

Committee: Youth Assembly

Issue: Action paper on fossil fuels versus renewable sources

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Position: Co-heads

INTRODUCTION

Dear participants, we warmly welcome you to the 10th CGSMUN. Considering that many of you may be new to the Model United Nations' world, we will try our best to assist you during the debate so as to enhance and nurture your skills and concern.

This study guide focuses on the important issues regarding renewable energy versus fossil fuels. Considering the issues that have arisen the last few years following the uncontrollable exploitation of our planet, it is crucial to examine critically both cases of energy production and to pinpoint the advantages and disadvantages of each, as well as the necessities of our times with regards to the selection of each energy source.

My name is Riana-Leah Byrne and I will be your Co-Head along with Manuel on this MUN conference. We hope to see a successful debate with all of the delegates participating.

My name is Manuel Finocchio and I will be your Co-Head in the Youth Assembly. It will be profoundly satisfactory both to flank you in this experience and behold your mature awareness on this matter.

DEFINITION OF KEY TERMS

Feed-in-tariff

It is a public policy procedure aimed at encouraging renewable energy production. A feed-in tariff drives market growth by providing developers long-term purchase agreements for the sale of electricity generated from renewable energy sources. It has proven to be the most efficacious policy to promote the renewable energy market so far.¹

Grid

It is an electric network comprising transformers, substations, conduction lines and other devices which transports electricity from the power source to the consumers.²

¹ A Policymaker's Guide to Feed-in Tariff Policy design, National renewable Energy Laboratory (NREL) <<http://www.nrel.gov/docs/fy10osti/44849.pdf>>

² "What is the smart grid?" <https://www.smartgrid.gov/the_smart_grid/smart_grid.html>

Off-the-grid power

“Off the grid is a designation for facilities that produce all their own energy and are not connected to any external source, such as the electrical power grid.”² Most off-grid generators are solar, wind and geothermal-based.

Solar Energy

Solar energy is the energy deriving by the light and heat from the sun using technologies like photovoltaics and solar heating.

Wind Energy

Wind Energy is the electrical energy obtained by collecting the energy from the wind using windmills or wind turbines.

Tidal Energy

Tidal Energy is a form of hydropower that converts the energy of tides into forms of power, mainly electricity.

Hydroelectric Energy

Hydroelectric energy is the energy which is derived from the movement of the water. Since water has mass, it falls and flows downwards because of the gravity. As the water moves, its kinetic energy is harnessed and the motion is converted to electric energy.

Wave Energy

Wave energy is a renewable energy where the power of the waves is captured so as to generate electric energy. Wave power is useful when it comes to electricity generation, water desalination and the pumping of water into reservoirs. The machine which generates the energy is called the wave energy converter.

Geothermal Energy

Geothermal energy is the energy derived from the heat of the earth. Heat from the centre of the earth conducts outwards and heats up the outer layers of rock called the mantle. When this type of rock melts it becomes molten and is called magma. Using this heat, water is converted to steam which drives turbines, which in turn produces electrical energy.

² “Off the grid”, WhatIs.com <<http://whatis.techtarget.com/definition/off-the-grid>>

Biomass

Biomass is all dead plants, agricultural waste and animal material, later used as an energy source.

OPEC

Organization of Petroleum Exporting Countries

GEFC

Organization of Gas Exporting Countries

BACKGROUND INFORMATION

Renewable Energy Sources

Renewable energy is the energy deriving from a perpetual source and can therefore be considered never-ending. The most common of these sources is the sun (solar energy), the wind (wind energy), the tides (tidal energy) and geothermal heat (geothermal energy).

Solar Energy

1. Electric currents are generated from solar cells.
2. Solar energy doesn't pollute the environment.
3. Solar cells are usually used to generate electricity on a small scale.

Wind Energy

1. In order to generate wind into energy, windmills and wind turbines should be located in non-built up areas (e.g. Moors and round coasts).
2. Each one of the wind turbines has its own generator inside it, the electricity is generated directly from the wind, turning the blades which turn the generator.
3. Wind energy doesn't pollute the environment, except when wind turbines are being manufactured.

Tidal Energy

1. Tidal barrages are big dams which are built across river that have turbines in them.
2. When the tide comes in it fills up the estuary height of multiple meters. After this, the water is let out through the turbines at a controlled speed.
3. The source of the energy is the gravity of the sun and the moon.

Hydroelectric Energy

1. In order to produce hydroelectric power, the flooding of a valley is required so as to build a big dam.
2. Rainwater is filtered through large turbines and there is no pollution.
3. There is a big impact on the environment due to the flooding of the valleys and possible disruption of ecosystem and natural habitats.

Wave Energy

1. As waves come in to the shore, they provide an up and down motion which can be used to drive a generator.
2. There is no pollution although wave-powered turbines are unreliable, since this kind of technology is still experimental and few turbines are actually connected to the power grids.

Geothermal Energy

1. There are no environmental problems coming from geothermal energy.
2. As a form of energy production is financially unsustainable, since the cost of building a power plant is often high compared to the output of energy.
3. Its use is limited, as a volcanic area is required for a geothermal power plant to be set up.

Biomass

1. Biomass is indirectly derived by the sun. Plants store the energy from the sun in their leaves and roots and animals eat plants. So, the energy of the sun is captured through the process of photosynthesis in the plants.
2. Biomass energy is renewable which means that more biomass can be produced by growing more plants.
3. It can be used to make electricity. Some countries burn their garbage to make electricity instead of putting the garbage in landfills.

It has been apparent in recent years that fossil fuels is an unsustainable source of energy. Therefore, there is a rapid shift in renewable and alternative sources of energy, but we must also be aware of the disadvantages of this kind of energy. Firstly, it must be noted that renewable sources of energy have a much smaller yield of energy than that of fossil fuels. For that reason, much more area is needed to produce the same amount of energy and many more facilities have to be created. These, in turn, require many resources to be built. Furthermore, renewable energy sources are much dependent on weather and as a

result the energy supply is unreliable. Lastly, we need to consider the aftermath of setting up huge facilities for renewable energy production in the future. For example, solar panels have a life span of 20 to 30 years and then we will end up with massive areas of disused solar panels.

This, nevertheless, should not be discouraging, as technology is continuously advancing producing equipment with even more lifespan and much more energy yield. Either way we need to consider that we do not have too much of a choice, since fossil fuels are finite and the shift to renewable energy is inevitable.

Fossil Fuels

Fossil fuel is a natural fuel such as coal or gas, formed in the geological past from the remains of living organisms (oxford dictionary). These are mostly natural gas, oil and coal. All fossil fuels produce water and carbon dioxide when they fully combust, which in turn causes the renowned greenhouse effect. But as hydrocarbons burn, these fuels also contain other substances, like for example Sulphur. Such impurities found in fuels cause major health problems to human and animal populations. Sulphur reacts with oxygen when the fuel combusts and forms a gas called Sulphur dioxide, which is poisonous and acidic. This causes a substantial deterioration to the environment as it is a cause of acid rain.

Oil

1. Oil is one of the world's most facile substances.
2. It can be refined into several compounds which are able to be manufactured into others.
3. It is burned in factories and power plants to make electricity.

Coal

1. Coal is used to create more than half of the electricity produced in the United States alone.
2. Coal is transported by trains to power plants where it's burned so as to make steam, which turns the turbines that produce electricity.

Natural Gas

1. It is made out of methane which is made up of carbon hydrogen atoms.
2. It is usually found near oil in the ground and is pumped up like oil from wells.
3. Then it is combusted for energy production and in various sectors of industry.

MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED

Iceland

Iceland is on the top of the list of the countries that are involved with renewable sources of energy since it supplies 85% of the country's housing with heat. The two types of energy which are very common in Iceland are geothermal and hydroelectric.

Norway

Norway's top three sources of electricity are hydroelectric, geothermal and wind. The country's renewable energy sector has been developed to serve the export market instead of the domestic consumption.

United States of America

The US is of the biggest consumers of energy, mostly deriving from fossil fuels. In recent years, due to the tightening of international, federal, state and local legislation the US has started to increasingly use alternative energy sources. Almost a quarter of the world energy production from renewable sources is created by the States, with hydroelectric power being the major sector, followed by wind power and biomass.

Germany

Germany has been a world leader for renewable energy production. Recently the country has made the decision to phase out nuclear power in favor of renewable energy sources. Almost 12% of the world renewable energy production is produced by Germany. The major sectors of energy production in the country are wind power, biomass and solar energy.

Saudi Arabia

Saudi Arabia is one of the top three oil exporters. The reserves in the country are the second largest in the world, estimated to be 268 billion barrels. These barrels used to take the first place in the world until Venezuela announced that they had increased their proven reserves to 297 billion barrels in January 2011.

Russian Federation

Russia has the biggest ever known natural gas reserves of any other place in the world. They come second as far as coal reserves are concerned, and lastly the country comes eighth largest on oil reserves. The country is lacking renewable energy production, but there are plans to head to that direction.

Iran

Iran has the fourth largest oil reserves and one of the largest natural gas reserves amongst all the countries in the world. The country is one of the leading members of the OPEC and GECF. Iran has received \$47 billion in oil export revenues. Both natural gas and oil consumption account for nearly half of Iran’s domestic energy consumption. The lift of the sanctions under the impending nuclear deal with the US is expected to increase exports and change the global energy scene.

TIMELINE OF EVENTS

Date	Description of Event
1861	John Tyndall, a British physicist discovers that water vapor and other gases can increase the “greenhouse effect”.
1886	The Motorwagen, generally considered the first automobile, is invented by Karl Benz, creating a brand new market for the consumption of fossil fuels.
1896	Swedish Svante Arrhenius realizes that coal burning augments the “natural greenhouse effect”, suggesting however that it might benefit coming generations.
1958	Charles David (Dave) Keeling by methodical measurements of CO ₂ in Antarctica, gives undeniably proofs that CO ₂ concentrations are growing.
1965	US Committee panel warns that global warming represents a serious risk for the environment.
1987	Montreal Protocol is signed, thus limiting chemicals that threatens the ozone layer and having a substantial impact on climate change.
1992	United Framework Convention on Climate Change, Rio De Janeiro.
1995	IPCC Second Assessment Report definitively corroborates the thesis that human influence has played a huge role in the rising of atmospheric CO ₂ concentration.
1997	The Kyoto Protocol is agreed upon. It fixed obligatory limits to CO ₂ emissions, planning their annual world decrease of 5% from 2008-2012. Since the Protocol ended in 2012, an extension is in place, called the Doha Agreement, but only 36 states have signed it.
2015	G7 resolves to progressively eradicate fossil fuels consumption by 2099.
2015 November	In Paris, in the 21st United Nations Climate Change Conference, it is expected that countries will reach a universal binding agreement over CO ₂ emissions.

UN INVOLVEMENT: RELEVANT RESOLUTIONS, TREATIES AND EVENTS

- **United Nations Conference on Environment and Development, Rio de Janeiro 1992:** The conference concerned the energy system and its Agenda 21 underscored the fact that the contemporary rates of consumption of fossil fuels are unsustainable; it asserted the need of harnessing more balanced and sustainable energy sources.
- **United Nations Framework Convention on Climate Change (UNFCCC), 21 March 1994:** The convention is almost universally adopted and its aim was the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”.³
- **Kyoto Protocol, 11 September 1997:** Entered into force in 2005. The states have made a commitment from 2008 to 2012. The Protocol was extended by the Doha Agreement, but only 36 states have committed for the second term.
- **9th session of the Commission on Sustainable Development (CDS-9), 2001:** The members of the Commission decided to reserve more political and economic will to the implementation of cleaner and more sustainable energy worldwide.
- **Johannesburg Plan of Implementation, World Summit on Sustainable Development, 2002:** It called for a multitude of diversified actions, while reaffirming the beneficial effects of a sustainable energy system in the eradication of poverty and the fostering of economic growth. It also set the goal to distribute alternative, clean, affordable energy in rural and impoverished areas.
- **Sustainable Energy for All initiative, 2011, UN Secretary-General:** The initiative has set three objectives to be fulfilled by 2030: ensuring global access to modern energetic sources, duplicate the universal energy efficiency and double the percentage of renewable energy usage worldwide.
- **General Assembly Resolution 65/151, 16 February 2011:** It declared 2012 the “International Year of Sustainable Energy”.
- **UN Rio+20 Conference on Sustainable Development:** “The Future We Want” was signed, urging members, among other things, to address the goals of universal access to energy services and increase of renewable energy production.

³ United Nations Framework Convention On Climate change, Article 2.

- **Resolution A/C.2/67/L.52 21 December 2012**, The General Assembly declares 2014-2024 the “Decade of Sustainable energy for all”.

PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

Not only single countries but especially entire organizations have tried to favor the transition. However, even though international summits and organizations may have fixed the targets, the measures to reach these goals have generally been elaborated by distinct countries or communities alone.

Pivotal planning decisions have been implemented, especially on the CO₂ emission restraints imposed by the Kyoto Protocol and the recent G7 decision to gradually eliminate fossil fuels consumption by 2099, so as to prevent a temperature’s rise greater than 2°C before the end of the century.

Europe

The European Commission for Energy has fixed targets for the continent as a whole and left each government free to tailor its own energy targets and measures. With the Directive 2009/28/EC, or Renewable Directive, Europe plans to fulfill 20% of the total energy demand by means of renewable energies by 2020.

Germany

Many investments have been made in renewable sources since 1990, which resulted in relevant implementation and significant upgrades in all renewable energy types. The main boost for fossil fuels reduction derived from the German Renewable Energy Act, in 2000, (Erneuerbare-Energien-Gesetz, EEG). Other minor measures ensured to energy producers the minimum connection price for all renewable energy supplied to public grids and required grid operators to link renewable energy production centers to the grid in the most direct and straight way in order to advantage renewable sources connections. Another crucial aspect in the energetic policies in Germany has been the promulgation of several taxes upon the consumption of fossil fuels and CO₂ emissions.

United Kingdom

The United Kingdom on the other hand, having based its economy on large reserves of oil, coal and other fossil fuels for more than a century, is currently facing more difficulties than other European members in reaching its self-fixed standard of 15% of total energy

supplied by renewable forms of energy by 2020. Nevertheless, the UK has undertaken several measures which may easily be adopted by countries in analogous conditions.

The United Kingdom is developing one of the most advanced off-shore wind plants, thus being a great example of how countries need to base their policies and technological investments on the features of their own natural environments.

United States of America

Some US states have also imposed, alongside with feed-in-tariffs, a specific regulation, the Renewable Portfolio Standard (RPS), which consists of obliging energy suppliers to produce a determinate amount of renewable energy units. Other US states' initiatives include zero interest loans for residential customers to plant modern as well as more efficient energy systems and tax credits in change for renewable energy implementation.

China

China has been one of the most polluting countries and has long been criticized for inaction. After promulgating the Renewable Energy Law in 2005, retouched and modulated several times, the Chinese government has sought renewable power implementation especially by RPS and feed-in-tariff policies.

Since some rural areas still lack sufficient grid nowadays and regions find difficult to exchange power, China began building large power grids in regions not equipped by independent renewable energy network. As of today, China remains predominantly dependent on coal.

POSSIBLE SOLUTIONS

In order to succeed in a gradual and sustainable transition, countries need to:

1. Plan feasible, yet ambitious, targets;
2. Organize and structure appropriate institutions;
3. Abate non-economic obstacles, such as lack of provident and constantly applied policies, bureaucratic hinders, missing correct information and immature awareness on the matter, deficiency of needed skills;
4. Provide consistent measures;
5. Provide financial support to business investments in renewable energy fields;

Technological development based on environmental potentialities

Diversified technological research is a key point in the issue: investments are required to be made in all different renewable sources, in order to shape a more solid and competitive market by encouraging diverse types of renewable energy production.

Of course, single countries need to be cognizant of the possible benefits of their own environment – solar panels in the Arab League, tidal devices in the UK etc. - and thus finance and plan accordingly.

Demolition of obstacles to renewable energies distribution

Insufficient or missing grids are serious hindrances to renewable energy transmission. Ensuring national delivery of electricity represents a stepping stone any significant improvement in this energy industrial transition. Other than investments, countries may prompt installations of renewable energy generators by adopting policies such as those of Germany.

Also, the deployment of off-grid renewable energy generators may be a sustainable alternative to wide-ranging power grid, considering that statistics⁴ show that the latter will not be enough to reach the World Bank Sustainable Energy for All 2030 goal of universal electrification.⁵

In this challenge, the private sector will play a fundamental role. However, precise policies and regulations are the most efficient means that governments possess in order to accelerate the shift from fossil fuels to renewable sources of energy. Feed-in-tariffs, tax credits and RPS are some that increment renewable energy production, while fiscal impositions on CO₂ discourage fossil fuels consumption. Also joint investments and agreements between different countries may be a productive solution, such as in the case of the “Arab Renewable Energy Framework (AREF)”⁶.

⁴ International Renewable Energy Agency (IRENA), “IOREC 2012 International Off-Grid Renewable Energy Conference KEY FINDINGS AND RECOMMENDATIONS” <http://www.irena.org/DocumentDownloads/Publications/IOREC_Key%20Findings%20and%20Recommendations.pdf>

⁵ World Bank Sustainable Energy for All 2030 goal. <<http://www.worldbank.org/en/topic/energy/brief/sustainable-energy-for-all>>

⁶ “Arab Renewable Energy Framework (AREF) and National Renewable Energy Action Plans Template (NREAP)” <<http://www.rcreee.org/projects/arab-renewable-energy-framework-aref-and-national-renewable-energy-action-plans-template>>

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