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A STUDY ON EMERGING EMPLOYMENT REFORMS IN INDIA W.R.T GREEN JOBS

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Abstract

No doubt, India is a developed economy, which is on par with many other developed countries globally. Development of an economy cannot be emphasized from the view point of education, technology, digitalization, job opportunities in information technology and so on. The most vital aspect of today's world is about "**Environmental Protection**". Environmental protection and sustainability is the most prioritized issue, which has to be given prominent attention by all over the countries in the world. India, being a highly populated, ever growing economy with tiny, micro, small and medium industries to large scale industries and abundant manpower. On the other side, urbanization, increase in usage of transport and industrial effluents, usage of plastic is causing pollution and threat to environment. Environment taught us a lesson recently, causing pandemic in the year 2019 i,e., Corona Virus. Our focus has been shifted towards knowing the importance of nature and its protection and sustainability. Renewable energy resources like air, water, solar and geothermal power offer us the most promising solutions for rapid industrialization, irrespective of Small-Medium or Large Scale industries. For instance, India has set a target of deploying approximately 500 GW of renewable energy by 2030 with an expected contribution of 280 GW of Solar PV. This endeavor can give rise to employment opportunities for the youth and enable them to play a vital role in preserving the environment. In this context, this paper focuses on the significance of environmental protection, issues and challenges and generation of green (clean) jobs, which will be a new reform in the history of employment in India in the near future.

Key Terms: Environment, Employment, Industrialization, Youth and Green Job.

1. INTRODUCTION

India is a developed country with vast resources at its disposal. Technology upgradation, digitalization of business transactions, online education system, entrepreneurship and start-up culture made India to stand on par with many other developed economies. It is not sufficient for a developed economy to concentrate only on these parameters, as there is a growing need for the environmental protection and sustainability.

The modern era has given rise to urbanization on one side and industrialization on the other hand. Increase in population demanded for occupation of cities, cutting down the forests and making path for human beings to accommodate. No doubt, industrialization developed the

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economy, but at the same time, there is increase in the pollution, chemical wastes in the canals, rivers, effluents which is casing threat to human life. There is a great necessity for the human race to take care of environment for their existence and also to welcome the coming generations.

To fulfil the above discussed necessity, it is inevitable to focus on the renewable resources that will generate energy, reduce pollution, increase the plantations and bring back the sustenance of natural vegetation in many parts of the country.

Definition of Green Job

According to Industrial Labour Organization/United Nations Environment Programme,

> "Any *job/ employment created in the economic sectors and activities that reduce environmental impact and brings down to levels of sustainability*".

Fig 1

2. LITERATURE REVIEW

Environmental protection is not a new phenomenon globally. Hence, many theories are laid down to support the research in protecting the environment all over the world. Few literature reviews are taken into consideration, for the purpose of study further.

Several research studies proved that achieving sustainable development requires reforming, rethinking and reformulate the current economic model. The topic of green job has frequently associated with study of sustainable development, green economy, circular economy and international agreements on environment. These areas of study should bring forth the issue of promoting those production and distribution of process that involve techniques, methods, procedures that preserve the environment.

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Few literature reviews are as discussed as under.

1) Bassi and Guidolin have investigated small and medium size enterprises in European Countries and revealed that there is a significant association between environmental protection, green skills, circular economy and sustainability.
2) In another study made by Unay-Gailhard and Bojnec analysed that there is a significant difference between green and non-green jobs in terms of skills and human capital. It is emphasized that green jobs require higher levels of non-routine cognitive skills and a greater dependence on formal education, training and certain work experience.
3) Song et al., opined that supply and demand of green jobs based on data provided by online recruitment services of the South Korean Labour Market between 2009 to 2021.
4) From the study of "top-down" and "bottom-up" approach of Solvenia's green economic experience, observed the potential of green economic measures to create green jobs in the agricultural sector for the young generations.
5) In another analysis made by Solvenia'sbetween 2007-2015 revealed that, the ability to adjust the workforce to activities complaint to environment policy does not lead to any job creation, while the amount of labour used on very large farms and farms that supply milk increased.

From the above literature review, it is observed that there is an increasing demand for the green jobs more than a decade and there is a significant association between green jobs and other environmental factors, which leads to the environmental protection.

Need for the Study

Based on the literature review, it is emphasized that reformulation of employment is required in India to protect and sustain nature for the existence of human race and also for the future generations. Green jobs are to be welcomed by various programmes that will be introduced by the Government of India, ILO and UNEP.

Objectives of the Study

Based on the literature review and need for the study, the following objectives are taken into consideration.

1. To study the environmental challenges that are being faced.
2. To study the relevance of green jobs in the context of environmental protection and sustainability.

Research Methodology

Though environmental protection, sustainability is not a new phenomenon, but it is gaining momentum in the recent decade with the globalization, modern industrial methods, pandemics and other factors. To overcome the problems of nature and balancing between human beings and nature, the intervention of human capital is necessary to protect the nature and natural

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resources. Wind, solar energy, geothermal energy, water conservation, in all these areas employment should be given to sustain the environment and save the human race in the long run.

Hence, the study is based on secondary sources drawn from official websites, portals, ILO Reports and UNEP Reports and Statistical information from authenticated sources. The data has been analyzed to infer conclusion from the reports and resources available.

Scope of the Study

The scope of the study is confined to environmental challenges and the avenues for green jobs in India and upcoming opportunities in this new employment reform.

3. ENVIRONMENTAL CHALLENGES

The environment is tremendously undergoing lot of changes since more than a decade. The temperatures are rising all over the globe due to several reasons such as pollution, radiation, emissions from transport/vehicles, sewerages, effluents from industrial wastes and so on.

Fig 2

1) **Water Pollution**is one of the major causes of environmental pollution. The main source of water pollution in many areas of our country is during rainy seasons as most of the water flow over the lakes and canals and there is every possibility of mixing it with drainage water. Stagnation of water is also one of the reasons for pollution as most of the water gets stagnated in many places of Indian cities, as there are no proper channel for rain water to flow into the manholes. The stagnated water will attract the insects, mosquitoes and other germs.
2) **Usage of plastic** is another major cause of pollution. Many of us since more than two decades, we stopped using mud vessels, copper, steel utensils. Consumption of water in plastic bottles is on much usage among all of us. This is causing pollution, as no plastic will dissolve in the soil quickly and it produces heat. Plastic water bottles, Plastic vessels, plastic kitchenware and plastic furniture, plastic garlands, plastic decorative items, plastic curtains are on much usage by many of the families all over the country.

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3) Industrialization is contributing the GDP of our country, but at the same time, it's contribution in polluting the environment is not measured many times by us. The economists only measure everything in terms of a rupee, rather than in terms of lives of all the living beings on the earth. **Chemical pollution** is damaging the human body, polluting the rivers, drinking water, food items, beverages and medicines. There are harmful side affects on consumption of food, water and usage of medicines. This is totally spoiling the health of human race.

4) **Air Pollution** is another major cause of environmental damage in the long way since, industrialization has began in India. Many fought against this, but could not win over. Though technology is improved, there is no reduction in the air pollution, rather, it is increasing day-by-day.

In addition to these major causes, there are certain environmental challenges that are being faced. Few of them are as follows.

- ❖ Increase in world's population from 1 bn in 1900 to 9 bn by 2050.
- ❖ No access to potable water by more than 900 million people.
- ❖ No access to reliable energy by 300 billion households.
- ❖ Nearly 3/4th of the world's poorest depend on nature as a significant part of their daily livelihood.

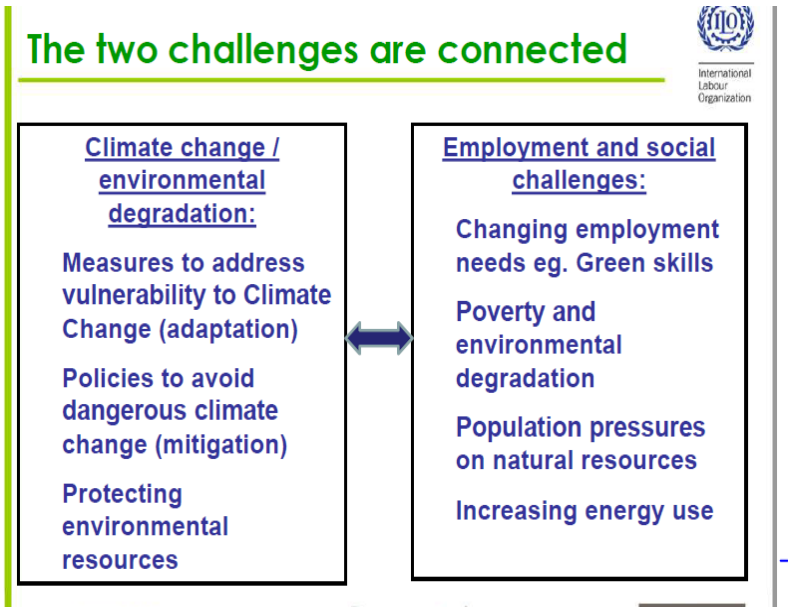

Fig 3

Source: Secondary Data from ILO Reports 2021

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The Concept of 'GREEN' Jobs

'**GREEN**' is something relating to nature, environment which includes eco-system, forests and plantations. Green Jobs contribute towards reducing adverse impact of environment. The source of green jobs are from renewable energy, pollution control, forestry and eco-tourism. Green jobs makes us to adapt to the effects of climate change e.g. in building resilient infrastructure.

The green jobs will have an effect on the sectors of the economy, as it has to create additional jobs, revenue generation, tax implications, jobs like extraction may be eliminated and some existing jobs may be transformed.

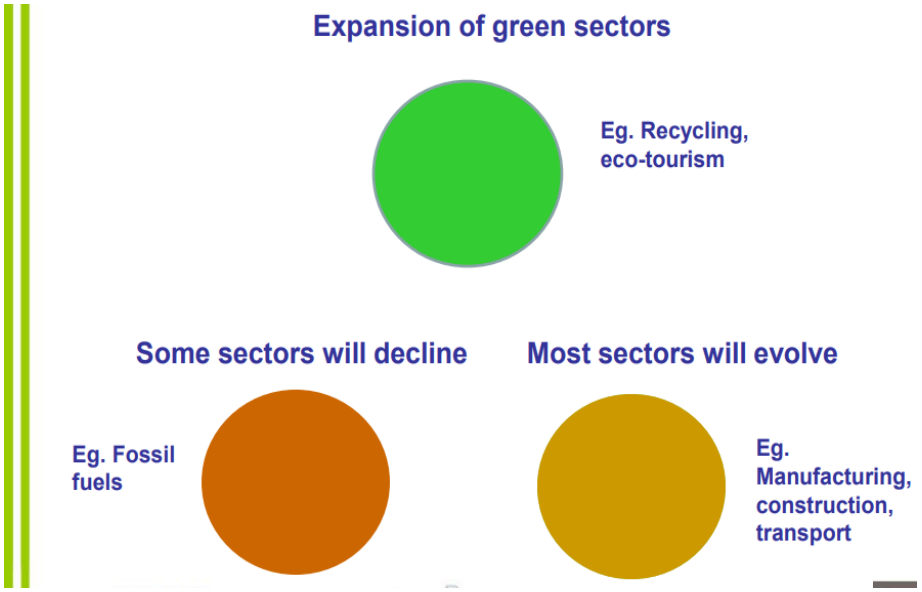

Fig 4

Source: Secondary Data

From the above figure, it is observed that expansion of green sectors will enable green jobs with the advent of recycling, eco-tourism and the impact of circular economy contributes to the green employment. There will be a shift in the labour market from high impact environmental jobs to low environmental impact jobs.

Obviously there will be positive and negative impact on the jobs from companies view point.

1. There will be opportunities for the companies to become leaders in green revolution.
2. Some of the companies may this aspect as a part of their social responsibility in generating employment in green sectors.
3. Labour cost, companies dependent on fossil fuels and companies should rise to the level of accepting environmental challenges.

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4. DATAANALYSIS& INTERPRETATION ON GREEN JOBS SECTORS IN INDIA

Figure 3: Cumulative workforce employed in the wind and solar sectors for 81 GW of installed capacity as of FY21 (Source: CEEW-NRDC analysis, 2022)[33]

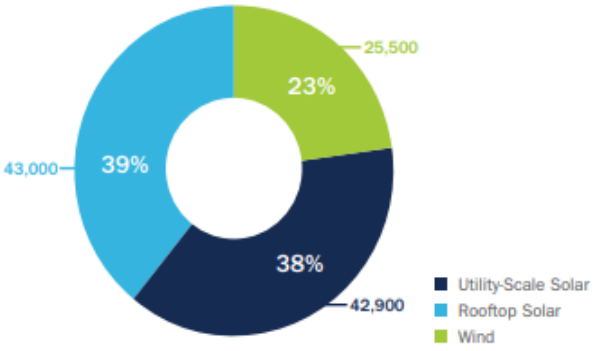

Fig 5: Green Jobs Generation in FY 2019-21

Source: Secondary Data

From the above pie chart, it is analysed that 23% of human resource is employed in wind energy, followed by 38% in utility scale solar and 39% in rooftop solar energy plants.

Figure 7: Solar and wind energy workforce added in FY20 (Source: CEEW-NRDC analysis, 2022)[43]

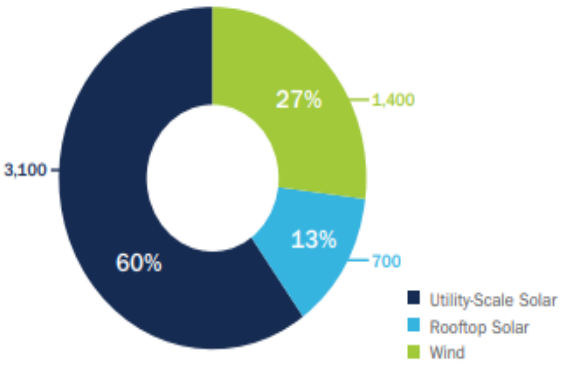

Fig 6: Employment Addition in FY 2020 -2021

Source: Secondary Data

From the above pie chart, it is observed that an additional workforce was added in the segments of utility scale solar, rooftop solar energy and wind energy.

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Figure 4: Employment trends in wind sector between FY10 and FY21 (Source: CEEW-NRDC analysis, 2022) [36]

Fig 7: Employment Trends in Wind Sector (FY 2010-21)

Source: Secondary Data

From the above bar chart, it is analysed that the employment in wind sector began from 2010 with an annual capacity of 1000 employees and it raised to 3000 in 2012 and reached highest among all the years in 2017 with a cumulative value of 25000 workforce.

Figure 5: Employment trends in the utility-scale solar between FY10 and FY21(Source: CEEW-NRDC analysis, 2022)[38]

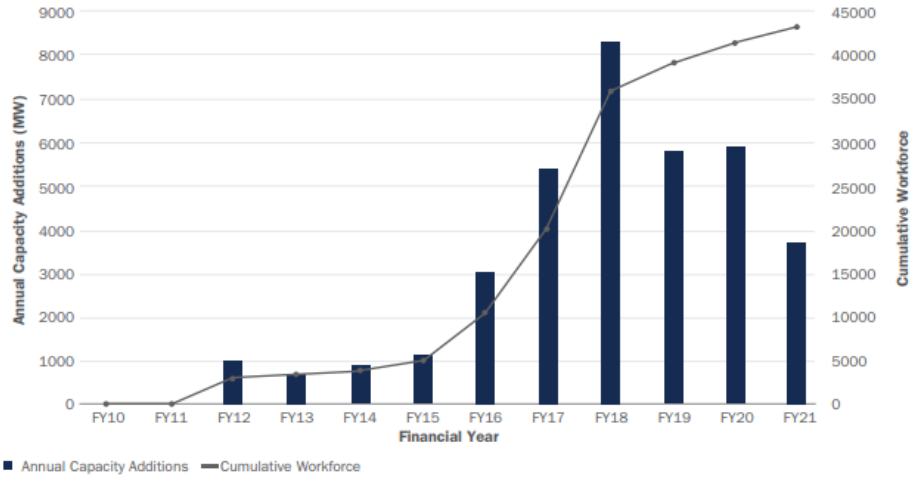

Fig 8: Employment Trends in Utility-Scale Solar Energy (FY 2010-21)

Source: Secondary Data

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Solar energy sector has been growing stupendously since last decade. From the above bar chart, it is observed that, the demand for solar energy is increase since FY 2012 with a cumulative affect between FY 2017 and FY 2021. The highest workforce is observed in the FY 2018.

Figure 6: Employment trends in rooftop solar between FY17 and FY21 (Source: CEEW-NRDC analysis, 2022)[39]

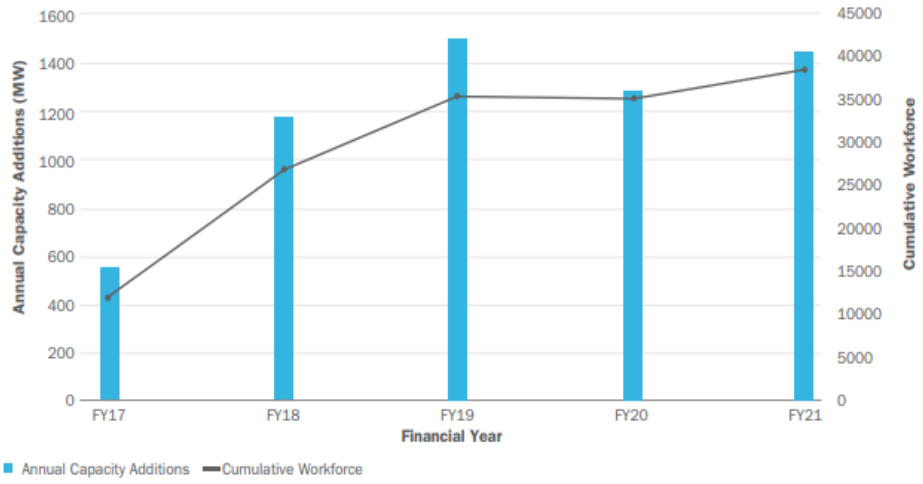

Fig 9: Employment Trends in Rooftop Solar Energy between FY 2017-21

Source: Secondary Data

From the above bar chart, it is emphasized that the employment trend in rooftop solar energy has gained momentum since FY 2017 and reached a cumulative workforce from 5000 to 40000 capacity with an additional from 200 1400 annually.

Figure 7: Solar and wind energy workforce added in FY20 (Source: CEEW-NRDC analysis, 2022)[43]

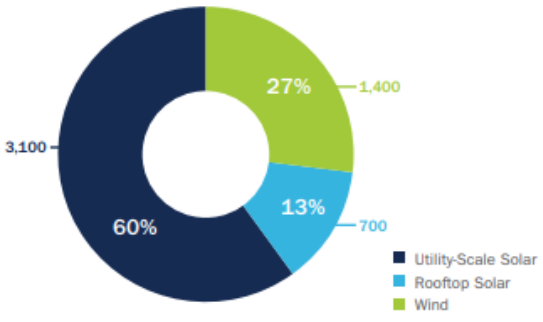

Fig 10: Solar & Wind Energy workforce added in FY 2020

Source: Secondary Data

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From the above pie chart, it is analysed that the workforce is added in the sectors of solar and wind energy. Utility-Scale Solar by 60% followed by Rooftop Solar by 13% and Wind energy by 27%.

Green (Clean) Jobs creation made potential

Skill development, Green Jobs creation and eradication of Covid-19 was the priority of Government of India since 2020, in the post covid-19 era.

Jobs created in the Renewable Energy (RE) market offer a significant opportunity to meet the Government's multiple goals of employment generation, clean energy growth and overall development of economy. Enhancing the clean energy target from 175 GW of RE in 2022 to 500 GW of non-fossil fuel capacity by 2030.

Table 1: Renewable energy technology mix in the three scenarios by 2030

Table 1: Renewable energy technology mix in the three scenarios by 2030 (Source: CEEW-NRDC analysis, 2022)[56]

Technology	Scenario 1: Government ambition		Scenario 2: Forward looking		Scenario 3: Market driven	
	New addition (2022-2030)	Cumulative capacity	New addition (2022-2030)	Cumulative capacity	New addition (2022-2030)	Cumulative capacity
Wind	101	140	148	187	52	91
Utility-scale solar	132	168	125	161	204	240
Rooftop solar	106	112	29	35	89	95
Bioenergy	7	17	18	28	9	19
Small hydro	0	5	18	23	1	6
Off-grid solar	6	7	18	19	10	11
Total		449		453		462

*Higher capacity for bioenergy has been considered in Scenario 1 because CEA target of 10 GW in Optimal Generation Mix Report has already been achieved.

Source: Secondary Data

From the above table, it is observed that, various renewable energy sectors are making the Government to fulfil their ambitions and forward looking from 2022 to 2030 and by making additions from the market driven forces.

These three scenarios are designed to estimate the job creation potential of 500 GW of non-fossil fuel capacity target. These scenarios are based on various national and international studies that have projections of India's energy mix for FY 2030.

To grow the clean energy sector workforce and to equip the workforce with skills and training, the Suryamitra training programme was launched by the Ministry of New and Renewable Energy in 2015.

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The findings from the survey is as follows:

Table 2: Table showing the improvement in Skill and Other Factors

Improvement in Skills and Other factors	Trainees (%)	Improvement in Skills and Other factors	Trainers (%)
Certified Trainees	95.7	Improvement in Technical-Know how	78.6
Increase in job opportunities	88.5	Increase in job opportunities	53.9
Improvement in performance	96.1	Improvement in performance	93.3
Increase in income	80.5	Increase in income	45.7
Improvement in quality living	99.3	Improvement in quality living	51.9

Source: Secondary Data

From the above table, it is analysed that, the training for the workforce has improved their performance and skills. The training personnel (both trainees and the trainers) got an opportunity to increase their capabilities, income and improve the quality of living. Since the inception of this programme, more than 78,000 trainees have been certified by Government of India under the Suryamitra Training Programme supported by various Central and State schemes.

Keeping in mind the success of this programme, more recent programmes like Vayumitra (Wind Energy) and Varunmitra (Solar pumping system installers) have launched.

Table 3: New workforce added between FY 2022 and 2030 in Solar and Wind Energy Sectors

Table 3: New workforce added in solar and wind sector between FY22 and FY30 in various scenarios (Source CEEW-NRDC analysis, 2022)[58]

Technology	Scenario 1: Government ambition	Scenario 2: Forward looking	Scenario 3: Market driven
Wind	63,400	95,600	30,900
Utility-scale solar	1,35,800	1,26,900	2,29,900
Rooftop solar	7,32,700	1,17,500	5,97,500
Total	9,31,900	3,40,000	8,58,300

Source: Secondary Data

From the above table, it is observed that, the addition of new workforce in solar and wind energy sectors between FY 2022 and FY 2030 under various scenarios.

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5. FINDINGS OF THE STUDY

Based on the data analysis and interpretation, some of the major findings are as follows.

1) From the figures 1.0 and 2.0, it is evident that the clean job opportunities are raising in solar and wind energy sectors since FY 2012.
2) There is a cumulative increase in the workforce in solar, wind, rooftop solar and utility scale solar sectors.
3) There is a tremendous increase in the addition of workforce in solar, wind, rooftop solar and utility scale solar sectors.
4) The initiative taken by the Government of India in conducting programmes like Suryamitra, Vayumitra and Varunmitra is a dynamic step in developing the skill and capabilities of clean jobs workforce.
5) There is a potential increase in the green job workforce, as both the trainees and trainers are able to improve their skills, capabilities, improve their performance, which resulted in increase in their income and quality of living.

6. SUGGESTIONS

1) Focus should be given on renewable energy sectors like rooftop solar, mini and micro-grids, bio-mass and small hydro systems and avoid long lead times and execution bottlenecks associated with public sector projects.
2) Our country should strengthen the domestic manufacturing units by removing sectorial disabilities and creating economies of scale for the development of eco-systems of the country.
3) Develop rural skill development programmes apropos to renewable energy.
4) There should be study and continuous projects from renewable energy sector, to engage the workforce throughout the year, so that, there will not be any job loss in clean job schemes.
5) There is a need for reskilling and upskilling of existing workforce to facilitate thousands of trainees for a career in renewable energy as well as growth.

7. EPILOGUE

Environmental protection and generating renewable resources and new resources is the most priority to sustain the nature for the future generations. Measures are to be taken for the adaption to the climate and policies are to be framed to avoid dangerous climate changes that are taking place globally. Workforce is to be trained to overcome the environmental challenges such as air, water and noise pollution. The policies of renewable sector is to be reframed to generate employment in the areas of solar, wind energy and rooftop solar panels installers. An awareness is to be brought among the companies and existing manpower to adapt to realise the

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clean job profiles and build a career in the same.

The future of employment seems to be more linked with clean jobs in our country, particularly in the solar energy sector, as many are installing solar rooftops domestically. The vendors are providing financial assistance in the form of EMIs to install solar power panels at home to avoid heavy electricity bills in the present era, as there is a good amount of increase in the per unit rate for consumption of electricity. The Government schemes are to be increased to train the workforce in the field of green jobs in the coming years to protect and sustain the nature, which in turn protects the human race on the earth.

8. SCOPE FOR FURTHER RESEARCH

Nature has the habit of giving back, whatever it receives. If we protect the nature today, it will protect us and our future generations in the coming eras. Hence, there is a good scope for the research scholars to study the changes in the climate, environment and nature from human resource, renewable resources, revenue generation and economic development view point. Green Jobs is a new phenomenon since a decade, which will give scope to the research scholars to study about its awareness, issues, opportunities and schemes for the existing as well as future generations of human beings aspiring to be the workforce.

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