

In May of 2018, I had the opportunity to represent the Construction Management Department of the School of Architecture and Construction Management in Otzenhausen, Germany for the *Workshop on Global Issues*; this was a very educational experience. Several topics were discussed during this workshop such as deforestation, renewable energy, alternative energy, reduction of food wastes, water conservation, plastics within the water, especially oceans, and how Europe deals with some of these topics. Deforestation is a major concern because it is more than just the reduction of the supply of wood; it effects the climate conditions, geological conditions, crops, and animal life. Climate conditions change due to the reduction of plant growth which, causes there to be more dust storms, erosion, and droughts. With no under growth to maintain the moisture in the ground it becomes dry and dusty, which can cause heavy dust storms and droughts because the land cannot hold the water. Lack of trees prevents the ability for the ground to be held in place causing there to be heavy erosion problems. These problems are causing issues in the ability to grow crops and raise cattle and other animals. These effect the food supply making it difficult to feed the growing number of people. Many countries are making deforestation illegal and instead are requiring afforestation initiatives. Ending deforestation can decrease the level of CO₂ in the environment, there is an initiative to restore 50% of the forests.

Carbon dioxide levels and global warming are rising at an extreme rate beginning with the Industrial Revolution, but the most excessive rise began in the 70s. Since then the CO₂ levels have increased from about 335 ppm to 400 ppm. Scientist found a link to the CO₂ level and the increase in global warming and climate change. The rise in greenhouse gas emissions has caused a 3⁰C – 6⁰C change in temperature. This change is causing the rise in sea-level and melting glaciers and ice caps, and the reduction of tundra in the Artic these are not even the greatest danger. The greatest danger is to the food supply and drinking water. In order to have a good crop yield we need to reduce greenhouse gas emissions and the increase in the global average temperature. The increase in the global average temperature is causing 100 trillion liters of water to be evaporated leading to drought situations in the Mediterranean, southwestern North America, South Africa, and western Australia creating a reduction in the yield of crops. Another means of crop failure, these situations are going to cause such a struggle for food meaning hundreds of millions of people will be dying of hunger and thirst. Students need to be aware of the issues of increased CO₂ and the options they have for aiding in the reduction.

In order to reduce global warming by two degrees we are going to need to cut energy consumption by at least 50% by 2050 and increase the use of renewable resources by 80% - 90%. This means an increase in wind farms, solar farms, hydropower and biofuels. We are going to need to make use of all free space such as the tops of buildings and wall surfaces as a means of energy creation. As a part of the planet we need to find ways to increase the amount of power obtained by the renewable

methods. Universities need to offer more classes in sustainability issues and resolutions. They need to have more research and development on new and better solutions for reducing and creating energy.

For the protection of sea and ocean life, thus maintaining our food supply, we need to do something about the plastic situation. The ocean is becoming a sea of plastic garbage. This plastic is breaking down into microplastics and getting into our food supply. We need a means to collect it and bring it in for recycling and begin using products that do not have plastics in them. Along with this we need to as a society push for industries and restaurants to stop using plastics, especially ones that are one-time use.

When looking at the Global Goals for Sustainable Development chart it shows that zero hunger is at the top of the list of importance. This is a problem when climate, global warming, CO₂, and plastics are affecting our food supply. Another big problem is just the waste of food, restaurants just disposing of excess food, purchasing too much food and allowing it to go to waste. We need to educate our students on the importance of finding ways to use this food for feeding the hungry. Maybe some of the sustainable chapters and clubs at the university could come up with a schedule where they could take the excess food from the cafeteria and donate it to surrounding organizations in need of food. Another good thing would be to use more fresh grown vegetables.

Based on the information obtained at the workshop I think we as a university need to work together to increase the student's knowledge on the destruction we are doing to our planet and the need for changes. Along those same lines we need to educate them on ways to improve their thoughts and actions in the usage of energy, water, materials, and food. For the area of construction management, it is important for them to know how materials are made and from what materials so they can use materials that are better for the environment.

As far as the classes that I teach, construction documents, mechanical and electrical, and building codes it is important that I take the knowledge that I obtained and integrate it into the knowledge I am bestowing to the students. In the construction documents class, we will look at the types of sustainable options in the construction field including building materials. As part of this lesson we will look into plans that are using sustainable options and how they are incorporated into the project.

In the mechanical and electrical class, we will begin by discussing what type of features would be best to include in the construction process in order to reduce energy consumption, CO₂ and greenhouse gas emissions. This will be done through a lesson on renewable energy. We will discuss the various options and then they will have to do a project on what options are best to use in the plans given. They can include new technology that has not come out yet but is in the research stage. The project will include adding this technology to the construction documents.

For the building codes class, I will discuss the Sustainable Development Goals chart, LEED v4, and the new WELL certification along with several other certifications that apply to materials, seafood, volatile organic compounds, and energy efficiency. They will need to incorporate these into their final project. We will also discuss the various foreign certification processes and compare them with the United States. Several of these certification credits apply to the Sustainable Development Goals. This will give them an understanding of the importance of these goals and how they can be incorporated into a building design.

In all of the classes, I will add a series of lectures on sustainable concerns the worldwide such as items like refrigerants that are being banned by the Montreal Protocol to determine if countries agree with the protocol or if they think that more refrigerants should be included. Other lectures would be on the water issues in the United States and worldwide along with deforestation issues. I would also like to work with other departments to allow the students to get a broader perspective of the importance of the sustainable issues.