Forum: Group of Twenty (G20)

Agenda: On measures to promote sustainable energy to enhance environment for prolonged economic development

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Introduction

Unfortunately, the human society's 80% of the energy are extracted by non-reusable energy sources. This includes fossil fuels, natural gas, oil and nuclear energy.

Despite there is a mixed evidence on the relationship between non-reusable energy consumption and economic growth, it is nothing but mere surface illusion. Several studies suggested that fossil fuel is the key to economic growth given its convenience in production and high efficiency with low cost, but the real price it's their foot print on our environment. When fossil fuels are burned, they release large amount of carbon dioxide, this greenhouse gas is an excellent heat trapper. Denying Earth's dissipation of heat by radiation by absorbing it within the atmosphere, this results into global warming. And global warming can lead to a wide range of economic affect. Increased sea level would heavily post damage to coast side countries, forced displacement would disrupt society balance and the additional health impacts not just to humans but to all organisms living, a disaster to habitat and food chain. This is the common disadvantage towards among most non-reusable energy sources such as coal and natural gas.

The others, however although might not appear to be possessing as much environment damage as the others. Given the nature of resources being at a scarce, there will be days that a certain type of energy source would be completely emptied. For instance, nuclear energy does not post major environmental impact if operating under restricted conditions, however the consumption of nuclear fuse will not be depleted when it's used. Meaning it is a non-reusable energy source and possesses the destiny of running out of fuel completely. This has meant that this is not a sustainable approach and are not reliable for economic development.

However, for sustainable energy sources in comparison they are more eco-friendly. Indicating less harm to the environment, and can almost infinitely harvest energy without the concern on running out energy source. Solar energy is a great example, it is capable of harvesting energy bass of radiation by solar power and post no significant effect on environment expect for the demand of open space. In addition to the advantages of being neutral to the environment and infinite energy amount, its versatileness including solar power, wind energy, hydrostatic and bioenergy also brings huge economical benefit. Allowing more jobs to be created, benefiting non-natural resource abundant countries etc.

Many country has already step into the path of switching from non-reusable energy to sustainable energy sources, Norway, has the highest share of renewable energy in the world with 56% of the total energy share coming from reusable energy sources. The growing trend in the usage of sustainable energy sources in developed countries has contributed huge benefit to the society however they're still work to be done less developed countries. Among the majorities of LDCs, the dependence on harvesting base on fossil fuels still remains around hundred percent and this need to be fixed as soon as possible.

This is also the aim of this G20 committee, to tackle the issue of over-dependence on unsustainable resources. Particularly in terms of the LDCs, many attempts to turning green energy had been denied due to its high-cost in building related infrastructures. Hydro-power for instance not only requires particular environmental conditions to be meet such as cliffs, large lakes and running rivers, it also requires substantial amount of money in constructing harvesting technologies. Despite profit may come as a return in a long-term perspective however the initial deposits would be unaffordable for poorer countries. However, as the determinants to future generations, it would be devastating in letting non-reusable energy remained upon prevalence. It is every countries obligation in tackling this global issue, and this conference is where resolutions that shape the future we want could take place.

Key Term

Reusable energy sources - Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed. Sunlight and wind, for example, are such sources that are constantly being replenished. Renewable energy sources are plentiful and all around us. Synonyms to sustainable energy sources.

Lower developed countries (LDCs) - Least developed countries (LDCs) are low-income countries confronting severe structural impediments to sustainable development. They are highly vulnerable to economic and environmental shocks and have low levels of human assets.

Energy - A physical quantity that refers to the ability to do work, usually refer to electricity under this context.

Energy development - The field of activities focused on obtaining sources of energy from natural resources. These activities include production of renewable, nuclear, and fossil fuel derived sources of energy, and for the recovery and reuse of energy that would otherwise be wasted.

Renewable energy industry - Part of the energy industry developing on new and appropriate renewable energy technologies.

Alternative fuel - Known as non-conventional and advanced fuels, are any materials or substances that can be used as fuels, other than conventional fuels. Can be used in developing more eco-friendly fuels instead of conventional fossil fuels.

General Overview

Despite a few very developed countries with minor population, most of the world's developed countries uses non-reusable energy as their main way of energy production. According to statistics, about 79% percent of the United States' energy comes from fossil fuels, 8.4 from nuclear, and a mere 12.5% from renewable energy sources. In fact, this is already a decent amount compared with the world's biggest non-reusable energy consumers catego-

rized as developing countries. On the other hand, China currently is the world's largest energy consumer and producer, occupying a staggering 25% of the world's share. Within the vast amount, 67% comes from fossil fuel, coal and oil drive thermal energy, and the rest from sustainable energy sources by the year 2021. Originally, almost 80% comes from non-reusable energy sources however due to being the largest energy supplier in the world it was put onto the spotlight of promoting reusable energy sources.

Worldwide, In Asia Pacific, electricity consumption per terawatt hour reached 11,985. With north America ranking second however by a significantly lower amount only at 5000. Following up Europe 3837, Eurasia 1246, South America 1109.5, last with middle east and Africa occupying 1059 and 732 respectively. The previous lack of attention on the necessity of promoting reusable energy has left the world with huge effects. In comparison, the emission of greenhouse gases had raised the land and ocean temperature by a 0.84 Celsius with the twentieth century average. Scientist have even estimated that by 2050 the temperature would continue to raise up to 2–4-degree Celsius. This had also led to serious economic effect to the world, For example, damage to property and infrastructure. Sea level rise, floods, droughts, wildfires, and extreme storms will require extensive repairs to critical infrastructure such as homes, roads, bridges, rail lines, airport runways, power lines, dams, levees, and dikes. In addition, global warming is likely to increase the number of "climate refugees" - people forced to leave their homes due to drought, floods, or other climate-related disasters. Mass movements of people and social unrest may lead to civil unrest and even military intervention and other unintended consequences. According to United Nations High Commissioner for Refugees (UNHCR), an annual 21.5 million people have been forcibly been displaced by weather related events such as floods, storms, wildfires and extreme temperatures.

So far, many countries have taken approach in promoting the usage of sustainable energy sources. Main ways such as financial incentives; grants, loans, rebates and tax credits are given to encourage renewable energy developments, or settle relevant regulations and upper limitation to the amount of thermal energy that can be used. For resource-rich countries such as Sweden, they took advantages of their natural resources and utilized a combination of hydropower and bioenergy.

Sweden

In 2012 Sweden reached their target of 50% renewable energy 8 years ahead of schedule. This puts them right on track to reach their 2040 goal of 100% renewable electricity production. They did this by taking advantage of their natural resources and using a combination of hydropower and bioenergy. The government's energy policies have also promoted the use of renewable energy. The Electricity Certificate System – a market-based support system for renewable electricity production – is one example. To qualify, electricity must come from wind, solar, geothermal or wave power; biofuels or small-scale hydroelectric plants.

Germany

Germany wants to fight the climate crisis and its heavy dependence on fossil fuel imports by speeding up the rollout of renewables with a massive overhaul of key energy legislation. In the "biggest energy policy reform in decades," the coalition of Social Democrats (SPD), Greens and Free Democrats (FDP) proposes to lift the rollout of wind and solar power "to a completely new level" in a draft law amounting to more than 500 pages. It aims to free up new land for green power production, speed up permit procedures,

and massively increase wind and solar additions to achieve a nearly 100-percent renewable power supply by 2035.

China

China as the world's largest carbon emitter is at the same time a leader in renewable energy usage, especially in solar energy and production. Being the largest domestic and outbound investor in renewable energy. Four of the world's five biggest renewable energy deals were made by Chinese companies in 2016. As of early 2017, China owns five of the world's six largest solar-module manufacturing companies and the world's largest wind turbine manufacturer. The Chinese government places a priority on investing in renewable energy primarily because it enables the country to tackle problems of air and water pollution, and mitigate risks of socio-economic instability. Reducing air pollution is a direct reason why Chinese government promotes renewable energy.

Costa Rica

Costa Rica currently has 98% of its electricity harvested from renewable energy sources, and it has been doing it for seven straight consecutive years. With a combination of hydro, geothermal , wind, biomass and solar power, this is also a leading country on the versatileness of using renewable energy sources. In addition, Costa Rica in some years would have excess generated energy allowing some to be exported to other countries in demand.

United States of America

In 2021, renewable energy sources accounted for about 12.4% of total U.S. primary energy consumption. Renewable energy sources accounted for about 19.8% of total utility-scale electricity generation. The US government had also promoted the usage of sustainable energy usage by financial incentives as mentioned before.

Saudi Arabia

Recently by 25th of September, Saudi Arabia has launched five new projects to produce electricity using renewable energy, with a total capacity of 3,300 megawatts. Here refers to as NREP programme. The NREP program sets out an organized and specific road map to diversify local energy sources, stimulate economic development and provide sustainable economic stability to the Kingdom in light of the goals set for Vision 2030, which include establishing the renewable energy industry and supporting the advancement of this promising sector while working to fulfill the Kingdom's commitments to reducing carbon dioxide emissions

Major parties involved

International Energy Agency

Created in 1974 to ensure the security of oil supplies, the International Energy Agency has evolved over the years. While energy security remains a core mission, the IEA today is at the center

of the global energy debate, focusing on a wide variety of issues, ranging from electricity security to investments, climate change and air pollution, energy access and efficiency, and much more.

Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for assessment of climate change. It is a key source of scientific information and technical guidance to the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and Paris Agreement. Used for setting regulations and timely report on current climate situation in making real time action adjustments. Organized by World meteorological organization and United nation in weather.

International Renewable Energy Agency

The International Renewable Energy Agency (IRENA) is a lead global intergovernmental agency for energy transformation that serves as the principal platform for international cooperation, supports countries in their energy transitions, and provides state of the art data and analyses on technology, innovation, policy, finance and investment.

United Nations Industrial Development Organization

The UNIDO is the specialized agency of the United Nations with a unique mandate to promote and accelerate sustainable industrial and economic development. UNIDO supports countries to industrialize in ways that foster digital and green transitions and accelerate progress with the Sustainable Development Goals.

Reusable Fuels Association RFA

The RFA is a trade association for America's ethanol industry, working towards an expanded demand for American-made renewable fuels and bio-products worldwide. It serves as a voice of advocacy for the ethanol industry, providing research data and industry analysis to its members, to the public via the media, to the United States Congress, as well as to related federal and state agencies.

Centre for Renewable Energy Systems Technology

The Centre for Renewable Energy Systems Technology (CREST) is a research centre into renewable energy based in the Department of Mechanical, Electrical and Manufacturing Engineering, Loughborough University in England. The MSc course in Renewable Energy Systems Technology, developed at CREST, is one of the longest established renewable energy masters courses globally. It is producing a stream of graduates who are working internationally in all aspects of the renewables industry. Courses include biomass, wind, solar, water/marine and electrical integration.

Timeline of Events

Date	Description of event

1970s	Coal phase-out environmental policies first took place. Coal phase-out is an environmental policy intended to stop using the combustion of coal in coal-burning power plants, and is part of fossil fuel phase-out. Coal is the most carbon-intensive fossil fuel, therefore phasing it out is critical to limiting climate change and keeping global warming to 1.5 °C as laid out in the Paris Climate Agreement. The end of new fossil fuel exploration policy.
1975s	David Gordon Wilson proposed Carbon tax. A carbon tax is a tax levied on the carbon emissions required to produce goods and services. Carbon taxes are intended to make visible the "hidden" social costs of carbon emissions, which are otherwise felt only in indirect ways like more severe weather events.
1992	United Nations Frame work Convention on Climate Change was drafted. It established an international environmental treaty to combat "dangerous human interference with the climate system", in part by stabilizing greenhouse gas concentrations in the atmosphere.
Early 2000s	Renewable portfolio standard first utilized in Australia. A renewable portfolio standard (RPS) is a regulation that requires the increased production of energy from renewable energy sources, such as wind, solar, biomass, and geothermal. Other common names for the same concept include Renewable Electricity Standard (RES) at the United States federal level and Renewables Obligation in the UK.
2005	Adoption of carbon pricing, also known as cap and trade (CAT) or emissions trading scheme (ETS), is a method for nations to reduce global warming. The cost is applied to greenhouse gas emissions in order to encourage polluters to reduce the combustion of coal, oil and gas.

UN Involvement, Relevant Resolutions, Treaties and Events

- United Nations Frame work Convention on Climate Change (UNFCCC)
  An international convention adopted at the United Nations Headquarters in New York in May 1992. On March 21, 1994, the Convention entered into force. The Convention does not impose specific obligations on individual parties, nor does it provide for implementation mechanisms. However, the Convention provides for mandatory emission limits to be set.
- UN Climate change conference
  UNFCCC conferences are held yearly within the framework of the United Nations Framework Convention on Climate Change (UNFCCC). They serve as a formal meeting between the UNFCCC parties to assess progress on climate change, and to negotiate the Kyoto Protocol beginning in the mid-1990s that established legally binding obligations on developed countries to reduce greenhouse gas emissions.
- Paris Agreement

The Paris Agreement, adopted by 195 UN member states on December 12, 2015, is a global climate agreement. As described in Article 2, the agreement aims to strengthen the UNFCCC.

1. Hold the increase in global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the increase to 1.5°C above pre-industrial levels, recognizing that this will significantly reduce the risks and impacts of climate change.
2. Increase capacity to adapt to the adverse effects of climate change and enhance climate resilience and low-GHG-emission development in a manner that does not threaten food production.
3. Align financial flows with pathways for low-GHG emissions and climate-resilient development.

Possible Solutions

The promotion of sustainable energy can be achieved in many ways, either by setting up policies or relying on scientific developments, the following are few possible solutions models inspired by existing country policies. By models, meaning the general perspective where the issue could be tackled however the precise resolutions are to be determined with response to countries developments extent and additional steps may be added to enhance effectiveness. The few are mentioned below;

Adding tax to pollutant emission coming form unsustainable energy sources

With reference to the concept of the currently active constitution of carbon pricing and carbon prices, the same policy can also be applied to other non-reusable energy types. Enhancing the effectiveness and further more if accompanied by flexibility on the fine amount, this policy has the potential to make a difference in every country facing different domestic economic situations. In addition, the fine then can be used as infrastructure building, organization funding... etc to maximize effectiveness.

Active governmental regulation on the limitations of utilizing non-reusable energy sources

This can be done via setting up relevant governmental departments devoting into actively checking the monthly usage of non-reusable energy sources, and giving real-time management.

Conduct research on new energy sources, seeking for replacements.

With MEDCs laboratory investigations, demand for larger governmental support and focus on relevant scientific fields.

Inter-country exportations for energy in excess.

With reference to costa rica, energy generated in excess can be exported into LEDCs with relatively low energy consumption however high usage rate in non-reusable energy sources.

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