

Research on Predicament of Developing Green Job and Countermeasure

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Abstract—At present, the serious energy consumption, environmental degradation and economic crisis result in the weak employment in traditional industries. The large-scale industrialization, city and countryside integration and the rapid development of economy give rise to desperate shortage of natural resources, which also bring about severe destruction to our ecological environment. This paper firstly defines the connotation and denotation of Green Job, secondly introduce the state-of-the-art of Green Job and discuss the existing problems of Green Job, lastly come up with policy suggestion to facilitate the development of Green Job in our country based on the characteristics of development of Green Job.

Keywords—green job; government; sustainable development

I. INTRODUCTION

Since 2008, the outburst of American subprime mortgage crisis quickly swept the whole international financial market and shaped the global economic crisis, which caused apparent decline of the world economy. Several countries such as USA, Russia, UK and so on, almost slipped into overall economic recession. Every country faced extremely severe unemployment issue. According to the UN website, the WLO pointed out in the published Report on Global Employment Trend of 2012 that under the perspective of possibly continuous deterioration of current economic activities, there are 200million unemployed people in the worldwide labor market after experiencing crisis for successive three years. Under the influence of financial crisis, every developed country formulates economic recovery plan in succession. Many countries including America and regions such as the EU and Japan develops the Green Economy and promote the Green job as an important mean of economic recovery, which drives the development of Green Job in a large part.

The concept of Green Job originally appears in the Report of Green Job in industry jointly published by Australian Conservation Foundation and Australian Council of Trade Union in 1994. Green Job refers to the job contributing to maintaining the environment quality in agriculture industry, manufacturing industry, research and development industry and administrative department. Those jobs achieve the effect of environment protection by improving work efficiency, cutting down energy consumption and reducing pollutant emission [1]. The labor

Science department of Ministry of Human Resources and Social Security defines it as a job in the industry, department, enterprise and post with low input and high output, with low consumption and few emissions and with circulation and sustainability, compared to the social average level in the national economy [2]. The author think green job can be explained from two angles. From the perspective of environmental protection, green employment is to meet the low-carbon emission standards, energy conservation, environmental protection has a certain role in promoting the job; from the workers point of view, green employment is engaged in the work of workers Work in line with environmental standards, and the physical and mental health of workers has no negative impact, are decent work.

II. PRESENT SITUATION

In china, the pattern of green job is not only an underlying improvement to the traditional patterns of employment, but also a powerful revolution to the traditional economic model. Green Job since coming up for the first time has aroused widespread attention from all sectors of society. Under the background of extremely severe climate and environment, and under the circumstances of global financial crisis, the traditional area of employment see continued weaknesses, which cause a massive unemployment. Hence the Green Job has been given high expectation and become the best choice for increasing employment. The Green Job has a relatively long development course, and since 1980s has gradually come into being environmental protection industry. From 1990s, the industry of solar energy emerged and now has developed into a considerable scale. The wind energy and biomass energy are developing violently. With the increasing strength of industrial energy conservation, some outdated production facilities have been gradually weeded out and some enterprises with severe pollution and energy consumption have been closed down. During this course, the green job in our country begins to take shape.

A. Employment in Environmental Protection Industries

With the increasingly strict environment supervision, and under the driving force of laws and regulations, standards and policies related to environment protection and resources conservation, the relevant industries of

environment protection show a rapid development trend, with the overall scale remarkably enlarged, the industrial structure deeply adjusted and industrial technology constantly increased, which makes the environmental protection industry an important part of structure of national economy. According to the Bulletin of Environment Protection-related Industry Status of Nationwide in 2011[3], the number of employees in environmental protection-related industry of 2011 is 319.5 million.

According to data in "Table I", in 2011, the number of working units in environmental protection-related industry amounts to 2.453 million, with number of employees amounting to 319.5 million. As the increasing attention to environment protection career and increased investment, the environment protection industry has shown great market potential in the field of Green Job.

TABLE I. STRUCTURE OF ENVIRONMENTAL PROTECTION-RELATED INDUSTRIAL FIELD

Category	Total	Production of environmental protection products	Environmental protection service	Production of resource circular using products	Production of environmentally friendly products
<i>Working units</i>	24530	4471	8820	7138	4104
<i>Employees (million people)</i>	319.5	39.6	51.8	92.0	146.8
<i>Year income (100million)</i>	30752.5	1997.3	1706.8	7001.6	20046.8
<i>Average number of employee in working units</i>	130	86	59	129	358
<i>Per capita income (10 thousand)</i>	74	50	33	76	137

B. Employment in New Energy Industry

China, as a developing country, has been at the forefront in many aspects of Green Job, setting a good example in the field of environment protection and using of new energy such as renewable energies. It is reported in the Renewable Energy and Jobs-Annual Review 2016, [4] published by the 11th council of IRENA (International Renewable Energy Agency) on May 25, 2016, that the number of employees in the field of renewable energy worldwide increased by 5% in 2015, amounting to 810 million.

Among those countries, China, Brazil, America, India, Japan and Germany have the largest number of employees in the field of renewable energy. The solar photovoltaic

industry still has the largest number of employees in the renewable energy industry, with the total number amounting to 280 million (increasing by 2.5% compared to last statistics), followed by liquid biofuel industry with the global number of employees amounting to 170 million. The wind power industry ranks the third, with global number of employees amounting to 110 million after an increase of 5%, among whom, the number of employees from China is 50.7 million. The development of new energies such as solar photovoltaic power generation and biomass energy has greatly facilitated the development of manufacturing industry, installation industry and equipment maintenance industry, which creates abundant green job posts. "Table II"

TABLE II. THE NUMBER OF EMPLOYEES IN THE FIELD OF RENEWABLE ENERGY WORLDWIDE (UNIT: THOUSANDS)

	World	China	Brazil	United States	India	Japan	Bangladesh	European Union		
								Germany	France	rest of EU
<i>Solar Photovoltaic</i>	2722	1652	4	194	103	377	127	38	21	84
<i>Liquid Biofuels</i>	1678	71	821	277	35	3		23	35	47
<i>Wind Power</i>	1081	507	41	88	48	5	0.1	149	20	162
<i>Solar Heating/Cooling</i>	939	743	41	10	75	0.7		10	6	19
<i>Solid Biomass</i>	822	241		152	58			49	48	214
<i>Biogas</i>	382	209			85		9	48	4	14
<i>Hydropower (Small)</i>	204	100	12	8	12		5	12	4	31
<i>Geothermal energy</i>	160			35		2		17	31	55
<i>CSP</i>	14			4				0.7		5
<i>Total</i>	8079	3523	918	769	416	388	141	355	170	644

C. Employment in the Field of Transportation

Urban transportation as the bloodline of a city is one of the major functions of a city. Faced with increasingly severe transportation conditions, every region carries out the construction of green transportation system such as bicycle transportation, BRT, light rail and metro. According to the data released by Chinese Cycling Association, the output of bicycles of our country in 2015 is 8026 million, while the export volume of bicycle is 5781 million, accounting for 72% of the output, which indicates that China is a country with relatively large bicycle output. In recent years, many cities including Guangzhou and Wuhan has been striving to develop the bus system, light rail system and metro system. According to the Construction Planning of 2015, Guangzhou has invested 0.24 billion RMB for the construction of railway transportation project from 2011 to 2015, with overall length of the line approximately up to 300km. Green transportation vehicles have been rapidly developed in recent years, and the production, construction, usage and maintenance of public transportation will generate a lot of jobs.

D. Employment in the Building Field

The green architectural development in our country has seen three periods. The first one is the starting period from 1982 to 1995, which is indicated by the release of Civil Building Energy Conservation Design. The second one is the mature period from 1995 to 2005 when the energy conservation standard system is firstly constructed. After 2005 comes the third period-comprehensive development period when the construction implementation rate of green building was up to 95.4%.

With the development of green energy conservation building, relevant policies and regulations are also deepened. Since 2005, relevant policies and regulations have been constantly issued, which gradually form relatively thorough green building standard system.

The Action Plan of Green Building issued in 2013 put forward that during the 12th five-year plan, the construction area of green building shall increase to one trillion square meters. The Outline of Modernized Development of Construction Industry issued in 2016 pointed out that the proportion of green buildings in the whole newly built buildings shall account for over 20% by 2020, and it shall increase to 50% by 2050. The rapid development of green buildings requires not only the adjustment of metallurgy industry, chemical engineering industry and building materials industry, but also the professionals. The popularization of green buildings will generate a great demand for labor, and hence bring large amount of jobs.

III. EXISTING PROBLEMS

A. High Cost for Creating Green Jobs

Developing green jobs and creating green jobs need vast investment and high cost. It is estimated that 115 million CNY will be needed to create a green job in wind energy

industry, 91 million CNY in solar photovoltaic cell industry, 70 million CNY in the solar energy heat utilization industry and 14 million CNY in biomass energy industry [5]. The high cost of creating green job posts becomes the major factor of restricting various countries in the world developing green economy. For developing countries, the capital investment for creating green jobs is much more than that required in traditional industries, which largely restricts the development of green jobs in many developing countries including China.

B. Imperfect Policy and Regulations

Green Job is still at a starting phase in our country. Although China has formulated relevant laws and regulations about environment protection and energy structure adjustment, perfect laws system of developing green jobs has not yet established. The laws issued by the government on environment protection and renewable energy development such as Renewable Energy Law, Medium-and-Long-Term Development Plan on Renewable Energy, and Implementation Opinions on Accelerating the Development of Chinese Green Buildings are still at the guidance level, lack of practical and feasible strategies, which has no materially facilitating effect on creation and realization of green jobs. Furthermore, our country has not established relatively perfect green tax system. The incomplete setting of tax categories such as resources and environment tax lead to a fluke mind of enterprises with relatively serious pollution when evacuating sewage. Some enterprises don't implement active pollution abatement and technical innovation, which further limits the development of green jobs.

C. Lack of Labor Skills

Green job pattern is a higher-quality employment compared with the traditional employment pattern, which raises a higher requirement for labor standard and labor skills. In our country, the schooling level and skills of laborers are generally low. Common employees in industrial enterprises are those with low education background, and laborers with high degree are in great shortage. Furthermore, the employees in such industries as environment protection, new energy field, transportation field and building industry are mostly from low education background and are peasant-worker from country sides. During the transformation from traditional employment to green jobs, the posts with potential green employment effects mostly exist in the aforesaid industries. In the field of New Energy, both the construction of solar roof and wind power generation need high-technical talents. However, most of the laborers in our country did not receive the education and training in this aspect, hence lack technical skills. Therefore, the low quality of laborers in these industries will also hinder the development of green job.

D. Green but Indecent

The green job at the present stage of our country is still at immature stage. Such works as assembling of solar panel and recycling of electronic wastes, although able to reduce

environment pollution to some extent, are not decent. Guangdong, has always been a big province with large labor input, with the number of employees in the field of recycling of wastes and refuse disposal up to 38 million, among whom 13 million are official employees and 25 million are nonofficial employees. In the future, Guangdong will enter a period of high speed development, and the disposal of solid wastes, metals, unwanted cars and electric appliances will also see a rapid increase. The development of these industries will drive the employment of sanitation workers, waste collection and disposal workers, and relevant sanitation checkers. However the household refuse in the economic circulatory system during the disposal can be deteriorated, thus causing hidden health danger. The disposal of wastes plays an important role in green economic system, but the severe working environment of relevant workers and even lack of corresponding social security can easily cause infectious disease of respiratory tract and intestinal tract. Their works truly make contribution to the environment protection course and facilitate green development, but are indecent.

IV. POLICY SUGGESTION

A. *Increase the Government Founding and Promote the Creation of Green Jobs*

The technical cost of creating green job is high, and the required funding is much higher than that in traditional industry. Relative high cost is needed in the initial stage of developing green job, therefore support shall be given to sustainable green enterprises and green projects that conform to the idea of energy conservation and emission reduction and the idea of low carbon development from the perspective of government and fiscal policy. Such as providing financial subsidies, interest subsidy and petty loan for enterprises or projects that conform to green employment after joint investigation by the department, and increasing the investment on cultivation of green jobs. First, from the level of policy, investment on green job field shall be emphasized, and the idea shall be pointed out in relevant programmatic document about developing green jobs, to highlight the investment on the field of energy saving and emission reduction, reducing energy consumption and sustainable development. Second, from the level of operation, the investment orientation shall be specified, capital subsidies shall be offered on enterprise training, enterprises shall be encouraged to carry out on-the-job training in favor of green job improvement, and tax preferential system and small-sum guaranteed loan shall be provided for laboring green enterprises.

B. *Improve Policies and Regulations, Establish Comprehensive Legal System of Green Job*

For the development of green jobs, our country mainly takes the form of guiding outline, and no mature legal system can be followed. At the present stage, the development of green job lack practical and feasible implementation strategy, so the development is very difficult. To facilitate the rapid development of green job in

our country, comprehensive legal system of green job must be established. First, the government should promote to establish comprehensive legal system of green job from a long-term perspective, establish relevant laws in the form of legislation to ensure that there are laws to abide by for the development of green jobs. Second, under the legal system of green jobs, the government should introduce feasible strategies to guide the development of green jobs and play the role of governmental macroeconomic regulation and control. Third, the government should quicken the construction of matching laws related to the green job such as environment tax and sewage disposal fee, which to some extent can restrain the enterprises with serious pollution. On the other hand, the earning from tax and sewage disposal fee can be used as the subsidy source to green enterprises to relieve fiscal burden and provide force for the development of green jobs.

C. *Increase the Training and Improve the Employ Ability*

Green jobs involve originally green job, green jobs during the industrial adjustment and newly increased job positions in relevant fields. Those jobs require professional talents whose cultural knowledge and working skills are at a relatively high level. So we need increase the strength of educational training and provide knowledge and skill training for the workers in the existing energy field to enable them to grasp the ability conforming to green jobs. First, we should popularize the green job knowledge to low-level workers and provide them with professional training to the point, to improve their knowledge hierarchy and working skills. Second, we offer technical staffs' education training about the renewable energy and green transportation to let them know the development prospect of green jobs. Last, for some newly increased green jobs, we should start from higher education, setting special courses that match with the newly increased jobs for the development of green jobs in colleges and universities and their relevant research institutes. We try to cultivate elite talents with strong profession proficient operating skills to create conditions for the future development of green jobs and transport talents needed.

D. *Perfect the Public Service and Improve Green Job Quality*

Nowadays, most workers of waste recycling don't have corresponding social security, and their health problems caused by work are not solved in time, which let down their employment enthusiasm. Therefore we should perfect the public service and provide social security for laborers when developing the green jobs. First, we can advocate the construction of harmonious community and labor relationship, cultivate their environmental awareness and gradually normalize the work of recycling waste. Second, we can initiate revolution of human resources management system, set up people-oriented thought and respect laborer of different industries, forming a development pattern of improving the industrial development relying on human capitals. Last, we should perfect the public services and handle the payment and transfer of social security, to ensure

equitable access to basic public services such as education, medical treatment and housing.

V. CONCLUSION

Developing Green Job is not only the innate need of China's economic development but also the development trend of international economy. Developing green job and facilitating the transition towards green economy require the government to play its leading role in increasing funding, establishing and perfecting legal system, strengthening the educational training, perfecting public service to promote the successful transition of traditional employment towards green job. The transition requires lots of considerations, eliminates partial understanding of cognition, and implements in the practical action in all works of life. To achieve sustainable development, China should continuously promote the development of green job. Only by transforming the employment mode and drive the upgrading of energy structure to realize the transforming of economic structure, can China's economy move towards sustainable development step by step.

REFERENCES

- [1] UNEP. Green Jobs: Towards decent work in a sustainable, low-carbon world [R].2008.
- [2] Labor Science Research Institute. The Development of Green Job in China[R]. 2009.
- [3] China's Environmental Protection Industry. Bulletin of Environment Protection-related Industry Status of Nationwide in 2011[J]. 2014(5).
- [4] Agency I R E. Renewable energy and jobs: annual review 2016[J]. 2016.
- [5] Zhang Libin. The Development of China 's Green Job [EB/OL].2015. <http://www.calss.net.cn/n16/n1194/n1233/27793.html>.
- [6] Human Resources and Social Security Research Institute of Labor Sciences.
- [7] Zhou Yamin, Pan Jiahua, Feng Yongsheng. Green Job: Theoretical Meaning and Policy Effect[J]. China's Population, Resources and Environment, 2014.