

Chapter 9

Green Entrepreneurship and Sustainable Development

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ABSTRACT

The environmental problems and employment crises throughout the world have been growing. Economic growth is one of the key parameters for economic policies expected for beneficial effects having good impact on the employment and economic well-being. Changes are required and need to find solutions for the problem instead of creating. These changes affect the environment while facilitating industries/business. To overcome the environmental hazard, green entrepreneurship came to light. The concept of green entrepreneurship came into existence from environmental hazards such as pollution, global warning, depletion of ozone layer, and climatic changes occurring due to disturbance within the ecosystem. This study also aims to analyze the relationship between entrepreneurship, transformation, and green development along with the relation between social, traditional entrepreneurship, and in-between institutions and industries.

1. INTRODUCTION

Sustainable development is a development which fulfils the requirement of the current generation without harming the further generations. Sustainable development (SD) motivates everyone to preserve, safeguard and boost the resources. Each and every human being should have the basic needs i.e. employment, food, water, sanitation and energy. Plenty of definitions of SD exist. Trzyna, in 1995 defined SD as Caring for

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the Earth (A. Jibril, 2011; Trzyna, T. C., 1995) aimed towards changing the quality of human life (A. Jibril, 2011). The spine of the sustainable development is social, economic and environment developments. The author Tarana A Chandel, defines sustainable development as 3P i.e. People, Profit and Planet. People, Profit and Planet relates to Social, Economic and Environment respectively. The first meeting regarding SD was held in 1987 and the report was published as “Our Common Future” from the World Commission on Environment and Development by Brundtland Commission (Rachel Emaet al, 2015; Keith Burgess, 2017). Green entrepreneurship is the action taken towards social and environment problems, upcoming with new technical ideas to implement and solve the related problems. These technical ideas are cost effective, support environment issues and at the same time balance economic sustainability at social level. Weather scientists made responsible to human being for climate change. The economic development is related with RE energy demand. Reduction in carbon emission itself is a challenging movement for businessman, private and government companies and also international organization globally. This challenge, impact and bearing capacity cannot be allocated evenly among different societies, countries and also generations. These challenges interconnected the duties and facilities given to human for survival and environment resources. In the last few decades, we see improvements in financial growth taking out 400 millions of people from poverty zone (Jennifer A. Elliott, 2013). Countries having financial growth are Russia, Brazil, India, China and the Global South (Jennifer A. Elliott, 2013). Now the scenario has changed. Low income countries especially Africa are successful in economic developments in trade and foreign investments. Difference in economic success between different countries is easily visible due to sustainable developments. Poverty has diverse paradigm beyond wealth; moral concern, human rights, peace and security. Work for poor for their better life should be global responsibility for the sustainable developments in future. Sustainability development is not only for poor people but for the global community with respect to environment hazard regarding climatic change (J. Mensah, 2019). The idea of green entrepreneurship came into existence from the ecosystem hazards or we can say disturbance in the environment regarding global warming, pollution in air, ozone layer and carbon dioxide emission all around due to fossil fuel. These hazards had brain washed the consumers toward ecosystem, making them more perceptive toward green and eco-friendly devices. This was the existence of emerging green market. This emerging market changed the human behaviour such as increased income of household women, values and also uplift in lifestyle. It showed improvements in business (private and government), designing new green products or re-designing the old products. This green market transformed into green supply chain management

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system (GSCMS), waste management system (WMS), changing the market policies. The motive of this chapter is to highlight progress on eco-system lifestyle of human globally, advancement in emerging technology, economic developments, sustainable developments goals, policies and green entrepreneurship.

1.1 CONCEPT OF SUSTAINABILITY DEVELOPMENT

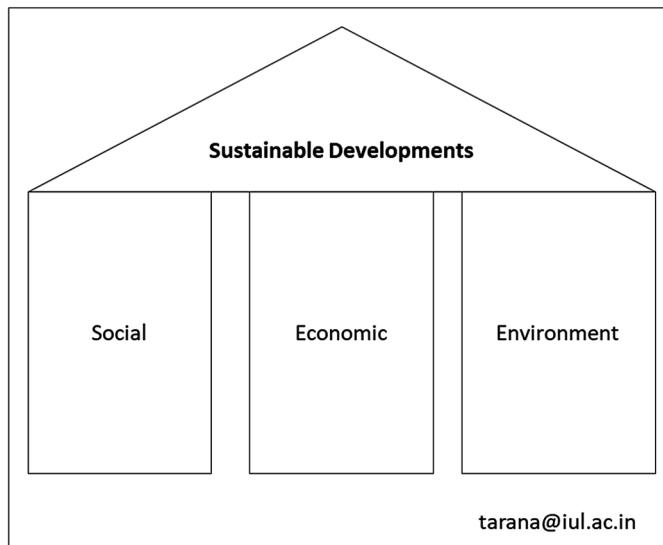
Sustainable improvement is considered a principal and vital mission for worldwide organisations together with the United Nations and other governments globally. The conceptualization of sustainable development does not have any absolute limit but limits toward innovative technology, social development, environment and the ability of eco-system to accept the after effect activities of human (Johannesburg, 2002; A. Leiserowitz, 2005). A study report by the board of Sustainable Development of U.S. National Academy of Science reviewed “Our Common Journey: A Transition toward Sustainability”. The report focussed on what at present is? And what has to be done in future? (A. Leiserowitz, 2005), the duration of this present and future is depicted is 25 years (A. Leiserowitz, 2005). Our Common Journey: A Transition toward Sustainability’ is shown in figure 1. Sustainable Development is categorized by social, economic and environment sustainability as shown in figure 2. Sustainability development can also be defined as an intersection of social, economic and environment developments as shown in figure 3. Social sustainability includes food, education, employment, human lifestyle, consumable product services, eco-friendly nature for survival and equality among human in society. Economic sustainability includes employment, financial uplift, business enhancement (private and government) and finally economic growth of individual human as well as country. Environment sustainability includes green and clean atmosphere, pollutant free air, waste management system and consumable recycle system. However approach toward sustainability development may vary. The UK government describes sustainability development based on five factors. These involve (i) Living within limits of ecosystem (ii) Guaranty of well-built healthy and fair-minded society (iii) Achieving a green finance, (iv) Upgrading good governance (v) Using flawless science liability. These principal incorporates excellent governance (A framework involving rules, procedures, regulations which are executed by the government) and an innovative science and technology.

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*Figure 1. A transition toward sustainability
(U.S NRC, 1999)*

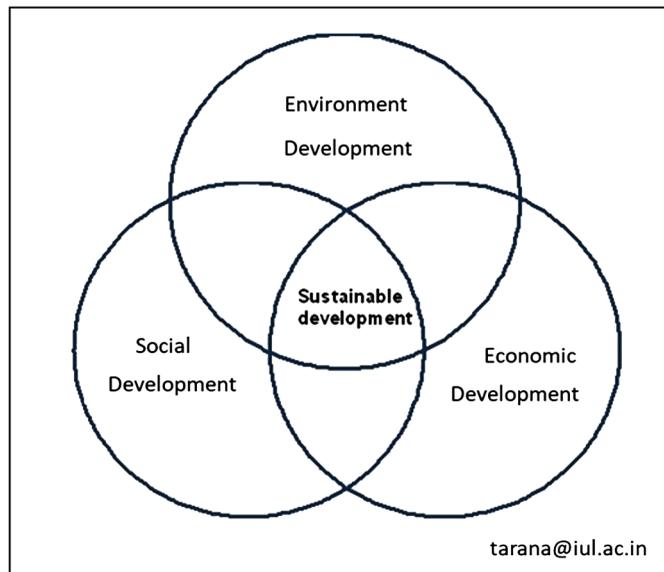
<p>What is to be sustained</p> <p>NATURE Ecosystem Biodiversity Earth</p> <p>LIVELIHOOD SUPPORT Resources Environment Eco-friendly services</p>	<p>Duration for present and future 25 Years</p> <p>Linked with all human</p>	<p>What is to be developed</p> <p>PEOPLE Children survival Food Education Employment Equality</p> <p>ECONOMY Manufacturing- sectors Employment Finance</p>
<p>Source: U.S. National Research Council, Policy Division, Board on Sustainable Development, Our Common Journey: A Transition Towards Sustainability (Washington, DC: National Academy Press, 1999)</p>		

*Figure 2. Concept of sustainable development
(Rachel Emaet, January 2015)*



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Figure 3. Sustainability development with its components (Trzyna, T. C., 1995)



1.2 EVOLUTION OF SUSTAINABLE DEVELOPMENT (SD)

The evolution of the SD in China was the concept of “Heaven and Earth in one” (L Shi, 2019; Wu, J, 2014). The emperor Western Zhou Dynasty (BC1100-771) noticed that the nature gifts of god i.e. mountain, river and forest and claimed to use following the laws of environment rather than exploiting them (L Shi, 2019;). Since then initiative has been taken to protect the natural resources and the sustainability management system started imposing policies, collecting taxes to maintain mountain, forest and gardens (L Shi, 2019; Niu, W, 2015). As environmental degradation continued due to different causes, measures were taken towards forest sustainability. In 1713 the word sustainability was firstly utilized by Carlowitz monograph as Afforestation and Economy and addressing the issues of forest sustainability (Von Carlowitz, 2014). In 1980 the phrase sustainable development became distinct when the World Conservation Strategy (WCS) was presented by an International Union of the Conservation of Nature and Natural Resources focussing to achieve SD by protecting the living resource (Von Carlowitz, 2014). Critics confessed associating SD as the basic goal of society (Von Carlowitz, 2014) and the World Conservation Strategy wholeheartedly contributed its interest in development of the community. Report paid emphasis on the condition of the population, spices, energy, industry and human habitation at global level (Von Carlowitz, 2014; WCED, 1987) A part

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of this, the report also debated on major issues of social, economic and environment that humans are facing. These are three major debate points; i. the calamity of energy, environment and developments cannot be segregated ii energy and other resources are not sufficient for human survival and development iii. Present development policies should be modified for the sake of present and future human (WCED, 1987).

1.3 SUSTAINABLE DEVELOPMENTS IN A GLOBALIZING WORLD

In 1992, United Nation organised a conference in Rio de Janeiro, Brazil. In this conference, they talked about environment and development and began the journey towards Sustainable Development globally (J.Mensah, 2019; Sun, X, 2012). The agreement was passed and signed as 'Rio Declaration on Environment and Development' and 'Agenda 21 known as the Johannesburg Plan' (J.Mensah, 2019). Agenda 21 had an agreement of recognizing the common with different responsibilities for both developing and developed countries towards environmental issues as well as financial support and technology transfer to the developing countries by the developed countries. This conferencing had goals and plans to execute sustainable development, making partnership globally to find solutions of global environment problems (10, Sun, X, 2012). This became a global history for implementing action to sustainable development strategy (Sun, X, 2012; Hu D. 2004). United Nation Millenium Summit was held in the year September 2000 at U.N. Headquarter, New York. In this summit, 189 countries participated, accepting Millennium Development goals (MDGs), focussing to get rid of poverty (Li. C., 2005). These goals were recognised as an international framework providing guidelines for national development and cooperation for coming 15 years in favour of human development in the beginning of the century (Li, C., 2005). After 1992, a dispute of interest arose gradually in action among social, economy and environment developments. The World Summit on Sustainable Development was organized in Johannesburg, South Africa, from 26 August to 4 September 2002 (Johannesburg, 2002). This summit agenda was "From our origins to the future". The general assembly had a commitment for human equality, caring global society and awareness of human self-esteem to all (Johannesburg, 2002). Acknowledging that humanity is at a crossway, the general assembly fully committed to achieving a goal to develop a practical and visible plan in eliminating poverty and social development. Eliminating poverty has become the biggest challenge globally and necessary for sustainable development especially for developing countries. The requirement to add the policies of cooperative governance of stakeholders globally became critical (U N, 2012). On behalf of these disputes, United Nation again organised a summit known as Rio Summit 2012 (J. Mensah,

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2019; Sun, X, 2012, 22). This summit laid emphasis on green economy as the basic parameters for the solution of dispute among environment and development (Barbier E.B, 2012). At the end of the summit one more component was added in SD i.e. governance. Now SD was social, economic, environment and governance (Zhu. D, 2016). A meeting was again held at the UN headquarter in New York as United Nation Sustainable Development Summit in September 2015, above 150 leaders of the nation joined the summit (U N, 2015). This summit evaluated the execution Millennium Development goals and fostering Transforming our World' - 2030 Agenda for sustainable development (U N, 2015). Transforming our world set the sustainable development goals changing the traditional concept of development. New concept of growth, sustainable development came into existence with three component as social, economic and environment development (U N, 2015)

1.4 SUSTAINABLE DEVELOPMENT GOALS

The establishment of SD in 2015, in New York as United Nation Sustainable Development Summit, the 2030 Agenda is for the prosperity in the sustainable world. The people in the world are having peaceful, protective and spirited lives on the earth. Table 1 shows the sustainable development goals (U N, 2019; M. Prabhakar, 2018; Tomislav Klarin, 2018).

1.5 ENERGY TRANSFORMATION AND LOW-CARBON DEVELOPMENT

Technologies have the ability to supply green, low-carbon, resilient electricity structures, transport and buildings. Improvements in value and overall performance are surpassing expectancies in areas which include solar harnessing electrical power, wind farms and electrical battery storage. Energy transformation leads toward low carbon emission and environmental injustice. Energy transformation is a fundamental system involving technologies, policies and infrastructure supporting sustainable development (F.W. Geels, 2004; A. Smith, 2007; A. Smith 2005). These systems vary from place to place, culture, economic structure, and stakeholders. The effects of policy transformation at state or national level are less noticed. At the same time different policies and political issues may have clear results in low carbon transition and outcome (Jehling, 2019). Energy transformation to a clean and green energy system utilizing renewable energy (Sovacool, 2009; Painul, 2001) resources such as solar and wind energy, electric vehicle (Sovacool, 2016) require innovative technology but in political ordinance tariff and pricing are major issues.

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S. No.	Goals	Description
1.	No Poverty	End poverty in all its forms everywhere
2.	Zero Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3.	Good Health and Well Being	Ensure healthy lives and promote well-being for all at all ages
4.	Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5.	Gender Equality	Achieve gender equality and empower all women and girls
6.	Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all
7.	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable and modern energy for all
8.	Decent Work & Economic Growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9.	Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10.	Reduce Inequalities	Reduce inequality within and among countries
11.	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient and sustainable
12.	Responsible Consumption and Production	Ensure sustainable consumption and production patterns
13.	Climate Action	Take urgent action to combat climate change and its impacts
14.	Life Below Water	Conserve and sustainably use the oceans, sea and marine resources for sustainable development
15.	Life On Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16.	Peace, Justice and Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17.	Partnerships for the goal	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

(M. Prabhakar, 2018; U N, 2019, Tomislav Klarin, 2018)

1.5.1 Importance of the Renewable Energy in the Sustainable Development

The role of electricity and thermal energy generated by solar energy systems even at higher cost is of incomparable importance in rural and remote areas where electricity is not available. Children are able to educate themselves in the brightness of solar lantern, community halls are illuminated by solar PV's electricity, water is heated by solar water heating systems and lives saving drugs in hospitals are kept in refrigerators. Solar energy systems designed and developed for these applications

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even at higher cost are helping in raising the standards of living in villages. Lots of job opportunities are generated based on solar energy technologies. It helps in alleviating poverty of rural masses. Similarly, it has been found that the renewable energy systems may contribute to green tourism development of hilly areas, historical place of remote areas, zoological and botanical parks, tourist places on islands and near sea and rivers, etc. Consequently, a community economic development is feasible. Solar energy can meet the significant amount of energy need of tourism infrastructure, such as warm water and space for warming themselves in winter and central air conditioning during summer. Solar energy systems and devices can also be used for water displacement pumps, water sterilization, and providing distilled water which is very important since water shortage is one of the major issues of tourist places. These are the novel areas for entrepreneurs to invest money.

1.5.2 Growth of Solar Energy Worldwide

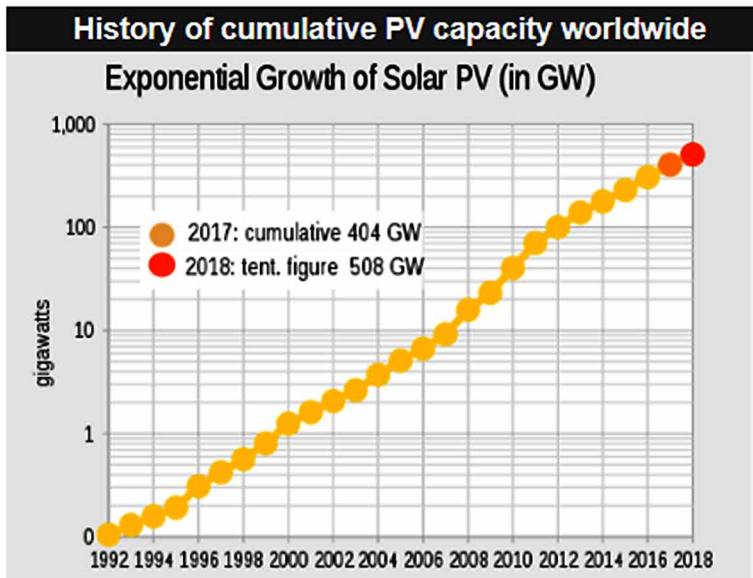
From 1992 till 2018, solar energy had an exponential growth worldwide (Brent Wanne, 2019) as shown in figure 4. This duration was famous as solar era evolving small scale industry and merged into large scale industry with larger market value in generation of electric power. The solar PV system was potentially recognized by the subsidy programs regarding tariffs. This was implemented by many governments to provide economic incentives for investments. The growth of renewable electricity is enhancing faster with time than ever worldwide, hold the new global energy economy (IEA, 2021). The worldwide capacity to produce electricity from solar panels, wind turbines and other renewable technologies is growing with time and will be on verge in the coming years. IEA 2021 predicts the renewable energy technologies in the field electricity, transport and heat till 2026 and challenges for industries in identifying the hurdles for fast growth in energy sector. Renewable energy plays a vital role in elimination greenhouse gas emission and ensuring a smooth pathway to net zero as the world is stepping back from utilizing fossil fuel energy. Apart of providing market analysis and forecasts, Renewables 2021 also explores emerging trends towards storage, producing hydrogen from renewable electricity, stimulus packages, aviation biofuels and residential heating. Along with it, renewable power generating capacity is on way to set further another annual record in 2021, driven by solar PV.

Almost 290 Gigawatt (GW) of new renewable power will be produced this year, 3% more than 2020's. Solar PV alone reports more than half of all renewable power expansion in 2021 globally, followed by wind and hydropower. The start-up initiative of the Jawaharlal Nehru National Solar Mission (JNNSM) taken by the Government of India and state government has been an important event for the renewable energy sector, promoting solar energy in Indian. The objective of this mission is to develop

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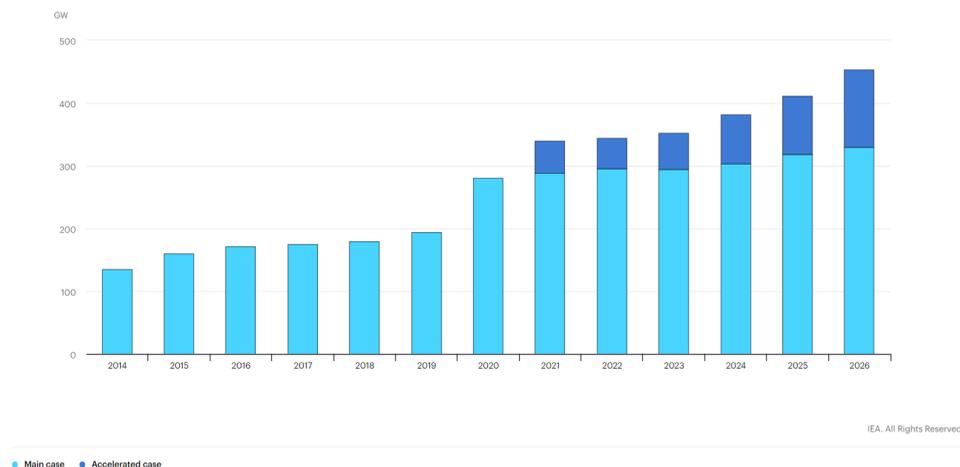
India in the market of solar energy and becoming a one of the global leader, by making the policies and spreading across the country. The mission was designed in three phase; one was from 2012-2013, next phase was from 2013 to 2017 third and the last phase was from 2017 till 2022. Inaugurated in January 2010, the JNNSM has been revised twice and now boasts a target of 100 GW of solar PV by 2022 (IRENA, 2021). A target of 20000 GW on grid solar plant was achieved. Government of India, State Government and various agencies are making efforts to aware consumers as well as investors about the benefits of using renewable energy resources including solar energy in the light of increasing pollution, effects of global warming due to over exploitation of fossil fuels for economic development. The motive of JNNSM is to make India a world leader in solar energy market by making the policies for its distribution across the country (IRENA, 2021). Capacity of renewable energy from 2014 to 2026 (IEA, 2021) is shown in figure 5.

Figure 4. Growth in solar photovoltaic energy exponentially
(Brent Wanne, 2019)



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Figure 5. Capacity of renewable energy from 2014 to 2026 (IEA, 2021)



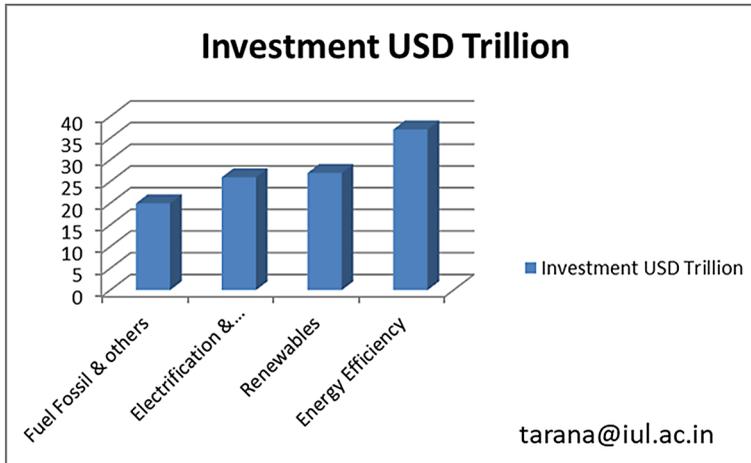
1.6. INVESTMENT IN RENEWABLE ENERGY SECTOR

The transition of energy globally requires accelerating to great extent to fulfil the objectives of the Paris Agreement to restrict the increasing average global temperatures below 2°C, and ideally to 1.5 °C, by the end of the century, in contrast to pre-industrial proportion (IRENA, 2020). Renewable energy supply, enhanced electricity services, and renewable energy efficiency can bring more than 90% of global greenhouse carbon emission reductions needed in the energy sector. To proceed the energy transformation globally, investment in RE is required to escalate significantly and essentially. In the present analysis of “A Roadmap to 2050: Energy Transformation globally”, IERNA aligned the world to follow the objectives of the Paris Agreement with collective investment of USD 27 trillion in the period of 2016 to 2050 on renewable energy necessities. The investment in fossil fuel, electrification and infrastructure, renewables and energy efficiency are 20, 26, 27 and 37 Trillion USD respectively (IRENA, 2020) as shown in figure 6.

The energy transformation globally in the power sector require approximately USD 22.5 trillion for new capacity installation by the end of 2050. Annual investments for 2050 installation capacity doubles compared to the present investment i.e. from USD 310 billion to USD 660 billion.

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*Figure 6. Investment in RE: A roadmap 2016-2050 (USD Trillion)
(IRENA, 2020)*

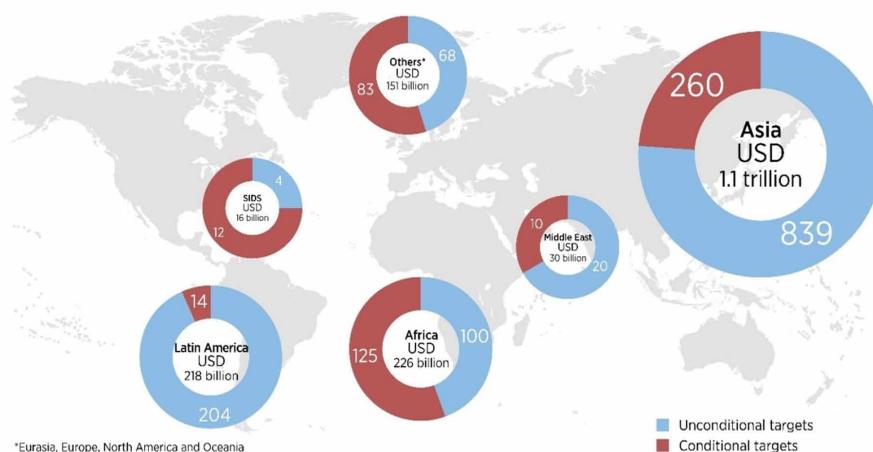


1.6.1. Investment to Implement Renewable Energy Targets in NDCs

Nationally Determined Contributions (NDCs) is accountable for the foundation of the Paris Agreement on climate change. Most certifier to the Paris climate deal have involved renewable energy in their NDCs, admitting that growing energy transition will be essential for acquiring the climate goals. Efforts for climatic action: RE in NDC, approximately USD 1.7 trillion is required for implementing RE target in between 2015 and 2030, an average of USD 110 billion/year. USD 1.2 trillion (approx. 70% of total investment) is circulated to fulfil the target. Furthermore USD 500 billion is needed for developing countries as international finance to support the restricted targets. Figure 7 shows the investment for implementing conditional and unconditional targets (IRENA, 2021). A worldwide plan, to invest USD 95 trillion worth on RE till the mid-century but these plans and related investments are not always funded for climate proof systems (IRENA, 2019). This survey has two pathways. First is the current plan (plans and policies set presently) and second is the clean and green energy transformation (IRENA, 2019). IRENA also planned to redirect the fossil fuel investment towards RE investment but double for the future decades. An overall energy transition can develop superior energy system assuring global temperature not more than ideal temperature of 1.5 degree Centigrade beyond industrial limits. To achieve this global temperature investment in RE should be done without any delay.

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Figure 7. Investment for implementing conditional and unconditional targets (IRENA, 2021)

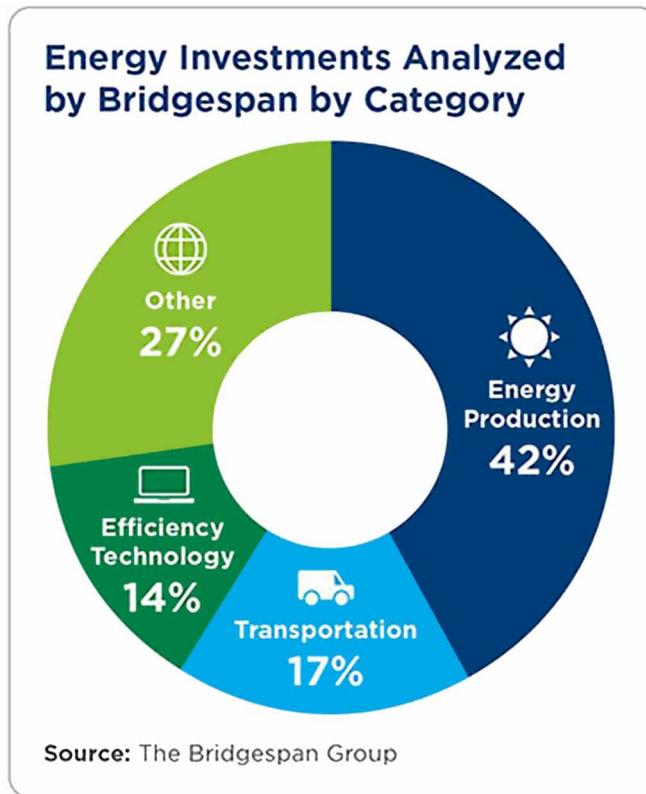


1.6.2 Investors Impact on Energy Transformation

Business man (big or small), companies (private or government) and investors are investing more money on RE sector rather than any other sector and observed 70% everlasting promising investment. At present energy sector is on boom and this is a perfect and secured time for the stake holder to shift and hold energy sector. On 11 May 2021, IEA announces discarding of all fossil fuel projects (IRENA, 2019; ET, 2021) as the world wishes net-zero CO₂ emission and limiting the global temperature up to 1.5°C. Following the above statement, IEA forecasted decline in fossil fuel, whereas 2040 is the dead line for the RE sector globally in reaching zero carbon emission. Impact investors are investing their capital in enhancing new technologies. It is called a fast and huge elevation of RE investment and capacity bringing happiness in wealth, health and development. Bridgespan jointly worked with many impact investors for last several years and scrutinized 70 effective investments in energy sector (Sam Whittemore, 2021). These investors spread globally and fund companies at different levels. Analysis of Bridgespan regarding impact investors investing their capital in different category of energy sector is shown in figure 8 (Sam Whittemore, 2021). Large numbers of investor have motive to mobilize large capital so that they can decrease carbon emission and avoid worst effect of climate change. They spotlight in three main directions; first is energy generation such as solar energy, wind energy, waste energy and power utilities, second is transportation such as electric vehicle and third is energy efficiency technology (Sam Whittemore, 2021). Electric vehicles decline fossil fuel carbon emission.

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*Figure 8. Energy investment category
(Moose, 2021)*



1.7 GREEN ENTREPRENEURSHIP

Green entrepreneurship is the trading firm of actively conveying environmental hazards or requires economic sustainable marketing strategy having positive effect on the environment, community, and financial system. Green entrepreneur is a person who establishes and executes the business drafted to bear the environmental hazards or need its device and tactics from the beginning of the marketing strategy. We can also say that green entrepreneur is a person who finds solution to the problems of people and environment and fully implement it by green products. Five categories of green entrepreneurial business are solar energy and other renewable energy, organics, recycling and reusing, “clean” products and green knowledge (Moose, 2021).

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1.7.1 Solar Energy and Other Renewable Energy

United State management has made plan of making energy self-dependent. President Obama in 2009 said excess dependency on traditional energy is unsustainable (Neville, 2021). Thus, he committed to move toward renewable energy. With the change in technology, businessman and investors having strong interest in green energy technology, made solar energy their priority area; designed, manufactured green product and launched in the market. The process of entrepreneur in RE and sustainability is the desire to start a new project with full passion or transform the present product of the company. Entrepreneurs and entrepreneurial managers change the future of their business with strong vision, designing and implementing new innovative products or model with full enthusiasm and passion. The gross outcome of the company is the company's development, growth and regeneration that are hold up by using new competitive merits leading to new constructive possibilities. The research and the entrepreneurial process in renewable energy has achieved the top most success on the sunrise of the new millennium, stretching it perimeter from a borderline of sub-field of control research into one of the most applicable spheres of strategic advertising, commercial enterprise and management

1.7.2 Organics

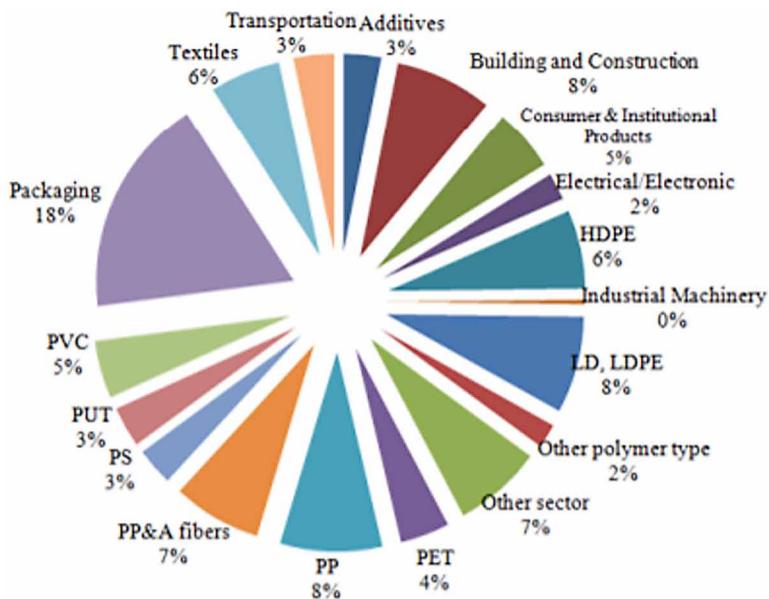
Green entrepreneurship in green organic products is on the rising horizon. With education and training given, consciousness of the blessings of consuming organically grown ingredients increases, cost-effectiveness in producing them to satisfy that demand. There are presently many approaches to get into the organic agriculture enterprise. There are organic grocery wholesales, dairy farms, cattle farms, fish farms, markets, and stores. The most common is a natural produce farm. Organic food is produced by farmers who use renewable resources and the conservation of soil and water to enhance environmental quality for future generations.

Owning your personal sustainable organic farm is a feasible and favourite commercial enterprise alternative while locals purchase part of the organic produce (Neville, 2021). This is as same as farming without fertilizers and chemical pesticides. Frey Family farm in Ashford, Washington are the present examples of organic farming (Moose, 2021). Products of Frey Family farm are certified organic products as they utilize only organic seed, principal and practices (Moose, 2021). Their motive is to produce healthy food for their family and community with the concern for the land which they steward. Frey family share their certified organic products in the community under Community Supported Agriculture Program (CSAP) and CSA program continues for 20 weeks (Moose, 2021). Other green enterprise are accessible in organic product organisation such as beauty product, garden treatments and also

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and textiles. Organic meat, poultry, eggs, and dairy products come from animals that are free from antibiotics or hormones for growth. Green products are label 'Organic' only after a government approved certifier inspector inspect farming land and ensures the products are grown following the rules satisfying USDA organic standards (Melissa C S, 2022). Restaurant and market providing organic products must be certified too. Other industries where organic products are manufactured are textile industry, cosmetic industry, agriculture.

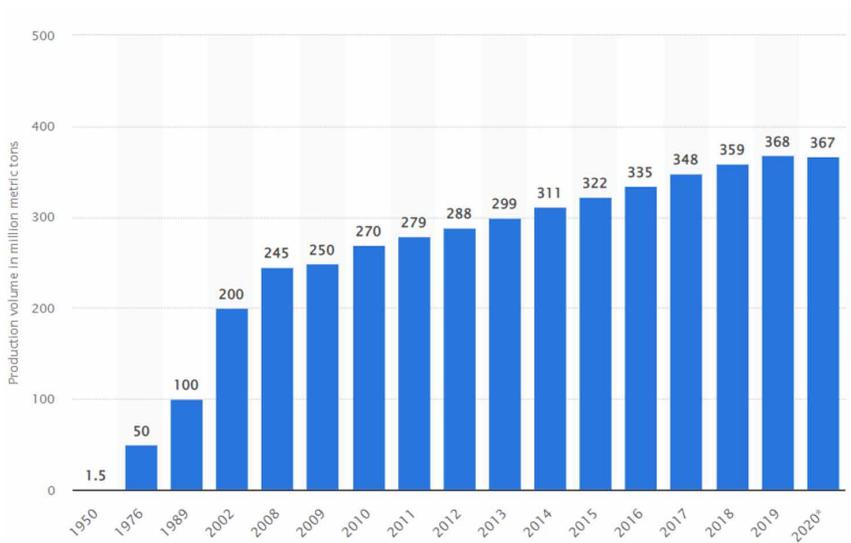
Figure 9. Use of plastic in various sector (Arokiaraj David, 2019)

**1.7.3. Recycling and Reusing**

Waste materials are the biggest problem of present and future world. The transition towards industrialization has great impact on environment creating global warming, carbon emission, polluted air for breathing, water, land and noise pollution. Green entrepreneur reuse this waste product. The waste products are paper, plastic, batteries, used electronics products, woods, construction materials, food products, textile and many more. Some of them are not biodegrading materials. On the other side, biodegrading waste materials are food, natural plants and materials, and feces.

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*Figure 10. Global plastic production till 2020
(Ian Tiseo, 2021)*



Plastic and rubber waste: Plastic is one of the non-biodegradable material. The production of plastic globally in 1950s was 1.5 million metrics, 336 million metrics in 2016 (D. Arokiaraj, 2019) and reaching 367 million metrics ton in 2020 (D. Arokiaraj, 2019). 9% was recycled, 12% was destroyed by burning and the remainder are still dumped on lands. The production has declined 3% only in 2020 due to COVID-19. The utilization of plastic in various sectors is shown in figure 9 (D. Arokiaraj, 2019). The global plastic production in 2010 was 270 million metric tons which has increases up to 370 million metric tons in 2020 (Ian Tiseo, 2022; Ian Tiseo, 2021). As per statistical data source statista 2022, global forecasting of plastic production in 2025 is 445.25 million tons and 590 million metric ton by 2050 (Ian Tiseo, 2021) is shown in figure 10. The forecasting of plastic production globally from 2025 to 2050 (Ian Tiseo, 2022) is shown in figure 11.

Food Loss and waste: In current scenario, issues on food loss and waste are focused as a main feature of the challenges and in capabilities which identifies the global food system and also its impact on social, economic and environment. Food waste is a measure of food loss and waste (FLW) (Per Pinstrup, 2014) or we can say edible part of the food is in short or wasted. Food loss is declination of quantity and quality of raw food products that is not directly consumed by human where as food waste refers to the amount of food consumed by human is discarded. This declination may be due to insects, birds, mold, and inadequate climate condition. Food losses may occur from production to storage, processing and during transport (Emilie Wieben, 2017), shown in figure 12.

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Figure 11. Forecasting of plastic production globally (Ian Tiseo, 2022)

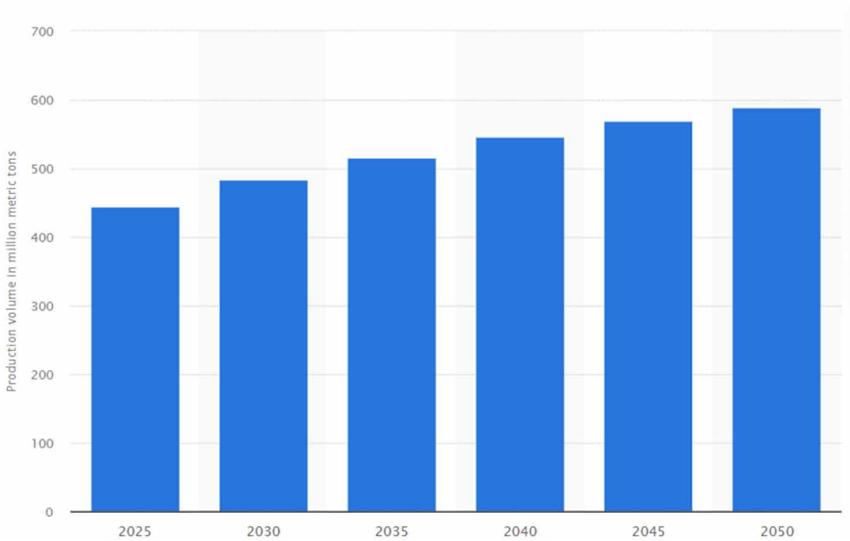


Figure 12. Food waste during processing (Emilie Wieben, 2017)



Food that are produced but somehow not consumed shows a powerful contributor towards greenhouse gas (GHG) emissions globally shown in figure 13 and reduces the productive outcome of food pile, which undoubtedly will effect each human life and eco-friendly capabilities to cope with climatic change. Removing large amount

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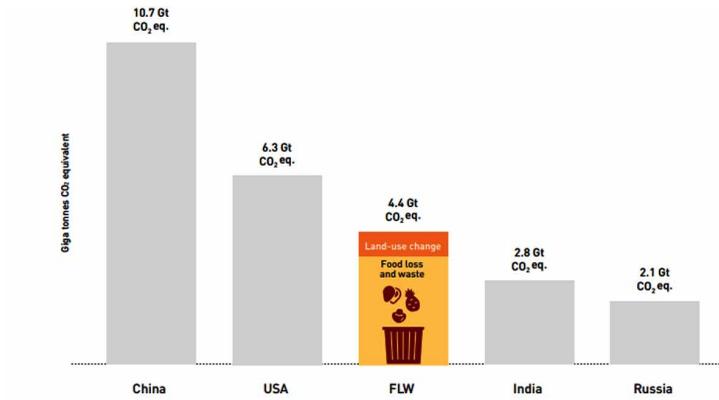
of food that are ruined and wasted is on top priorities for improving sustainability within the food organization, fulfilling the growing request for food and riding the climatic movement ahead. This is focused inside the 2030 Agenda for sustainability development (SD), setting the mark in reduction of food wastage and loss globally (Emilie Wieben, 2017). The Paris Agreement also accept the value of food production and security system regarding climatic change, while many other countries have finally registered food value chain intercession in their proposed Nationally Determined Contributions (INDCs) (Emilie Wieben, 2017). This confirms the growing global acknowledgement towards the action inside the food production and security system fulfilling the objectives for SD and environment stabilization. Tackling the issues of food waste and loss globally requires some calls and meeting for joint action towards the integrated food technology covering all risk, demand, business and opportunities toward SD. This is relevant towards worldwide climatic change, reaction towards food waste and loss and scaling up weather technologies and weather-smart practices within the food organization. Finance chain infrastructure, regulation and capacity restriction are major sources of food waste and loss in the developing countries. Focussing smart solution for weather across food organization may strongly support to enhance economic flow required for the implementation. However, this will reinforced regulatory framework in addition to policy coherence to support the incentive required for financial investments from private organization. In this aspect, support will be crucial to ensure policy framework and financial incentives are in line with the dreams for food waste and loss reduction and climate action.

Contributions to climate change: Good food production is based on natural resources along with best environmental condition. Water, sunlight, power energy and other inputs are essential to sustain the process and other activities within the food organization. Withdrawal from natural resource endowments will lead towards greenhouse gas (GHG) emissions contributing to climate change.

When computing the aggregate carbon emission contributing the environmental change all through life cycle, unconsumed food is predicted to be 3.6 Gt of CO₂ eq per year in addition to 0.8 Gt of CO₂ eq per year from the associated land use and forestry (Emilie Wieben, 2017). Food waste and loss has major contribution towards carbon emission, whereas country wise China is on top and India rank third position in the world where carbon emission is maximum from food waste and loss as shown in figure 13. Food waste decomposing in the landfills also produces greenhouse gas as methane. Larger the food waste greater is the greenhouse gas emission. A different source of carbon emission is shown in figure 14 (Emilie Wieben, 2017).

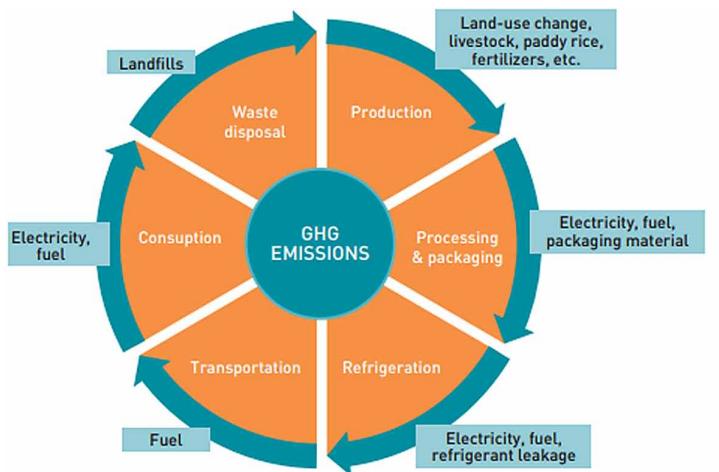
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Figure 13. Carbon emission globally from food waste (Emilie Wieben, 2017)



Source: FAO, 2015a and CAIT Climate Data Explorer (2017).

Figure 14. Sources of carbon emission (Emilie Wieben, 2017)



Solutions to Food Waste: Minimizing food waste is lead to sustainable food future. On 4th June 2013, Department of Agriculture and Environment Protection Agency in US organised the U.S Food Waste Challenge, calling on individuals involved in food chain including farmer, agriculture processors, food manufactures, grocery stores, restaurants, universities, school and local government (Chan, 2022). The goals (Chan, 2022) are as follows

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1. Minimize food waste by correcting product development, storage, shopping, marketing, labelling and cooking process
2. Connect strong food donors to hunger relief camps/organisation / food banks / pantries
3. Recycle food waste by feeding animal or generate clean and green energy, natural fertilizers.

Department of Agriculture and Environment Protection Agency announced the goal set on 16 September 2015 for 50% reduction and improvement in food security and protect natural resources (Chan, 2022). The guidelines for reducing food waste throughout the process of food production chain was issued by the National Resources Defence Council are given below (Chan, 2022)

1. **State and local governments** can include education expedition and prevention of food waste and implement municipal mulch program. Farmers who donate surplus amount of product to the food bank can be benefitted through the government by tax credit
2. **Businesses** such as restaurants, grocery stores, and institutional food services can figure out the amount of their food waste and implement best practices
3. **Farmers** can figure out food loss while processing, distribution, storage and can implement best practices
4. **Consumers** should know how to cook food and store it properly, develop awareness when the food is not in the state of edible and to generate organic fertilizer.

1.7.4. Green Architecture

Green architecture or green building deals with the study of design and construction with an eco-friendly environment leading to sustainability development. Green architecture utilized the construction material that does not harm the environment and human health, providing full ventilation for sun to penetrate and exhaust greenhouse gas. Green architect pay emphasis on filter water, clean and green air, green roof and integrating eco-friendly system into the building while constructing it. The approach behind this to maintain temperature in summers and winters, indoor and outdoor climate, eliminate GHS (Md R. Ghaffar, 2017; Amany Ragheb, 2016) leading towards sustainability development. The word green roof indicate that the roof of the building is constructed utilizing green technology such as solar photovoltaic panel (Mohammad Reza Ghaffar, 2017) and solar water heater for providing green energy and hot water. Some of the real time green building globally is mentioned below

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Pixel Building (Melbourne, Australia): this is first building in Australia made carbon-neutral office building producing water and energy on its site. This building is aesthetically good having multiple features in the building (G. Green, 2020). This building have proper shading and allowing daylight in the building as required, support the collected rain water on roof and helps the proper process of water waste and wind turbine to provide green energy to the building. This building is shown in figure 15 (G. Green, 2020)

Central Park (Sydney, Australia): this is a residential building, designed by Ateliers Jean Nouvel with PTW Architects and is in use since 2014. This residential building is known as Central Park as it is having 250 species of plants and flower making it attractive look as shown in figure 16 (G. Green, 2020)

Figure 15. Pixel Building (Melbourne, Australia)
(G. Green, 2020)



Suzlon One Earth (Pune, India): this building is constructed in India in 2009, designed by Christopher Benninger (G. Green, 2020) shown in figure 17. This building has a top-tier green headquarters. it is having platinum LEED certification and utilizes 80% of power energy generated through wind and 20% power energy generated through solar.

Bosco Verticale (Milan, Italy): This building is a duplex residential apartment, designed by Stefano Boeri and is under use since 2014 shown in figure 18. This is the tallest residential building with lot of space to accommodate, plenty of herbs and shrubs, full grown trees.

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*Figure 16. Central Park (Sydney, Australia)
(G. Green, 2020)*



*Figure 17. Suzlon One Earth (Pune, India)
(Going Green, 2020)*



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*Figure 18. Bosco Verticale (Milan, Italy)
(Going Green, 2020)*



1.8 GREEN MARKET

In view of current economy and environmental sustainability demand in the recent year, national and global effort are made to upgrade green development as a new source of growth. The transition of green economy has become a policy debate in present scenario. It is a path way towards sustainability development, declination in poverty and new economic growth through it. Looking towards international economy crisis, the UN general assembly and many other UN agencies had 2nd Preparatory Committee Meeting UN Conference on Sustainable Development on 7 March 2011 - 8 March 2011, NEW YORK, USA, (UNEP, 2022) which was based on the conclusion of the Intergovernmental Preparatory Meeting held on 28 February-4 March 2011. This meeting was the combine effort. In 2008-09, green market was promoted on the basis of short term growth. This was done to enhance the potential of employment and income of human through investment in green innovative technology while other proceeded toward green growth with environment point of view maintaining sustainability development. Investment in green innovative technology (e.g. green energy, climatic change, green architecture, green food) undoubtedly will increase long term financial performance leading towards enhanced worldwide economy, according to the macroeconomic model reported in Green Economy Report documents (UNEP, 2011) (UNEP, 2022). The

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World Trade Organization (WTO) is on fast track in achieving UN's Agenda 2030 for SD with combine effort of UN's Department of Economic and Social Affairs in monitoring and achieving SD Goals (SDGs) (UNEP, 2022, S. U-tantada, 2019) such as poverty declination, green health, elevating education and climatic change. These goals place great emphasis on green trade economy globally to fulfil the 2030 Agenda. The use of green market economy can be expressed with the references of the United Nations-Department of Economic and Social Affairs (UN-DESA, 2015) (UNEP, 2022) having 17 goals. These 17 goals create awareness about worldwide financial, social and environment conditions and how it can be improved globally with conjugate work on three different factors.

- Improving social and economic condition i.e. decline in poverty and removing hunger under the goal (no.: 1, 2 and 8)
- Human welfare including green energy, green consumable products, clean healthy environment, gender equality, employment, green health under the goal (no.: 3, 4, 5, 7, 9, 10, 11, 16 and 17)
- Green environment include sanitation, filtered water, pollution free air to breath, life's in water, on land under goal (no.: 6, 12, 13, 14 and 17)

Top politicians and business leaders globally can collaboratively frame policies and implementing it and transit towards green trade and green economy.

1.9 IMPACT OF COVID-19 ON ENTREPRENEURSHIP

COVID-19 pandemic had a great impact on global economy. It has pulled the worldwide economy years back. As per International Labour Organization (ILO), 5 million to 25 million jobs were lost, dropping down the labour income from \$860 billion to \$3.4 trillion (UNGA, 2020). More than 70 million people were drop back into poverty. Medium and small scale industry was the root and pillars of the worldwide economy with 66% employment for developing countries with low income (UNGA, 2020). Side by side, the fully enthusiasm entrepreneur of small and medium scale industry can be capitalized (on) to handle the global problems and implement on the goals of SD for social and environment recovery. This small and medium scale industry was the base of the employment and living. Entrepreneur was growing with time. In 2018-19, within 15% of the youth population took initiative toward entrepreneurial activity. Alas, this entrepreneurial activity growth was 40% further fallen down in some countries (UNGA, 2020; Donna Kelley, 2019) in 2019 due to COVID-19 pandemic.

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Figure 19. Annual change in economic growth globally (Mukhisa Kituy, 2020)



Source: UNCTAD (2020).

Note: Calculations for country aggregates are based on GDP at constant 2015 dollars

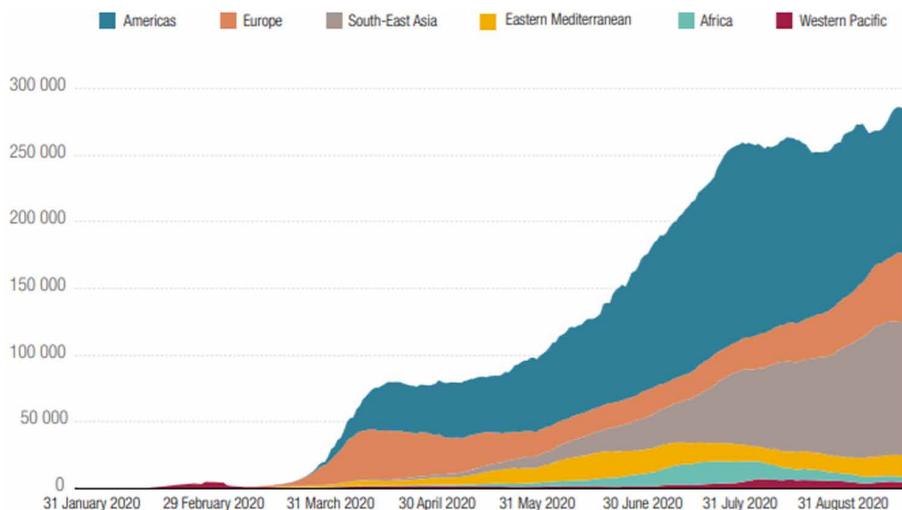
* Forecasts.

Gender biasing was also one of the major issues in many countries. After surveying 62 countries, the rate of entrepreneurship for women equivalent to men was only in 6 countries (Donna Kelley, 2019). Entrepreneur within age of 25-34 were on top in 36/50 countries which declined gradually due to COVID-19 pandemic (UNCTAD, 2020). COVID-19 pandemic has negative impact on the newly upcoming entrepreneurs whether men or women due to lockdown and financial crises. Approximately 27% of women entrepreneurs were financially thrashed and bankruptcy. 4.3% of global economy has shattered down in 2020 with only 4.1% recovery in 2021 (Mukhisa Kituy, 2020) as shown in figure 19. Developed countries were more affected competitively to developing countries in 2020. Economic downfall in developed countries was 5.8% whereas developing countries had 2.1%. Similarly the recovery rate in developed countries was +3.1% compared with +5.7% in developing countries. Unlike the global financial crisis of 2008/09, developing countries are expected to experience negative growth in 2020, and developed economies are expected to experience a much deeper fall in output, at -3.4 per cent in 2009 compared with -5.8 per cent in 2020. Positive growth in economy of China and republic of Korea by +1.3% and +0.1% respectively in 2020 whereas Argentina, Brazil, Mexico, France, Germany, Italy, suffered from negative economy by -10.4%, -5.7%, -10%, -8.1, -4.9, -8.6 respectively. United Kingdom of Great Britain and Northern Ireland had -9.9% economy downfalls. Lives in all corners of spheres have been affected, resulting impact on social and economic condition by COVID-19 pandemic. The corona virus disease originated in China (Asia) and spread out in Europe and America, this was the bingeing of economy fall down. Gradually it spread as fire leading to

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recession. The World Health Organization, on 23 September confirmed 31 million people infected with corona virus disease and 963,000 deaths globally (Mukhisa Kituy, 2020) the same day whose data can be reflected in figure 20. America was on top among infected people in the nation and accounted 53% of world's confirmed infected cases and 53% death also whereas Europe was the 2nd largest and accounted 20% of the world infected cases and 24% of death (Mukhisa Kituy, 2020).

Figure 20. Number of reported cases of COVID-19 by WHO (Mukhisa Kituy, 2020)



Source: World Health Organization, COVID-19 Dashboard (as at 23 September 2020).

Note: Regions according to World Health Organization designations.

The COVID-19 pandemic has had an immediate and negative impact on foreign direct investment (FDI) in 2020. Due to pandemic the on-going investment projects were delayed and the new projects were on racked on shelves. As the result, forecasting of FDI flow has decrease 40% in 2020 since 2019 as the closed value was \$1.6 trillion (Mukhisa Kituy, 2020) as shown in figure 21.

The above graph shows that FDI has fallen down below \$1 trillion in 2020 since 2005 and is further expected to fall in 2021. From the beginning of the year 2022, FDI is expected to be recovered at the earliest. The lockdown during COVID-19 had blocked the investment flow; thereby downfall in economy globally.

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Figure 21. Foreign direct investment globally (Mukhisa Kituy, 2020)

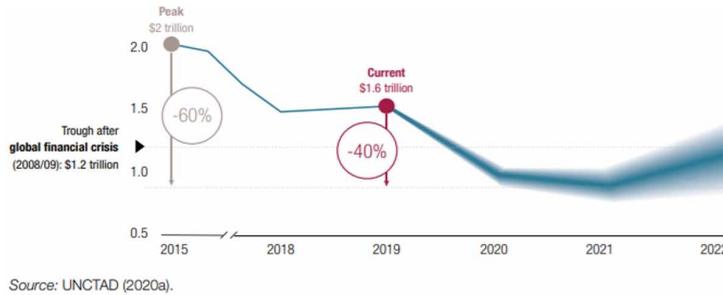
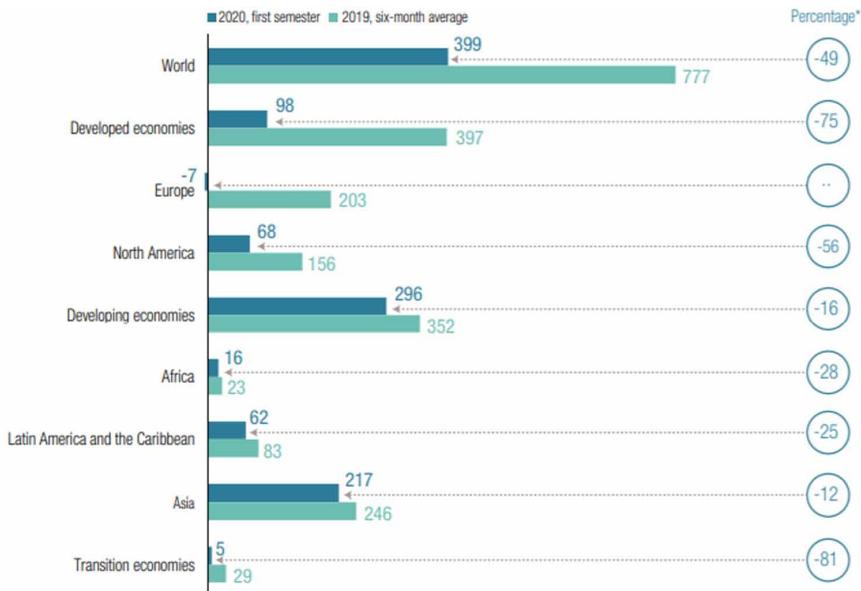


Figure 22. Foreign direct investment flow (Mukhisa Kituy, 2020)



Data from UNCTAD 2020 certify the immediate impact of COVID-19, reflecting on FDI with 49% downfall as compared to 2019 as shown in figure 22. Decline in FDI flow in developed as well as developing countries was 75% and 16% respectively whereas 28% reduction in FDI Africa, 25% in Latin America and Caribbean and only 12% in Asia. The less declination in FDI flow Asia was due to strong investment China. The overall study show greater impact of COVID-19 pandemic in developed countries rather than developing countries in 2019-2021.

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Due to COVID-19 many people lost their job and became handicap. Government of India introduced Atmanirbhar Bharat Abhiyaan or Self-reliant India. The Hon'ble Prime Minister Shri Narendra Modi introduced Atmanirbhar Bharat Abhiyaan or Self-reliant India campaign for A Vision of New India. On 12 May 2020, Prime Minister contributed 2.5 Million USD economic package under the 'Atmanirbhar Bharat Abhiyaan', to support the citizen of our country during the Coronavirus crisis (by making self-reliant) and to resist with COVID-19 pandemic in India. The motive behind this is to make the country and its citizens self-supporting and self-sustaining in all aspects. The backbone of this Aatma Nirbhar Bharat is Economy, Infrastructure, System, Vibrant Demography and Demand. Finance Minister further announces Government Reforms and Enablers across Seven Sectors under Atmanirbhar Bharat Abhiyaan.

1.10 GREEN PRODUCTION AND EMPLOYMENT

More the 200 million students are enrolled in higher education and expected to twice by 2030. Higher educational institute should study and have research in collaboration with the business, government bodies, NGOs with the vision to implement policies, regulations and framework for green economy. These job require technical training for technician through technical educational institute and business managers, economists, engineers and marketers are trained during education from universities. Approximately 71 million youth are having completed their education and are unemployed, struggling for suitable job (Mari Nishimura, 2021). As per International Labour Organization (ILO), transition towards green economy will generate 60 million of job by 2030 (Mari Nishimura, 2021). Green job has become one of the subjects of economic research during last one and a half decades. Economist Mathew Forstater proposed a green public carrier employment application which was reflected in the notable report of peer reviewed journal since 2004 (Michael Forstater, 2004). Political Economy research Institute made a proposal of two years recovery program worth \$100 billion generating 2 million green jobs in power sector in 2008 (Robert Pollin, 2008). Before, the Bureau of Labour Statistics (BLS) presented the study on green job, there was no global and consolidated way to follow green job in the economy sector. Since then the term green jobs are often used in green economy reports (ILO, 2010). Policies to boost renewable energy production were included while implementing 2009 American Recovery and Reinvestment Act (ARRA) under the advisory-ship of Van Jones. The initiative of green job by BLS (ILO, 2009) was to create awareness towards

1. Transition toward jobs in renewable energy with time

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2. Industrialization, employment and geological distribution of jobs
3. Earning of the labours in these job

BLS had two approaches to measure green jobs (ILO, 2009). These two approaches are mentioned below

1. Output approach: recognizes the foundation of produced green products, services and associated jobs
2. Process approach: recognizes the foundation of eco-friendly production process, following the procedure and associated jobs.

Green employment are divided in three categories

1. Renewable energy generation
2. Energy efficiency
3. Environment management

Renewable energy generation employment involves all jobs in solar, wind, water, tides, geothermal, biomass and nuclear energy. Generation of renewable energy requires surveying and mapping, technical consulting, geological services, lawyers, accountants and financial services, electrical, mechanical, and project engineers, construction, marketing, sales, transportation, permitting, installation, quality assurance, and maintenance.

Energy efficiency employment involves the job of heating and air conditioning mechanics and installers, plumbers and pipefitters, roofers, and manufacturers of energy efficient products, including household Energy Star appliances, manufacturers that use recycled products as inputs, public transportation workers, workers making and selling electric and hybrid cars or car parts, and workers building and maintaining a more resilient energy grid.

Environment management employment involves jobs in environment and health sectors. These include waste material collectors, sweeper, pipes and waste water cleaner, scientist, engineer, educators, regulators and legislator

Green employment upgrade energy, raw materials efficiency, environment providing pollution free air to breath and live, reduce GHG emission, waste and pollution, supporting ecosystem for climatic change and making eco-friendly and healthy environment. RE sectors have 11.5 million jobs in 2019 and it will enhance and reach up to 42 million jobs by 2050, 21.3 million employments in power efficiency sectors and 14.5 millions in power grids and variable/ flexible renewable energy. Organic agriculture, sustainable agriculture and green food production are based on labour incentive. For installation we require infrastructure thereby generating

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employment in construction, transport and sanitation. Sustainable development management provide 362 to 630 million jobs by 2050.

1.11 CONCLUSION AND FUTURE SCOPE

This study has illuminated a positive, regionally heterogeneous relationship between green and non-green entrepreneurship and sustainable development. In particular, green entrepreneurship had a stronger influence than non-green entrepreneurship on all the domain of sustainable development. Our results are consistent with previous studies that have shown tight links and interrelations between green entrepreneurship and sustainable development. The findings also correspond with more recent work that has recognised the bidirectional nature of green entrepreneurship and sustainable development in urban contexts. Policies makers from government and private agencies should think and consider what activities should be taken into consideration as green. People working in RE power sectors can help the society in making economically and environmentally sustainable. Young leader are increasingly occupy high position in International Politics, Education, Economics, Government & Corporate field. This change is influencing the scenario completely that will change the current work values and ethics. The top leader, politician and businessman of the nation can make prosperous future with green economy. On the other side when consumers are aware of importance of green products, they will give the priorities to the Eco-Friendly product and will help to develop the stable sustainable environment and social value. Green-Thinker Entrepreneurs will increase in number. Eco-Business will grow strongly. Combining the policies, social, government and private enterprises, one can reach to stable global green economy growth rate. Green business will enhance green entrepreneur, will come forward with the justice and responsibility towards the future generation and society. Once the green business capture the market, green economy growth enhances. People are having lead projects with bottom-top approach rise for green innovative technology, enhancing the value prosperous green business future. "A JUST TRANSITION CREATES DECENT WORK OPPORTUNITIES FOR ALL AND ENSURES THAT SOCIAL PROTECTION EXISTS WHERE NEEDED. IT ALSO INCLUDES MECHANISMS FOR SOCIAL DIALOGUE FROM THE PRIVATE SECTORS AND WORKER'S UNION THROUGHOUT POLICYMAKING PROCESS AT ALL LEVELS" (Mari Nishimura, 2021).

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