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Development with Green Job, Renewable Energy and Sustainability and Power Quality

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Abstract. This article presents the strategy of the use of the green job as a way of providing a sustainable development to the planet Earth. In agreement with the Program of the United Nations for the Environment, (PNUMA, 2011), the green job is the work in the agriculture, manufacture, research and development, administration, and service activities that contribute substantially to preserve or to recover the environmental quality. Specifically, but no exclusively, that includes works that help to protect ecosystems (USP, 2012) and biodiversity (E O WILSON BIODIVERSITY FOUNDATION, 2012), to reduce the consumption of energy, materials and water through strategies of high efficiency, decarbonizing the economy and minimizing or avoiding the generation of all the garbage forms and pollution (UNEP, 2008).

The article investigates which are the sectors of the green economy in Brazil and in the world. There are also suggested public politics that seek to promote or to enlarge the offers of green jobs in Brazil. Finally, a scenery showing the economical, social and environmental advantages in case strategies of creation of green jobs were used in some sectors of the Brazilian economy, is provided.

Key words

Green Job, Sustainable Development, Renewable Energy, Energy Planning, Public Policy.

1. Introduction

Energy and environmental safety are problems of first greatness faced by the global economy. Fossil fuels, particularly the raw oil, they can be found for commercial exploration in some areas of the world and the continuity of its supply is governed through dynamic factors as the politics, economy and the environment.

These factors conspire to generate a climate of instability that produces high prices of fuels and an environmental politics demanding a reduction of emissions of poisonous gases and of greenhouse effect. Besides, the increase of the growth and the largest demand for the well-being on the part of the developed countries and in development are exercising larger pressure on the use of sources of energy.

In matter, new consumers of developing countries already reached a high purchasing power enough to guarantee them the world access to any article type and market of energy. This characteristic impels the consumption of energy and the competition for all of the types of resources. Although this tendency at first can represent a progress in relation to conquest of the wealth distribution and of the social well to be, it is contributing, in the moment, for that these countries to have hurry for the appropriation of available resources. In general these resources are directly or indirectly connected to the consumption of energy, what can be an important factor to generate a planetary instability if this fact doesn't go appropriately understood and administered. Strategies for the generation and coherent consumption of energy are requested from such way to provide mechanisms of clean development (MCD).

These strategies should focus the supply and the demand of energy, the safety in the access the energy, development problems, social equality, market dynamics, taking into account the whole life cycle of the energy. Besides the production of fuel, transmission and distribution, conversion of energy, the impact on the manufacturers of equipment of energy and the final users of the systems of energy.

Subjects related to the energy efficiency and the effect of its repercussion should also be taken into account. In the

short period, the objective is to reach a larger energy efficiency and increase of the supply of local sources of energy, in particular, renewable sources of energy. In the long period, it is important to change our lifestyles, to increase still more the alternative sources of energy and to migrate for dealerships that supply new types of energy just as the hydrogen, what contributes to solve or to relieve the problems generated by the consume of fossil fuels. Any strategy to be used should include inspection procedures and national accompaniment. The procedures should consider the indiscriminate use of natural resources and the environmental degradation, and to answer questions related with the industrial growth, the load capacity, sustainability and the equality in power of generation of energy regarding to other countries.

That whole climate justifies the urgent need to establish strategies for the production and consumption of renewable energy. This article presents the strategy of the use of the green job as middle of providing a maintainable development to the planet Earth. In agreement with the Program of the United Nations for the Environment, (PNUMA, 2011), the green job is the work in the agriculture, manufactures, research and development, administration, and service activities that contribute substantially to preserve or to recover the environmental quality. Specifically, but no exclusively, that includes works that help to protect ecosystems and biodiversity, to reduce the consumption of energy, materials and water through strategies of high efficiency, decarbonizing the economy and minimizing or avoiding the generation of all the garbage forms and pollution.

In physics, work is a measure of the energy transferred by the application of a force along a displacement. In the current world the main type of energy used to generate the work is the originating from the burn of fossil fuels. On the other hand the fossil fuels are the largest responsible of the greenhouse effect and of the global heating. The global heating for its time provokes drastic climatic changes that cause disastrous consequences with the flood of vast areas, desertification of other and extermination in mass of ecosystems.

These unbalances, besides the consequences to the environment, cause the own man the loss of its natural habitat, proliferation of several types of diseases, material losses and social exclusion. Nowadays the more we work more we will be contributing to the aggravation of all situation. An obvious answer to reduce these disasters would be to change the type of energy that we use to produce work. This change should guarantee the necessary potency demanded by the energy systems and to maintain balanced the system of collection of taxes and chain of jobs that depend on the use of fossil fuels for its existence.

Therefore, the change cannot be abrupt. It should be slow and planned in such a way that most of our produced goods, generated works and collected taxes are provided from a green economy based in the use of renewable sources of energy. We already have technologies for this change. To have an idea, the Earth it receives 174 petawatts or PW (174.000.000 Giga Watts or $174x10^{15}$ Watts) of solar radiation in the superior area of the atmosphere.
The renewable energies (solar, winds, geothermic and hydraulics) have a potential of 86.9 PW, almost 5800 times the potency installed in the world now (15 Tera Watts). Only the solar energy has a potential of 86 PW and the wind energy has a potential of 870 Tera Watts. Of 174 PW, 89 PW is absorbed by the atmosphere, oceans and continents (forming the winds, rains, waves and sea currents) and 85 PW is reflected for the space. The wind energy is produced by the solar energy, because the heat of the Sun creates differences of temperature that produce the winds. The hydraulic energy is also produced by the solar energy, because the heat of the Sun evaporates the water of the oceans and rivers that condense, forms clouds and later it falls in the rain form, supplying the reservoir of the hydroelectric power stations.

The current world consumption of energy is smaller than 1% of this capacity (IEA, 2010; REN 21, 2011). In a green economy, in the case of photovoltaic systems were used, only the sun can provide all the energy that we needed with surpluses.

If we take in consideration other sources of renewable energies as the wind, the oceans and rivers, the forests, the garbage, the hydrogen, etc., we will still have much more than the necessary capacity to feed all of the existent energy systems. The implantation of a green economy carried out in a planned way will be the main tool for a new Era creation. Their basic foundations won't allow the disrespect or destruction of the environment, of the biomass, of the proliferation of diseases, of the desertification or flood of extensive areas, of the human exodus, of the poverty and of the social exclusion. This way, the energy planning allied to public politics for the renewal of the energy systems and of production of goods and consumption based on renewable energies is fundamental for the flourishing of a new world based on green jobs.

In the sequence we will talk about the green job in Brazil and in the world. Finally we presented suggestions of public politics that can accelerate the implementation of the green economy and the main conclusions of our work.

2. Green Job in Brazil

According to the Program of the United Nations for the Environment - PNUMA (PNUMA, 2011), the politics of understanding of the companies is fundamental for the process of creation of new jobs based in the sustainability. The world today demands that and the companies need to develop the change process.

Brazil still faces enormous challenges, as the deforestation and the social exclusion, for instance, however the country possesses a great potential of generation of jobs related to the maintainable development.

A study of the International Organization of the Work (OIT) about the generation of green jobs in Brazil concludes that in the end of 2008 already existed approximately 2.653.059 workers in that situation (OIT, 2009). And that the transition for an economy with activities that emit less greenhouse gases should increase the offer of this job type.

This number answered for approximately 6,73% of the total of formal job positions, that at that time was of 39.411.566 job positions. The results also show that the country is creating politics so much for the development of decent work that interferes directly in the environmental preservation, as in important politics for the social development.

The calculations of OIT for the obtaining of the numbers above were based mainly on data coming from federal officials (RAIS).

The data from RAIS show that the largest number of formal green jobs in 2008 was offered by the group of public and private transportations with 797.249 formal jobs following by the group of generation and distribution of renewable energies with 547.569 job positions and maintenance, repairing and recovery of products and materials with 435.737 job positions.

We noticed that since 2006 up to 2008 there was a larger growth of offers of green jobs in relation to the growth of formal jobs. Among 2007 it was of 1,36% and in 2008 it was of 1,89%.

Since 2006 up to 2008 the participation of green jobs in the annual stocks of formal jobs has been larger than 6%, increasing every year.

3. Green Job in the World

The green job positions created in the world up to 2012 have not been affecting the creation of jobs positions not green. On the other hand, it is waited that the measure that the green economy is implemented with more intensity, the creation of jobs in pollutant industries tends to decrease or to disappear with these companies. For the society not to suffer an impact with this social problem, the government should plan the transition of these companies and pollutant jobs for an economy essentially green.

The amount of green jobs positions should vary in agreement with the economical activities and with the aptitudes of each area. It is important that the experience and the technology developed for the green economy are shared by all of the countries. This way a standard global methodology of measurement should be created for the implantation or even change of experiences and information in a program of world integration.

Nowadays the green job positions are found mainly at countries that traditionally possess a strong program of research and development. These countries usually adopt environmental public politics innovative, they possess a qualified workforce and an manufacture industry that uses high technology.

A maintainable economy demands social justice and solidarity among all from the countries. It is essential the use of new technical approaches shared globally, mainly in 8 key sectors: agriculture, forest industry, fish farming, energy, industry of materials, recycling, construction and transports (ILO, 2012). The number of countries in that can be applied a generation program and fomentation of green jobs has been increasing quickly, particularly in the area of Asia-Pacific (OIT-2, 2009).

Agriculture. The agriculture sector is the largest global employer. It possesses more than 1 billion workers. It employs a great number of poor rural workers, farmers of subsistence planting, mainly women. It requests a great investment in training, organization and rural infrastructure to allow to small farmers the adoption of practices of greener and productive production. These measured, besides using green techniques, they seek mainly to increase the number of offers of jobs in the area and to improve these workers' purchasing power, avoiding the lack of foods and a great rural exodus for the metropolises.

Forest industry. Due the use of unsustainable practices, this sector has been losing a reasonable amount of job positions. It is essential the modernization of the sector with the systematic use of maintainable forest administration. This practice certainly will provide quality job positions besides the supply of raw material and regulated environmental services.

Fish farming. The sector goes by a threatening period due to extensive over fishing that some areas are suffering. Approximately 95% of the workers of this area, in other words, 45 million of positions are of poor and craft fishermen living in developing countries. A temporary reduction of the amount of fishing is necessary to recompose the stocks of fish and to allow the generation of foods and jobs in a maintainable way.

Energy. Petroleum, gas and coal represented 87% of the use of commercial primary energy in 2010. The energy originating from renewable sources represented 8% while the nuclear energy only 5% of the produced total energy. A transition for the use of green energy in a balanced way requests that the richest individuals stop using fossil fuels and reduce their demand of energy through larger efficiency and conservation efforts. The poor will need cleaner energy and in larger amount. The two dimensions of that transition offer job opportunities. At first the energy sector is an employer relatively modest, in spite of its relationship with all the economy. However the use of the renewable energies tends to generate more jobs than the sector already ripe and quite automated of fossil fuel. In the same way, the search for energy efficiency also offers more job opportunities than the increase of the supply of energy. The renewable energy is expanding quickly. The world investments jumped of just US$ 7 billion in 1995 for US$ 243 billion in 2010. The types of

energies that received great investments were: eolian with US$ 96 billion and the solar with US$ 89 billion. Regarding the total renewable installed energy, being excluded hydroelectric energy, the leaders countries are United States, China, Germany, Spain and India. If the hydroelectric energy be included, Canada and Brazil join to the group (REN 21, 2011; REN 21-2, 2005).

The number of works related with renewable energy is increasing quickly all over the world, although there is not a systematic collection of data on job. In 2010 an estimate indicates at least 4,3 million direct and indirect jobs in the chain of supplies while, in 2008 that number was of 2,3 million.

The sector of renewable energy still offers less jobs than the one of fossil fuel. The extraction of petroleum, gas and coal uses more than ten million people, and the use of those energy resources in thermoelectric plants contributes with other millions of jobs. However, being taken into account that the renewable energy still represents a small portion of the total use of energy, the number of people that already work in that area is expressive.

Industry of Materials. The industry of aluminium, iron, steel, electric and electronics uses 25 million people approximately all over the world. There is a concern that the green economy would tend to reduce the number of jobs in this section. The researches indicate that the decrease of the number of job positions in the sector is resulted mainly by the automation process that these industries received. A maintainable industry of materials suggests the use of innovative technologies for the creation and retention of green jobs enlarging the chain of values and services based in design and ecological industry, energy efficiency and use of renewable fuels, use and recycling of the garbage, production with durability, decrease of the pollution and use of natural resources. These productive chains and their services, on the contrary, suggest a great potential of creation of new job positions.

Recycling. The recycling is important for the energy efficiency, garbage waste, safe treatment of polluted garbage and recovery of valuable materials. The number of job positions can significantly increase through the improvement of the recycling taxes. The recycling can also act in the sense of creating positions formalized of permanent work improving the social inclusion, because the great part of workers of this sector are women and poor children working in an informal way.

During the 20 century, the extraction of minerals increased 27 times, crossing the tax of the economical growth. Now that the deposits of easy extraction already meet practically exhausted, the environmental impacts of the mining are larger. The extraction of the same amount of minerals requests the removal of approximately three times more rocks and other materials of what there is one century before. Due to the great discard of goods and products, the amount of residues continues to expanding parallel to the mining. The subject of the garbage is usually summarized to the discard in sanitary embankments, incineration and sending for other countries, legal or illicitly. These actions exercise environmental negative impacts and of health in the adjacent communities. On the other hand, recycling and the use of new techniques of manufacture of products allow to reduce the wood extraction and mining.

They save substantial amounts of energy and water with the substitution of the processing of raw materials and larger use of scrap material. It is finally avoid the contamination of the air, of the water and of the soil associated to the discard of residues. Estimates show that more than one billion tons of metals, paper, rubber, plastics, glasses and other materials are recycled annually. In spite of expressive, this number represents only 1/10 of the amount of collected residues.

Construction. The constructions answer for approximately a third of the final use of the energy. Almost 60% of the electricity generated in the world is consumed in residential and commercial buildings. Being admitted the premise that there are not new ways to act in that field, the projections appear for an increase of the demand of energy of a building in the order of 60% up to 2050. However, that sector also offers an enormous potential for significant savings in energy and reductions of emission of carbon through more appropriate construction materials and larger isolation in windows and coverings, as well as in the use of heating systems and illumination, appliances and more effective equipments.
The building sector is also a great employer. In most of the countries, it is responsible for 5% to 10% of all of the jobs, although a lot of times there are great seasonal variations. In the world, at least 111 million people work in that sector. However, as the sector is highly fragmented in several types of services and many workers are in the informality, the real number of jobs should be very larger.
Due to the fact of the poor families in general spend a larger part of their income in energy; the supply of homes with larger energy efficiency can constitute an instrument against the poverty. To execute these improvements the poor families will need official help and the government's subsidies.

Researches accomplished at several countries confirm that there are several ways to turn existent constructions more maintainable, or more green, and in this way, to generate more jobs. These researches also demonstrate that more work positions are created than lost in the sectors of great energy consumption that produce inputs as cement.

Researches accomplished in the United States reveal that 6% to 10% of the new residential constructions and 10% to 12% of the new commercial constructions are maintainable. This shows that there is a great potential that still was not explored.

Transports. The sector of transports is the largest consumer of fuel liquid fossil. It answers for approximately 25% of the emissions of CO2 coming

from the consumption of energy. The level of emission of carbon generated by this activity grows faster than in any other economical sector. The sector is one of the main ones responsible for the climatic changes that are happening.

The use of alternative renewable fuels, hybrid vehicles and the increase of the energy efficiency are contributions that can be inserted in the sector of transports seeking to reduce the impact that their emissions cause to the environment. In spite of an increase of the efficiency of the automotive fuels, the models really efficient still don't represent a tenth of the total of sales. For its time the hybrid and electric vehicles represent now less than 3% (HYBRID, 2012).

It is important a world politics that stimulates the public transportation in the cities and the rail transport in intercity trips. The sector of production of vehicles uses directly more than eight million people all over the world, and those numbers increase when we considered the chain of supplies. Now about half millions of people work directly in the section of production of vehicles on rails. And a great number of people work in the operation of public transportation systems. In the urban transport of mass we have more than 7,6 million jobs and in the passengers' rail transport and of loads they are 7,1 million (UNEP, 2008).

Some changes in the transport sector are generating more jobs in the operation of the public transportation systems. Investments for the use of urban and rail public transportation intercity are increasing in the whole world.

4. Suggested Public Politics

The politics mentioned below are just some suggestions. They indicate the types of approaches that could help the humanity to reach sustainability with justice.

Energy planning at state level. Nowadays few are the Brazilian States that accomplish its own energy planning. This way the planning is centralized, not taking into account the energy potentials of each area and nor their productive chains. A state planning in a maintainable way could focus the potentialities of each area seeking a maintainable development.

Creation of subsidies to promote the sustainable development. The government should create fiscal politics and of subsidies for any type of consumer goods or service that promotes the maintainable development. The incentive would come in the form of smaller taxes for any consumption type of consumer goods or service linked with the green economy.

Creation of laws or fiscal incentives that sought to brake the unbalanced consumption of natural resources. The government should reward the balanced consumption of resources and to burden the unbalanced. We should demotivate the abnormal use of energy, water, materials, physical space, etc.

Centers of research and development should be created at state and federal levels to promote innovations to facilitate the maintainable development. New green technologies and personnel's training can be the main product of these centers. The offer of knowledge and technology should facilitate the flourishing of a maintainable economy that allows the ecological restoration and guarantee the social well-being without materialism.

An international metric should be adopted to measure the maintainable development. The maintainable development should arrive to all the countries. For that it is important the adoption of an only international standard for the knowledge change and experiences.

To promote the implantation of companies that seeks to increase the efficiency in the use of energy and of materials in their products. These companies would tend to produce consumer goods and services with energy efficiency and durability and this way they would be awarded with financing taxes and imposed smaller.

Creation of public politics to motivate the recycling and the reuse of material. This activity has several benefits. It generates job, it reduces the environmental pollution and the extraction of resources of the nature.

To turn the capitalist system more ecological. The governments should create mechanisms where it is not necessary a huge consumption of raw materials, consumer goods and services for not reducing the offer of job positions. The slogan is to create jobs so that the people can have a wage to guarantee them to live without destroying the planet or even our social system. We already have technology to allow to every human being a job position where he can daily use his intelligence, feeling a fundamental and useful piece the society, satisfying his basic needs with laser, comfort and dignity without destroying the nature.

5. Conclusion

The society is living a crucial moment where on one side the capitalist system demands more consumption and production and on the other hand, a planet and a tired race ask for good sense, peace and reconstruction. We asked for one is enough to the exploration of resources in a wild way, to the indiscriminate use of fossil fuels, to the ecological and environmental disasters, to the weakness of the social system generating a mass every time larger of excluded and a brutal difference of use and wealth distribution among the classes.

In this article we nailed the end of this world and we suggested the beginning of a new age. This age should be covered by a green economy that aims the sustainability of the planet and that promotes the man to a noble position in this context. The man's figure will be the one of caring for the planet and for his fellow creature. His main mission is to promote the maintainable

development through the green job of his work and of his available resources. In this article we showed that in Brazil and in the world the green job is gaining force. The main sectors of the economy where these activities can bloom are agriculture, forest industry, fish farming, energy, industry of materials, recycling, construction and transports. To reach the success in the creation of the green jobs it is very important to adopt public and fiscal politics and mechanisms that motivate the companies in its adoption.

We know that the suggested changes cannot happen in an immediate way. Therefore we suggested that each state of the federation makes an energy planning addressed mainly to its needs and resources. Finally, an understanding of the society regarding the practices of recycling of materials, of the use of energies and renewable materials, of the balanced consumption and of the sharing of information in an open way are necessary for the context of the green job.

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