G20

MetMUNC XLVIII

Topic: Energy Efficiency

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Energy efficiency is defined as the goal of reducing the amount of energy required to provide the same products and/or services. Energy efficiency has the ability to implement wide-ranging benefits to a country: reducing greenhouse gas emissions, reducing demand for energy imports, and lowering costs on a household and economy-wide level. This mentality is often the cheapest, and fastest, way to reduce the use of fossil fuels. Renewable energy technologies can best accomplish these objectives, but there are enormous opportunities for efficiency improvements in every sector of the economy, broken down into subcategories relating to building design, community planning, vehicles, and human behavior.[1] Building designers constantly seek to incorporate renewable energy and optimize building efficiency technologies. Heat and power systems are being merged together in order to capture waste heat from power plants. Neighborhoods are being created to reduce the necessity of private transportation, and large car conglomerates are requiring less fuel to cover longer distances. Human behavior, the final element, is the most varied, as it depends on the region of the world and the country. This is due to differences in natural resources, energy consumption practices, and technologies.

In terms of natural resources, many nations use inefficient and dangerous forms of energy production, harming the environment and the well-being of the planet. One of the most common

[1] https://www.eesi.org/topics/energy-efficiency/description

ways to produce energy throughout the world is the combustion of coal. However, these coal plants can have detrimental effects on the human body, as people who work within them have a statistically higher chance of contracting diseases in the heart and lungs as well as brain damage. Coal plants release gases and vapors containing heavy metals such as mercury, lead, and sulfur dioxide, which can affect the kidney, nervous, and respiratory systems of the people in their vicinity. More immediate health impacts can range from breathing difficulties, to brain damage, and even premature death.[2]

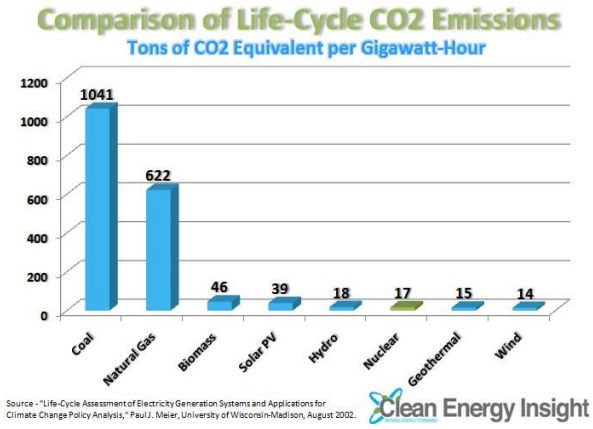


Figure 1: This study, conducted by officials at the University of Wisconsin-Madison, illustrates the numbers of tons of carbon dioxide produced per gigawatt-hour of various natural resources.

However, there are many safer alternatives to replace these devices.[3] Many countries in Europe have replaced coal plants with wind turbines. These convert kinetic energy from the wind to usable energy, a process that is significantly more efficient. It is also beneficial because wind is not finite, as opposed to the massive quantity of coal used in this process. However, this device costs $1.3 million per megawatt, while a coal plant costs just $5,500 per megawatt. Also, storage technology is undeveloped, and in times of low wind, these devices can be rendered useless. Additionally, solar energy has seen a peak in usage in recent years as a renewable energy source that has seen little to no harmful effects on the environment. However, storage limitations also prevent solar power from being a principal energy choice across the world. The issue of energy efficiency is a

[2] https://www.ucsusa.org/resources/coal-power-impacts

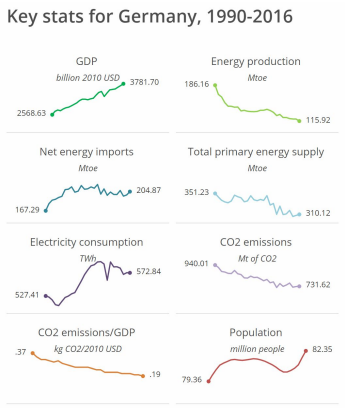
[3] https://www.windpowerengineering.com/worlds-first-floating-wind-farm-delivers-promising-results/

complicated one that could be looked at through a variety of lenses. For example, civil engineering of buildings and bridges uses an abundance of energy. Additionally, motor vehicle pollution is a significant contributor to the issue at hand. [4,5]

Energy-Progressive

Many developed countries support the movement towards energy efficiency and have been proactive in their efforts to become more efficient. Some of the most energy efficient nations are Japan, Germany, and Australia.

Germany is one of the G20 countries with the highest levels of energy efficiency. Between 2000 and 2017, Germany became 25% more energy efficient, mainly because of citizen participation in efficient energy measures and the substitution of electricity from nuclear energy and fossil fuels with electricity from renewables.[6] In September 2010, the federal government adopted the Energy Concept, a strategy for a long-term integrated energy pathway to 2050, that was later accelerated to attempt to phase-out of nuclear power by 2022.[7]They began by closing eight of their oldest plants which, resulted in the adoption of a new policy that determined renewable energy as the cornerstone of future energy supply. They have successfully decreased their CO2 emissions and energy production from fossil fuels, while also increasing their GDP.



[4] https://ipeec.org/en/bulletin/19-argentina-makes-fast-strides-on-energy-efficiency.html
[5] https://www.energy.gov.au/government-priorities/energy-productivity-and-energy-efficiency
[6] https://www.odyssee-mure.eu/publications/efficiency-trends-policies-profiles/france.html
http://www.worldwatch.org/energy-transitions-ge-us

[7] https://ec.europa.eu/energy/en/topics/energy-efficiency
https://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-germany.pdf

Australia has made major reforms in the development of renewable energy that include acts such as the National Energy Productivity Plan. This aims to improve Australia's energy productivity by 40% between 2015 and 2030. This outlines ways to reduce greenhouse emissions, and support better energy use in buildings, equipment, and vehicles. The Australian government has also implemented an energy rating label system in which products are graded on their energy efficiency before a consumer buys them. The theory is that the consumer will buy the more efficient product so that their electricity bill is lower. Finally, in the realm of vehicular efficiency, through the Emissions Reduction Fund businesses can earn carbon tokens by producing more low-emission vehicles, or ones with renewable fuel sources.

In both Germany and Australia, attempts to increase energy efficiency through citizen education and participation, government run energy efficiency plans, and government incentivised programs have been successful. [8,9,10] However, although these countries were successful in their efforts, it should be considered that neither of these nations have an economy dependent on oil exports, and many of their citizens have access to media where they can be educated to partake in the movement towards energy efficiency.

Non-Energy Progressive

Other countries are not very proactive in their attempts to be more energy efficiency or they have been unsuccessful in their attempts.[11] Some of these countries include South Africa, [12,]

[8]http://www.eec.org.au/news/eec-news/article/australia-ranks-worst-for-energy-efficiency-in-developed-world
[9] *https://www.energy.gov.au/government-priorities/energy-productivity-and-energy-efficiency*
[10]http://www.eec.org.au/news/eec-news/article/australia-ranks-worst-for-energy-efficiency-in-developed-world
[11] https://www.eia.gov/beta/international/analysis.php?iso=KOR
https://breakingenergy.com/2014/08/01/the-curious-case-of-russian-energy-efficiency/
https://www.iea.org/countries/Japan/
[12] https://www.iea.org/topics/energyefficiency/e4/indonesia/

[13]Indonesia, Saudi Arabia, Russia, Mexico, and India. [14]Some of these countries, like Saudi Arabia, Indonesia, and Russia, have economies that are almost entirely dependent on the export of biofuels, which may be the reason why their governments have made very few policies attempting to increase their energy efficiency, as it would potentially destroy their economy without proper planning. [15]Other nations do not make an effort to become more energy efficient because it is too expensive and don't have the resources to do so, or they just don't want to move away from fossil fuels.

Other nations have created some policies that have increased energy efficiency in certain areas, but in these nations, and many others, the laws target energy expenditure in sectors that are not using the most energy.[16] For example, some governments have set numerous regulations on buildings, and lack regulations on industry which contribute the most to the country's energy consumption.

Countries like South Africa have created plans to increase their energy efficiency, but they have had difficulties convincing their citizens to get on board.[17] Additionally, Australia is not as energy efficient as it seems. It has been reported that Australia's National Energy Productivity Plan which aims to improve energy productivity by 40 percent between 2015 and 2030, but said that implementation of the plan has been slow. So, some countries have the appearance of being energy efficient, but they may not be so.[18]

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[13] https://energypedia.info/wiki/Indonesia_Energy_Situation

[14] https://www.iea.org/policiesandmeasures/pams/saudiarabia/name-147402-en.php

[15]

[16]

[17] https://www.iea.org/topics/energyefficiency/e4/southafrica/
https://www.gov.za/about-government/national-electricity-efficiency-programme-0
https://www.gov.za/sites/default/files/gcis_document/201612/40515gen948.pdf

[18] https://library.e.abb.com/public/557d50223ed20a76c1257beb0044f3bc/South%20Korea.pdf
http://www.worldwatch.org/node/6212
https://www.epa.gov/energy/national-action-plan-energy-efficiency

Possible Solutions:

The G20 committee has the potential to improve energy efficiency, if the delegates choose to do so. The G20 could make both long-term and short-term plans to either cut down on the use of fossil fuels and increase the use of biofuels, or a plan to get individual citizens involved in the member nations to help increase energy efficiency.

Some possible solutions include:

- Led lights: LED Lights are a highly efficient form of lighting technology. They use 75% less energy than traditional light bulbs, and last longer. [19]

Energy efficient appliances:

- Insulation: The U.S Environmental Protection Agency (EPA) agrees that adding insulation to air leaks helps save 20% on monthly energy bills. 56% of energy used in a home supplies heating and cooling. [20]
- Energy Rating Labels: a label set on various appliances to show consumers how energy efficient their product is, and to compare it with other models. It also informs them about what they are using and how much energy it uses. Countries such as Australia and New Zealand have adopted this model.[21]

Moving towards a less fuel dependent economy:

- This could be applicable in the production and the usage. This may not be attainable for all nations and may hurt the economy of those nations so delegates should consider those issues before attempting to implement this..

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[19] https://www.energy.gov/energysaver/save-electricity-and-fuel/lighting-choices-save-you-money/led-lighting
[20] https://www.whysprayfoam.org/homeowners/efficiency/
[21] http://www.energyrating.gov.au/about/what-we-do/labelling

Shutting down old nuclear power plants:

- Germany has done this slowly while replacing those plants with other renewable forms of energy like wind and water.

Summary:

Something to note is that recently in the more developed countries of this committee, a trend of decreased energy consumption of the general public has occurred, likely due to increased awareness of extreme energy usage in civilians, government outreach, and the development of more energy efficient appliances. However, the opposite is true for industry. In numerous countries, including South Africa and Germany, industry continues to be the leading energy consumer, and government regulation has been far less effective in this area than in others in reducing energy consumption. Other nations have bigger issues with other areas of energy consumption, but industry is a major unsolved problem for multiple countries and should be taken into serious consideration.

Questions to Consider:

1. Where does your country use the most energy? Residential buildings? Industry? Agriculture? Something else? Why?
2. Does your country have regulations in place to reduce energy expenditure for each of these areas?
3. How effective have previous efforts to reduce energy usage in your nation been?
4. What methods have been effective and ineffective in improving energy efficiency in your country?

5. Does your country support and/or prioritize the movement to reduce energy usage to save resources and the environment?
6. What methods has your country used to effectively become more energy efficient, and that other countries might be able to adopt?

Helpful Links:

https://www.iea.org

https://www.eia.gov/

https://www.odyssee-mure.eu/publications/efficiency-trends-policies-profiles/

https://aceee.org/sites/default/files/publications/researchreports/e1602.pdf