

Willow Rivers Wealth

Responsible Investments



CLIMATE CHANGE REPORT

THE EARLY DAYS

Scientists have long been aware of the Earth's extreme temperature variations, with the last major ice age ending about 10,000 years ago. However, in 1824 Jean- Baptiste Fourier discovered a global warming (or greenhouse) effect and, in 1861, the Irish physicist John Tyndall carried out key research on carbon dioxide (CO₂) and heat absorption.

In 1896, Swedish and American scientists independently concluded that CO₂ was the likely cause of global warming. By 1957, US oceanographer Roger Revelle was warning that humanity is conducting a 'large-scale geophysical experiment', while colleague David Keeling set up the first continuous monitoring of CO₂ in the atmosphere, confirming year-on-year-rises.

FORMATION OF THE IPCC

Despite these early signs, it took until 1979 for the first World Climate Conference, organised by the World Meteorological Organisation (WMO), to state that 'continued expansion of man's activities on Earth may cause significant extended regional and even global changes of climate'.

By 1987 the "Montreal Protocol" the international community agreed to act on scientific evidence that certain industrial gases can lead to dangerous depletion of the Earth's ozone layer. This led the WMO and the United Nations Environment Programme (UNEP) to establish a scientific advisory body: the Intergovernmental Panel on Climate Change (IPCC).

The IPCC issued its First Assessment Report in 1990, finding that the planet had warmed by 0.5°C in the past century and would rise further by 0.3°C per decade in the 21st century, accompanied by global mean sea level rises of 6 cm per decade.

THE KYOTO PROTOCOL

The UN established the Framework Convention on Climate Change (UNFCCC) that 154 nations (including the US) signed at the Rio 'Earth Summit' in 1992. In 1995, the IPCC Second Assessment Report confirmed that concentrations of greenhouse gases (GHGs) were continuing to increase, and that the socioeconomic impacts of climate change were significant, while the UNFCCC began negotiations on an international agreement to limit the emission of GHGs.

The result was the Kyoto Protocol, adopted in 1997, which: (1) set mandatory targets for emission reductions for the world's 38 leading economies, and (2) proposed three flexible market mechanisms for achieving these reductions through carbon trading. The targets collectively amounted to a 5.2% global reduction in GHGs from these countries against 1990 levels by 2012.

THE 21st CENTURY

Despite US opposition to the Protocol, momentum continued to build, with the EU launching its Emission Trading Scheme for CO₂ in 2005. In 2007, the UK's Stern Review, prepared by former World Bank Chief Economist Sir Nicholas Stern, warned that tackling climate change will now cost around 1% of global GDP, whereas the cost of not acting could be between 5% and 20%.

Shortly thereafter, the IPCC released its Fourth Assessment Report, concluding with 90% confidence that human activity is causing climate change. This seemed to mark the end of denial and the beginning of urgent global action on climate change. The IPCC Fourth Assessment Report in 2007 found that "Global GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004."

CURRENT GLOBAL CARBON LEVELS

In 2008 our planet was estimated to contain 385 ppm (parts per million) of CO₂ in its atmosphere, the highest concentration of CO₂ for more than 630,000 years.

This has occurred primarily due to human industrial and technological progression, specifically the production and consumption of power from the burning of fossil fuels, estimated to have caused around 85% of CO₂ emissions. Just 15% is estimated to have occurred from land use change.

Natural CO₂ absorption systems that remove and store CO₂ from the air, known as "sinks", have historically provided the natural balance to keep atmospheric CO₂ concentrations at a safe level. Without these sinks, such as the earth and oceans and trees, total CO₂ emissions caused by humans would have already caused atmospheric CO₂ to increase from pre-industrial values of 280 ppm to nearly 500 ppm.

CO₂ CONCENTRATION GROWTH RATES

Many scientists believe our planet can only comfortably sustain a balanced population of 4bn inhabitants. Considering current human social, political, economic and health trends, it is believed our global population of 6.5bn should peak around 9.5bn in 2050. With the necessary industrial output required to sustain this population explosion (see "Global Energy Demand Growth"), global CO₂ emissions will continue to increase over the next 40 years.

Currently the atmosphere's concentration is increasing at 2 ppm CO₂ per year, however with natural sinks weakening (such as disappearing forests) and previously inert carbon pools (such as peat land and Arctic permafrost) now breaking down and releasing CO₂ back in to the atmosphere, the rate of atmospheric CO₂ concentration increase is spiralling.

OUR TARGET

To keep the World within a safe level of climate change global temperature increase must be below 2 degrees Centigrade, meaning CO2 concentrations must peak at 450ppm.

Beyond a global 2 degrees Centigrade temperature increase the IPCC has outlined that the capability of society and ecosystems to adapt will rapidly decline, with an increasing risk of social disruption through health impacts, water shortages and food insecurity.

At current growth rates a 2 degrees Centigrade temperature increase could occur in around 30 years, 2040.

To try to avoid this many leading scientists suggest that CO2 emissions must peak at 2015 and be phased out as soon as possible after 2050. In most recent reports from the United Nations Environment Program, climate researchers now agree however that the global thermometer will rise around 6 degrees F during the century, even if all emission reduction targets are achieved.

GLOBAL ENERGY DEMAND GROWTH

From the International Energy Outlook Report 2009 IEO2009, published by the US Department of Energy, these are the current energy consumption forecasts for the globe;

- Total world energy consumption will increase 44% by 2030
- 65% of this increase will come from within Asia, specifically India and China, at which point they will total 28% of total world consumption
- World natural gas consumption is set to increase by 1.6% per annum, with coal consumption set to increase 1.7% per annum despite climate change warnings.
- Coal will still account for 28% of world energy consumption in 2030, with natural gas & coal together to still account for 64% of global electricity generation in 2030.
- Together the US, China and India will account for 88% of the projected net increase in coal consumption from 2006 to 2030
- Upfront costs for financing will stifle solar power energy plant development, despite this being the only major long-term solution.
- OECD Europe & Japan are expected to decrease coal consumption before 2030, with most short-term renewable energy growth expected to come from wind and bio-mass.
- Hydroelectric generation is expected to be the predominant source of renewable energy growth in China, India, Brazil, Vietnam and Laos.
- Bio-fuels will increase from 800,000 barrels per day (now) to 5.9m barrels per day in 2030 (6% of total)

WHAT NEEDS TO BE DONE

Willow Rivers gives everyone the opportunity to invest in projects, companies, systems and technologies whose underlying aim is to mitigate climate change. Here is a brief overview of the most fundamental industries that need all of our attention.

Energy Efficiency

The most efficient and immediate method of reducing our overall power consumption is to improve efficiency. With residential and commercial buildings being responsible for a large percentage of power consumption, simple concepts such as reducing the Wattage of light bulbs used, or intelligent power management systems in buildings known as SMART systems.

Within efficiency, the minimisation of industrial output through the recycling of goods is now an important practice, whilst general global system efficiencies are also being improved to ensure other vital reductions such as food wastage are achieved.

Renewable Energies

Replacement of all fossil fuel dependent technology is the essential solution to the Worlds climate problems, however this is not an easy solution to accomplish.

Society's dependence on electricity is the single largest problem, with the vast majority of power plants currently running on coal and causing around 30% of global green house gas emissions. Generation of electricity from renewable energy sources such as solar energy and bio-fuels (algae) present the long-term solutions, with short-term intermediate solutions offered by wind and hydro-electric power.

Our dependence on fossil-fuelled transportation systems is also a major cause of global pollution, with automobiles around the planet still almost completely fueled on oil. Governments must enforce an emphatic and fundamental change in our transportation systems, stopping all petrol-fuelled engine technology and move to new transportation technologies such as bio-fuels and hydrogen.

To reduce their carbon footprint, Governments will also need to develop intelligent modern schemes such as modern public transportation, car-sharing, remote work-station networks and individual carbon liabilities to ensure every country is responsible for its low-carbon impact.

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Stern Review: www.hm-treasury.gov.uk/sternreview_index.htm

Intergovernmental Panel on Climate Change (IPCC): www.ipcc.ch

Kyoto Protocol: unfccc.int/kyoto_protocol/items/2830.php

BBC, section on climate change: www.bbc.co.uk/climate

Carbon Trust: www.carbontrust.co.uk

Cool Mayors for Climate Protection: www.coolmayors.org

Corporate Leaders Group on Climate Change: www.cpi.cam.ac.uk/bep/clgcc

E3G: www.e3g.org/index.php/programmes/climate

EU Greenhouse Gas Emission Trading Scheme: ec.europa.eu/environment/climat/emission.htm

Institute for Public Policy Research (ippr): www.ippr.org.uk/research/teams/?id=86&tid=86

Princeton Stabilization Wedges: www.princeton.edu/~cmi/resources/stabwedge.htm

Stop Global Warming: www.stopglobalwarming.org

Tyndall Centre for Climate Change Research: www.tyndall.ac.uk

Together.com: www.together.com

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