NIH GREEN ZONE NEWSLETTER

The Newsletter of the NIH Environmental Management System

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Climate Change Series: How Do We Combat Climate Change?

**This is the third and final article in a series about climate change. This article builds off topics discussed in the July 2021 issue and the August 2021 issue.*

In our previous articles on climate change, we established that radiation from the sun and the way it interacts with the Earth's surface and within our atmosphere is the main factor that determines climate. We also established that greenhouse gases, due to the way they trap solar radiation within our atmosphere, have been the primary drivers of climate change. Greenhouse gases are notably produced by the combustion of fossil fuels, which explains why our current climate crisis can be tracked back to the industrial revolution in the mid-1700s.[1] The question that remains now that we have discussed the causes of the climate crisis is: how do we slow down and eventually reverse climate change?

One solution for fixing the climate crisis is reducing greenhouse gas emissions: we are working towards net-zero greenhouse gas (GHG) emissions with the goal of reducing U.S. GHG emissions by at least 50% by 2030. However, the path for getting there is much more complex. The first requirement is an overall reduction in energy usage, drastically reducing the amount of greenhouse gas emissions and finding alternatives to these GHG sources. For electricity generation, options like wind, solar, hydroelectric and geothermal energy are all likely to play a role in replacing fossil fuels like coal and natural gas.[2] For example, NIEHS has established a net-zero energy warehouse (Building 110) on the RTP campus that minimizes the energy required to operate this building and uses solar panels to provide the majority of the building's energy needs. Electric and hybrid vehicles are likely to replace gasoline vehicles, which utilize the electricity sector to further reduce GHG emissions.[3] Another form of offsetting GHG emissions will likely come from carbon credits, which are already in use in the European Union. These credits permit a company to emit a capped amount of GHGs and sell any unneeded credits to other companies. This system has the benefit of capping GHG emissions, while also providing monetary incentives for companies to reduce their emissions. These solutions and many more will enable us to drastically reduce GHG production, but we will never be able to eliminate these emissions entirely.

This is where the "net-zero" aspect comes into play. The second requirement for reaching net-zero GHG emissions is to find ways to capture GHGs from the atmosphere so that the rates of production and removal are equal (or, if possible, negative). GHGs remain in the atmosphere for decades or longer, so we must find ways to reduce the elevated concentrations of these gases in the atmosphere to "roll back" climate change.[4] Various methods of carbon sequestration have been proposed as possible ways to remove carbon dioxide from the atmosphere. Some are attempting to draw CO_2 from the air to create graphene sheets used for various technological applications.[5] Others are looking to use CO_2 in the water to create calcite, which then draws more CO_2 into the ocean and out of the atmosphere.[6] However, one of the most effective solutions already exists all around us: trees! As a part of photosynthesis, most terrestrial plants absorb CO_2 to produce food. It is estimated that 25% of our carbon emissions have been captured by Earth's forests, grasslands and farms.[7] Planting new trees and protecting our existing forests will play a large role in combating climate change.

At the NIH, much of the effort to combat climate change will start with executive orders and other forms of legislation. There have been multiple executive orders in the past year that address climate change (such as EO 13990). These orders will provide guidance to the NIH for accomplishing the required goals in environmental areas related to climate change like greenhouse gas emissions, energy use and fleet management. Legislation and regulations placed on residential, commercial and industrial areas are also likely to heavily influence climate change in the coming years, both at the NIH and in all of our personal lives. However, legislation is only the beginning of how we fight climate change. An equally important part of this fight is that we change our mindset to place the environment at the forefront of our actions. New laws and products will give us many more opportunities to benefit the environment in the coming decades, but they will not be effective unless we embrace them. An open mind to change and a mindset centered around the environment will allow each of us to fight climate change in the present and future!

SPOTLIGHT

Club RML Improves Its Community Garden

The Club RML Community Garden has received many upgrades since its inaugural year in 2019. Read the full article to learn more about this on-campus gardening space at RML.

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TAKE ACTION

How Much Energy Do Your Biosafety Cabinets Use?

October is Energy Awareness Month! To promote awareness of the energy consumption of lab equipment, we discuss the energy use of biosafety cabinets.

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NEMS TRAINING

Did you know? The average U.S. household uses approximately 29kWh per day, roughly the same amount as an old ULT freezer or 2 biosafety cabinets.[8] To learn more about energy use at the NIH, please visit the NEMS Training webpage to view a short (20 minute) NIH environmental awareness training video.

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