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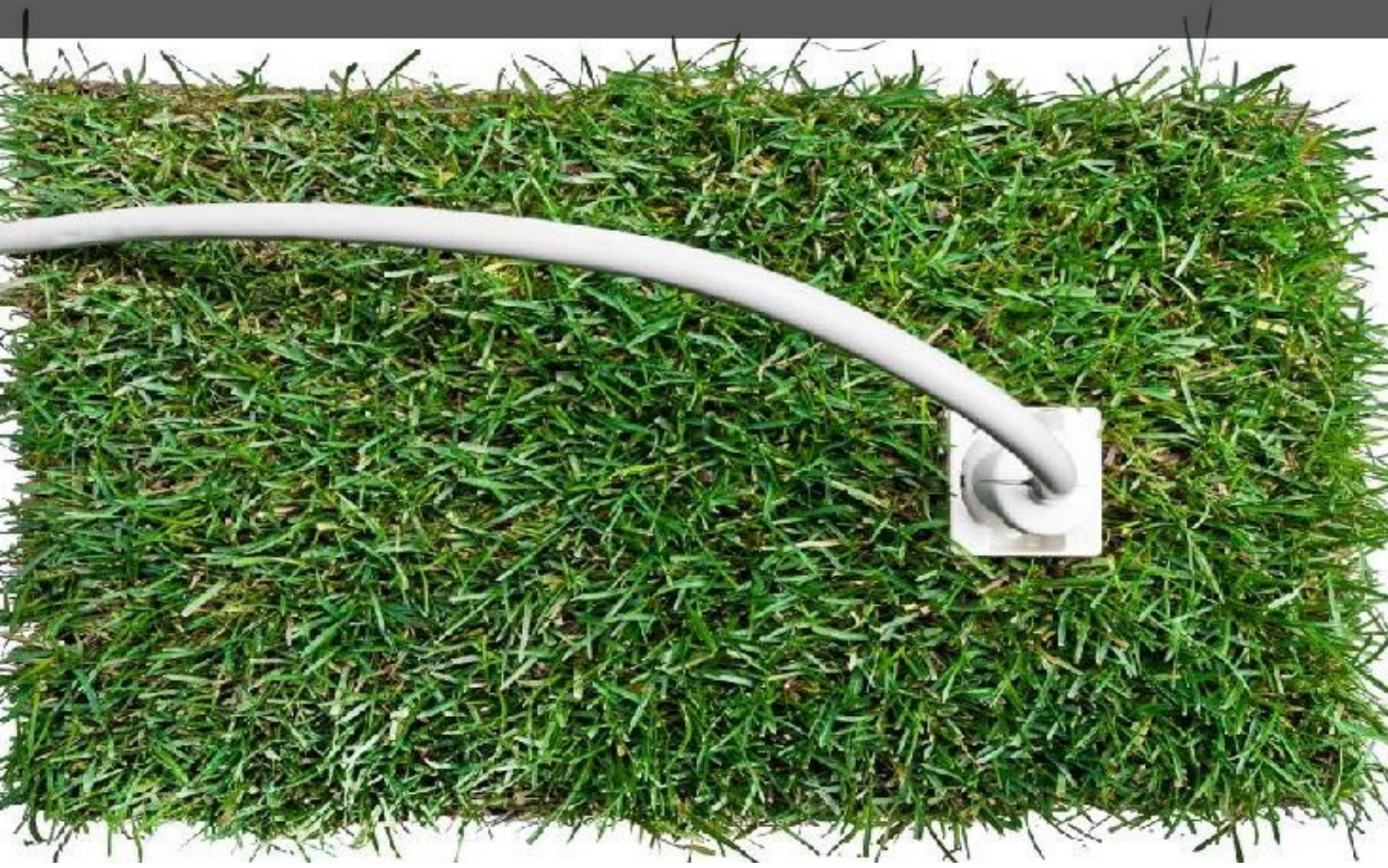
Green Technology and its Implications Worldwide

By : Muhammad Zaid Qamar*

Mariya Noor, Dr. Wahid Ali, Mohammad Obaid Qamar



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Abstract:

Green tech is an umbrella term that encapsulates any technology that is created to be environmentally friendly from its production line all the way to its usage. It is a continuously evolving form of technology which aims to be less taxing to the natural resources as humans are consuming the resources faster than it can be replenished. The major goal of green technology is to help control climate change, protect the natural environment, reduce our dependence on Non-Renewable resources such as fossil fuel, and heal the damage done to the environment. Few sectors that are actively investing in this technology are Transportation, Energy, Waste Management Sectors. While there are many advantages of using this technology, it needs to cross some hurdles before it can become a new normal. Over the years' green technology has become one of the employment sectors with the fastest growth. Day after day it is getting more obvious that we need to invest more in green solutions for the survival of mankind and the necessity of green tech lies in reducing the risks posed to the environment and in conserving natural resources. As discussed in this paper, even if we have now emerging technologies for reducing emissions are available for implementation, including wind power, improved solar cells, and electric vehicles, we still need to deal with the issue of technology transfer as the developing countries produce majority of the world's pollution, particularly CO2 and other greenhouse gases due to the careless environmental policy implemented.

KEYWORDS : Green technology, Natural resources, Employment sectors, Emerging technologies.

Author : Muhammad Zaid Qamar[1]*

CoAuthors : Mariya Noor[2], Dr. Wahid Ali[3], Mohammad Obaid Qamar[4]

[1] The Author is currently pursuing Final year at Aligarh Muslim University, India. Contact no.- +91-7417921142
Email - mzqamar@myamu.ac.in
[2] The 1st Coauthor is currently pursuing 3rd Year (Undergraduate)/Student at Aligarh Muslim University, India.
Contact no.- +91-9756126692 , Email - Khalidmariya592@gmail.com , gk7960@myamu.ac.in
[3] The 2nd Coauthor is Assistant Professor at Jazan University, Kingdom of Saudi Arabia. Contact no.- +966-541139960
Email - Wahid8petro@gmail.com
[4] The 3rd Coauthor is Research Scholar at Yeaungnam University, South Korea. Contact no.- +91-9068337191
Email - Obaidqamar21@gmail.com

Introduction

The term technology usually refers to the application of various techniques, skills, methods and processes for any and all practical purposes or to achieve certain objectives such as scientific investigation or research. A technology that is environmentally friendly in its production, supply chain or usage is referred to as Green Technology or Green Tech for short. Green tech is an umbrella term that continuously develops products, system or equipments which are less taxing to the natural environment and its resources which limit and diminishes the negative effect of human exercises. The world we live in has a limited amount of natural resources which are referred as Non-Renewable resources or the resources which can be depleted during the course of time. Human activities caused many to already perish from the face of the Earth. According to the estimate Global Footprint Network in 2018, humans are consuming natural resources 1.7% faster than the Earth can replenish. Therefore, the need of the hour is that we as a society should invest in Green Tech as they are:

a) Less taxing to the natural environment thus reduces the resources depletion.
b) Emission of greenhouse gases (GHG) (CO_2, CH_4, N_2O) is considerably less or zero.
c) Usage of renewable resources (wind, solar) is encouraged.

Understanding Green Tech

The main goal of producing Green Tech is to control climate change, protect the natural environment, reduce our dependence on Non-Renewable resources such as fossil fuel, and heal the damage done to the environment. The market for Green Tech is relatively in its starting stage but the investment capital is already blooming. While it is true that green tech has gotten progressively mainstream in the modern age, components of these business policies have been being used since the 18th and 19th century when the Industrial Revolution was at its peak. Manufacturers were trying to minimize their negative environmental externalities in the early 19th century by modifying manufacturing practices to create less soot or waste by-products. In any case, green innovation as a perceived business division didn't generally create until the 1990s. The global cumulative investment in renewable forms of energy and green technology processes exceeded $200 billion in the year 2017, according to a United Nations study published in 2018. $2.9 trillion has also been invested in sources such as solar and wind power since 2004. The UN also reported that China was the world's largest investor in the field, with about $126 billion invested in 2017.

Sectors Using Green Tech

a) **Energy Sector:** Right now, this is the fact that the majority of the world's energy is being produced by burning fossil fuels. Green tech can be used to build alternative, more environmentally sustainable fuel sources than fossil fuels. Usually fossil fuels produce waste as a by-product of their production. Instead of fossil fuels; solar, wind, and hydroelectric dams can be used, since they are environmentally cleaner and do not produce any harmful by-products.

b) **Transportation Sector:** One of the biggest contributors of global GHG emission are conventional fuel based vehicles. Therefore, many companies are incorporating Green Tech in transportation infrastructure and vehicles in the form of electric vehicles and compressed natural gas (CNG) buses.

c) **Waste Management Sector:** Green Tech is also being used in waste management sector for transporting, storing and recycling of wastes.

d) **Water Filtration:** Around the world, green tech is being widely used for water purification. Countries around the world where water supply is limited, green tech may be used for purifying polluted water or extracting salt from seawater to improve the supply of safe drinking water.

e) **Air Purification:** Green tech is also being used to clean the polluted air by decreasing the carbon emissions and gases released from the industrial sectors.

Advantages of Green Tech and Hurdles to Cross

- Helps in recycling and managing waste materials.
- It is environmentally friendly as a result emit zero or less harmful materials in the environment
- Maintaining the Green Tech is very cost efficient.
- Green Tech helps conserve energy
- It is also helping in rejuvenating the health of our ecosystem.

While there are many advantages to the use of Green Tech there are many hurdles in the way of Green Tech that first need to be cleared. We as a civilization grew largely depending on the fossil fuel as our main energy source. Statistics show that around 90% of our energy needs is fulfilled by burning fossil fuels. The shift from using cheap, energy dense and abundantly available fossil fuel towards environmentally friendly green tech will surely prove to be a major hurdle to cross. Widespread usage of wind and sun energy would surely help us to move away from relying on fossil fuels, but the expansion of wind and solar technologies will prove to be a difficult task because of the fact that the sun does not always shine and wind does not always blow. This unreliability can be solved by storing the energy generated and using when it is needed. Few of these green technologies also cannot be anywhere such as tidal energy can only be utilised during high tides, geothermal energy can only be utilised in a geologically unstable place. We will also require new transmission lines to

shuttle existing energy around the electricity grid and to bring wind and solar energy generated in the prairies and deserts to cities and towns where it's needed. Although there exist few hurdles in the way of Green technology but in the long run the usage of green tech will be worth the extra mile, we will put in it.

Green Nanotechnology

Green nanotechnology is the use of nanotechnology to improve environmental sustainability of processes which produce negative externalities. It involves processing green nano-products and making use of nano-products to promote sustainability. The study is underway on the use of nanomaterials for purposes including more efficient solar cells, practical fuel cells and environmentally friendly batteries. The most advanced energy-related nanotechnology initiatives are: storage, conversion, manufacturing changes by reduction of materials and process speeds, energy conservation and increased renewable energy sources. Green nanotechnology also offers great potential in treatment of water due to their unique activity towards recalcitrant contaminants.

The Case of Electric Vehicles

Electric vehicles (Evs) are proving to be a more viable option over conventional vehicles. Electric cars and trucks are proving to be even cleaner than the most efficient traditional vehicles, in terms of air pollution and greenhouse gas emissions. Charging EVs exclusively from renewable electricity can be proven to be completely emission free. While it is true that no GHG emissions come directly from EVs but they run on electricity which is still predominantly derived from fossil fuels in most parts of the world. Energy is also used to manufacture the vehicle-and the battery in particular. There are many studies being published showing that the carbon footprint of an EV is the same as conventional vehicles but the problem with that data is it includes the carbon emissions of power plants that produce the electricity using fossil fuels. That same argument, however, can be applied for conventional cars, taking into account the amount of carbon emissions produced during the drilling and refining of crude oil. The benefits of EVs are smaller in countries with coal-intensive electricity generation. However, as the world is moving towards decarbonising power generation, driving emissions for existing EVs will fall drastically and output emissions for new EVs will also decline. Most of the maintenance cost is also eliminated as the moving parts in an EV is very less. In 2019, a Nissan Leaf EV 's lifetime emissions per kilometer were found to be about three times lower than the average conventional car, even before accounting for the falling carbon intensity of electricity generation during the lifetime of the car. However, it is difficult and complex to draw a comparison between the conventional vehicle and electric vehicle as the comparison largely depends on the size of the cars, the precision of the calculations used for

fuel-economy, how emissions are measured, what driving habits are presumed, and even the conditions in regions where the cars are being used. No single estimation applies everywhere. There is also considerable uncertainty about the pollution associated with the manufacturing of EV batteries, with various studies reporting vastly different figures. As battery prices fall and vehicle producers continue to produce larger batteries with longer driving ranges, emissions from battery manufacturing will have a greater effect on the environmental benefits of EVs. Around half of the battery output emissions come from the energy used in the processing and installation of the batteries. Manufacturing of batteries in regions with relatively low carbon electricity or in renewable energy-powered plants such as Tesla's Gigafactory in USA would greatly help in reducing battery pollution. Electric vehicles emissions primarily come from the production and distribution of the electricity being used. According to an Australian study. A typical petrol driven car generated 355 grams of CO2 per kms driven whereas a typical electric vehicle charged using an average electricity grid produced around 40% less CO2 emissions at 213 grams per kilometer which proved that even with the dirty grid electricity EVs prove to be more environmentally friendly.

Most of the emissions over the lifespan of both electric and conventional vehicles in most countries come from vehicle usage rather than car production. However, there are exceptions in countries, like Norway or France, where almost all the electricity comes from near-zero carbon sources, such as hydroelectric power or nuclear power. However, while it is difficult to minimize the pollution produced by burning a litre of petrol (motor spirit) or diesel, the same is not true for the electricity. Electric vehicle life cycle emissions are much lower in countries like France (which obtains much of its energy from nuclear power) or Norway (from renewables). However, if the emissions targets set out in the 'Paris Agreement' are to be achieved, producing power must become considerably less carbon-intensive, giving further advantage to electric cars over traditional ones. For example, in the UK, power generation emissions have dropped to just 38% in just past three years and are predicted to fall by more than 70 percent by the mid-to-late 2020s.

Why Is Green Technology Necessary

Green technology 's primary aim is to control global warming and reduce the greenhouse effect. The principal concept is to develop innovative inventions that do not affect the natural resources. It will result in less damage to humans, animals and our planet's overall health. Now it is obvious that our world is beginning to suffocate from all the waste that we produce. But if there's a will, then there's a way to make this problem much smaller. The successful use of green technologies will make a major contribution towards reducing emissions. This is why many developed and some developing countries are now transitioning towards this form of technology to help protect them from harmful impacts on the climate.

Though the pollution problems are old enough, green technology, however, is a relatively new idea. It is becoming more common now because people have begun to realize that we are actually destroying our world. Green technology has become one of the employment sectors with the fastest growth. And because protecting our world has become important, green technology is certainly far more than a trend that will soon pass. The necessity of green tech is evident by the fact that pollution kills over 9 million people yearly. Broadly speaking, the necessity of green tech lies in reducing the risks posed to the environment and in conserving natural resources. This would also ensure that clean , renewable energy sources are used to prevent the other non-renewable sources from being fully depleted. One case at question is solar roof tiles, a brainchild of Tesla's chief executive, Elon Musk. These solar roof tiles are different from the traditional solar systems currently available. According to the CEO, Elon Musk, these tiles produce energy, are cost-effective in sales, better insulated and have a longer life. Green tech will also help us reduce slow global warming. In the last 100 years the global surface temperature has significantly increased between 0.4 and 0.8 ° C. The Intergovernmental Climate Panel predicts the temperature crawl will range from 1.4 to 5.8 ° C by 2100. Such a temperature rise combines with intensified greenhouse effects. Some of the negative impacts of this include smog emissions, ozone depletion, ocean acidification, and plant growth changes. Nonetheless, with the aid of green tech, climate change can be reduced as it taps into future new energy production methods and rising carbon consumption.

Green technology is also trying to provide alternative sources of energy which do not deplete critical fossil fuels. It's also important to combat global warming by reducing greenhouse gas emissions such as nitrogen and carbon dioxide. To this end, some of the forms green tech has embraced include harnessing solar energy, fuel cells, wind energy, and geothermal energy. In addition to these renewable energy sources, green tech also offers approaches such as battery storage, green building, and metallic foams. The use of technology is already very widespread across the globe and is continuously growing. However, green tech sews technology and recyclable components together. Such an initiative helps to foster an atmosphere free of pollution which can sustain life. Green computers, for example, are being made. The current generation of computers are largely made of cadmium, lead, plastics and brominated fire retardants and can all be listed as environmentally harmful. Green tech works to manufacture computers which are made of safe parts for disposal. Throughout the construction industry, green technology is also playing a role by incorporating sustainable features. This new feature helps the building industry improve the value of the property by making it environmentally friendly. While green buildings' initial cost is high, they do reap well on the long haul. For example, geothermal installations can be expensive, but they use nearly 50% less power than standard systems. Geothermal pumps also minimize emissions of carbon dioxide by 70%. This lowers energy prices and, at the same time, preserves the earth by conserving her natural resources.

Simply put, green technology is proving to be crucial for our future survival. An ugly picture that is painted by the consequences of pollution and climate change give rise to the need and importance for such clean technologies. Green technology also provides alternative sources of energy, supports biologically degradable goods, encourages recycling, and promotes sustainable building growth. This also leads greatly to emissions reduction, decline in global warming and natural resources conservation.

Green Technology Transfer

Now that emerging technologies for reducing emissions are available for implementation, including wind power, improved solar cells, and electric vehicles, the new challenger in the room arises, that is, technology transfer. Generally, a developing economy country seeks to get advanced technologies invented and patented by multinationals, usually from developed countries in order to keep their growing economies balanced. However new and emerging technologies carry high cost which reflect the research and development that went into a technology, which are usually higher than the developing country can pay. Transfer of technology as the name suggests is when high-tech equipment is physically transported to another country by international trade. The UN Conference which was held on Trade and Development (UNCTAD) has drafted the International Code on the Transfer of Technology, (ICTT). The process of Technology Transfer is drive by push and pull factors. One factor pulls a technology into a developing market and the other factor pushes the technology away from the developed market. Market-based pull factors continue to take that technology into markets where ample technology demand and adequate economic resources are available to draw technology owners to meet demand.

Technology transfer is a two way process. In order to encourage the transfer of green technologies from industrial economies to the developing countries, both the supply and demand factors are supposed to be considered. On the supply side, investors and businesspeople involved in technology transfer demand a suitable as well as enabling environment in the recipient market, specifically the capacity and infrastructure to support production and management, and the regulations that promote more green technology growth. While on the demand side, local demand (pull factors) must occur for the effective adoption of green technologies. Also, developing countries must promote the transfer of green technology through the development of technological capacity and institutional structures to allow the transferred components and systems to be absorbed, adapted and enhanced if they want to adopt sustainable green tech. Because of the rapid growth and modernization of developing countries it is clear that the technology transfer is important. As of now, the majority of technology transfer is taking place in the largest emerging economies, including China, Brazil and India. However, it is not fully unidirectional. It is taking place, within and across the developed and developing countries in many ways. The most common transition method is the straightforward

purchase and sale. In addition, in-licensing and out-licensing agreements concerning new innovations and related knowledge as well as developing more advanced mechanisms to build, move and use technology also exists. However, there are some obstacles in front of technology transfer. One such obstacle is the economic barrier, which includes tariffs and other trade blocks, another one is the social barrier to technology adoption. While the economic barriers prevent a superior technology from being imported while social barriers prevent widespread adoption of technology because it is foreign or against societal norms.

Conclusion

Our Planet is on the verge of being collapsed under the pollution and our negative environmental externalities. We must cross every barrier and must continue to innovate in green technology. The market of green technology is on the all-time high as we are getting more and more aware of the environmental destruction we are causing. This awareness is pushing the market to introduce new and improved green technologies. The rise of Electric Vehicles and its demand is the live example of that demand. Because of the Paris Agreement many governments are also buying the green tech increasingly. For businesses being green is becoming a major opportunity in appeasing the crowd therefore they are buying green technology so that they can be perceived as the supporter of environmental sustainability. All in all, it is a win for the environment. Green technology innovations are being increasingly implemented and getting more and more improved and environmentally friendly**.**

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