

The Reality and Challenges of Green jobs in China: An Exploring Research¹

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Abstract:

According to International Energy Agency's statistics in 2010, China had already passed the U.S. to become the biggest energy consumer of the world. Propelled by the remarkable economic growth in the last decade, the total primary energy consumption of China had jumped from 776 million tonnes of oil equivalent (Mtoe) in 2000 to 2164 Mtoe in 2009. Up until now, coal is still the major energy source in China. Coal-fired power generation not only causes serious air-pollution in China, it also contributes significantly to the nation's greenhouse gases emissions. In the face of global climate change, the intensifying environmental degradation, and the rapid depletion of natural resource, the Chinese government is now spending billions of dollars each year to build and expand its own renewable energy industries. It is estimated by Worldwatch Institute that there are about one million people currently work in China's renewables sector, and the solar thermal industry alone employs approximately 600,000 workers. The number of green jobs created by the renewable industries, such as hydropower, wind-power, and solar photovoltaics (PV), is expected to grow tremendously in the next few decades. Despite its increasing importance, the working conditions (i.e. wage level, occupational health and safety, etc.) of these newly created green jobs still remain largely unexplored. Building the authors' previous research on labour and environment in China, this paper aims to explore the working conditions of the green jobs and identify some potential strategies which help to ensure decent wages and OHS in China, by systematically reviewing relevant academic literatures, policy papers, legislations, media reports and other documents.

1. Introduction

The remarkable economic growth experienced by China since the beginning of the economic reform in 1978 has often been praised as a "miracle". The tremendous wealth gained by the country through its rapid industrialization in the past 30 years is beyond the imagination of many. However, such astonishing economic achievement does not come without a cost. Although China is expected to be the fastest growing economy in the world for the next decade, such growth will not be unsustainable in the long-run due to serious environmental degradation and overexploitation of natural resources.

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China's economic development has been heavily depended on carbon-based energy. According to International Energy Agency's statistics in 2010, China had already passed the U.S. to become the biggest energy consumer of the world (IEA, 2010). The total primary energy consumption of China had jumped from 776 million tonnes of oil equivalent (Mtoe) in 2000 to 2164 Mtoe in 2009 (NBS 2010, as cited in Cheung, 2011). Up until now, coal is still the major energy source in China. Over 60% of the energy consumption in China is from coal (Chang et al. 2003). Coal-fired power generation not only causes serious air pollution in China, it also contributes significantly to the nation's greenhouse gases emissions. The total annual CO₂ emission in China now is about 6 billion tons, which makes it one of the top emitters of the world. In 2000, the total amount of SO₂ emission had reached 20 million tons, ranked the number one of the world (Liu et al. 2011). Both of these are known to be the major greenhouse gases.

According to the 4th assessment report from the Intergovernmental Panel on Climate Change (IPCC) (Solomon et al. 2007), the rate of warming has nearly doubled over the past 50 years. There is general consensus among the scientific community that humans are causing global climate change. As one of the major strategies to mitigate climate change, the Chinese government is now spending billions of dollars each year to build and expand its own renewable energy industries. It is estimated by Worldwatch Institute that there are about one million people currently working in China's renewable sector, and the solar thermal industry alone employs approximately 600,000 workers (WWI 2011). The number of green jobs created by the renewable industries, such as hydropower, wind-power, and solar photovoltaics (PV), is expected to grow tremendously in the next few decades.

Despite its increasing importance, the working conditions (i.e. wage level, occupational health and safety, etc.) of these newly created green jobs still remain largely unexplored. This paper aims to explore the working conditions of the green jobs created by the renewable energy sector, and we narrow down our focus to wind power plants as to allow for a more concentrated analysis. Renewable energy can be generated from a variety of sources, including solar, wind, hydro, geothermal, biofuels, etc. It would be difficult, even not impossible, to discuss all renewable industries in China effectively. For instance, a person working at a geothermal power plant may be subjected to occupational hazards which are different from those at a hydropower plant. Besides, among all the renewables, some are more developed than the others. China has started to develop its wind power since the early 1980s, and it exceeded the U.S. in 2011 to become the country with the most installed capacity, reaching 44733.29MW (CWEA, 2011). Some of the wind turbine manufacturing companies, like Sinovel, Goldwind and Dongfang, are even among the world's top ten. Considering its significance in China's renewable industry, to compare the wind power sector with the conventional power sector will provide us with some insights into understanding the working conditions of green jobs in China.

In this paper, we will use examples from academic literature, legislations, policy papers and media reports to evaluate the general working conditions of green jobs and to identify potential strategies to help to ensure that green jobs are decent jobs.

2. Defining Green Jobs

In general, there are two main aspects involved in green jobs. One is the environment, and the other is employment. There is a notion suggesting that environmental protection would result in unemployment. The logic behind is that, if the environmental standards set by a government

were stringent, that would increase the cost of production, decrease competitiveness, and eventually result in unemployment. This “jobs versus environment dilemma” indeed affects workers’ perception towards the transition to green economy (Rathzel & Uzzel, 2011). Therefore, giving green jobs a proper definition serves as an important step in conceptualizing the relationship between jobs and environmental protections. Green jobs are a relatively new concept, and the scope and content of green jobs are constantly evolving under the global transition from an unsustainable to a sustainable economy. There is no standard definition of green jobs, and each country, depending on the stage of economic development, may have a different definition.

For instance, Center for Wisconsin Strategy (COWS) in the United States describes green jobs as “family-supporting jobs that contribute significantly to preserving or enhancing environmental quality”, and that “most green-collar jobs are and will be middle-skill jobs requiring more than high school, but less than a four-year degree”. About the employment side of green jobs, they emphasize that it should also be a good job, which “pays more than a poverty wage... offer benefits, at least health-care and ideally pensions, paid sick leave, safe working conditions, reasonable schedules, organizing rights, and a modicum of job security” (COWS, 2008).

In contrast, the definition made by the Institute of Labor Studies of China’s Ministry of Human Resources and Social Security (MOHRSS) skews more towards the environmental and technical aspects of green jobs. It defines green jobs as the positions created by any industry or department which are “low-input-high-output, low wastages, low emissions, recyclable and sustainable” (MOHRSS, 2010a).

For the purpose of the essay, we choose to adopt a more comprehensive definition (i.e. one that covers both the environmental and employment aspects) created under the “Green Jobs Initiative” by the United Nations Environmental Program (UNEP), International Labor Organization (ILO), International Organization of Employers (IOE) and International Trade Union Confederation (ITUC). According to the report released by the Initiative, “Green jobs: Towards decent work in a sustainable, low-carbon world”, green jobs are defined as “positions in agriculture, manufacturing, construction, installation, and maintenance, as well as scientific and technical, administrative, and service-related activities, that contribute substantially to preserving or restoring environmental quality”, and they “also need to be good jobs that meet longstanding demands and goals of the labor movement, i.e., adequate wages, safe working conditions, and worker rights, including the right to organize labor unions”(UNEP, 2008).

3. Evaluating China’s Renewable Energy Policies

China’s renewable energy policies can be grouped into 3 major categories depending on their natures and scopes (Li et al., 2002). The first level basically provides direction and guidance for the overall development of country’s renewable energy. The second level usually set out specifying objectives and outlines for development plans. The third level provides practical guidelines or incentive for the management and execution of the development plans. While the first and second levels are often set by the central government, the third level is usually determined by the local governments. A list of policy documents concerning the development of China’s renewable energy sectors between 1983 and 2001 is shown in Appendix 1.

3.1 The development of policy support

It was suggested by Li et al. (2002) that the lack of policy environment was one of the major barriers for the development of renewable energy. For instance, the lack of consistence and coordination in policy would make it difficult to integrate the electricity generated from wind energy into the existing power grids. For the same reason, without the policy support from the government, the process to put biogas technologies into practice would largely be impeded, since it would require the enforcement of waste water discharge standards.

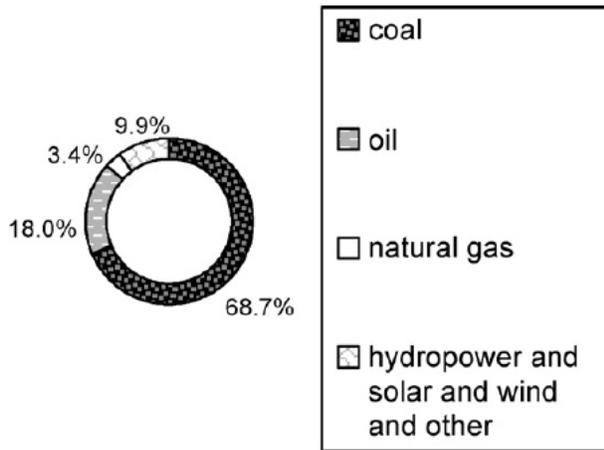


Figure 1 China's energy structure in 2009 (Liu et al., 2011)

Compared to conventional energy (carbon-based), renewable energy is not yet cost-competitive due to its high capital investment and low capacity. As mentioned earlier, over 60% of the energy in China is still generated from coal-fired power plants (see Fig. 1). Wind energy, together with other renewable sources, only contribute to less than 10% of the nation's total energy production. The share of renewable energy in China's energy profile had only increased slightly between 2000 and 2009 (see Table 1). In order to raise the competitiveness of renewable energy in China, support from the government is much needed, and that can be accomplished through measures like providing economic incentives (e.g. favourable taxation or direct financial subsidy) or support for technological research and development.

Table 1

China's energy structure over the past 10 years (2010 China statistical abstract as cited in Liu et al., 2011)

Items	Years									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal	67.8%	66.7%	66.3%	68.4%	68%	69.1%	69.4%	69.5%	68.7%	68.7%
Oil	23.2%	22.9%	23.4%	22.2%	22.3%	21%	20.4%	19.7%	18%	18%
Natural gas	2.4%	2.6%	3%	2.6%	2.6%	2.8%	3%	3.5%	3.8%	3.4%
Other	6.7%	7.9%	7.7%	6.8%	7.1%	7.1%	7.2%	7.3%	9.5%	9.9%

3.2 China's Renewable Energy Law

In response to the deepening threats posed by the global climate change and local energy shortage, the *Renewable Energy Law* was adopted at the 14th Meeting of the Standing Committee of the Tenth National People's Congress on February 28, 2005. It was an important piece of legislation, not only because it identified renewable energy as a government priority, but also because it provided clear and practical measures to foster the growth and development of renewable energy. Most importantly, the law requires the power grid operators to purchase all of the electricity generated from the approved renewable energy producers, and any non-compliance will be subject to a penalty. The National Development and Reform Commission (NDRC) is responsible for setting the prices for the renewables, and it can adjust the prices from time to time. Beside financial incentives and management guidelines, the law also specifies requirements for technology standards, building codes, resource surveys, and long-term development plans. Since renewable industry needs high capital investment, all the measures laid out by the above law can significantly lower the cost of capital of the renewable energy producers, and hence increase their profits.

3.3 The missing issue---The challenges met by the laid-off workers under the transition

In terms of building a stronger and bigger market for renewable industries, the Renewable Energy Law and the like are powerful tools. However, the missing issue in here is that, in order for a society to move away from the brown economy to a green one, a strong green-collar workforce is a must. It is an issue that has often been overlooked by the Chinese government. Dr. Cheng Ying from the Chinese Academy of Social Sciences, who are currently working with the WorldWatch Institute to study the development of green employment in China, pointed out that, "right now there are still quite a large number of workers in the green industry working on jobs which are unstable and low-tech, and those jobs are not the green employment that we like to pursue"; however, "according to our data, the possibility for our government to release policy relating to green employment is relatively small" (People's Net, 2011-03-23). Up until now, there is still no any specific policy or legislation designated for green jobs.

The fear of job loss could be one of the major factors preventing workers from supporting China's green transition. As the Chinese government continues its ambitious and aggressive approach for the greening of the country's economy, factories which lack the resources to meet the new environmental standards would be forced to close down and more jobs will be lost in this way. In 2007, the National Development and Reform Commission (NDRC) released the policy paper *Opinions on Speeding up the Shut-down of Small Thermal Power Units*, asking all thermal power plants with a capacity lower than 50 MW and all 20-year-old-or greater with a capacity lower than 100 MW to close down within the 11th five-year planning period (i.e. 2006-2010). It was estimated that the closing down of the small, inefficient thermal power units had caused about 236,000 job losses by 2008, and among those who lost their jobs, only one tenth of the workers were re-employed (MOHRSS, 2010a).

Most of the workers who lost their jobs have difficulties finding a new job. This is because renewable energy involves new technologies and requires workers of higher education and skill level. It has been shown that workers in the wind power plants are generally more educated compared to those working in the thermal power units (see Fig.2). Some studies suggested that, if taken into account both direct and indirect employments, the transition from fossil fuels to renewable power generation would eventually result in a net job gain (Cai et al., 2011; Pan et al., 2011). Nevertheless, the renewable energy is a knowledge-intensive rather than labor-intensive

sector. Cai et al. (2011) suggested in their recent study that, “the current speed of structural change in labor’s educational level is far below the pace required to meet the needs of the industry, resulting in a structural unemployment”. In other words, instead of job gains, what the workers from the conventional energy sector facing are immediate job losses. Furthermore, middle-aged laid-off workers are the people most adversely affected by the transition. To help them cope with the transition through trainings alone might not be enough, since it seldom guarantees re-employment. In most cases, the enterprises are more willing to train up fresh graduates from university or vocational colleges simply because they have a longer work life ahead of them.

In the old days, before the economic reform started in 1978, workers were allocated to different work units in the state-owned enterprises (SOEs) by the local governments. Thirty years after the reform, even though the energy sector still remains largely state-owned today, most of the SOEs have already been marketized, and instead of job allocation, workers are now mostly employed from the labor market. Workers have to compete with each other for jobs, and older workers are generally less competitive than younger workers due to their old age or low education level. With the advancement in technology, the demand for unskilled labor will further decline.

	Junior middle school and below	Senior high school	Vocational high school	Technical School	Secondary technical school	Junior college	University	Masters and above
Wind power	.0%	4.0%	.0%	2.0%	4.0%	38.0%	50.0%	2.0%
Large Thermal power	2.5%	3.3%	3.0%	10.5%	9.8%	26.1%	43.1%	1.8%
Small Thermal power	4.8%	3.6%	9.6%	10.8%	14.5%	25.3%	27.7%	3.6%

Figure 2 Education levels of workers among different power enterprises (MOHRSS, 2010a).

In the age where lifetime employment has become a history, social security plays a crucial role in ensuring laid-off workers would still be able to maintain a basic living standard (at least for a short period of time). In 1986, The Chinese government promulgated the first unemployment insurance policy in response to the foreseeable massive layoff of workers due to the marketization reform of SOEs. However, at the time, the policy only covered workers from the SOEs. To improve the unemployment insurance system, the State Council approved and released the *Regulations on Unemployment Insurance* in 1999, expanding the coverage of the insurance to workers in joint-venture or other private sectors. Nonetheless, the current unemployment insurance system still has a number of critical shortcomings, making it inept in providing adequate financial support for the laid-off workers to maintain a basic living standard. The shortcomings include:

1) Narrow coverage: The unemployment insurance policy only applies to urban economy, and rural economy is not being covered. Within the urban areas, its implementation is primarily on

SOEs, workers from the private or foreign-funded enterprises, to a large extent, are yet to be integrated.

2) Low security level: In general, the unemployment compensation in China is about 60 to 80% of the local minimum wage, which can only replace roughly 25% of the wages. Compared to the typical replacement rate of 40 to 75% in other countries, China's unemployment benefits are too low. It is clear that policy does not take into account that a worker may have a family to raise.

3) Insufficient monitoring: Both workers, enterprises and the government contribute to the unemployment insurance funds. The premium rate for workers is 1% of their wage, and the rate for enterprises is 2%. In order to lower the cost, enterprise might reduce a worker's wage and make up the amount by means of subsidies. As a result, when the worker becomes unemployed, the compensation that he/she receives might not be enough to lead a basic living.

Because of the reasons above, the current social security system might not be able to offer sufficient protection for the laid-off workers from the conventional energy sector. In mid-1990s, responding the rising protests from the laid-off state workers in large scaled SOE, the All China Federation of Trade Unions (ACFTU), the official trade union in China, and some local governments have initiated Active Labour Market Policies, by providing retraining program and job search agency service for the laid-off workers (Johnson, 2002). Together with the Passive Labour Market policies such as unemployment insurance, these measures have played a significant role to constrain the wave of labour unrest and help thousands of workers adapt to the new economic structure. Since the new millennium, however, the government's labour policy concern has turned to the migrant workers, and the rights and interests of this group of laid-off workers who were previously working in the traditional power industry has been neglected.

4. Evaluating the Working Conditions of Green Jobs

4.1 Review of existing literature

Lots of studies have been done on describing the role and importance of renewable energy (Lui et al., 2011a; Chang et al., 2003; Liu et al., 2011b), but very few of them study the impacts or the working conditions of green jobs in the renewable sector. Most of the studies on renewable energy are largely speculative.

Study on Green Employment in China (MOHRSS, 2010a) (refer as "the Report" hereafter) is the most comprehensive study on the working conditions of green jobs in China that is conducted by the central government ministry. In this section, we are going to evaluate the Report by comparing its findings with other examples from media reports, hiring ads and other sources.

4.2 Parameters for evaluating working conditions

In the Report, surveys were carried out among front line workers from different types of power generation plants. Eight power plants were selected in total. Three of them represent large thermal power plants equipped with modern technology; two of them are small conventional thermal power plants; one of them is a wind energy plant; one of them has both new and old generators; one of them represents regional power plants (the technology used by the plant was

not specified in the study). Six out of the eight studied power plants are SOEs, and the other two are joint-venture.

The differences in working conditions between conventional and renewable power plants are evaluated based on the following parameters:

- Working hours
- Wages and benefits
- Social security
- Working environment

4.2.1 Working hours

It is almost like a norm that workers in the power generation industry are often required to work overtime and take long shifts, but the situation seems more severe within the renewable sector. It was reported that 93.5% of the workers from the wind power plant had worked over time over a year, while there were only 89.3% and 87.7% of the workers overworked in the large-scale and small-scale thermal power plants, respectively. One of the reasons for overworking to be so common in wind power plant is that the industry is growing too fast that the training of qualified labor fails to catch up. That results in a strange phenomenon, in which both unemployment and increase in job vacancies happen at the same time.

Even though the majority of workers were compensated with either overtime pay or supplementary leave, long working hours is a sign of poor working conditions. Long working hour not only reduces a worker’s performance, making he/she more susceptible to occupational hazards. It is suggested that working in jobs with overtime schedules is associated with 61% higher injury rate compared to jobs without overtime (Dembe et al., 2005). Moreover, long working hours may also decrease the quality of a worker’s family life.

4.2.2 Wages and benefits

4.2.2.1 Wages

Last year’s income				
	Lowest	Highest	Average	Standard Deviation
Wind power	27000	100000	51687.50	14715.446
Large thermal power	7500	120000	46792.74	17750.316
Small thermal power	15000	95000	42219.34	20373.406

Figure 3. The average annual income of workers in power enterprises (MOHRSS, 2010a)

According to the Report, the average annual income of the workers in the wind power plant was higher than those working in the small-scale or large-scale thermal power units by around 4800 to 9400 RMB (1 USD≈6.5 RMB). In terms of wages, the results from the Report suggest that working conditions is better in the renewable power plants than in the conventional power plants.

However, there are a number of problems associated with the methodology of the Report, which may reduce the representativeness of the results. First of all, the sample size for the wind power plant (i.e. 9.1% of the total samples) is much smaller than those of the small-scale (27.8% of the total) and large-scale (63.1%) thermal power plants. The relatively small sample size for the renewable energy sector may result in greater sampling error, reducing the precision of the results.

In China, the power generation industry is largely dominated by SOEs. Guodian (Longyuan Electric Group), Datang and Huaneng are the top three developers of wind farms in China, and they are all large SOEs. The wages in SOEs are generally higher than those in the private sectors. In 2010, the average annual salary in China's non-private sector was 37147 RMB, while the average annual salary in the private sector was only 20759 RMB (MOHRSS, 2010b). Since the only wind power plant studied in the Report was a joint-venture enterprise and that might not be representative for the industry as a whole.

The Report only shows the average annual "incomes" which may include both basic salary and overtime pay. Since overtime work happens so frequently in the wind power plants, there is a reason to believe that the portion of income generated by overtime pay could be substantial. Besides, the average incomes were not grouped or analysed according to the nature of the jobs or length of service, so it makes it difficult to draw any firm conclusions regarding the possible factors contributing to the observable discrepancy in wages among different types of power enterprises.

Two hiring ads (HIMET, 2011-06-10; YJH, 2010-03-18) from two privately-owned wind power companies from Hebei show that the basic monthly salaries for the front line workers range between 1300 - 2500 RMB, depending on the nature of the work. In terms of annual basic salary, the range is between 15600 – 30000 RMB. When compared to the numbers in Fig. 3, the lowest annual salary (i.e.15600 RMB) offered by the privately-owned wind farms is much lower than the 27000-RMB average annual income for wind farms suggested by the Report. Again, we cannot compare the numbers from the ads directly to those from the Report since we do not know the basic salaries of the workers surveyed.

One possible explanation for the observation above could be that the difference in average annual incomes between the two types of wind power enterprises (i.e. privately-owned vs joint-venture) is small when the overtime pay earned by the workers in the privately-owned plants is taken into consideration. If this is true, which means the basic salaries for the front line workers in wind farms are generally quite low, and a large portion of their income actually comes from overtime pay and other subsidies. Another explanation would be simply that some wind power plants fail to offer decent wages.

4.2.2.2 Benefits

In terms of subsidies for meal and transportation, people working in the conventional power plants are generally better off as suggested by the Report. About 61- 77% of the workers from the thermal power plants received meal subsidy, while there was only 32% of the workers from the wind power plant enjoyed such benefits. For transportation subsidy, only 26% of the workers from the wind power plant enjoyed the benefit, whereas 73% and 54% of the workers from the large-scale and small-scale thermal power plants, respectively, enjoyed the same.

Similarly, the percentage of workers who received the living allowance for needy employees was higher in the thermal power plants than in the wind power plant. Regarding health checks, about 82-84% of the workers in the thermal power plants had access to this benefit as compared to the 94% in the wind power plant. Overall, the percentages of workers who were able to receive the benefits are higher in the conventional power plants than in the wind power plant.

4.2.3 Social security

The results of the Report show that the participation rates of the 5 mandatory social insurances (i.e. basic pension, basic medical, unemployment, child birth and occupational injury) and enterprise annuity are generally higher among workers from the power generation industry than the national average. Except for child birth insurance, the differences in participation rates for pension, medical, unemployment and occupational injury insurances between conventional and renewable power plants are small, same for enterprise annuity. Workers in the small-scale thermal power plants had the lowest participation rate (i.e. 52%) for the child birth insurance compared to the workers in large-scale (i.e.74%) or wind power plant (i.e. 77%).

4.2.4 Working environment

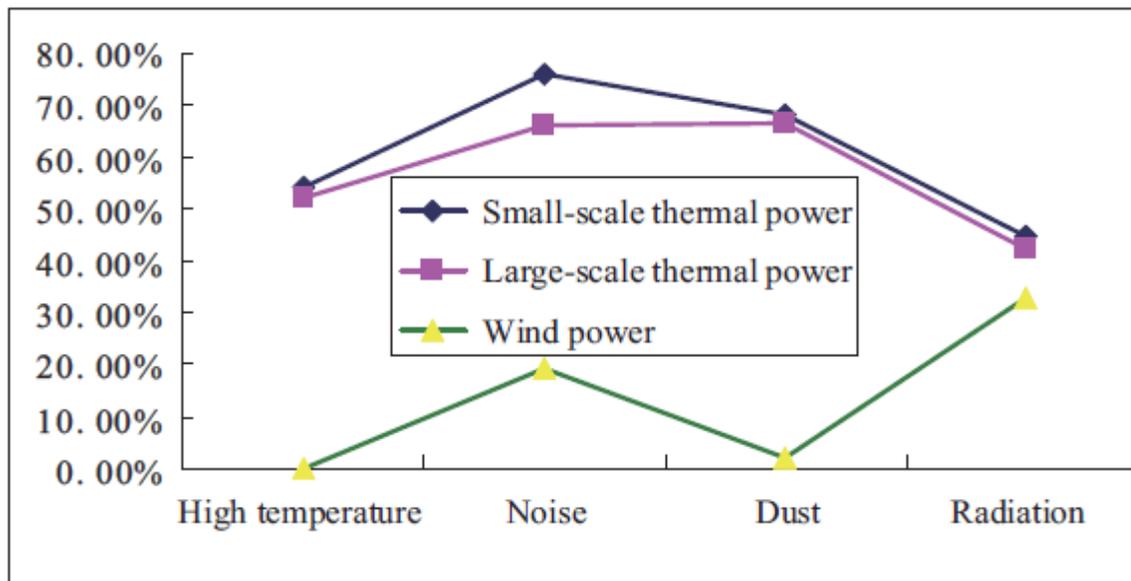


Figure 4 Occupational hazards faced by workers in the power generation plants (MOHRSS, 2010a)

The working environment is significantly better in wind power plants than in the thermal power plants. As indicated by Fig. 4, workers in the coal-fired power plants were generally more prone to heat, noise, dust and radiation hazards. According to the Report, over 50% of the workers from the thermal power plants had encountered heat pollution in their workplace, and even more people (60-75%) had encountered noise and dust pollutions during work. In addition, over three quarter of the workers from the wind power plant felt that the working environment was very good, whereas only 13-18% of the workers from the conventional power plants felt the same.

None of the workers in the wind power plant had developed any occupational diseases. In contrast, 47-55% of the workers in the coal-fired power plants had suffered from different occupational diseases. When they were asked to assess the risk of occupational diseases associated with the workplace, while no workers from the wind farm thought that there was any significant risk, about one third of the workers from the conventional power plants felt that the risk of occupational diseases was significant at their workplace.

Compared to conventional coal-fired power plants, the working environment of wind farms are substantially better. Nonetheless, the power generation industry as a whole is a high risk industry. There are many sources of risk associated with wind power systems, including blade ejection, tower collapse, overheating, the use of high voltage electricity, the use of rotating machinery, working at significant heights, the handling of heavy equipment, etc (Ragheb, 2011). China has seen a number of serious accidents in several wind farms since 2010, which causes concern of the safety of the industry. Here are just a few examples to illustrate the seriousness of the issue:

- At least five wind turbines had collapsed in five different wind power plants in less than two years since 2010 (Liang Post, 2011-04-16; Nanfang Weekend, 2010-12-29).
- In January 2011, three workers were killed by electric shock during the installation of a new turbine in Hebei Province (Nanfang Weekend, 2010-12-29).
- In October 2011, five people were crushed to death when the arm of the crane holding a to-be-installed wind turbine fell to the ground (Smarter Energy, 2011-10-11).

4.3 Labor Relations

All of the energy enterprises examined in the Report had labor unions. More than 90% of the surveyed workers were members of the unions, and over 80% of them said that the union or worker representatives were able to participate to the company's management. Except for the annual workers' representative meeting, the Report does not explain as to how and through what channels those representatives influence the decisions of the enterprises. Furthermore, even if there are channels for the representatives to get involved in the decision making, it does not mean that workers' voice can be truly reflected. This is because most of the union representatives are not always produced through direct elections.

Chinese workers are not entitled to organize independent trade unions. It is outlined by the Chinese Labor Law that all trade unions have to be affiliated with the ACFTU, and the formation of competing unions is prohibited. In SOEs, Union representatives are generally appointed by party officials, while in the private sector, it was the management to decide whom to be trade union officials, instead of being elected by the members of the union. This is the major reason why ACFTU is often been regarded as an organ of the Chinese Communist Party (CCP), which tends to side with the management than to protect its members' rights. As it is quoted by Bei (2011) in her paper studying the role of ACFTU, the ACFTU chairman Wang Zhaoguo had once said, "All trade union organisations must consciously accept the leadership of the Party, resolutely implement the Party's line and directives and also comply with all decisions and plans

adopted by the Party Central Committee”. The speech by the chairman somehow reveals the inherent top-down organizing approach of the ACFTU.

As a result of the growing frustration with the ACFTU’s failure in safeguarding workers’ rights and interests, the number of independent collective actions by workers has been increasing over the past decades (Chan, 2009; 2010). The ACFTU, in response to the growing pressures, has accelerated its reform in recent years, and one of the measures is to allow a greater degree of direct elections among grassroots unions. In many cases, however, that does not prevent managers or their relatives from standing and being elected as union chair. (Bei R, 2011). Moreover, direct elections are often limited to grassroots unions, whereas in the provincial or industrial level’s trade unions, the leaders are simply appointed by the party and overlapped with the party cadres (Taylor and Li, 2007) to ensure a certain degree of stability and control. Since the leadership of the union is usually not elected by workers, it is hard to guarantee that workers’ interest will be represented properly when conflicts arise between enterprises and workers (Chen, 2010). In addition, as pointed out by Zenglein (2008) that “the local governments are in competition for foreign investment domestically as well as with other rising regional economies such as Vietnam, and may prefer to keep trade unions tame”. That gives another explanation as for why trade unions in China often side with the management or government instead of protecting the interest of the members. Even though there are more and more cases of workplace trade union direct election reported (Howell, 2008), the wage bargaining is very rare (Clarke et. al, 2004). A possibility of change has been evidenced in a Honda factory where workers staged a 17 days long strike in May 2010 (Hui, 2011). From 25th February to 1st March 2011, almost a year after the strike, wage negotiation took place between the trade union and the management with the facilitation of the Guang Dong Provincial Federation of Trade Unions. In the end both parties agreed to a pay rise of more than 30% (*Southern Metropolitan Daily*, 13th March 2011). The rise of independent trade unionism is unlikely without more significant political change in China (Howell, 2008). However, as Clarke et. al. (2004) argue, the fatal weakness of Chinese workplace trade unions to represent workers in wage bargaining is management’s manipulation over trade union, rather than the state’s control. They suggest that “[s]uch a change [disengagement of the trade union from management] is not likely to occur...unless unions at a higher level recognize the need for the change and develop their capacity to support genuine collective bargaining at the enterprise level.” (Clarke et. al, 2004: 252). In this regard, the possibility of releasing workplace trade unions from the management’s control rests on the power of higher level trade unions to back up its enterprise affiliates in collective negotiation.

Apart from the Honda factory, the party-state or high level trade union backed up wage bargaining has been also recently reported in the catering industry in the city of Wuhan in Hubei province (*Workers Daily*, 24th May 2010). However, there is still no sign that the green industry like the wind power industry will promote and implement wage bargaining in the near future.

5. Conclusion

In order to mitigate and adapt to global climate change, there is an urgent need for our society to reorganize production on the basis of environmental protection and sustainable development. Without the support from the working class people, however, this goal will never be accomplished. It is important to ensure that the green jobs created by each sector during the

transition to a green economy will not only improve the environment but also provide workers with more decent jobs.

To reduce greenhouse gases emissions, China has made big moves to promote renewable energy. However, the closing down of the small, inefficient thermal power units had caused thousands of job losses. Most of the laid-off workers have great difficulty finding a new job. Since the greening of our economy is for the benefit of the whole society, the negative impacts resulted from the transition should therefore be borne by the society as a whole but not the workers alone. It is the government's responsibility to minimize the adverse transitional impacts on the laid-off workers by providing trainings, financial assistance and other social support services. Both ALMP and PLMP measures should be taken to help the laid-off workers to find new jobs and maintain a decent life. One of the possibilities is to provide retraining programme for those laid-off workers who were previously employed in the conventional energy industry.

Although the working conditions in the renewable energy sector, in terms of social security and OHS, are significantly better than those in the conventional energy sector, it is yet too soon to declare it a success. For one thing, renewable energy is a new field in China, for another is that it requires more than just technology but also ideological, political and economic changes in our society. We need workers to be part of the solution, and in order to do so, workers at all levels should be given a chance to participate in the planning and decision making processes for the management of their workplace. In the long run, it is crucial to revise the top-down organizational structure of ACFTU. Under the current political context, both the Chinese state and the ACFTU should guarantee direct elections for worker/union representatives in every workplace and support the workplace trade unions to hold regular collective bargaining with the management. The green industry, with its mission to promote sustainable development and decent work, should take a lead in this initiative to promote trade union direct election and collective bargaining. Through this effort, hopefully the abuses of long working in the wind power industry as the MOHRSS research suggested can be improved.

6. Limitation of this research

This paper is based mainly on second source of information. We found that green economy and its impacts on workers and working conditions is highly unexplored area, except from a number of survey based official researches we have reviewed in this paper. We call for independent studies based on policy analysis and empirical case studies to further unpack the reality of green job creation in China.

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Appendix I: China's Renewable Energy Policy Documents

China Policy Documents	
First Level	
1983	Suggestions to Reinforce the Development of Rural Energy
1992	China Agenda 21
1992	Ten Strategies on China's Environment and Development
1995	State Science and Technology Commission (SSTC) Blue Paper No. 4: China Energy Technology Policy
1995	Outline on New and Renewable Energy Development in China, State Planning Commission (SPC), SSTC, State Economic and Trade Commission (SETC)
1995	Electric Power Law
1996	Guidelines for the Ninth Five-Year Plan and 2010: Long-Term Objectives on Economic and Social Development of China
1996	State Energy Technology Policy
1997	Energy Saving Law
2003	Renewable Energy Promotion Law
Second Level	
1994	Brightness Program and Ride the Wind Program, formulated by SPC
1995	New and Renewable Energy Development Projects in Priority (1996-2010) China, by SSTC, State Power Corporation, and SETC
1996	Ninth Five-Year Plan and 2010 Plan of Energy Conservation and New Energy Development by the State Power Corporation
1996	Ninth Five-Year Plan of Industrialization of New and Renewable Energy by SETC
1998	Incentive Policies for Renewable Energy Technology Localization by State Development and Planning Commission (SDPC) and Ministry of Science & Technology (MOST)
2001	Tenth Five-Year Plan for New and Renewable Energy Commercialization Development by SETC
2003	Rural Energy Development Plan to 2020 for Western Areas
Third Level	
1997	Circular of the Communication and Energy Department of SPC on Issuing the Provisional Regulations on the Management of New Energy Capital Construction Project
1999	Circular of MOST and SDPC on Further Supporting the Development of Renewable Energy
2001	Adjustment of Value Added Tax for Green Resources

