

Global Challenges and Sustainable Futures

Student Led Session

Climate Change and the Future of Energy



Group 2

Fall 2018



CASE 1: Simris: Sweden's 100% Renewable Microgrid for the rural community

100% Renewable Energy being used for the rural community in Simris (BACKGROUND)

The local town of Simris in south of Sweden due to the harsh weather, trees falling on the overhead power lines results in the town being disconnected from the power grid. The conventional way of supplying the electricity is through diesel generators in case of such an emergency. However, the use of diesel generators means increase in carbon emissions which is not sustainable. Reliable solutions for the problem comes down to the use of Renewable Energy in the small microgrid providing the residents with a continuous electricity supply.

Moving forward: (PROBLEM DEVELOPMENT)

The solution provided by the large European electricity utility company E. ON., was to feed the 150 homes in the area with a continuous supply of electricity consisting of 500 kW wind energy and 442 kW of solar energy. Moreover, battery storage systems and backup diesel generators are provided.

The system works on islanding mode where it is disconnected from the grid and is fed through Solar and Wind power plants. One of the major flaws in this case is the intermittency of renewable energy sources which in turn can hamper the continuous supply of electricity to the residents. Industrial batteries integration to this system is desirable which will help in eradicating such problem. Also, the inclusion of solar panels on the rooftops and battery storage systems in the homes supporting the microgrid is being worked upon.

In this context we ask: (DISCUSSION QUESTIONS)

- Do these practices justify the steps taken towards the reduction in the Carbon emission? (PEOPLE AND PRIVILEGE)
- Taking into consideration the huge investment that should be made for such a system, are there some ways with which the cost and installation of such system be reduced? (TECHNOLOGY)
- How can the investment in such a system be justified if the general population of the country is already privileged enough to have in our case electricity supply and instead this investment can be made in parts of the world where the general population is struggling with lack of electricity to light their homes? (GLOBAL JUSTICE)
- How can we inspire the general public using such cases to increase the share of renewable energy in the power systems across the country? For example: Recently, there was a huge movement to stop the installation of Offshore Wind Power just because it causes an unpleasant visual impact. Also, in this example, the Offshore Wind installations were 30 miles off-shore. (STATUS QUO OR CHANGE)
- How could the Simris Project be developed so as to support the Sweden-2030 fully renewable energy goal? Sweden wants to be the first country to go fully renewable by the year 2030. (POWER)



CASE 2: China: Revolution in Public Transport System

China is adding a London-sized electric bus fleet every five weeks (Background)

Due to the rise in Carbon emissions across the globe, reduction in the generation and emissions of CO₂ and other harmful carbon compounds is a priority. There are various ways to tackle this problems and the use of Renewable Energy is one of them. However, energy storage solutions are also one of the favorable solutions and electric vehicles come under such case because we can store the energy in the electric cars and use it when the demand increases. One of the major steps taken by China is increasing the number of Electric Vehicles for public transport which in turn will reduce the carbon emissions from this sector.

Moving forward: (PROBLEM DEVELOPMENT)

As impressive as it sounds, China is leading the world in Carbon emissions and also the raw materials required for the construction of the Electric Vehicles which are going to be used for public transport comes from controversial practices in the mining industry of the country. Child labor and below par working conditions are still major problems in the working class responsible for the mining of the minerals. Nearly 75% of Lithium and 20% of Cobalt reserves in the world are in China and as the demand of these minerals increases, the exploitation of the general population living in the area also increases quite a lot.

In this context we ask: (DISCUSSION QUESTIONS)

- Do these practices justify the steps taken towards the reduction in the Carbon emission? (PEOPLE AND PRIVILEGE)
- Taking the use of electrical vehicles as the first step to make our transportation sustainable, what other issues need to be addressed to reach a fully sustainable model of transportation?
- How does technology play a part in the public transportation sector and how can it reach a sustainable system level? (TECHNOLOGY)
- How can the mining of these required minerals be done in a way that it doesn't create situations which result in child labor practices and unacceptable working conditions? (GLOBAL JUSTICE)
- Is the inclusion of Electric Vehicles in the public transport sector the only step which could have been taken to fight climate change? (STATUS QUO OR CHANGE)
- How can the government incentivize the usage of electric vehicles in not just the public transport sector but also motivate the society to use electric vehicles? (POWER)