

# Ecologically Safe-Engineering (Green-Technology)

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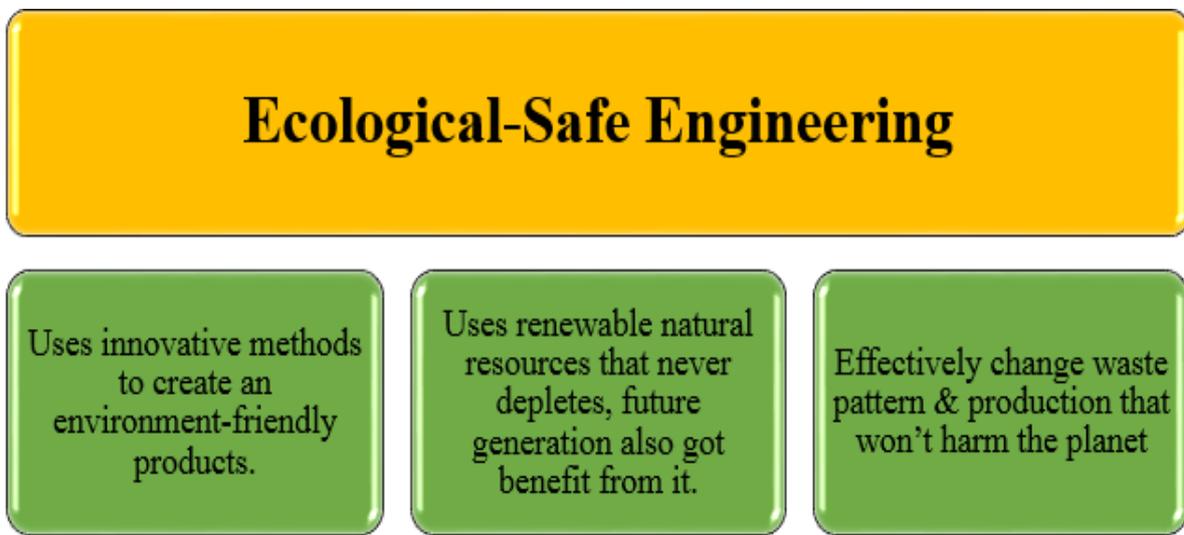
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**ABSTRACT:** *Green-technology is a useful technology by several industries to keep the practices of sustainability. The engineering to green-mission results in the green-market from growing novel product that are based on the core challenges of Green-technology. Developing green-technology needs a long learning efforts. The aim to this study that find out about the engineering of green-technology that is safe for the environment and provide no harms to coming future generation and also to study the advantages, disadvantages, roles and applications of green-technology that uses eco-friendly products that save the natural resources from depleting. Encouraging Green-growth needs to identifying & removing the barriers which restrict large-scale-distribution of clean-technology to growing countries, especially the less developed countries & small growing areas or states. The use of the green-technology cover much of the area in the future. The more economical-activity in the future depend upon making product which are more safe & more useful for environment. Government to different countries identifying essentiality of utilizing the green-technologies which are more environment-friendly. Green technology will create more new career openings with progress in future. The scope of this technology can be enhanced by creating attentiveness among people. The resourceful practices comprise the desires of people without initiating any harm to present natural-resource & protect it for future use. Green technology gives highly importance via letting the completion of the present desires.*

**KEYWORDS:** *Energy, Engineering, Environment, Friendly, Future, Green, Natural, Products.*

## 1. INTRODUCTION

Ecologically-Safe Engineering is also known as Green-technology which states that a system which uses inventive methods to make environmentally friendly products. Using these technologies and going-green which is friendly to the environment is one of the approach countries is looking for to support economic-growth & improve the lifestyles and living of Indian population. These technologies utilize renewable & natural-resource which never depleted down that helps future generations too and novel & the inventive energy-generation technique. Green technology utilizes green's engineering & green's-chemistry among latest technology. Disposability of the wastage is most significant factors for environmental-pollution and it can efficiently reform the pattern of waste and its productions in such a method so that it does not harm planet Earth. Green's energy, eco-friendly textile, organic agriculturing, green-building construction & production of related product & materials for supporting green business are expected to some of the possible areas for creation & growth. Applicably using solar-power and fossil-fuel are some of the form of green-technologies into the fields of energy-generation so the coming future generations get benefits by them without the harm to planet. Green-technologies comprise a large area for production & consumption technology. The use & adoption of these technologies involve use for environment technology for pollution prevention & control, assessment & monitoring -technology that utilized track & measure environment conditions and for remediation & restoration. Monitoring technologies are also used to track releasing of natural materials and the anthropogenic material to harm nature.



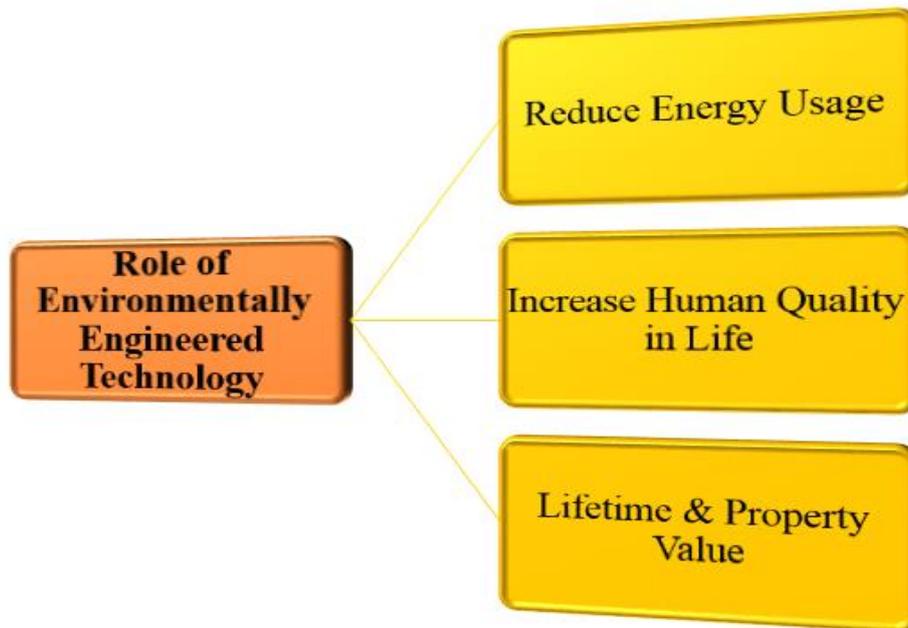
**Figure 1: Illustrating the brief description of Ecologically-Safe Engineering**

Ecological-Safe Engineering (Figure 1) uses various approaches and that are helpful in building safe green-environment. It is system that uses inventive methods that create an environment eco-friendly. It also uses renewable sources of energy and most importantly natural resources of energy which never deplete so that future coming generation can get benefit from it. This system can efficiently change pattern of waste and its productions such that does not harm our Earth. Green-innovation process is new to many firms established, adopting the green-technology and product & market context as well requires important efforts of learning. Green-innovation contribute in three ways and the ways are: developing path's based learning to green invention that involves multipath, dead ends & emerging branches, showing learn occur at the 3 main points- when new-path branch is opened (path initiation), during existed path (on path) and when experience by multiple-paths considered (across paths): these shows complexities of the green-technologies innovations, from two innovations practices; deliberates failure & intelligence trial & the error which gets managed for increasing chances of the success.

There is only fixed amount of natural resource present in the world from which some of them have already been ruined. Like- house-hold battery & electronic often contains hazardous chemical which can pollute groundwater after the disposal that contaminate the soil & water with chemicals. Food-crop that is sown on that polluted soil gives serious risk for human-health. This protection to biodiversity & ecosystem is at stake, also. Green-technologies are the application & development of different product, a system that utilized conservation of natural resources that minimizes & reduces negative-impacts to human activity.

*1.1. The ecologically safe engineering refers to the system or products that satisfy various criteria:*

- Minimize degradation to the Environment.
- Have low green-house gases emission which must be safe to use and promoted a healthy environmental condition to all forms to life.
- Conserve the use of natural resource & energy
- Promote the use of renewable-resource
- Help in production of alternative-fuel that reduces our dependency on conventional fossil-fuels
- Able to preserve & protect the environment
- Sustainable in a long-run
- Have potentiality in creating new-opportunities/jobs



**Figure 2: Illustrating the various Roles of Environmentally-Engineered Technology**

There are different roles (Figure 2) of green-technology in improving quality of Environment. One of the most important role is to reduce the usage of energy: we can minimize energy usage of nonrenewable energy and conserve it for the future. Other important role of green-technology is in increasing Human-Quality in Life: It makes to live Humans, Animals, and other living beings to live. The other main role of ecological engineered technology is Lifetime and Property-Value: green-technologies have long lifetimes due to proper maintenance. Importance of this technology that practicing of creating structure & using process which are environmental responsibly & resources-effective all over the whole cycles by siting for designing, then constructions then operations, then maintenances, their renovations & finally deconstructions. Its main purpose is to lessen the energy consumption as well as pollution because more we usage of non-renewable energy, higher is the pollution risk.

## 2. LITERATURE REVIEW

Green technology involves green-inventions. Green inventions comprise new products, new technologies, models or services which gives positive effects to the society and environment. It satisfies all the needs of coming generation or present generation without causing any harm to them. Richard Adams, et al. studied the theoretical development of innovation by sustainability approaches by adopting a framework that involves landscape which is tested, then shaped then refined and final a model that include development in the field. Yu-Shan Chen[2] found in their studied the green-invention performance, green imaging of small and medium enterprises and green main capability all were significantly less as compared to large enterprise in information & technology. Rosa Maria Dangelico[3] studied regarding the invention of green-products and found that the most relevant green products that are produced for innovation of green-technology are cost-effective, have competitive advantage, have increased the market shares, turnover and sales increases, have high profits, reputed, increases exports and productivity. Many factors are responsible for its development such as: commitments, collaboration, integration and capabilities. Cristina Diaz Garcia, Angela Gonzalez Moreno, et al. [4]studied about the ecological innovations and observed the increase in relevance of eco-innovation among several trends that arise in its research. They found it as improvement in a multi-level frame work of eco-invention with special emphasis on findings. Paul H. Driessen et al.[5] studied the development of an integrative frame work for new green-product which is based on its applicability. They have observed two case studies of industries and found is as a good basis for green product development. They found that greenness plays important roles in framework of the green targeting, green positioning & industry type.

Chris Foster and Ken Green [6] studied that investigation of green issue that influence whole processes of the researcher and its developmental as an aid for an innovations. They have found that companies having capacities and capabilities to push green issues in order to active opportunities for more development in order to speed-up the products and green services. Dayuan Li et al. [7] studied the effect

of quality managements of various green's inventions & found that Ecological parameter considerably alleviates negative impacts to quality administration on the green's management invention & green technologies invention both. This would obstruct the inventive change in administrative arrangement or procedure organization system from the current situation to completely novel which is conducive to sustainable development. Pascual Berrone et al. [8] studied the larger controlling and normative pressure that concerns environment issues that positively affect companies prosperity to involve in ecological-invention. They have also found the effect of inventions which is stronger with high specificity and resources availability which plays different characters. Bon, Mustafa, et al. [9] studied the relation among the total quality's management & its invention in service organizations for developing research frameworks. They have found an innovative plan that involved a scope of service industry that have conceptual framework. Hall & Christian Helmer[10] studied role of the protection of patent into transfer of green's-technology's. They have found the environment and information externalities which implies that patent protection might not be ideal instrument to stimulate invention in the area specifically in a variety of green-technology and the need for variation of local technologies as well.

### 3. DISCUSSION

Due to the degradation of environment humanity is going down into a hazardous position. The breakdown of natural food-system, polluted air and extreme weather event have indicated the determination to get clean forms of growth. Pollution is problematic by-product and fundamental threat also that lead significant changes in the environment.

3.1. *Green-technology has mainly categorized into two:*

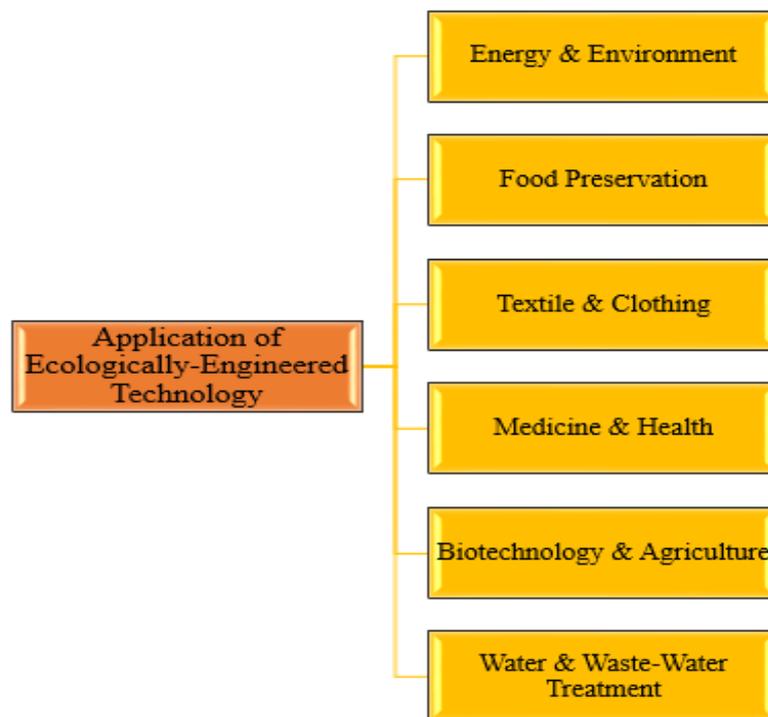
- 3.1.1. One deals with global-warming by reducing green-house gases emission and alternatively reducing the potential harmful effects on the Earth.
- 3.1.2. Other is associated with developing economic sustainable-growth that includes resource reduction, recycling and several aspects of the biosciences.



**Figure 3: Illustrating goals of Environmental-Safe Engineering or Green-Technology**

3.2. *Green-technology have important goals (Figure 3) which include:*

- 3.2.1. Natural-resources conservation use
- 3.2.2. Development of recyclable or reusable products
- 3.2.3. Bringing out the change in production pattern for reducing waste & pollution
- 3.2.4. To Find out the alternatives to the practice that poorly affect the human as well as environment.



**Figure 4: Illustrating different applications of Environmentally-Safe Engineered Technologies**

3.3. *There are various applications of green-technology but main comprising applications (Figure 4 & 5) of green-technologies are: Green-nanotechnology, Green-Chemistry, Environment-Preferred-Purchasing, Green-building, Energy, Sewage-treatment, transportation and agriculture:*

#### 3.3.1. Green's-Chemistry:

Innovation, design & its applications of the chemical process & products that eliminate & reduces usage & generation to dangerous substance that come under the green-chemistry. It prevents waste, maximizes atom-economy, least-hazardous chemical synthesis, provides safer-solvent & reaction conditions, chemical and products, increases energy efficacy, use of renewable feed-stocks, uses catalysts.

#### 3.3.2. Green-Nanotechnology:

It is the study of the ways by which nanotechnology can benefit ecologically. Less energy usage during production process, ability or recycling of used products, eco-friendly products usage is the main objective of Green-nanotechnology. It supports in providing clean water to large population by new filtration technique & ability to de-contaminate dirty water, waste-management & environmental remediation, increasing use of renewable-energy in solving efficacy issues.

#### 3.3.3. Environment-preferable-purchasing:

Government's-innovations the research to that product whose content & method for production contains smallest potential that impacts to environment & directives that all are favored product to government's-purchasing.

#### 3.3.4. Green-building:

It helps in reducing-emissions, reduces-waste, conserve-water and consumes low energy to that of conventional technologies. Green-building use material in more effective ways.

#### 3.3.5. Energy:

Today scenario has been changed a lot. In old times, people hardly thought for using solar-panels in place of heaters & cooking range. Green-technology have gone a lot of optimization that has made it feasible solution for most of energy-needs. People must use these alternative fuel solution because of cleaner fuel to that of conventional fuels like diesel, petrol & and natural gas.

### 3.3.6. Sewage-treatment:

It is done by using green-technology that makes water resource least polluted. This will permit the use of reused water for different purposes. Different bioreactors are used for such purpose- Settlers, Anaerobic Baffle Reactors, Anaerobic Filters, Plant Gravels Filters.

### 3.3.7. Transportation

- Rail-transport:

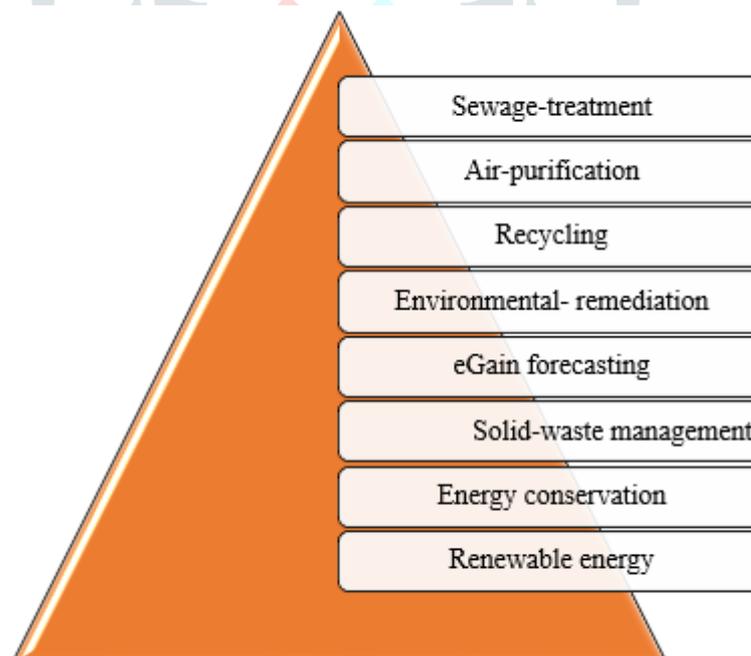
It is natural green mode of transport. It can have made greener by involvement of low energy consuming practice or renewable energy. Government of India has taken-up the initiatives in railways by the introduction of optimum light control-system that control loads of lightning of all kind.

- Electric-vehicle:

The one of the most ambitious and important initiative taken by the Government of India is National-Electric-Mobility-Mission-Plan. It has the potential to bring out a transformational shift in automotive & transportation industries in country.

### 3.3.8. Agriculture:

The alternative system of agriculture is the Organic Agriculture that depends on organic fertilizers like-compost, green-manure, and manure. The methods included are crop rotation & companion planting. Synthetic fertilizer use is prohibited whereas pesticides that occur naturally like- pyrethrin & rotenone are acceptable.



**Figure 5: Illustrating different Scopes of Green-technology in improving environmental-conditions**

Green-technology scopes in these areas can reduce stress on natural-resource, environment and economy as well. This all points plays an important role in maintaining the environmental balance. Prevention of global-warming & effects of greenhouse-gases can reduce pollution. Green-chemistry ensure the chemical product which is safe to environment. The Health problem because of increasing pollution that will also decreasing. This world will become better to live.

## 4. CONCLUSION

Green's-technology or ecologically-safe-engineering or eco-friendly technologies are developed and utilized which protect an environment & conserve natural resource. It is basically environment-friendly initiative. It comprises of different goals like- recycling & disposal policy, paperless-offices, Energy-audit,

save-energy, green-products or environment-friendly products. Saving energy by means of Compacted-Fluorescent-Lighting (CFL) bulb, use of energy-save powered-strips which conserves electricity by auto-switches, energy setting usage on computer or laptops. 'Green innovation' creation for remarkably novel improved product, its process, its method of marketing, structure of organization and arrangement of institution that leads to the improvement of environment. Sustainable development is wide concept that contains an economic, social and ecological dimensions which require substantial inventions. Green technology is a main tool to attain this sustainable development.

There are various advantages (Figure 6) & disadvantages (Figure 7) of Green-technologies that come into knowledge-

<b>Advantages of Green-technology</b>	
	Emission of anything harmful in the air is not possible by green-technology
	It can bring out the economic benefits to some areas
	Less maintenance required so that no one need to shell out much money for its operation.
	Its renewable which means it will never go off
	Slow-down the effect of global warming by reducing carbon-dioxide emission.

**Figure 6: Illustrating some of the advantages of Ecological-Safe Engineering**

<b>Disadvantages' of Green-technology</b>	
	Cost of implementation is very high
	There is lack of information among population
	There is not completely known raw material input and alternative chemicals
	Not much information of alternative process of technologies
	There is huge uncertainty about the performance input
	Lack of human resources & skills

**Figure 7: Illustrating various disadvantages of Ecologically Safe Engineering**

Promoting Green-growth needs identify and remove the barriers that obstruct large scale distribution of clean-technology to developing countries, specifically the least developed countries & small developing states. The strength of Green-technology is the ability to encounter firm product conditions in foreign-market, to improve production efficacy through the decline of input costs, to improve any firm's environment reputation that is crucial if another competitor or consumer is becoming more environmental conscious. In future, the usage to green-technologies will explore more of the areas. More economic activities in the future rely upon making product which is safe & useful for the environment. Government from different countries identifying the requirement of utilizing this technology that are more

environment-friendly. Green technology creates more new career opportunities with the progress in future. The scope of this technology can be improve by creating awareness among people. This technology uses non-polluting practice for producing things & materials that are non-toxic. The inventive practice involves satisfying the needs of the people without causing harm to available natural-resources and save it for the future use. So, green technology gives significance at the same-time by allowing the fulfilment of the current or present needs. The fact is that invention has positive impact on the economic growth of the country. That's why it is not possible for the governmental organization to make rules which restrict Indian industry's invention. The policies made by the Government is a significant aspect that controls the environmental quality. 'Green innovation' a creation for remarkably novel enhanced product, its process, its method of marketing, structure of organization and arrangement of institution that leads to the improvement of environment. Sustainable development is wide concept that contains an economic, social and ecological dimensions which require substantial inventions. Green technology is a main tool to attain this sustainable development.

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