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Energy and its Participation in the Development of Skill India

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I. INTRODUCTION

Skills and their development are at the centre of India's agenda at present. The recent National Skill Development Policy by the Government of India states that skills and knowledge are driving forces of economic growth and social development. India's skills targets are immense and ambitious: creating 70 million new jobs by 2012 and having 500 million skilled by 2022. A key Indian agency, the National Skill Development Corporation (NSDC), has a mandate to skill up 150 million of these 500 million by then.

Energy plays an important role in the progress of country. If a country has sufficient resources it develop and progress very fast. The utilization of energy plays the key role in the progress of the country. If we saw the developed and developing county and its utilization of energy, we find that the developing country was not use the energy recourses in comparison to developed country. According to the Indian Government if utilize our energy recourses the become decrease pollution, illness, dependency to the other country and its increase the economic wiliness of the citizen of the country.

II. TYPES OF ENERGY

A. *Conventional Sources of Energy*

Conventional sources of energy are as follows:

1) Coal
2) Petroleum
3) Lignite
4) Nuclear Energy
5) Natural Gas
a) LPG
b) LNG
6) Electricity

B. *Non Conventional Energy*

1) Bio Energy
2) Solar Energy
3) Energy from urban waste
4) Wind power energy

III. GREEN AND SUSTAINABLE ENERGY; ENVIRONMENTAL CONCERNS

In the past three decades, research and development in green energy has exploded, yielding hundreds of promising new technologies that can reduce our dependence on coal, oil, and natural gas. But what is green energy, and what makes it a better option than fossil fuels? Green energy comes from natural sources such as sunlight, wind, rain, tides, plants, algae and geothermal heat. These energy resources are renewable, meaning they're naturally replenished. In contrast, fossil fuels are a finite resource that take millions of years to develop and will continue to diminish with use. Renewable energy sources also have a much smaller impact on the environment than fossil fuels, which produce pollutants such as greenhouse gases as a by-product, contributing to climate change. Gaining access to fossil fuels typically requires either mining or drilling deep into the earth, often in ecologically sensitive locations. Green energy, however, utilizes energy sources that are readily available all over the world, including in rural and remote areas that don't otherwise have access to electricity. Advances in renewable energy technologies have lowered the cost of solar panels, wind turbines and other sources of green energy, placing the ability to produce electricity in the hands of the people rather than those of oil, gas, coal and utility companies.

Green energy can replace fossil fuels in all major areas of use including electricity, water and space heating and fuel for motor vehicles.

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A. What is Green Energy?

Green energy refers to energy derived from renewable sources with a low environmental impact and includes solar, wind, geothermal, biogas and hydroelectric energy. Green energy sources don't create harmful greenhouse gases at the same rate as fossil-fuel energy sources. Nonrenewable sources of energy such as the fossil fuels oil, coal and natural gas are finite, and elements such as the uranium used for nuclear power have limited availability. Renewable sources of energy take their power from wind, the sun, water movement, organic plants, waste material and the heat from the Earth.

Green energy encompasses the cleanest renewable sources of energy. Solar energy is derived from the Sun's rays, and wind turbines create energy by harnessing the power of the wind. Hydroelectricity utilizes the power of rapidly moving water, and energy from biomass is derived from organic materials such as human, animal and plant waste. Power sources that work by capturing the Earth's heat are called geothermal sources. In addition to using renewable sources that reduce greenhouse gases, green energy also avoids environmentally harmful extraction techniques such as drilling, mining and fracking. The by-products from nuclear power include radioactive waste, which is expensive to store and is harmful to humans, animals and the ecosystem.

B. Types Of Green Energy

Research into renewable, non-polluting energy sources is advancing at such a fast pace, it's hard to keep track of the many types of green energy that are now in development. Here are 6 of the most common types of green energy:

1) Solar Power
2) Wind Power
3) Hydropower
4) Geothermal Energy
5) Biomass
6) Bio-fuels

a) Energy Conservation: In green technology, energy conservation use of equipment which requires lesser amount of energy, low consumption of electricity, reducing the use of fossil fuels to generate the same.

i) Water Treatment: The process use to make the water recycling the water for the end users. The use of such water in different purposes among drinking water, industrial use, medical use, irrigation and other uses. Basically, as we are concentrated on environment after use.

ii) Air Pollution Control: Air pollution control comes under green technologies which minimize the level of adverse impact in the environment due to air pollution.

iii) Sewage Treatment: The objective of sewage treatment in green technology is to give safe fluid waste stream and solid waste disposal or reuse which are environmentally correct.

b) Advances In Green Technologies For Urban Life: The field of Green Technology is expanding in a very fast manner. Different sectors of society are using techniques in their operations which are characterized as Green & Clean Technologies.

i) Solar Cell: It directly converts the energy in light into electrical energy through the process of photovoltaic. Generating electricity from solar energy means less consumption of fossil fuels, reducing pollution.

ii) Hydrogen and Fuel Cells: A fuel cell is a device that converts the chemical energy from a fuel into electricity by a chemical energy from a fuel into electricity by a chemical reaction with an oxidizing agent. Fuel cells are more efficient to power cars when compared to our conventional internal combustion engines. The energy efficiency of these cells around 40-60%.

iii) Green Buildings: Green buildings is the practice of creating structures and using process that are environmentally responsible and resource efficient throughout a building life-cycle from sitting to design, construction, operation, maintenance. It is sustainable or high performance buildings.

iv) Rain water Harvesting: Rain collector systems are extremely simple mechanical systems that connect to a gutter system or other rooftop water. Collection network and store rain water in a barrel for later non potable use.

C. Local Green Energy Systems

Those not satisfied with the third-party grid approach to green energy via the power grid can install their own locally based renewable energy system in the small scale industry. Renewable energy electrical systems from solar to wind to even local hydro-power in some cases are some of the many types of renewable energy systems available locally. Additionally, for those interested in heating and cooling their dwelling via renewable energy, geothermal heat pump systems that tap the constant temperature of the earth, which is around 7 to 15 degrees Celsius a few feet underground and increases dramatically at greater depths, are an option over conventional natural gas and petroleum-fueled heat approaches. Also, in geographic locations where the Earth’s Crust is especially thin, or near volcanoes (as is the case in Iceland) there exists the potential to generate even more electricity than would be possible at other sites, thanks to a more significant temperature gradient at these locales.

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Production of different energy in India

Year	Cumulative Capacity of Solar power in MW	Cumulative Capacity of wind power in MW	Cumulative Capacity in BU
2010	161	13064	771.551
2011	461	16084	811.143
2012	1205	18421	876.887
2013	2319	20150	912.056
2014	2632	22465	967.150
2015	3744	23447	1048.673
2016	6763	26777	1107.822
2017	12289	32280	1160.141
2018	21651	34046	1206.306
2019	28181	36625	1041.988

D. Findings

We discuss the status, opportunities and challenges in using Green Energy for sustainable development of India. The Renewable Energy Generation technologies includes Solar- photovoltaic, Solar -Thermal, Wind, Hydro, Bio-mass, Tidal energy generation. The photovoltaic power generation system keeps growing in the last two decades to produce promising source of energy. Solar energy is so enormous and free in most parts of the world & has become economical source of energy in many applications. On a clear sunny day the sun's radiation reaching on the earth can be 3000 watts per square meter depending on the location. The Fig -1 & Fig -2 depicted the typical set up of roof- top solar water heater system and wind power generator respectively.

Fig-1: Solar water heater system

Fig-2: Wind power Generator

Since Solar- photovoltaic Generation system is growing very rapidly as a promising source of renewable energy due to its many advantages Majority of the nations have installed the grid -connected Solar -PV system to provide best alternate source of energy. The trends & break-up of Energy Generation worldwide are depicted in Fig .3 & Fig.4 respectively. It is clear that hydro and wind take 85 % of the total expected Green Energy. Whereas the solar and Geo-thermal energy only 2% each of the total expected Renewable energy. The biomass and tidal contribute 11% of the total expected renewable energy.

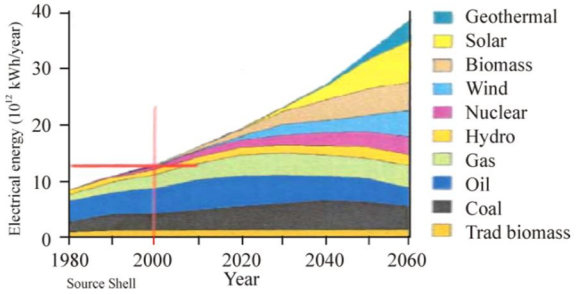

Fig. 3: Expected Trends of Energy Generation (Word wide)

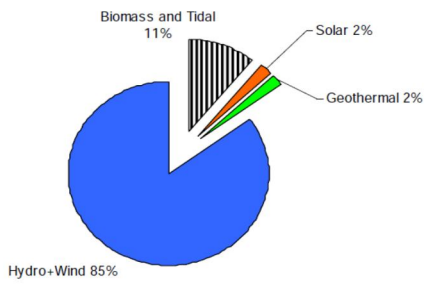

Fig. 4 : Expected Break-up of Renewable Energy by year 2035

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The Solar- PV generation scenario (Global) is depicted in Fig. 5, it is observed that the Solar- PV power has grown exponentially to a capacity of 299 GW in 2016. As far as growth of Solar -PV system Generation is concerned; China followed by Japan and United states and became the second leader in Solar-PV generation behind Germany as shown in Fig. 6. The photovoltaic generation has grown by 38% to a total of 139 GW worldwide.

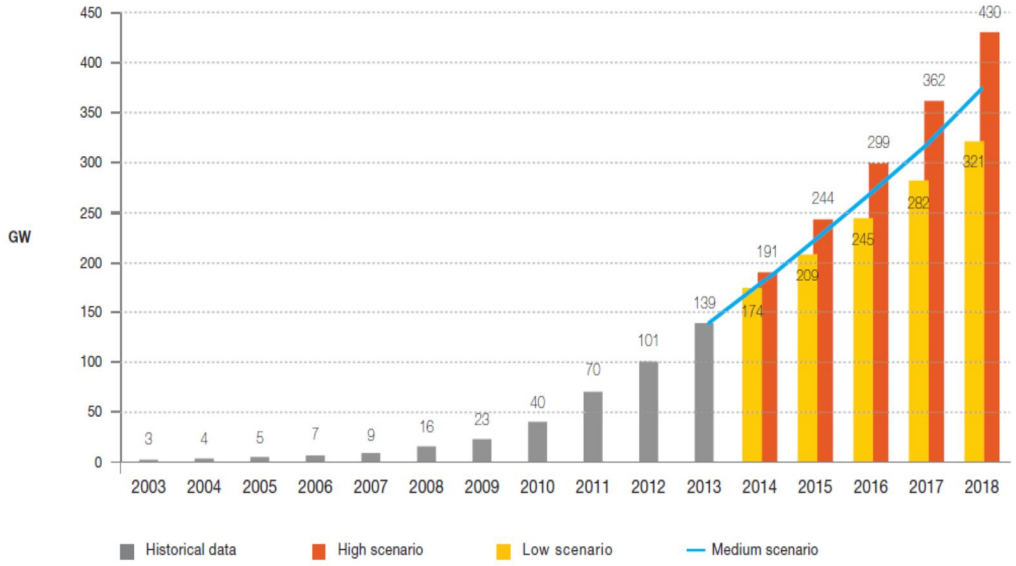

Fig.5: Forecast of Solar -PV Generation till 2018 (Global) by EPIA
(Source: European Photovoltaic Industry Association)

India is the fourth largest in Solar -PV generation after China, USA and Russia. India's primary energy consumption comes from crude oil (29.45%), natural gas (7.7%), coal (54.5%), nuclear energy (1.26%), hydro electricity (5.0%), wind power, biomass electricity and solar power is 995 Mtoe in the year 2016. India imports highly dependent fossil fuel to meet its energy demands by 2030. India energy dependence is expected to exceed 53% of the country total energy consumption. India imported 159.26 million tons of crude oil in 2009-10, which amounts to 80% of its domestic crude oil consumption and 31% of the country's total imports are oil imports. As India's rapid economic growth, it has one of the world's fastest growing energy markets. It is expected to become second largest contributor to fulfill the global energy demand by 2035.

Renewable energy in India comes under the purview of the Ministry of New and Renewable Energy. Early 1980s India was the first country to set up a ministry of non-conventional energy resources. The cumulative grid interactive of India's excluding large hydro has reached 29.9 GW, of which 68.9% comes from wind and 4.59% of the renewable energy installed capacity contributed solar-PV nearly in India.

E. Utilisation Of Power In Small Scale Industry

Small and medium enterprises have an important role to play in the present context due to its capacity for employment generation, technological innovation, raising exports and developing entrepreneurial skills. They reduce regional imbalances. They have been accorded a strategic position in the successive five year plans towards fulfillment of our socio-economic objectives and helped to achieve our dictum of growth with equity. Since the early 1990s', Indian SMEs have been exposed to intense competition due to the accelerated process of globalization. But at the same time, globalization has brought new opportunities and challenges to Indian SMEs.

India used to support small and medium industrial sector since independence compared to many developing countries. Series of institutions have been set up by the Central Government, State Governments, and provided financial assistance, technical consultancy, information, technical input, training, legal advice, and marketing support and helped in the healthy development and progress of small and medium industries. But a pertinent question that has often been emerged here, whether their capacity has been utilized to the fullest extent or not. Through this paper an effort is made to study the capacity utilization of small scale and medium industries.

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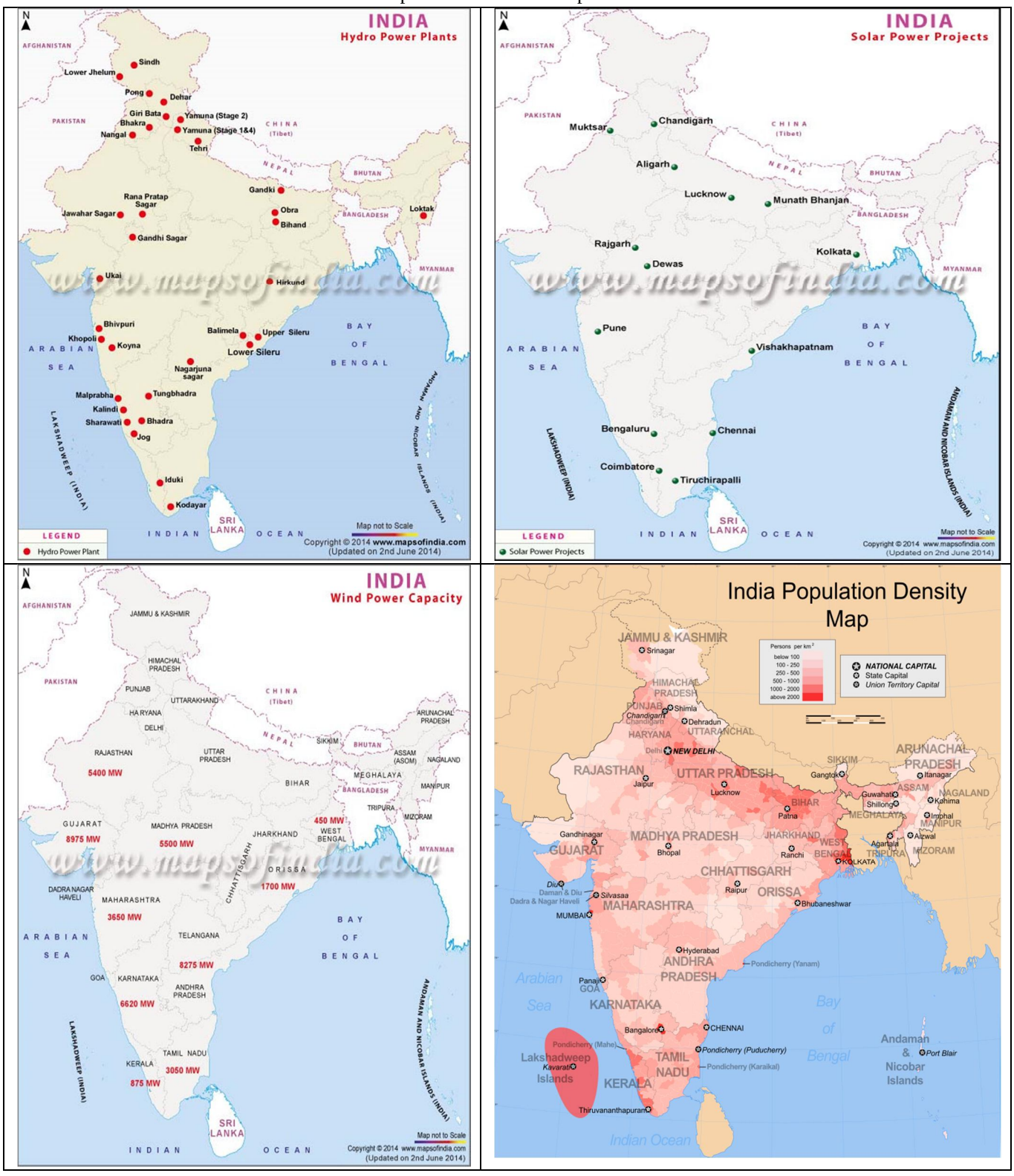
IV. COST OF DIFFERENT POWERS

The Cost of solar and wind power energy is low in comparison to hydro power energy. This is very helpful to reduce the cost of product.

Indian Population and different power station-



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V. CONCLUSION

Renewable energy, after its generation, needs to be stored in a medium for use with autonomous devices as well as vehicles. Also, to provide household electricity in remote areas (that is areas which are not connected to the main electricity grid), energy storage is required for use with renewable energy. Energy generation and consumption systems used in the latter case are usually stand alone power systems.

Some examples are:

A. Energy carriers as hydrogen, liquid nitrogen, compressed air, oxyhydrogen, batteries, to power vehicles.
B. To provide household electricity in remote areas (that is areas which are not connected to the main electricity grid), energy storage is required for use with renewable energy.
C. To provide electricity in remote areas for small scale industry in which not the main electricity grid.
D. The Cost of solar and wind power energy is low in comparison to hydro power energy. This is very helpful to reduce the cost of product.
E. Sometimes we find that we have all types of resources as like manpower, land, raw materials etc but due to shortage of power we cannot start the industry, It is a best option to use the solar and wind power energy.
F. These sources will last as long as earth receives light from the Sun.
G. These sources are freely available in nature
H. These sources don't cause any pollution.
I. Flywheel energy storage, pumped storage hydroelectricity is more usable in stationary applications

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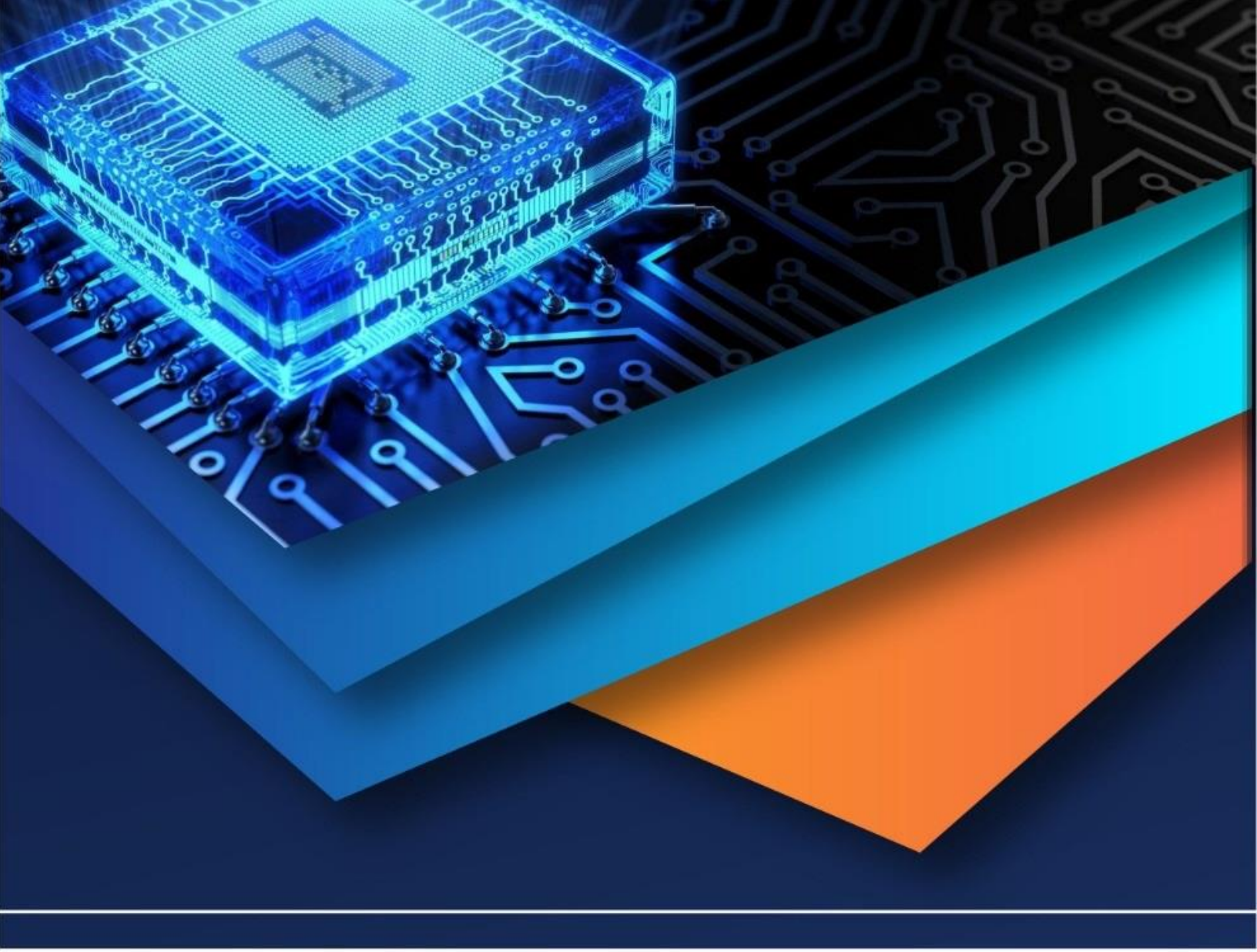

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