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Investigating Renewable Energy Sources

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ABSTRACT
In the current research, seven types of renewable energy sources have been investigated. This research has been done using the review research method. Global energy demand has increased due to population growth and technological development. Therefore, renewable energy and its technology are progressing in all over the world. There are seven types of renewable energy sources in the world, that these sources include hydrogen energy, solar energy, geothermal energy, biomass energy, hydropower energy, ocean energy and wind energy. There is no element abundant hydrogen in the world. Therefore, it is the best renewable energy. Renewable energy sources help to reduce greenhouse gases. These energies do not produce polluting and harmful gases for the atmosphere. These energies can be produced in every regionally and locally, but fossil energy sources exist only in some regions.

Keywords: Renewable Energy, Hydrogen Energy, Geothermal Enegy, Hydropower Energy

INTRODUCTION
Humans rely on energy for essential aspects of daily life such as cooking, heating, lighting, and transportation. Basic needs like heating and cooking fall within this spectrum. Presently, a paramount objective for developing countries revolves around energy provision due to the direct correlation between economic growth and adequate energy supply (Liu, 2017). Renewable energy sources supply 14% of the world's energy needs (Assessment, 2000). These sources include solar energy, geothermal energy, biomass energy, hydropower energy, ocean energy and wind energy. Renewable energy is among the primary, domestic and clean energy sources. In other words, it is an inexhaustible source of energy (Bilgen et al., 2004). Currently, in line with the improvement of the quality of life, the industrialization of developing countries and the increase of the world population, the consumption of fossil fuels has increased significantly. The excessive increase in fossil fuel consumption has not only led to an increase in the reduction rate of fossil fuel resources. Rather, it has a serious and harmful effect on the environment and causes health risks to increase and dangerous changes in the climate of the planet (Farhad et al., 2008). Changes to improve the environment are being accepted globally, especially in developed countries. The society is slowly moving towards the search for sustainable production methods, minimizing waste, reducing pollution caused by devices, protecting local forests and reducing greenhouse gas emissions (Sims, 2003). The 1992 United Nations Framework on Climate Change (UNFCCC) laid the crucial groundwork for mitigating greenhouse gas (GHG) emissions. It emphasized the imperative need for reducing emissions to avert catastrophic environmental consequences (Chiari & Zecca, 2011).

In this section, we demonstrate the research question and state the objectives of the research. There is a problem, how many types of renewable energy are there in the world and which is the best renewable energy? The objectives of this research are that, there are seven types of renewable energy. Hydrogen energy is the best renewable energy.

The paper is structured in the following manner: In Sec. 2, materials and methods is introduced and discussed. In Sec. 3, types of renewable energy are explained. Ultimately, the paper ends with results and conclusions.

MATERIALS AND METHODS
This is a review paper therefore many databases were used for literature, these databases are including Scopus, Google Scholar and semantic scholar.

Renewable Energy Sources

Renewable energies will play an important role in the future of the world, these sustainable energy sources not only safeguard the environment but also contribute significantly to the reduction of greenhouse gas emissions. Renewable energy sources fulfill the energy requirements of households (Zakhidov, 2008).

There are seven types of renewable energy usage nature instead of world, each of which has been investigated.

1. Hydrogen Energy

One of the lesser known renewable energies is hydrogen. Hydrogen can be used as fuel. There is no element in the universe as abundant as hydrogen. Therefore, the best energy is renewable. The source of energy is endless. The use of hydrogen as a fuel is less because it is not economical. When we convert water into hydrogen and oxygen, there will be no side pollution. There are also companies that use water to obtain hydrogen. Another problem is that it is very dangerous to store and transport, because hydrogen is highly flammable, the slightest accident may lead to an explosion (Yue et al., 2021).

2. Hydropower Energy

Hydropower is the kinetic energy of flowing water, converting it into a potent source of electricity (Ellabban et al., 2014). Hydropower can disrupt aquatic habitats and their inhabitants, necessitating ongoing monitoring and management of water quality to mitigate its impact (Okot, 2013).

3. Wind energy

Wind energy boasts numerous positive impacts and stands out as one of the cleanest energy sources available. Yet, it's crucial to acknowledge certain limitations. Among these, the primary concern lies in its impact on wildlife, both directly and indirectly, notably affecting migratory birds despite being considered relatively compatible with animal welfare (Saidur et al., 2011). Some other negative impacts include noise, interference with telecommunication signals, and visual unattractiveness (Mohtasham, 2015).

4. Solar energy

The sun's boundless energy potential suggests that solar power has the capacity to replace fossil fuels entirely, meeting all our energy needs without limitations (Kabir et al., 2018). Solar energy stands out for its non-polluting nature, posing no harm to the environment or human health. Additionally, it offers a pathway to energy security, given its ubiquitous availability across the planet (Timilsina et al., 2012). China possesses abundant solar energy resources. However, despite this considerable potential, the adoption rate of solar by households remains relatively modest at around 193.4 kWh per 1000 households (Mauthner et al., 2016).

5. Biomass energy

Biomass energy, also known as bioenergy, is derived from converting organic matter, obtained directly from land products or various crop residues (Ellabban et al., 2014). Bioenergy offers significant socioeconomic advantages as its production stimulates employment and income in rural areas. Moreover, it plays a pivotal role in alleviating poverty in developing nations (Bildirici, 2013).

6. Geothermal energy

Geothermal energy is the renewable energy sourced from natural processes within the Earth's interior (Owusu & Asumadu-Sarkodie, 2016). Natural mechanisms like water and steam facilitate the transfer of geothermal energy to the Earth's surface. Various technologies harness this energy, including district heating, geothermal heat pumps, hydrothermal reservoirs, among others. Additionally, ongoing advancements like Enhanced Geothermal Systems (EGS) represent innovative technologies currently under development (Halkos & Gkampoura, 2020).

7. Ocean energy

Ocean energy encompasses the energy stored within the ocean, generated by the interplay of wind and waves (Owusu & Asumadu-Sarkodie, 2016). It categorizes into six main types: ocean wave, tidal range, tidal current, ocean current, ocean thermal energy, and salinity gradient (Uihlein, 2016). Wave energy, the most prevalent form, results from powerful winds generating large waves. These waves' energy is captured by converters, then transformed into electricity (Owusu & Asumadu-Sarkodie, 2016). Ocean energy boasts a minimal environmental footprint, generating no emissions or waste. It stands as a consistently available and abundant resource, often predictable in its availability (Melikoglu, 2018).

RESULTS

The primary characteristic of these energy sources are their inherent compatibility with the environment. There are seven types of Renewable energies nature, these sources include hydrogen energy, solar energy, geothermal energy, biomass energy, hydropower energy, ocean energy and wind energy (Bilgen et al., 2004; Okot, 2013). Renewable energy does not produce polluting and harmful gases for the atmosphere. Renewable energies do not produce waste and problematic residues. These energies are inexhaustible, but non-renewable (fossil) energies have limited and finite resources (Farhad et al., 2008). There is no element abundant hydrogen in the world Therefore, it is the best renewable energy (Yue et al., 2021). These energies can be produced in every regionally and locally, but fossil energy sources exist only in some regions. These energies cause to improve the level of small communities because their equipment is often installed in rural areas.

CONCLUSION

In conclusion, severn types of renewable energies sources and their significant usage and damages are reviewed.

In the course of this research, an examination has been conducted on seven distinct types of renewable energy sources. These sources include hydrogen energy, solar energy, geothermal energy, biomass energy, hydropower energy, ocean energy and wind energy.

Using renewable energy sources could help to reduce the emission of greenhouse gases in to atmosphere. These energies can be produced in every regionally and locally, but fossil energy sources exist only in some regions.

There is no element abundant hydrogen in the world. Therefore, it is the best renewable energy. Ocean energy boasts a minimal environmental footprint, generating no emissions or waste. Wind energy has negative impacts include noise, interference with telecommunication signals, and visual unattractiveness.

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