COMMITTEE GUIDE

UNCSTD

United Nations Commission On Science And Technology For Development

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1. Presidents' Letter

Dear Delegates,

Welcome esteemed delegates to CCBMUN XXI and to the United Nations Committee on Science and Technology for Development (UNCSTD). It is with great pleasure that we, Antonio Suárez and Luis Enrique Robles, seniors at Colegio Bolivar, assume the role of presidents for this distinguished committee. Our journey in Model United Nations has been one of dedication and passion, with Antonio's involvement spanning since sixth grade and Luis Enrique's since seventh grade. Over the years, we have accumulated invaluable experience, having participated in a variety of committees and amassed over ten models each. Today, we stand before you as presidents, excited to embark on this new chapter and share our expertise.

UNCSTD holds a special place in our hearts, as it embodies originality both in its approach and subject. It provides a platform for delegates to explore complex issues and tackle them through innovative and demanding means. We have long admired the committee's capacity to encourage creative thinking, problem-solving, and substantive debates. Now, as your presidents, we aim to utilise our extensive background as delegates to create an exceptional experience for all of you.

We understand that navigating a Model United Nations conference can be both challenging and rewarding. Therefore, we want to emphasise our commitment to supporting and guiding you throughout your journey in the UNCSTD Committee. Whether you have questions about the topics at hand, require assistance with understanding your country's position, or need any other form of guidance, we are here for you. Our role is to foster an inclusive and collaborative environment that enables fruitful discussions and effective resolution-building. Together, let us forge ahead with a shared determination to excel. We aspire to create an atmosphere where knowledge is deepened, diplomatic skills are honoured, and personal growth is key. Once again, welcome to CCBMUN XXI and the UNCSTD Committee. Let us embark on this exciting journey together, united by our shared dedication to promoting science, technology, and development on a global scale.

If you have any doubts, or questions, or are just looking for advice, we will always be happy to help. You can contact us through the committee email or through our mobile numbers 3024649492 (Luis Enrique) or 3162743494 (Antonio). Good luck delegates!

Yours sincerely,
Luis Enrique Robles & Antonio Suárez (UNCSTD Chair)
uncstd@ccbcali.edu.co

2. Introduction to the Committee

I. Overview

Welcome to the United Nations Commission on Science and Technology for Development (UNCSTD) at CCBMUN XXI! In this committee, we will explore the important relationship between science, technology, and development. Our goal is to address urgent global challenges and find creative solutions that promote sustainable development worldwide. Get ready for dynamic discussions, problem-solving, and policymaking as we tap into the power of science and technology for a better future.

II. Historical Context

The United Nations Commission on Science and Technology for Development was established in Vienna in 1979. In 1992, the General Assembly decided to transform the Committee into a functional commission of ECOSOC and to set up the CSTD. This committee was established with 3 main goals in mind: to guide the future work of the United Nations; to develop common policies; and to agree on appropriate actions for the future. CSTD is described as the forum that helps ask and frame the critical issues influencing the fields of science and technology today. In this committee, different countries can raise critical challenges and explore opportunities presented by rapid technological development. It is also a place where developing countries are encouraged to be part of the development of new technologies.

III. Mandate

The UNCSTD's main aim is to use science and technology to promote inclusive and sustainable development. We encourage international cooperation, sharing of knowledge, and capacity-building to tackle the complex challenges faced by nations at different stages of development. Through bridging the digital divide, fostering innovation, and promoting ethical practices, we strive to create a fair and prosperous future for everyone.

UNCSTD is important because it is essential for the sustainable development goals to be completed, as technological advancement is crucial for the development of most of the objectives. The United Nations Commission on Science and Technology for Development meets annually for a period of one week in Geneva, Switzerland. Its members are composed of national governments, specifically forty-three member states, that are elected by the Economic and Social Council for a term of four years.

In conclusion, as we embark on this Model United Nations journey within the UNCSTD committee, we hold the power to shape the future. Let's work together, guided by collaboration and innovation, to harness the potential of science and technology for sustainable development. Welcome to CCBMUN XXI's UNCSTD committee, where our goal is to build a brighter and more equitable future for all nations and peoples.

3. Topic 1: *The Implementation of Advanced Military Technologies in Modern Day Conflicts*

I. History/Context

The integration of advanced military technologies in modern conflicts has undergone significant historical evolution. From the introduction of tanks, aircraft, and chemical warfare in World War I and II, to the Cold War era's nuclear deterrence and space exploration, technological advancements reshaped warfare. The Gulf War marked a turning point, showcasing precision-guided munitions and stealth capabilities. In the 21st century, conflicts have been shaped by drones for reconnaissance and strikes, cyberwarfare for espionage and disruption, and ethical concerns surrounding autonomous and information warfare. (XYM 2022) These technologies have not only changed the way wars are fought, but have also introduced new dimensions of conflict and ethical considerations.

Figure 1: *Kott, A. The future of war technology (2022, December 3)*

The rapid progression of military technologies has yielded transformative outcomes. Advanced surveillance, intelligence systems, and non-lethal weapons have augmented capabilities on the battlefield. Simultaneously, the digital age brought cyberattacks and

information warfare, highlighting the significance of not only physical, but also virtual battlegrounds. As technology continues to advance, its application in conflicts will likely become more intricate, demanding international dialogues on ethical boundaries and global security implications.

Advanced military technologies have rapidly transformed the landscape of modern warfare, introducing new capabilities and challenges for military forces around the world. The globe has experienced a paradigm shift in the nature and conduct of armed conflicts in an era marked by fast technological breakthroughs.

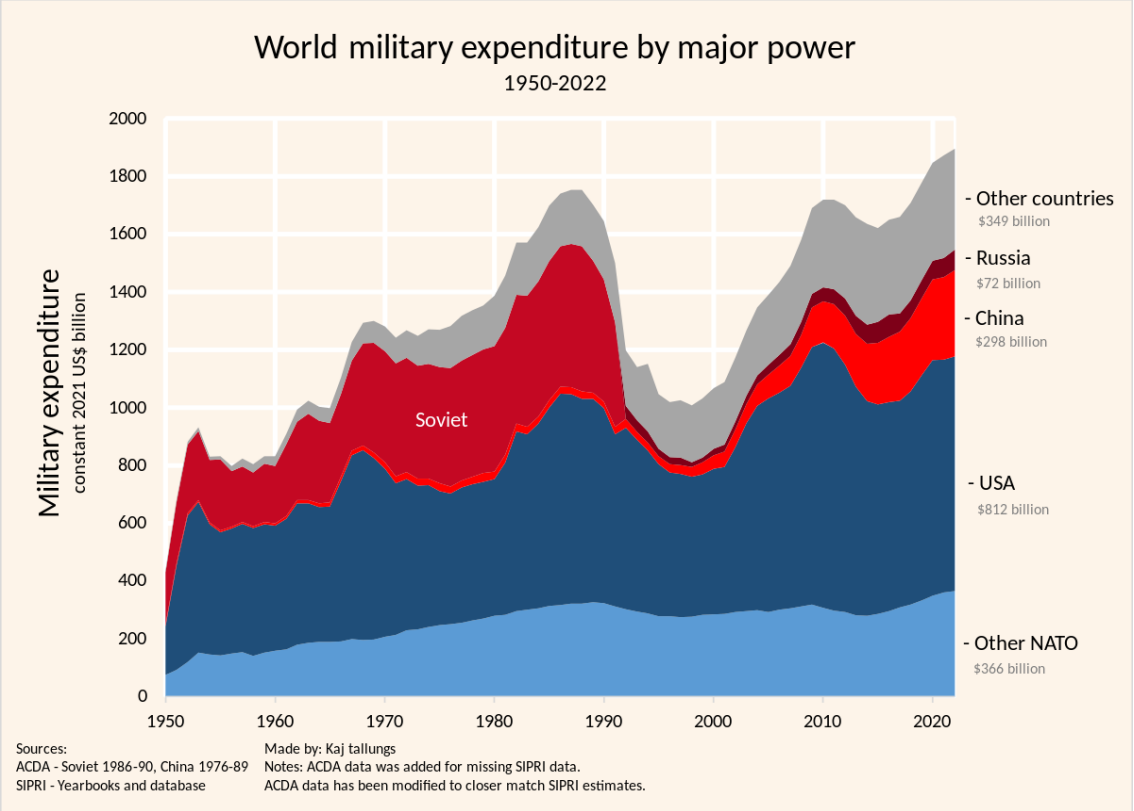

***Figure 2**: Ali, A., & Rao, P. World Military Expenditure (2022, May 15)*

Revolutionary advances in military technology, including drones, cyberwarfare, and directed energy weapons, have reshaped military forces throughout the world's strategy and capabilities. These cutting-edge innovations present us with a complicated web of concerns

that need educated and diplomatic conversations. Let's explore some specific examples of these groundbreaking technologies and their impact on contemporary conflicts:

Drones

Drones, also known as Unmanned Aerial Vehicles (UAVs), have become a prominent feature in modern military operations. An illustrative example is the use of armed drones by various countries in the fight against terrorism. These drones are employed for targeted strikes against high-value terrorist targets in remote and hard-to-reach areas. While their precision has been praised for minimising civilian casualties, controversies arise from the lack of direct human involvement and concerns about potential violations of international law. (Saab 2022)

Another example is the widespread use of surveillance drones for intelligence gathering. Military forces utilise drones to monitor enemy movements, assess potential threats, and gain a tactical advantage on the battlefield. However, the extensive use of surveillance drones also raises privacy concerns and questions about the scope of such monitoring activities.

Figure 3: *Surveillance drone Hay Newman. (2019, June 20)*

Cyberwarfare

Cyberwarfare has emerged as a powerful tool for both state and non-state actors to gain an advantage in conflicts. One significant example is the Stuxnet virus, which targeted Iran's nuclear facilities. Stuxnet, believed to be a collaborative effort by intelligence agencies, demonstrated the potential for cyberattacks to sabotage critical infrastructure and hinder a nation's nuclear capabilities. (*Biggest Cyber Security Challenges in 2023 - Check Point Software.)* Additionally, cyberwarfare has been employed in disinformation campaigns and election interference. For instance, allegations of foreign entities attempting to influence electoral outcomes through cyber operations have raised serious concerns about the integrity of democratic processes.

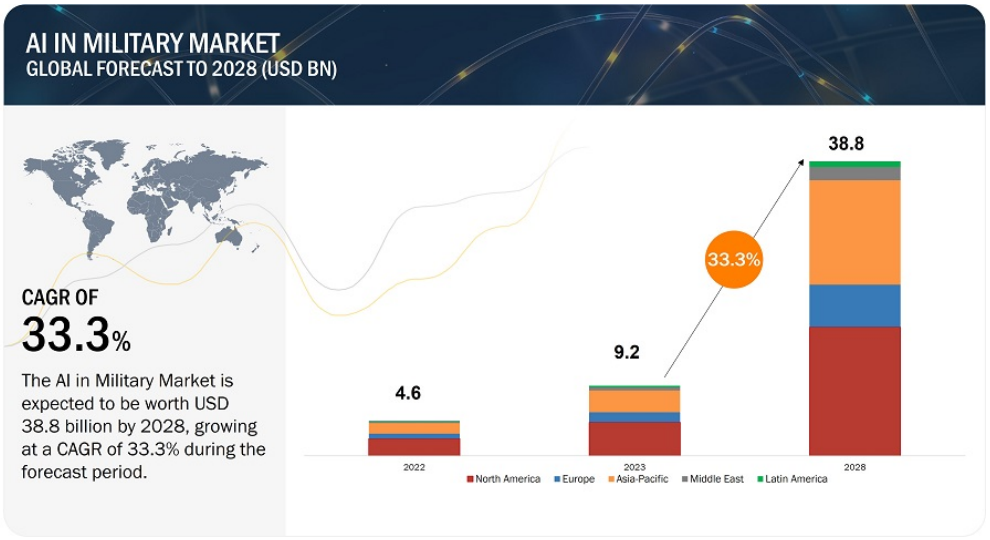

***Figure 4**: Artificial Intelligence (AI) in Military Market Size Growth Opportunities Industry Trends and Analysis 2030. (2023).*

Precision Strike Capabilities

Precision strike capabilities have revolutionised modern warfare, offering military forces the ability to precisely target enemy assets with high accuracy and reduced collateral damage. These advanced technologies utilise sophisticated guidance systems, precision munitions, and real-time intelligence to hit specific targets with precision and efficiency. By minimising the risk of civilian casualties and damage to non-military infrastructure, precision strikes aim to uphold international humanitarian law and reduce the human cost of armed conflicts.

However, despite the undeniable advantages of precision strike capabilities, the risk of collateral damage remains a significant concern. Unintended consequences, such as civilian casualties, damage to critical infrastructure, and the displacement of civilian populations, can occur even with the most precise weapons. Factors such as inaccurate intelligence, human error, or rapidly changing battlefield conditions can influence the outcomes of precision strikes and increase the risk of unintended harm. (USMP 2023)

Autonomous Weapon Systems

Autonomous Weapons Systems (AWS) represent a groundbreaking advance in military technology, introducing the prospect of machines making life-and-death decisions on the battlefield without direct human intervention. (CIA 2023) The emergence of AWS has sparked profound ethical dilemmas and ignited intense debates among policymakers, military experts, and the broader global community. On the one hand, proponents argue that AWS could enhance military efficiency, reduce casualties, and provide a strategic advantage in the face of evolving threats. On the other hand, the prospect of delegating lethal decision-making to machines raises significant concerns about accountability, transparency, and adherence to international humanitarian law. The lack of human judgement and empathy in AWS's decision-making processes poses a grave challenge, as it may lead to unintended consequences and violations of fundamental ethical principles.

Directed Energy Weapons

Directed energy weapons represent cutting-edge military technology with promising applications. An example is the development of laser weapons for missile defence systems. These weapons use directed energy to intercept and neutralise incoming ballistic missiles, offering a potentially cost-effective and efficient defence against aerial threats. In the maritime domain, directed energy weapons are being explored as a means to counter small boat threats and drones that may pose a risk to naval assets. These weapons have demonstrated their capability to disable or destroy targets swiftly and precisely. While directed energy weapons show great promise, there are concerns about their potential misuse and the long-term effects on both military personnel and civilians. Striking the right balance between advancement and ethical considerations is crucial in their deployment.

To find out more about the different types of directed energy weapons, use the following

[Directed energy weapons 2023]

Figure 5: *Directed Energy Weapon Market Opportunities, Drivers, Challenges, Scope, Share, & Analysis By 2029.* (2022).

We have a rare chance in this committee to discuss the ethical, humanitarian, and security aspects of using new military technology. Maintaining international humanitarian law concepts like distinction, proportionality, and military necessity is critical as we traverse the complexity of using new technologies responsibly in armed situations. The above instances demonstrate the complex influence of improved military technology on modern-day wars. While these technologies provide unrivalled benefits in terms of accuracy, efficiency, and reduced human danger, they also present significant ethical, humanitarian, and security issues.

II. Current Situation

In today's world, the implementation of advanced military technologies such as drones, cyberwarfare, directed energy weapons, autonomous weapon systems, and precision strike capabilities has significantly impacted modern conflicts, shaping the ways nations engage in

warfare. In ongoing conflicts such as the Syrian civil war, drones have played a vital role in intelligence gathering and targeted strikes. Armed drones have been utilised by various actors, including the United States, Israel, and Russia, to target terrorist elements, rebel groups, and high-value individuals. However, the use of drones has also faced criticism because of the number of civilian casualties and the potential violations of sovereignty when deployed in countries without explicit consent.

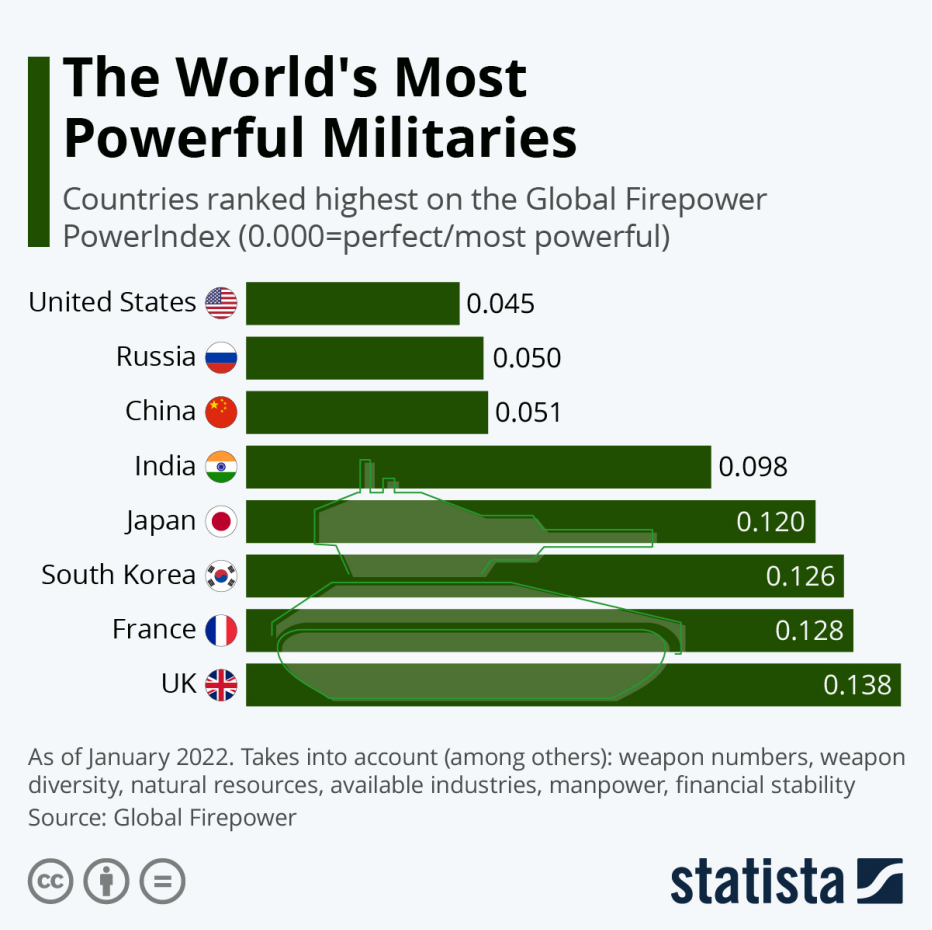

Figure 6: *Armstrong, M. (2022, January 14). Chart: The World's Most Powerful Militaries.*

Cyberwarfare has become a prominent tool in conflicts across the globe. For example, cyberattacks have been employed as part of a hybrid warfare approach in the context of the ongoing Russia-Ukraine conflict. Cyber operations have targeted critical infrastructure, disrupted communication networks, and spread disinformation, causing both financial and political implications. Nations have been investing heavily in cybersecurity to protect their assets from such attacks, while also developing their offensive capabilities.

While not widely deployed in active conflicts, directed energy weapons continue to be researched and developed by major military powers. In potential future conflicts, these weapons may change the dynamics of warfare significantly. (R*eport to Congress on Emerging Military Technologies - USNI)* They could offer faster response times and reduced collateral damage, making them attractive options in specific scenarios. However, ethical concerns surrounding their use, as well as technical challenges in scaling up and deploying DEWs on the battlefield, remain obstacles to their widespread adoption.

Figure 7: *Roberts, R. (2022, December 29). YEAR IN REVIEW: Soldiers take next steps, preparing for future fight*

The development and deployment of autonomous weapon systems have raised substantial ethical questions. For instance, the ongoing conflict in Yemen has seen the use of drones with varying degrees of autonomy. Human Rights Watch and other human rights organisations have expressed concerns about potential war crimes when such systems are used with limited human oversight, leading to concerns over the development of an international legal framework to govern their use. *(OCHOHR Preventing Torture 2023)*

Precision strikes have become a defining feature of modern conflicts, evident in conflicts like the Israeli-Palestinian conflict. Both sides have employed precision-guided munitions to target specific military assets, terrorist leaders, and launch sites. While precision strikes offer advantages in reducing civilian casualties, there are also challenges in identifying legitimate military targets and the potential for unintended escalation, especially in densely populated urban areas.

The implementation of advanced military technologies in today's conflicts has brought both advantages and challenges. As technology continues to evolve, it becomes increasingly crucial for nations to address the ethical implications, establish international norms, and ensure accountability to mitigate potential harm and ensure responsible use on the battlefield.

III. Key Points of the Debate

- **Ethical concerns:** The implementation of advanced military technologies, like drones, cyberwarfare, and directed energy weapons, sparks debates about the ethical implications of remote warfare and the potential for increased civilian casualties and collateral damage.
- **Precision and accuracy:** Advocates argue that these technologies offer improved precision and accuracy in targeting enemy assets, minimising unintended harm to civilians and infrastructure during modern-day conflicts.
- **Strategic advantage:** Supporters emphasise that integrating advanced military technologies provides a strategic advantage, enabling nations to deter potential adversaries and protect their interests more effectively on the global stage.
- **Escalation risks:** Critics worry that the proliferation of these technologies may increase the likelihood of conflicts by reducing the perceived costs of engagement, potentially leading to unforeseen escalations in modern warfare.
- **Cybersecurity vulnerabilities:** The use of cyber warfare raises concerns about the vulnerability of military infrastructure and sensitive data to cyberattacks, prompting discussions about the need for robust cybersecurity measures.
- **Lack of human judgement:** The automation of certain military tasks, such as drone strikes, raises questions about the diminishing role of human judgement in critical decision-making processes during conflicts.

- **Arms control and proliferation:** The emergence of advanced military technologies accentuates the importance of international cooperation and arms control agreements to manage the proliferation and misuse of such capabilities.
- **Economic investment:** The development and deployment of these technologies demand significant financial investment, leading to debates on prioritising military spending over other societal needs and economic considerations.

IV. Guiding Questions

1. What research and development has your country done into advanced military technology, if any?
2. What advanced military technology has your country bought/sold for use in current or potential conflicts?
3. Has your country been negatively affected in any way by advanced military technology?
4. How does the implementation of these technologies impact civilian populations in conflict zones? What is your government's position on the ethical issues of this type of technology being used against civilians?
5. How can nations ensure responsible use and prevent these technologies falling into the hands of non-state actors? If your country sells weapons, how does it ensure they only go to legitimate governments? If your country buys these weapons, how does your government ensure that they are not stolen or sold to non-state actors?
6. How does your government think that advanced military technologies affect the balance of power between developed and developing countries?
7. What steps can be taken to address the potential misuse of advanced military technologies, such as drones, by state and non-state actors?
8. How can international norms and agreements be developed to govern the use of advanced military technologies, considering the rapid pace of technological advancements?

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Figure 1: *Kott, A. (2022, December 3). The Future of War Technology Whispers to Us From the Past, and We Must Listen Better. War on the Rocks.* *https://warontherocks.com/2019/12/the-future-of-war-technology-whispers-to-us-from-the-past-and-we-must-listen-better/*

Figure 2: *Ali, A., & Rao, P. (2022, May 15). Mapped: The World's Top Countries for Military Spending. Visual Capitalist.*
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Figure 3: *Hay Newman, L. (2023). The Drone Iran Shot Down Was a $220M Surveillance Monster. Wired.com.*
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Figure 4: *Artificial Intelligence (AI) in Military Market Size Growth Opportunities Industry Trends and Analysis 2030. (2023). MarketsandMarkets.*
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Figure 5: *Directed Energy Weapon Market Opportunities, Drivers, Challenges, Scope, Share, & Analysis By 2029*. (2022). Data Bridge Market Research.
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Figure 6: *Armstrong, M. (2022, January 14). Chart: The World's Most Powerful Militaries. Statista. https://www.statista.com/chart/20418/most-powerful-militaries/*

Figure 7: *Roberts, R. (2022, December 29). YEAR IN REVIEW: Soldiers take next steps, preparing for future fight. Army.mil.*
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4. Topic 2: *The potential of renewable energy sources to drive economic growth and promote sustainability*

I. History/Context

Even though the creation of renewable energy sources seems very new, they have existed for thousands of years. Renewable energy is an energy source that can be used repeatedly because it naturally regenerates itself, unlike fossil fuels. Although it is unclear which was the first renewable energy source in history, records in Europe over two thousand years ago, in the year 200 BC, show a simple form of hydroelectric power with the use of waterwheels. It was used by many civilizations like the Greeks, the Romans and the Chinese. This system turns running water into mechanical or electrical energy. The rotating wheel turns the kinetic energy into mechanics. It was used for agricultural activities like grinding wheat.

Similarly, windmills have existed since around 635 AD in the Middle East and Central Asia. However, the initial technology of windmills was perfected by the Netherlands in the 1590s when its use was at its heyday; windmills used blades and a rotor shaft, so that when the blades rotated in the wind, power was created. They were very effective and were mainly used to pump water and mill grain. This is why windmills are a huge part of Dutch culture.

The second era of investment in windmills came at the end of the 19th century when, in 1887, wind turbines were generating interest across Europe and the rest of the world. In 1888 Charles F. Brush invented a windmill that produced electric energy for a farm in Cleveland, Ohio.

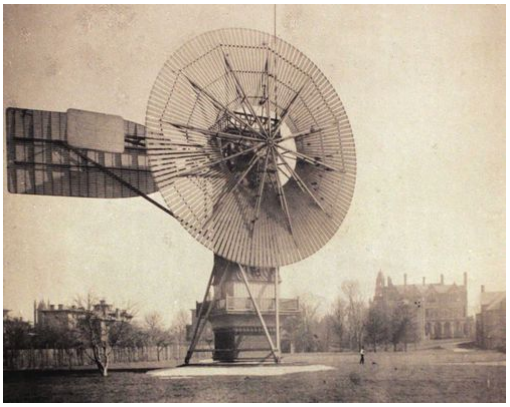

Figure 1: Krouse, P., clevel, & .com. (2011, August 11). *Charles Brush used wind power in house 120 years ago*

The success of wind turbines continued to grow so that by 1908 there were 72 wind turbines in Denmark, and by the 1930s they were spread across the United States. Nowadays, the recent interest in generating clean energy has increased their use exponentially. Currently, there are more than 341,000 wind turbines across the world which have helped produce 1,555,000 jobs.

Figure 2: Chiesa, L. (2011). *How can windmills create electricity if they're so often moving slowly?*

The other most popular type of renewable energy is solar energy, which is the most modern type of renewable energy, although very early civilizations such as the Egyptians, Romans, and Greeks used the sun as a tool to improve their well-being. For example, the Romans built south-facing windows in their bathhouses to collect sunlight and heat the water, the Egyptians used sunlight to evaporate water and cool their homes, and the Greeks used it to heat their homes in winter.

The development of solar energy as we know it today occurred in the 19th century. Since developing energy sources is so hard, there wasn't just one person that invented solar energy. However, the first big advance was made by Edmond Becquerel, a French physicist, who, at only nineteen years old, discovered that select matter generated an electric current when exposed to sunlight. Then, in 1873, Charles Fritts made the first prototype of what is now known as a solar cell, which created hope in the scientific community. However, it wasn't until 1954 that David Chapin, Calvin Fuller and Gerald Pearson invented a working solar cell. They patented their product in 1957, and this was the first documentation of working solar technology.

Technology kept developing in the following years, especially during Jimmy Carter's presidency and, in 1981, in California the first large scale solar plant was built using 1,818 mirrors that reflected sunlight into a receiver which used heat to run a generator (Zagame et al., n.d.). Solar energy actually produces 4.5% of the total energy generation in the world, and it is the third-largest renewable source behind wind and hydroelectric power (*Solar - IEA*, 2023).

Other types of renewable energy are: tidal energy, geothermal energy, and biomass energy.

Figure 3: Smith, J. (2023). *The Power of Solar: 35% of US Manufacturing Could Be Powered by Rooftop Solar Panels.*

Before the First Industrial Revolution in the United Kingdom in the 18th century, the major energy sources were muscular, because the work was done by human and animal labour, and biomass, such as firewood, which was used for cooking and heating. In some areas of the world, windmills and watermills existed, but they were used only for specific purposes like milling flour and grain. With the arrival of steam engines during the First Industrial Revolution, coal became the primary source of energy, and it allowed for the fast development of power plants. Then, in the late 19th and early 20th centuries, there was a gradual shift to oil.

Oil is an abundant commodity which is found all over the world and, as drilling technologies improved, global oil production increased. In the 19th and 20th centuries there was a huge increase in the level of industrialization, including advances in transportation such as trains, ships and cars. Oil became a reliable and abundant source of energy. Also, the introduction

of combustion engines and oil-powered ships, which ran on gasoline derived from oil, cemented the importance of oil as a power source.

The two World Wars, especially the second, accelerated the demand for oil because it was the power for tanks, aeroplanes and vessels. Later, oil powered the modern lifestyle of the world after World War II; it was used for energy and also to produce daily products such as plastics, pharmaceuticals and shampoo, consolidating it as the most important commodity in the world. In the 20th century oil was the most significant energy source in the world, and a massive global distribution system for petroleum was established which included pipelines, storage tanks and liquid bulk carriers.

Figure 4: Arun, M. G. (2023). *Why OPEC's crude oil production cut is bad news for India.*

II. Current Situation

Renewable energy sources are becoming more popular as people see the need to reduce greenhouse gas emissions. The most common types of renewable energy today are hydroelectric, wind, and solar power.

Hydroelectric power is a generation method that harnesses the energy of flowing or falling water to produce electricity. It typically involves the construction of dams, reservoirs, or other water control structures to control the flow of water, which is then released or allowed to flow over turbines. Hydroelectric power provides 71% of the renewable energy worldwide and 16% of the world's electricity. Its operational costs are very low and emit little to no

greenhouse gases, but it has a great environmental impact because building dams and reservoirs changes the ecosystem.

Wind power is the second-largest renewable energy source in the world after hydroelectric power. Electric power is harnessed from the wind with wind turbines, typically organised in wind farms, consisting of large rotating blades connected to a generator, to capture the energy from the wind's motion. As the wind turns the blades, they drive the generator, which converts the mechanical energy into electrical power. Wind farms can be both in and offshore, the second one generates electricity from the wind blowing in the sea, and it is considered more reliable because of the higher consistency and speed of winds and less interference from land or human made objects. Wind power represents 7.33% of the total energy generation worldwide. The biggest limitation of wind power is that it can only produce energy when the wind is blowing so wind farms do not always produce as much as their capacity.

Solar power converts sunlight into electricity or heat for various applications. It uses photovoltaic (PV) cells or solar panels to capture and convert the energy from sunlight into electrical power. The amount of energy that can be harnessed depends on a number of factors like geographic location, time of day and weather conditions. Solar power is a clean and sustainable energy source, as it relies on the abundant and natural energy from the sun, and it doesn't produce greenhouse gas emissions during electricity generation. Solar power is the fastest growing energy source because of its abundance (the amount of solar radiation that reaches the Earth’s surface every hour is more than the energy consumed by humans every year), low costs, and energy independence because it can be harnessed for both residential and commercial use, making it a versatile and environmentally friendly source of power. Today it represents 4.5% of the worldwide energy production.

FOSSIL FUELS AND DECARBONISATION

It is said that the regular burning of fossil fuels since the First Industrial Revolution has emitted millions of tons of greenhouse gases, which have polluted the atmosphere and have been associated with problems of global warming and climate catastrophes. According to

some scientists, the burning of fossil fuels has altered our “carbon budget”. The carbon budget is the amount of carbon dioxide, among the other greenhouse gases, that can be emitted to the atmosphere while still keeping global warming within levels which we can control.

Carbon is everywhere in our world, but for the health of our planet these experts say that it needs to be controlled. By burning fossil fuels, which were trapped underground for millions of years, and releasing carbon into the atmosphere, it creates a greenhouse effect which increases the temperature of the planet, which then causes climate change with its respective problems. Carbon needs to be balanced in the ocean, earth, and air (Blair, 2022).

In order to improve our environment and our well-being, decarbonization, the process of reducing carbon dioxide emissions resulting from human activity in the atmosphere, has been proposed (*What Is Decarbonisation, and Why Do We Urgently Need It?*, 2022). To keep the global temperature from increasing and putting the planet in danger, countries have agreed to reach net-zero by 2050. Net-zero means that the amount of greenhouse gases produced is equal to the amount of greenhouse gases removed from the atmosphere (*What Is Decarbonisation, and Why Do We Urgently Need It?*, 2022).

According to the World Economic Forum, decarbonization is the only way to stabilise the climate crisis we are facing today. We are already behind the targets set in the 2015 Paris Agreement, and they say it is urgent to find a solution to this problem. The main goal of this summit was to limit the global temperature increase to below 2°C, and the optimistic goal is to limit it to 1.5°C. To put this into perspective, the last time the global average temperature was 2°C warmer, mean sea level was six metres higher than today.

If we reach a 3°C increase, in the long term, it is predicted that coastal cities like Miami, Shanghai, and Rio de Janeiro will sink, and that around 275 million people would need to be located worldwide. These are the four main scenarios of the future of global greenhouse gas emissions which are shown in the graph below:

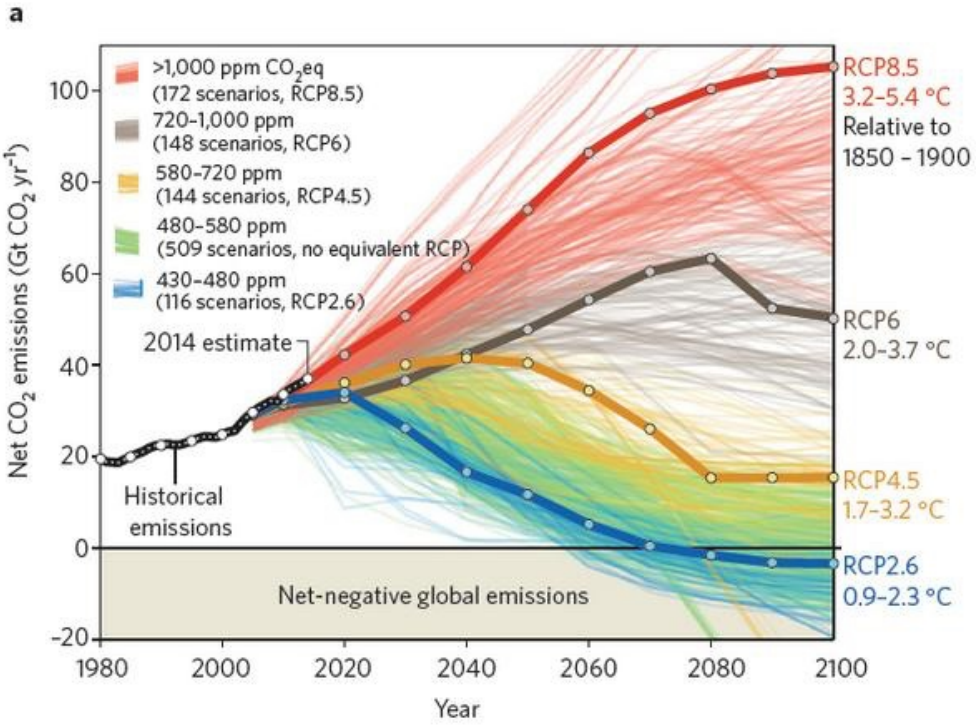

Figure 5: IPCC's Representative concentration pathways (RCP) presenting four scenarios for net CO2 emissions.

RCP2.6 (the blue line in the graph) is the only scenario where the Paris Agreement goals are reached. Some of the key points of the Paris Agreement are: a long-term temperature goal; voluntary cooperation; and climate change education and public awareness. To see all the agreements, please visit: The Paris Agreement | UNFCCC. It is not possible to stop using non-renewable energy overnight, so the Paris summit and other campaigns are trying to accelerate the process of using renewable energy, and to upgrade the infrastructure of producing, storing and distributing renewable energy.

ELECTRIC CARS

The biggest change right now is being made in the automobile industry, with sales of electric vehicles increasing at a high rate. With advances in EV batteries and charging infrastructure such as V2G, carbon emissions from cars are predicted to fall in the following decade (*What Is Decarbonisation, and Why Do We Urgently Need It?*, 2022).

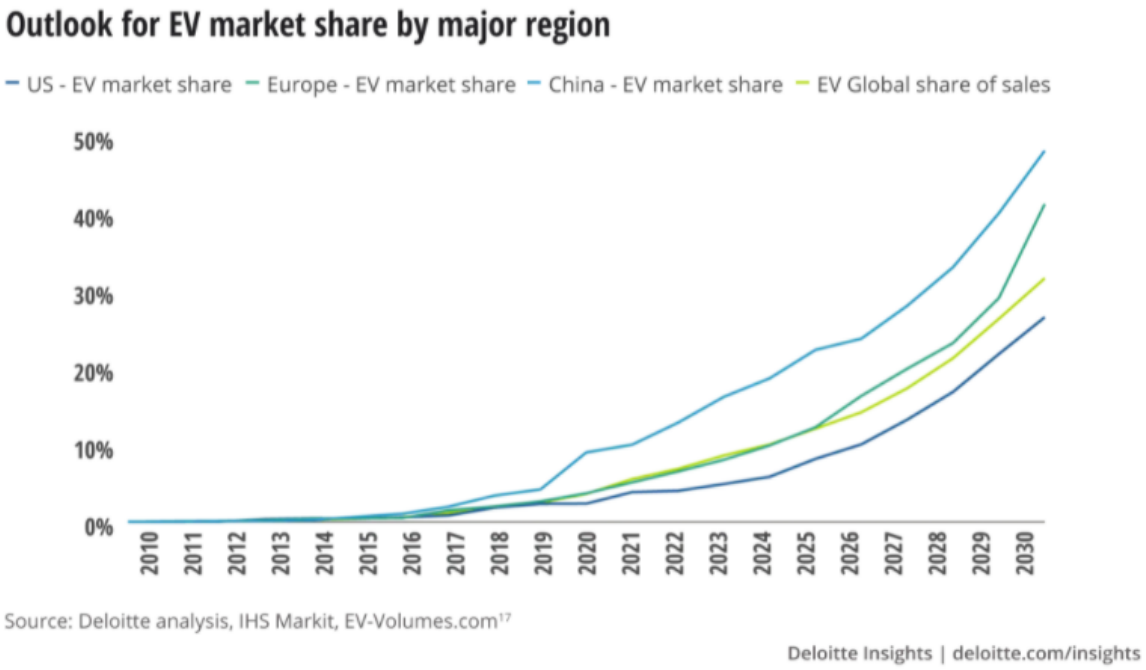

Figure 6: (2022). https://www.virta.global/blog/decarbonisation

By 2030, 32% of the cars are going to be electric and in Europe EV cars will represent 40% of the total car sales (*What Is Decarbonisation, and Why Do We Urgently Need It?*, 2022). The European Union has also gone beyond the 2015 Paris Agreements and released new objectives in their Green Deal plan for 2030 which include:

- 55% reduction of emissions from cars by 2030
- 50% reduction of emissions from vans by 2030
- 0 emissions from new cars by 2035

However, electric cars are generally more expensive than their gasoline-powered counterparts for several key reasons. First, the cost of manufacturing lithium-ion batteries because they are complex and require expensive materials like lithium and cobalt. Second, electric cars have advanced technology that drives up their cost, like regenerative braking and high-efficiency electric motors. Additionally, the limited scale of EV production makes it almost impossible to reduce manufacturing costs.

While the long-term operating costs of electric cars are lower due to cheaper electricity and reduced maintenance, the upfront purchase price remains a barrier for some consumers. However, as technology advances and production scales increase, it is expected that the cost of electric vehicles will continue to decrease, making them more accessible to a broader range of consumers.

ECONOMIC GROWTH LED BY THE IMPLEMENTATION OF RENEWABLE ENERGY

Renewable energy is here to stay. The global renewable energy market is valued at US$881.7 billion in 2020 and experts estimate that it will reach US$1.98 trillion by 2030. Where it will grow at a compound annual growth rate of 8.4%. Over 100 countries, including developed and developing nations, have set targets for the transition to renewable energy. For instance, the European Union plans to get 32% of its energy from renewable sources by 2030. Also, China is responsible for generating 30.8% of global hydroelectric power production, 33.8% of global wind production and 32.3% of solar energy production.

Some countries that are benefiting economically from renewable energy are Denmark and the Netherlands. Both countries have increased their solar and wind power production at a higher rate than other countries. Denmark has been the leader in wind energy innovation for the past century. Its government spends the most on renewable energy research and development than any other country as a share of GDP. Denmark has reduced electricity from fossil fuels from 97% in 1990 to 16% today. This has translated into economic growth because the country is able to export energy which is worth billions of dollars, while the energy bills in the territory are lowered. The renewable energy project in Denmark will create 380,000 mainly temporary jobs over the next 30 years, of which, 17,000 will be permanent. Today 75,000 people hold “green jobs” of a national workforce of 2.75 million people. Also, since the seventies, when the country began its bet on renewable energy, its GDP has doubled.

For further information on the economic repercussions of renewable energy, refer to the following source: Renewable Energy Benefits

CRITICISMS OF CLIMATE CHANGE PREDICTIONS AND NET ZERO POLICIES

It is also important to note that not all climate experts agree that rises in the Earth's temperature are caused by human activity or an increase in the amount of carbon dioxide in the atmosphere. There is an alternative view amongst many scientists that the temperature of the world fluctuates due to natural cycles, and this is why the planet has gone through a number of ice and warm ages throughout history. They say that an increase in CO2 in the past has led to the greening of the planet, and that CO2 actually increases as a result of temperature rise, not the other way around, therefore carbon zero policies are misguided. You can read more about these views using the following link: Drawbacks of net zero policies. It is important to keep these alternative viewpoints in mind, because many of the net zero policies that governments are proposing are extremely costly and will have significant effects on their citizens, especially those within lower income brackets who cannot afford to buy costly heat pumps or electric cars.

PROBLEMS WITH RENEWABLE ENERGY

Renewable energy is solving many of the issues regarding pollution and greenhouse gas emissions. However, there are some problems with this type of energy that are regularly overlooked. For example, manufacturing electric vehicles requires six times the mineral output of gasoline cars because they need extra minerals such as cobalt, nickel, lithium and manganese for the EV batteries, which pollute the environment where they are mined. Experts say that EVs will surpass gasoline car sales before 2040, so the demand for these minerals will skyrocket in the next two decades.

Some experts say that plans to slash carbon emissions, such as Biden's carbon proposals for the electricity sector, are unworkable because they depend on very expensive technologies that have not been tested on a large scale. They say that technologies this plan promotes to serve as the basis for proposed standards will not satisfy performance and cost requirements, unless Americans are prepared to pay exorbitant energy prices. 60% of power plants rely on fossil fuels in the USA, so the electricity that EVs use is not necessarily environmentally friendly. An increase in the amount of EVs also puts extra strain on energy infrastructure, as happened in California in August 2022 when EV owners were asked not to charge their vehicles between 4 and 9 pm due to a heatwave (Scalise, 2022).

Another big problem with renewable energy is the reliability of wind and solar power because wind and sunlight are intermittent; so when the wind does not blow and the sun does not shine, wind and solar power cannot produce energy. A solution to this problem is to store the energy in batteries, but this is too expensive and relies on a method of production that is not always environmentally friendly.

Renewable energy tends to be extremely expensive at the moment, whilst the price of fossil fuels has not increased over the years. In Germany, for example, electricity prices have increased by 50% with the introduction of more renewable energy sources, whilst in California prices are seven times higher than some other states due to an increase in the use of renewable energy.

Governments often pay subsidies for the production of fossil fuels and renewable energy, so real costs of energy production can be difficult to gauge. In the UK for example, the government has given £20bn more in subsidies to fossil fuel companies than to those that produce renewable energy since 2015 (Horton, 2023). The government says that it is important to have both forms of energy to ensure the country is energy secure. Many renewable energy sources depend on fossil fuels as a backup, for example, wind turbines depend on backup generators that run on diesel.

Renewable energy needs much more land for its production than fossil fuels, which could have devastating effects on the environment. Wind farms require 370 times more land than a nuclear plant, whilst wind and solar generation need at least ten times as much land per unit of power as coal or natural gas power plants. To illustrate this point, a 200-megawatt wind farm requires 49 square kilometres while a natural gas power plant can fit in a city block.

Finally, solar and wind farms may damage the surrounding ecosystems and cause changes in the surrounding air temperatures. They also have limited life spans, and are not easily recyclable at the moment.

POINTS TO TAKE INTO CONSIDERATION FOR THE DEBATE

Delegates should keep the following points in mind during the model:

- **Renewable Energy as a Driver of Economic Growth:**

  What is the potential of renewable energy sources (such as solar, wind, hydro, geothermal, and biomass) to stimulate economic growth by creating new industries, generating jobs, and attracting investments in clean energy technologies?**Energy Security and Independence:**

  How could a diversified renewable energy portfolio complement energy security by reducing dependence on fossil fuel imports? What are the economic advantages of having locally available renewable energy sources?

- **Fostering Innovation and Technological Advancement:**

  How will the change towards renewable energy encourage innovation and the development of new technologies? What advances need to be made in energy storage, grid management, and energy efficiency?

- **Investment and Finance Opportunities:**

  How could sustainable energy projects in your country attract public and private investment?

- **Barriers and Challenges:**

  What needs to be done to make renewable energy production more efficient? What are the challenges facing the widespread adoption of renewable energy, such as problems caused by the intermittent nature of energy production (in the case of solar and wind energy), high initial investment costs, and grid integration issues.

- **International Cooperation and Technology Transfer:**

  What international collaboration is needed in renewable energy research, development, and technology transfer to facilitate global progress in sustainability and to help developing countries access cleaner energy solutions? What is the role of

international agreements and partnerships, such as the Paris Agreement of 2015, in promoting the diffusion of renewable energy technologies across borders?

Delegates can use these points to present arguments, propose solutions, and engage in constructive discussions to demonstrate the potential of renewable energy sources in driving economic growth while promoting sustainability during the MUN debate.

Please remember that UNCSTD is a branch of ECOSOC, so the committee must focus on the economic effects and challenges of renewable energy, not just on the technologies and science.

III. Key Points of the Debate

- Renewable Energy as a Driver of Economic Growth
- Energy Security and Independence
- Fostering Innovation and Technological Advancement
- Investment and Finance Opportunities
- Barriers and Challenges to adoption of renewable energy
- International Cooperation and Technology Transfer

IV. Guiding Questions

1. What percentage of your country's energy needs is provided by renewable energy sources? What sort of renewable energy sources are used in your country?
2. What is your country doing to guarantee that the objectives for the Paris Agreement are met?
3. If your country has very few renewable energy sources, what is the reason for this? Is it the intention of your government to introduce more renewable energy projects in the future?
4. How can the development and expansion of renewable energy industries stimulate

economic growth and create job opportunities in your country?

5. In what ways could the expansion of renewable energy infrastructure lead to land use conflicts and disrupt local ecosystems in your country? Have there been any objections to the construction of renewable energy plants? What has your government done to mitigate any negative impacts of renewable energy sites on the environment/local population?
6. How could public-private partnerships and international cooperation accelerate the deployment of renewable energy infrastructure in your country?
7. Is it feasible to convert to solely renewable energy sources in your country? If not, what are the setbacks to achieving this goal, and what would be a realistic compromise between renewable energy and fossil fuels?
8. What needs to be done to help developing countries implement renewable energy sources in order to drive economic growth and promote sustainable development?

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