(5) Technologies that were invented to mitigate the effects of climate change for the past ten (10) years. (2010-2020):

Carbon capture and storage

Even under optimistic scenarios for reducing greenhouse gas emissions, scientists say we will not meet targets to limit global warming to 1.5 degrees Celsius without removing some of the CO2 we have already emitted. The IPCC projects between 100 billion and 1 trillion tons of CO2 would need to be removed this century. Trees and plants that extract CO2 from the atmosphere and turn it into oxygen through photosynthesis are one way of doing this. But they take up large tracts of land — which is needed for other purposes such as growing food — and are not a secure way of storing carbon, because they may be felled for firewood or burned in forest fires. Some companies are experimenting with capturing CO2 from power plants and storing it deep underground. By doing this with biomass plants — where recently-grown plant matter is burned and not ancient fossils — then power can be produced while reducing the amount of CO2 in the atmosphere. But with just 19 facilities running such systems, its deployment is not happening quickly enough to meet emissions reductions targets, according to a report from the Global Carbon Capture and Storage Institute.

Cement-Free Concrete by Carbicrete

By now, most people know that we have a plastics problem, but fewer people realize that concrete has a large environmental footprint, too. One of its key ingredients is cement, and cement production generates ten percent of the world's CO_2 emissions.

Carbicrete is hoping to change that. Instead of filling concrete with cement, Carbicrete fills it with steel slag, a byproduct of the steel-making process. Then, Carbicrete injects the wet concrete with CO_2 to make it stronger. The result is a carbon-negative, cement-free concrete that reduces the amount of CO_2 in the atmosphere.

Efficient Cooling by SkyCool Systems

Cooling systems are another problem area. They account for seventeen percent of electricity use and eight percent of greenhouse gas emissions worldwide.

The startup SkyCool Systems hopes to use a phenomenon known as “night-sky cooling” to give air conditioning and refrigeration systems a boost. In the most simplistic terms, night sky cooling occurs when heat is emitted from an object as thermal radiation at a very specific wavelength. That allows the heat to escape the atmosphere and travel to space. Because space is so much colder, the object cools drastically.

In nature, this happens at night, but SkyCool uses a specialized material that allows the process to occur at any time. This tech could be added to cooling systems to make them more efficient, and eventually, it could create an electricity-free cooling system.

Remote working

As the coronavirus pandemic has shown, many office jobs can be successfully fulfilled from home - potentially offering a route to reduce emissions from transport and office buildings. Driving to and from work is the largest source of carbon emissions in the developed world. The technology to support remote working has been rapidly adopted as businesses attempted to manage the impact of **COVID-19** on their workers, and governments rushed to lock down their countries and prevent mass deaths. However remote working may only be an effective method of reducing emissions during the summer. It turns out that when buildings need to be heated during the winter it is much more efficient to have numerous people in a single building rather than distributed across their own homes, and some research suggests this might even offset the emissions from transportation.

Feeding cows seaweed

Another significant greenhouse gas is methane, emissions of which are reaching record levels due to cattle farming. Agriculture accounted for roughly two-thirds of all methane emissions related to human activities between 2000 and 2017 according to one recent study, with fossil fuels contributing most of the remaining third. This methane primarily comes from burping cattle, due to how cows digest food - fermenting it in their stomachs where the sugars are converted into simpler molecules that can be absorbed by the body. Scientists have discovered that a red seaweed which grows in the tropics can reduce methane emissions by 80% in cows when it is added as a supplement to cattle feed. However, with nearly 1.5 billion head of cattle globally, there is simply not enough of this seaweed currently available to suppress these burps - although perhaps some scientists might be able to reproduce the crucial ingredient which will help keep them down.

(5) programs initiated by different government and non-government organization in our country in order to minimize the effect of climate change in our country:

GHG Mitigation Assessment under the Asia Least Cost Greenhouse Gas Abatement Strategy (ALGAS)

- launched in 1995 with GEF funding, implemented by the UNDP and executed by the ADB

- looked into GHG mitigation options in the energy, agriculture and forestry sectors.

Promotion of Renewable Energy, Energy Efficiency and GHG Abatement (2002)

- Implemented by the DOE with ADB Funding
- Intended to develop capabilities for promotion on renewable energy and energy efficiency and GHG abatement projects

Capacity Development for the Clean Development Mechanism in the Philippines (CD4CDM)

- funded by the Dutch Government, executed by the UNEP-RISO and implemented by the IACCC through the Climate Change Information Center (CCIC)
- aims to generate a multi-sectoral understanding of the opportunities offered by the CDM
- aims to develop the necessary institutional and human capabilities to allow formulation and implementation of CDM projects
- intends to capacitate key stakeholders in the CDM regimes such policymakers, project developers, project financiers, academe, research institutions, investment promoters, information disseminators, NGOs and local communities.

Establishment of the CDM National Authority, Operational Framework and Support Systems for the Philippines

- A project proposed to the Dutch Government through the UNDP which hopefully shall lay down the groundwork for the formal implementation of the CDM in the Philippines;
- to secure the official designation of a national government entity as the National Authority for CDM;
- to formulate the CDM Operational Framework.

Philippine Strategy for Sustainable Philippine Strategy for Sustainable Development (PSSD) Development (PSSD)

- in 1989, the country formally embraced sustainable development as a guiding principle and development efforts through the approval and adoption of the conceptual framework of the PSSD
- balanced and integrated approach towards environment and development issues
- led to the creation of the Philippine Council Philippine Council for Sustainable for Sustainable Development (PCSD) Development (PCSD) which was mandated to chart environmental and sustainable development issues

reasons that contribute to global warming leading to climate change:

- Humans are increasingly influencing the climate and the earth's temperature by burning fossil fuels, cutting down rainforests and farming livestock. This adds enormous amounts of greenhouse gases to those naturally occurring in the atmosphere, increasing the greenhouse effect and global warming.
- Greenhouse gases include carbon dioxide (CO2), methane and water vapour. Water vapour is the most abundant greenhouse gas in the atmosphere, but it stays in the atmosphere for a much shorter period of time, just a few days. Methane stays in the atmosphere for about 9 years until it is removed by oxidation into CO2 and water. Carbon dioxide stays in the atmosphere much longer, from years to centuries, contributing to longer periods of warming. These gases trap solar radiation in the Earth’s atmosphere, making the climate warmer.
- Over very long periods, plate tectonic processes cause continents to move to different positions on the Earth. For example, Britain was near to the equator during the Carboniferous period, around 300 million years ago, and the climate was warmer than it is today. The movement of the plates also causes volcanoes and mountains to form and these too can contribute to a change in climate. Large mountain chains can influence the circulation of air around the globe, and consequently influence the climate. For example, warm air may be deflected to cooler regions by mountains. Volcanoes affect the climate through the gases and particles (tephra/ash) thrown into the atmosphere during eruptions. The effect of the volcanic gases and dust may warm or cool the Earth’s surface, depending on how sunlight interacts with the volcanic material. During major explosive volcanic eruptions, large amounts of volcanic gas, aerosol droplets and ash are released. Ash falls rapidly, over periods of days and weeks, and has little long-term impact on climate change. However, volcanic gases that are ejected into the stratosphere stay there for much longer periods. Volcanic gases such as sulphur dioxide can cause global cooling, but carbon dioxide has the potential to cause

global warming. In the present day, the contribution of volcanic emissions of CO_2 into the atmosphere is very small; equivalent to about 1% of man-made emissions.

- Ocean currents carry heat around the Earth. As the oceans absorb more heat from the atmosphere, sea surface temperature increases and the ocean circulation patterns that transport warm and cold water around the globe change. The direction of these currents can shift so that different areas become warmer or cooler. As oceans store a large amount of heat, even small changes in ocean currents can have a large effect on global climate. In particular, increases in sea surface temperature can increase the amount of atmospheric water vapour over the oceans, increasing the quantity of greenhouse gas. If the oceans are warmer they can't absorb as much carbon dioxide from the atmosphere. The oceans contain more CO_2 in total than the atmosphere and exchanges in CO_2 occur between the oceans and the atmosphere. CO_2 absorbed in ocean water does not trap heat as it does in the atmosphere. The world's oceans absorb about a quarter of the CO_2 we release into the atmosphere every year. As atmospheric CO_2 levels increase so do the ocean's CO_2 levels.
- Almost all of the energy that affects the climate on Earth originates from the Sun. The Sun's energy passes through space until it hits the Earth's atmosphere. Not all of this energy passes through to reach the Earth's surface. The rest of the energy is reflected back into space or absorbed by the atmosphere. The energy output of the Sun is not constant, it varies over time and this has an impact on our climate. Only some of the solar energy intercepted at the top of the atmosphere passes through to the Earth's surface.