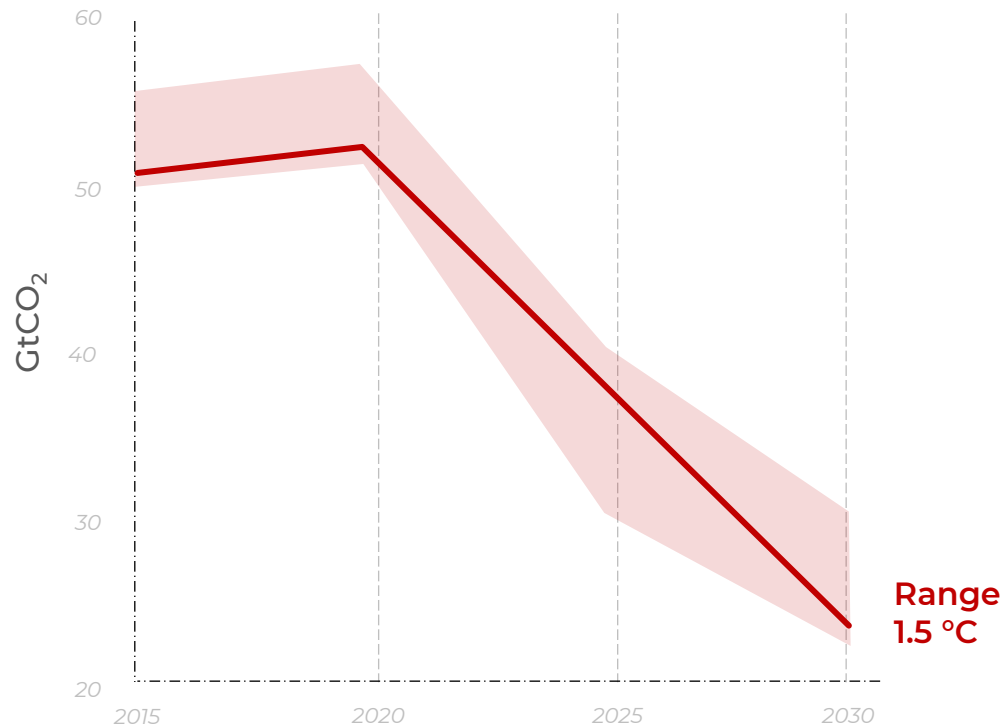
70-90% of coral reefs will disappear. This is the habitat of millions of species and the food source for half a billion people.

- [IPCC Global Warming of 1.5 °C 2019](#)

In 60 years, oxygen deficiency began to affect 4 times more areas of the ocean, and in 80 years the deficiency will cover 30% of its area, leading to the extinction of species in need of oxygen (the majority).

- [IPCC The Ocean and Cryosphere in a Changing Climate 2019](#)





It is still possible to limit the warming to **1.5°C**

Despite the increase in consumption, it is necessary to reduce annual CO₂ emissions by **7.6%** each year from 2020 to 2030, reducing them by 55% in 9 years (2030) and reaching zero in 30 years (2050).

[The United Nations: Emissions Gap Report 2019](#)

For comparison: due to **quarantine** in 2020, including the shutdown of an unprecedented number of plants and facilities around the world, the suspension of flights, reduced traffic flow and other activities, CO₂ emissions will be reduced **only by 7%** and will return to their previous levels in 2021.

[International Energy Agency: World Energy Outlook 2020](#)



The 2°C scenario **can still be avoided**



Morbidity and mortality

The morbidity and mortality rates associated with extremely hot weather will increase. In 9 years (2030), some countries will have heat wave fatalities of 5% per year. In 30 years (2050), the risk of fatal heat waves will quadruple worldwide, affecting 1.2 billion people.

- [McKinsey: Climate risk and response: Physical hazards and socioeconomic impacts 2020](#)



Cataclysms and natural disasters

In 10 years (2030) the number of natural disasters may increase by another 50%, which is 7.5 times higher than in 1970.

- [World Meteorological Organization: State of Climate Services 2020](#)

In another 20 years (2050) the number of natural disasters will double again.

- [Universal Ecological Fund: The Truth about Climate Change 2016](#)



Droughts and heat

By the end of the century, cases of extremely hot days that occur every 20 years will occur every two or three years.

Fresh water shortages, reduced crop yields and reduced nutritional value are expected.

The spatial extent and proportion of time affected by drought will rise to more than 80% within 30 years (2050) in many parts of the world, including Italy, France, Croatia, Spain, Cyprus, Greece and others.

- [NASA: More Droughts and Heat Waves](#)
- [McKinsey: Will the world's breadbaskets become less reliable 2020](#)

The probability of a global decline in grain yields by 15% in a given year in 4 years (2025) will double to 2% per year or 18% cumulatively in 10 years, which could lead to global price increases of more than 100%. In another 20 years (2045) the probability will double to 4% per year or 34% cumulatively.

The probability of a 10% decline in yields in 4 years (2025) will increase from 6 to 11% per year or 46 to 69% cumulatively, and in another 20 years (2045) will be 18% per year or 86% cumulatively.

- [McKinsey: Will the world's breadbaskets become less reliable 2020](#)

The 2°C scenario **can still be avoided**



Economic shock

Losses from weather events will rise to at least \$2 billion a day by 2030 and total losses will reach \$54 trillion and continue to rise as the climate continues to change and adversely affects human health, livelihoods, food, water, biodiversity and economic growth.

- [Universal Ecological Fund: The Truth Behind the Climate Pledges 2019](#)
- [McKinsey Climate risk and response: Physical hazards and socioeconomic impacts 2020](#)



Destruction of ecosystems and extinction

Three times as many insects (18%), twice as many plants (16%) and vertebrates (8%) will not be able to adapt and will lose most of their habitat in the next 30-50 years (probably become extinct).

- [The United Nations: Emissions Gap Report 2019](#)
- [IPCC Global Warming of 1.5 °C 2019](#)
- [University of East Anglia: The projected effect on insects, vertebrates, and plants 2018](#)



New diseases and toxins

Permafrost will melt twice as much or about 70% in the coming decades.

The accumulation of organic pollutants and mercury in marine plants and animals is expected to increase, as is the prevalence of waterborne pathogens.

Live-stock animals will be exposed to unfavourable effects and diseases.

This will also lead to an even greater acceleration in climate warming, as permafrost contains twice as many greenhouse gases as the atmosphere currently contains.

- [IPCC The Ocean and Cryosphere in a Changing Climate 2019](#)
- [Permafrost Stores a Globally Significant Amount of Mercury 2018](#)
- [Giant DNA viruses National Academy of Sciences \(PNAS\) 2014](#)
- [International Livestock Research Institute: Climate and Livestock Disease](#)
- [Nature: Climate policy implications of nonlinear decline of Arctic land 2019](#)

The 2°C scenario **can still be avoided**



Sea level

Within 30-80 years, cities with a population of 230 million people will be flooded: London, New York, Hong Kong, Venice, Shanghai, Miami, Amsterdam, Mumbai, Calcutta, Bangkok, Maldives and the Marshall Islands and others.

- [Nature: Sea-level rise and coastal flooding 2019](#)
- [IPCC The Ocean and Cryosphere in a Changing Climate 2019](#)

Odessa, Kherson, Nikolaev, Mariupol, Berdyansk, Kerch, Vilkovo and 27 other cities, as well as 660 environmentally hazardous facilities in Ukraine, may go underwater within 80 years.

- [Eco-action: Sea level rise in Ukraine due to climate change 2018](#)

Half of the world's sandy beaches will be underwater within 80 years due to sea level rise and erosion of over 100 metres.

- [Nature: Sandy coastlines under threat of erosion 2020](#)



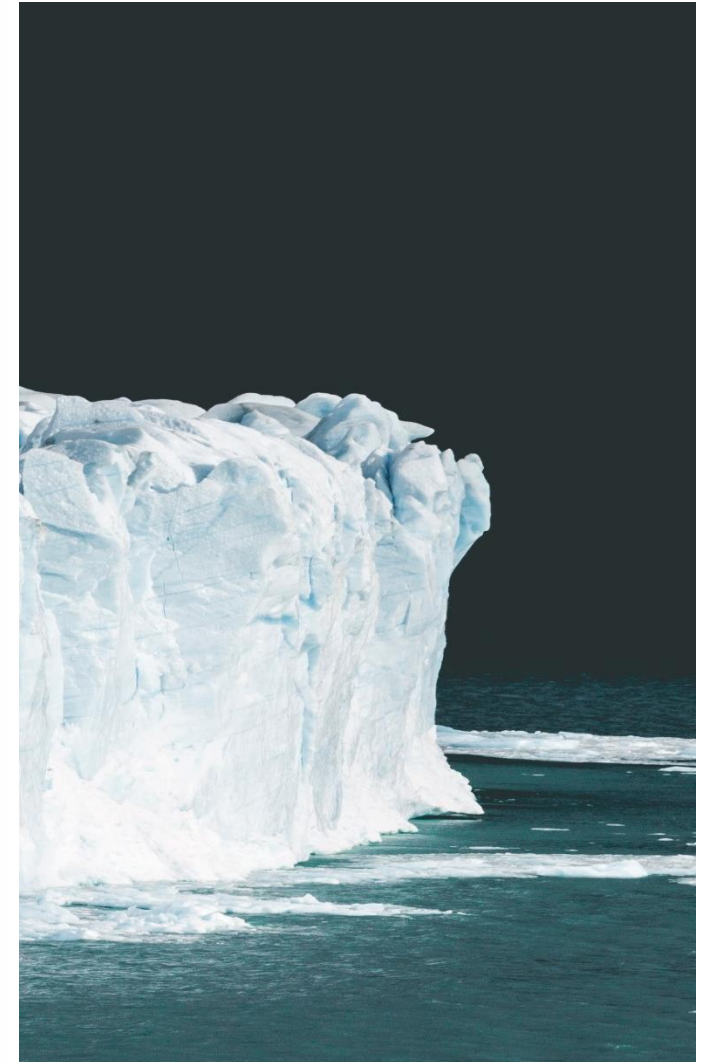
Ocean oxidation and oxygen loss

In the coming decades, the world's oceans will lose another 3-4% of their oxygen, the oxygen-deficient area will cover 60% of the ocean, the upper layers of the ocean will be heated 5-7 times faster and the frequency of heat waves will increase by 50 times.

- [IPCC The Ocean and Cryosphere in a Changing Climate 2019](#)

The risk of total extinction or irreversible damage to many marine and coastal ecosystems, from algae to fish. 99-100% of coral reefs will disappear.

- [IPCC Global Warming of 1.5 °C 2019](#)



The difference between the **1.5°C** and **2°C** scenario is enormous. But if we limit ourselves to measures already taken, in 30 years (2050) the temperature will reach **2.5–3°C**, which will lead to catastrophic natural disasters and extreme weather events around the world.

In another 40 years (2080), the planet will warm up to **3.3–5°C**, causing mass extinction of animals and plants and making most of the planet uninhabitable for human life.

This will only take place in just one generation

- [Unprecedented climate events: Historical changes, aspirational targets, and national commitments, 2018.](#)
- [The Global Commission on Adaptation: A Global Call For Leadership On Climate Resilience 2019](#)
 - [The United Nations Climate Change Annual Report 2019.](#)
 - [International Monetary Fund: World Economic Outlook 2020.](#)

For comparison: at **3-3.2°C** warming about **49%** of insects, **44%** of plants and **26%** of vertebrates will lose most of their habitat (likely become extinct), **74%** of the world's population will be exposed to deadly heat for at least 20 days per year and the average duration of a drought will be **10** months.

- [University of East Anglia: The projected effect on insects, vertebrates, and plants 2018](#)
 - [The Global Commission on Adaptation: A Global Call For Leadership On Climate Resilience 2019](#)
-



We're running **the most dangerous** experiment in history right now, which is to see how much carbon dioxide the atmosphere can handle before there is an environmental catastrophe

CEO of Tesla and SpaceX
Elon Musk



SOLUTION



Nations must **triple** their current efforts to limit warming to **2°C** and multiply their current efforts by at least **five times** to limit warming to **1.5°C**

Evidently, greater cuts will be required the longer that action is delayed.

[The United Nations: Emissions Gap Report 2019](#)

As the situation worsens, there is a growing risk that these changes will become irreversible.

[World Meteorological Organization
The Global Climate 2019](#)

But it is not too late to change everything.

[International Monetary Fund:
World Economic Outlook 2020](#)



Energy, industry, buildings, transport and agriculture account for the largest share of emissions.

- [Our World in Data: Emissions by sector](#)
- [Bloomberg New Energy Outlook 2020](#)

The **next 10 years** are crucial to get on track. Three things need to happen:

Accelerate the deployment of Solar
and Wind energy

Switching to electric transport
and heating

Scale up development and
deployment of a zero-carbon
molecule for widespread
deployment beyond 2030

[Bloomberg New Energy Outlook 2020](#)

A fair and timely transition to **sustainable development** must be provided:



Renewable energy electricity expansion

Installation of solar, wind, biogas and other RES power plants and power storage systems.



Coal phase-out

Suspension of financing and subsidies for coal-fired power plants;

Expand carbon capture usage and storage systems;



Decarbonize transport

Switching to electric cars, transport on hydrogen and other clean fuels;

Redistribution of traffic between transport modes;



Decarbonize industry

Refusal to purchase power from hydrocarbon power plants;

Switching to RES;

Improve energy efficiency;

Electrify heat processes.

The greatest transformation challenge humankind has faced is staring right at us:
The world has **10 years** to halve global greenhouse gas emissions and avoid global warming of above **1.5°C**.

All organisations, large and small, public and private, need to make the achievement of
a **carbon-free economy** (net-zero) central to strategy and decision making.

[PwC: guide to embedding net zero into your business 2020](#)



The cheapest power sources in the world are Solar and Wind power plants. The cost of generating them is already 20% and 12% lower respectively than in conventional power generation using the cheapest fossil fuels.

- [IRENA: Renewable Power Generation Costs 2020](#)
- [Bloomberg New Energy Outlook 2020](#)

Modern real estate standards significantly reduce operating costs and ensure energy independence. For example, zero-energy buildings – energy-efficient buildings with a “zero” annual energy balance – consume as much energy during the year as they produce from renewable sources.

- [World Green Building Council 100% Net Zero Carbon Buildings by 2050](#)

Electric cars are already cheaper and safer to operate than cars with internal combustion engines, and their cost will be equal in 4 years (2025).

- [UBS: Electric cars 'as cheap to manufacture' as regular models by 2024](#)
- [Consumer Reports: EVs Offer Big Savings Over Traditional Gas-Powered Cars 2020](#)

**Ready or not, we are entering an age of adaptation.
The right investments will deliver a “triple dividend” by averting future losses.**

Managing Director of the International Monetary Fund
Kristalina Georgieva

**Companies that don't adapt will
go bankrupt, without question**

Governor of the Bank of England,
Mark Carney

**Business cannot succeed in a
society that fails**

President of World Business Council for
Sustainable Development,
Peter Bakker



Now you know why

2020

The record 30% of the EU budget for 2021 - 2027 is aimed at combating climate change.

2020

In Japan, the USA, Germany, Austria and Hungary, the construction of houses without solar power plants is already prohibited in some cities.

2020

All EU countries have introduced Directive 2010/31/EU (EPBD), which requires all new buildings to have almost zero energy consumption (zero-energy buildings) as of December 31, 2020.

2020

90% of all investments in the power sector were made in RES. The largest share falls on solar and wind power.

2020

The CO2 emissions tax averaged USD 31 per tonne and is increasing annually in most countries. The tax is already being collected or planned in 97 countries.

2021

The EU will establish a carbon border mechanism, a duty on imported goods where CO2 emissions exceed current EU standards.

2025

RES will be the largest source of power in the world. The combined capacity of solar and wind power plants will exceed that of any other power plant, including gas and coal.

2030

In 75% of the EU countries coal generation will completely disappear. The share of RES in power generation in the EU will be 60%.

2030

The UK will prohibit the sale of petrol and diesel vehicles.

Now you know why

2025

All Audi units will work with zero CO₂ emissions.

2025

Kering Group (Gucci, Saint Laurent, Bottega Veneta, Balenciaga, Alexander McQueen, Brioni, Ulysse Nardin and others) will reduce its CO₂ emissions by half ([link](#)).

2025

Nike will fully switch to RES.

2025

Amazon will switch 100% to RES and invest \$2 billion in start-ups with decarbonisation technologies.

2030

Apple will become carbon neutral, including all its suppliers.

2030

Microsoft will become carbon neutral and spend \$1 billion to combat carbon emissions.

2030

Google will fully switch to RES.

2030

Intel will fully switch to RES.

2050

Japan, Germany, England, France, Sweden, Finland and more than 60 other countries and 100 cities will be carbon neutral.

More than 100 banks and insurers of global significance and over \$10 billion AUM capital each have announced their **refusal** to finance or insure coal mining and/or coal-fired power plants:

<i>World Bank</i>	<i>Barclays</i>	<i>Goldman Sachs</i>	<i>Wells Fargo</i>	<i>BNP Paribas</i>	<i>Citi Bank</i>	<i>EBRD</i>
<i>Credit Suisse</i>	<i>Deutsche Bank</i>	<i>U.S. International Development Finance Corporation (DFC)</i>	<i>JPMorgan Chase & Co</i>	<i>Mitsubishi UFJ Financial Group (MUFG)</i>	<i>Morgan Stanley</i>	<i>EXIM Bank</i>
<i>Crédit Agricole Group</i>	<i>UBS Group</i>	<i>UniCredit</i>	<i>Banque de France (BdF),</i>	<i>Swedbank</i>	<i>HSBC Holdings</i>	<i>National Australia Bank (NAB)</i>
<i>Inter-American Development Bank (IDB)</i>	<i>National Australia Bank</i>	<i>U.S. Bancorp</i>	<i>Export Development Canada (EDC)</i>	<i>United Overseas Bank (UOB)</i>	<i>OCBC Bank</i>	<i>And many others</i>

[IEEEFA: Financial institutions are restricting thermal coal funding](#)

More than a thousand of the world's largest companies have set goals for **reducing greenhouse gas emissions** and joined the Scientifically Based Goals initiative:

Adobe Systems Inc.
Autodesk, Inc.
Cisco Systems, Inc.
Coca-Cola HBC AG
Colgate Palmolive Company
Danone
Dell Technologies
Electrolux
Ericsson Group
Fujitsu Limited
Hewlett Packard
Hitachi
Husqvarna AB
Inditex
IKEA
Kawasaki
L'Oréal
Mars
Metro AG
Nestlé
Nokia
PepsiCo, Inc.
Philip Morris
Procter & Gamble
Schneider Electric

Unilever plc
Walmart Inc.
Xerox Corporation
Marks & Spencer
Bacardi Limited
Tesco
Epson
Carlsberg Group
JLL
FUJIFILM
Coca Cola
Gap Inc.
NIKE, Inc.
Guess?, Inc.
Target
Panasonic
SPAR
McDonald's
Yamaha
News Corp
Raiffeisen Bank International AG
Nokian Tyres
Hilton
Michelin
Mastercard
CHANEL

Oriflame
Siemens
Bloomberg LP
CBRE
The Hershey Company
Henkel
MITSUBISHI
Decathlon
Nikon
British American Tobacco
PayPal
Burberry
PUMA SE
Vodafone
SCANIA CV
AT&T Inc.
Microsoft
Logitech
Bayer
Mercedes-Benz
Valio Ltd.
Tele2 AB
Starbucks
Moody's
Sharp
Adidas

Kuehne + Nagel International AG
Hugo Boss
Ralph Lauren
Jacobs
Rolls-Royce plc
Amazon
Toshiba
Applied Materials
BMW
Volvo
Volkswagen
Facebook
Ford
Louis Vuitton
McKinsey
Uber
Campbell
Sony Corporation
TETRA PAK
ABB
Lenovo
Universal Corporation
KPMG
Seagate Technology
Kering
And many others

**Governments cannot afford to wait.
People and families cannot afford to
wait. Economies must shift to a
decarbonization pathway now.**

[The United Nations: Emissions Gap Report 2019](#)



PROBLEM

REASONS

CONSEQUENCES

SOLUTIONS

“When it gets warmer, every fraction of a degree, every year, every decision counts”

IPCC Global Warming of 1.5 °C 2019

“We will be able to implement the Paris Agreement only in one case – by taking immediate and comprehensive measures to stop carbon dioxide emissions into the atmosphere”

WMO *The Global Climate 2019*

«No institution or individual can stand on the sidelines in the fight against climate change»

Managing Director of the International Monetary Fund *Kristalina Georgieva*

«You must be really blind if you don't see the tipping point is here in clean energy»

Head of banking giant HSBC Holdings *Stuart Gulliver*

«We all know the cost of doing nothing is far, far too high»

IFRC *The Cost Of Doing Nothing 2019*

«Stay informed, share the science widely, and urge those with decision-making powers to act now»

The United Nations: 10 things to know about the Emissions Gap 2019

«We have to wake up to the fierce urgency of the now»

14th President of The World Bank *Jim Yong Kim*

«We have a single mission, to protect and hand on the planet to the next generation»

45th President of France *Francois Hollande*



1850

dynamics of global average annual temperature growth

2020

The material was prepared using renewable power from the Solar Power Plant:
SunPower Maxeon 39.6 kW, Unit.City, Kiev, 2020