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## Analysis and Study of Low-Carbon Clothing Design and Fashion Lifestyle

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### ABSTRACT

Low-carbon is not only a slogan, but also a global action to protect the environment. In the clothing industry, low-carbon clothing design has drawn public focus and it also conveyed the notion that we should respect for nature and advocate the concept of conservation. Through the analysis and study of low-carbon clothing design, it comes to two conclusions: On the subjective aspect, low-carbon design consciousness of designers which humanization of costume design, design clothing beyond beauty, thinking and caring about people; on the objective aspects, low-carbon clothing design is analyzed in three main aspects: fabric, color and styling. It is necessary to put low-carbon concept into people's behavior consciousness and let the slow fashion environmental concept return back to people's fashion lifestyle, so that consumers can look for their self-positioning and rational thinking. Therefore, the design of low-carbon clothing should be raised to the design of humanistic care to ensure that low-carbon concept is a global need and responsibility.

**Keywords:** Clothing Design, Environmental Protection, Fashion, Lifestyle, Low-Carbon.

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### 1.0 Introduction

With the rapid development of industrial civilization in 20th century, people have changed their material life. However, global environment suffers from malignant pollution. For example, ecological resource is destroyed and the species diversity is reduced. In order to protect our earth, humans began to focus on ecological protection and emphasize low-carbon sustainable development (Liming, 2010). In the clothing industry, low-carbon clothing design has drawn enough attention. Firstly, people pay more attention to the quality of clothing rather than the quantification. Secondly, the designer's concepts has been more humanization, low-carbon idea of clothing has humanistic concern and slow fashion concept gradually returned back to public's lifestyle. Thirdly, consumers pursue clothing quantitative upgraded to the quality. Starting from the concept of low-carbon environmental protection, low-carbon clothing design is not only the trend of the clothing development, but also a new fashion lifestyle pursued by many people.

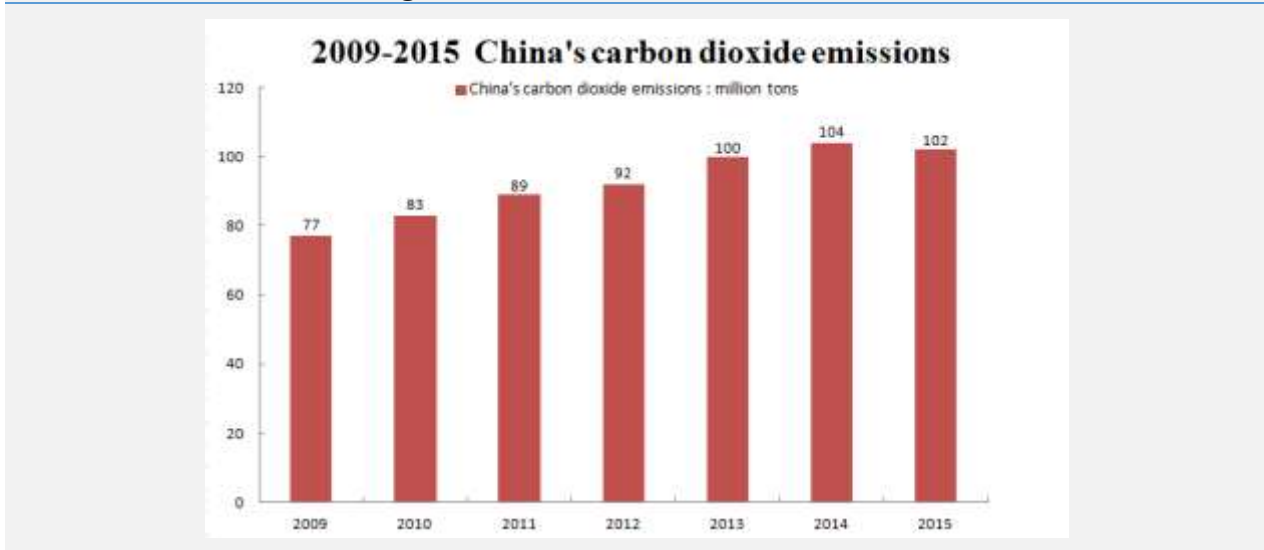
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## 2.0 The background of low-carbon clothing at home and abroad

Low-carbon is not only a slogan, but also the environmental protection operation of everyone on earth. With the arrival of a low-carbon economy era, the development of clothing industry should be adapted to the trends of the global economy. Low-carbon clothing design has become the trend of the clothing development (Xiaodan, 2015). People's life has been quickly improved. Humans began to focus on eco-environmental protection and sustainable development. In December 2009, the United Nations Climate Change Conference was held in Copenhagen, Denmark, triggered a hot debate on the low-carbon economy. After that, low-carbon has become a major trend in the global economy and new rules. In Copenhagen climate change conference, the United States promised greenhouse gas emissions in 2020 will be reduced by 17% compared to 2005 (Yuanling, 2015). Korea will be implemented one of the most rigorous in the three plans in order to cut carbon emissions. Over the next 10 years, the plan will make the 2020 carbon emissions lower than normal levels of 30%. The Chinese government is also committed to that the 2020 unit of GDP carbon dioxide emissions decreased by 40% ~ 50% than in 2005 (Ruixiang, 2015). According to the survey of China's carbon dioxide emissions in recent years (figure 1), China's carbon dioxide emissions are increased. The emissions are growth from 7.7 billion tons to 10.4 billion tons from 2009 to 2014. But China's carbon dioxide emissions decreased by 1.5% in 2015. It can be seen that the emissions have remarkable decrease. It implies that people are concerned about the issues of low-carbon and environmental protection. In order to achieve economic development goals of low energy consumption, low pollution and low emission, people are encouraged to form a low-carbon lifestyle and pursue a low-carbon economy.

Figure 1: China's carbon dioxide emissions



On May 19, 2015, "Made in China 2025 strategy", officially released by the State Council, puts forward the basic policy of "Innovation driven, quality first, green development, structural optimization, people-oriented". Made in China 2025 strategy is the key to the development of China's garment industry. Green development policy extends the green manufacturing engineering. It including costume green production, environmental protection design and recycle the old cloth (Yanhong, 2015). On May 20, 2015, the NPC Standing Committee vice chairman Lu Yong Xiang, president of Chinese academy of sciences says: "We must accelerate the transformation of development mode, the adjustment of industrial structure and achieve green manufacturing" in World Green Design Forum 2015 Yangzhou Summit. It indicated that green manufacturing has been promoted to an important degree. As a developing country, manufacturing industry has not been out of the development patterns of high input, high consumption and high emission. The excessive consumption of resources has become an important factor restricting the development of China's economy and society (Huadi, Xinxin & Pan, 2015). From the state industry and enterprise, "grow first, clean up late" is the wrong path, we should remember the lessons drawn from others' mistakes.

Earth hour is the world's largest environmental action launched by the world natural foundation in Australia from 2007. It appeals to people all over the world to switch off their lights for one hour on Saturday night in March of every year. This action shows their supports for global action to combat climate warming and thinking on environmental problems (Lun, 2010). In 2016, the Earth Hour campaign's theme is blue life, encouraging the public farewell sustainable living and consumption patterns for the blue sky and our planet. There are five aspects for public to practice in daily life, clothing, food, housing, transportation and fun. Facing the climate change, it is hoped that the haze disappear and the sky bluer. Turn off the lights for one hour, more than one hour of environmental protection. In the fashion industry, the global fast fashion brand Urban Revivo (UR) takes concrete actions to show that its determination of low-carbon and environmental protection. The night of March 19, 20:30, 104 stores of UR store light to initiatives. It influences the public to pay attention to environmental protection. UR has been vigorously participates in low-carbon action in all areas. In order to reduce the pollution, UR shopping bags are made of low-carbon material and the paper bags are also biodegradable and recyclable. Low-carbon sustainable lifestyles make the action widely supported by the public.

### **3.0 Low-carbon clothing design**

From the anti-fur campaign, more and more people realize that environmental protection is not just a slogan. It calls for all human beings put their actions to protect the earth (Ting, 2010). Have you done low-carbon today? Recently, this is the most popular internet topic. This is a new generation of network people committed to environmental protection and low-carbon. They pushed the fashion trend to the low-carbon era. They show low-carbon fashion, lifestyle and advocate low-carbon environmental awareness to their fans. This paper analyzes and studies the design of low-carbon clothing in two aspects. On the subjective aspect, fashion designers need professional ability. In the trend of low-carbon, the designer's work should reflect humanization, thoughts and caring about people. Of course, fashion design beyond the beauty is also required. On the objective aspect, the low-carbon clothing design is analyzed in three essential factors: material, modeling and color.

#### **3.1 Study on low-carbon clothing designs at the subjective level**

Fashion designer needs more low-carbon concept of consciousness and thinking. Clothing brand advocate the low-carbon as the trend of development. The public like the low-carbon and creative costumes. Consumer's behavior consciousness is being raised. They are voluntarily looking for the rational orientation and pursue clothing quantitative upgrading to the quality.

##### **3.1.1 Fashion designers' low-carbon design**

Fashion design must be beautiful. Japan fashion designers, cubist master Issey Miyake released the 1325 Series clothing design. Among them, 1 represents a whole piece of fabric, 3 represents a three-dimensional, 2 represents the two-dimensional shape after folding, 5 represents a new three-dimensional experience. 1325 Series use low-carbon sustainability as a design concept. Its inspiration comes from Japanese Origami. Every piece of clothing material is recyclable plastic bottle (PET material). Issey Miyake's design has beyond the space of two-dimensional and three-dimensional. Three dimensional fashions are folded into two-dimensional geometry plane. Designers need innovative spirit and thinking toward people, design should pay more attention to the cultural and emotional exchanges.

##### **3.1.2 Low-carbon activities of brand clothing**

The environmental work shows at London Fashion Week, many brands are based on low-carbon concept. For example, organic cotton fabrics can not only protect the environment but also wears comfortable to human body. Bamboo fiber is a special natural fiber which has very good permeability.

It is easy to dry and difficult to produce bacteria. Linen and cereal fiber raw materials are also eco-friendly fabrics. South Korea's environmental protection fashion show display designer's works using old clothing. For example, the design of the bag, it uses the old suit as the material. Designer re-designs the old clothing or old material into a fashion cloth. Designers want to encourage people to participate in low-carbon activities. Recycling the old clothing merges into people's fashion life style.

Low-carbon is activities of brand clothing. For example, H&M introduced organic cotton clothing. Giorgio Armani used flax and corn fiber as raw materials. Armani believes that unprocessed material is the environmental. In the low-carbon activities held by Armani, clothing selling is bond with money donation for African children. This money is used for HIV/AIDS treatment (Xiao, 2012). The clothing design concept of GUESS is low-carbon. It launched Green series. This series is green jeans which are made of organic cotton. Brand clothing's principle is green design. Its design concept is low-carbon and advocate that public should participate in low-carbon activities. People should put the low-carbon into the fashion lifestyle, work together to protect nature, respect for nature.

### 3.2 Study on low-carbon clothing designs at the objective level

With the development of high-tech, clothing fabric, shape and color have reached a new level. For example, 3D printing fabric has been widely used in our life. The emergence of 3D printing pen achieves a fairy tale magic brush Ma Liang. 3D printing pen can create on any surfaces, even paint directly in the air. 3D printing pen is small. It is needed to select the right materials. It can start creation. For example, graduated from the United States Charlotte art college, fashion design artist Patrick Tai designed a skirt with the 3D printing pen. The whole works takes 100 hours. Tai using 3D print pen to draws a skirt in model's body. The creative inspiration came from geometry, modern building, and some unique of texture. 3D print Pen has achieved Tai's work, ABS plastic and relative soft of FLEXY material have been selected as 3D print material, which can reflected the low-carbon environmental design in material. 3D printing technology has opened a new path of low-carbon materials. Provide designers with a variety of ways to achieve inspiration.

In the fashion industry, 3D printing technology has been used in a variety of brands, such as the New balance's shoes, Chanel's suits. Recently, the Ministry of Supply of Boston clothing brand designed a 3D print woven carbon seamless coat. Print quality of this jacket is very classy. Coats, clothing, collar, and the sleeves are needed to design complete clothing. Ministry of Supply's seamless coat was printed directly rather than sew. The advantages of this dress are fitted wearing, durable wear and saving fabrics. According to the survey, traditional cut and sew clothing process can waste about 25%-30% fabrics. Waste percentage of low-carbon seamless coat using 3D printing is 0%, which means no waste. Apparently, it can save the cost of fabrics in the production process and reduces environmental pollution. It is intelligent that during the 3D printing process, it can use the intelligent modeling to make consumers more comfortable.

3D printing low-carbon era is the future trends in fashion design; Using high-tech low-carbon fabrics to replace ordinary cloth. Fashion design can become low-carbon, environmental protection and intelligent.

## 4.0 Analysis and study on low-carbon lifestyle and fashion

Low-carbon fashion design is a clothing design based on environmental protection. From a design standpoint, the engagement of low-carbon and lifestyle should be carefully considered. Low-carbon clothing is artistic creation which has been intensively studied and combined with fashion life.

### 4.1 Lifestyle under the concept of slow fashion

Slow fashion concept gradually returns to people's lifestyle. Designers need to express human emotions, beyond beautiful, user-friendly works. Transmit environmental messages to the people and

constantly promote the development of low-carbon trend. For example, the mother of fashion punk Vivienne Westwood encouraged people to buy less clothing in the campaign to save the Arctic, she shouted the slogans: quality not quantity.

## 4.2 Consumer concept

Nowadays, the public's consumption concept gradually returns to slow fashion culture. People began to pursue a quality of life. The attitudes of low-carbon and environmentally-friendly have gradually penetrated into every consumer's lifestyle. Low-carbon is not only the way of environmental protection, but also the lifestyle. Similarly, low-carbon design should be suitable for consumers and a development goal of the recycling enterprises. Consumer consumption concept is the decisive factor which determines the development speed of ecological environment in the clothing industry (Jing & Peipei, 2015). However, who will guide the consumer concept? Consumer attitude is the long-term accumulation result of national culture and the direct reflection of social reality. Among the many factors that lead the concept of individual consumption, the main consumption concept and individual factors are the basic factors to guide the consumption concept (Guangjie, 2012).

Firstly, the influence that the mainstream concept of consumption having on the concept of personal consumption. Green low-carbon is the new consumption trend. More and more consumer's requirements gradually increased. They focus on clothing durability, environmental protection and low-carbon fabric. Through the network and other ways, consumers should understand the impact to the environment in the process of clothing produce. These consumption concepts gradually formed the mainstream culture and then continue to affect others concept. Based on the data analysis, more consumers would buy fewer clothes and shopping rationally, even some environmental protection consumers pay more 20%-30% price to buy low-carbon fabrics clothing or recycling clothes for their consumption values and lifestyles.

Secondly, Personal factors are determined by the degree of people's culture, thinking and the quality of thinking. As 2015 China's first eco environmental fabrics design competition jury expert judges, they think in terms of consumer's personal consciousness, if each category of consumers can be like the mother and infant brand consumers, the promotion of ecological environmental protection will quickly enter a new stage in China's textile and garment industry (Jing & Peipei, 2015). In the low-carbon age, return to the slow fashion and rational way of life, they can clearly know their own consumption concept positioning. Rational lifestyle includes, first, personal subjective reduction in the purchase of clothes or the old clothing renovation, each person reduce one piece of clothes. It is equivalent to a reduction of about 5.7 kg of CO<sub>2</sub> emissions. Second, consumers need to choose environmentally friendly fabrics and styles. Such as the cooperation fabric clothing of Lining and Teijin, ECO CIRCLE. Through the CIRCLE ECO system recovery process, each 3000 pieces of clothing can reduce the amount of CO<sub>2</sub> emissions, equivalent to 228 trees one year's absorbing amount of CO<sub>2</sub>. Thirdly, choosing environmental washing will save water and prevent the detergent pollution. Washing by hand instead of using machine washing and dry naturally. One time of washing by hand can reduce carbon emissions 0.26 kg. Fourth, consumers can participate in charitable activities and donate money or clothes to the disaster area, helping the needy people. When consumers find their own positioning and the lifestyle that integrated into the consumer's personal concept, they resonate with low-carbon environmental protection.

## 4.3 Revival and recovery of old clothing

Low-carbon clothing design of the old clothes is related to the life style of the public. It is also one of the acts of green environmental protection. The revival of the old clothing can be the DIY re-design of the old clothing. DIY means do it yourself. Consumers reduce unnecessary clothes. It can put the concept of low-carbon environmental protection into the life style. Consumers can start from the DIY design using the old clothing. DIY can also be understood design it yourself. Creative design can be



combined with the popular elements of tassel, bright skin, stitching, simple cut etc. Design creativity can also be the design of worn clothing, made the old clothes into shopping bags. It is redesign of fabric. Let the old clothes DIY design become clothing that can be continually used.

Re-surrection using clothes can come from clothing factory. In response to low-carbon and environmental protection slogans, Sweden's fast fashion chain clothing Hennes and Mauritz (H&M) clothing stores in China offer "collection of used clothing " boxes, consumers can use their own old clothes in Exchange for a H&M 85 percent coupon. Recently H&M brand material on these old clothes to design new "Close the loop" denim. Old clothes for this series of revival in apparel fabric are 20% for cotton and 80% organic cotton, this design is one of the biggest highlights. Clothes recycling cost will be relatively high. H&M, Adidas, PUMA join in recycling old clothes project, I:CO company who provides technical support ,said that current 40% to 60% old clothes for recycling after disinfection processing into the secondary market, the remaining part will be recycled for the manufacture of cloth and other products, and others will be used for thermal power generation. Today, H&M launched collection weeks of used clothing, the first world collection weeks of used clothing start at the April 18th, the activities planned to collect more than 1000 tons of used clothing worldwide, and the campaign slogan "recycle one T-shirt, 2100 liters of water can be saved" make everyone raise up the enthusiasm about recycling old clothes.

## 5.0 Conclusion

Low-carbon is not only the consumption trend in global economy but also a green lifestyle. It is a way to solve the earth environmental problem. Low-carbon slogans should be advocated to upgrade to the environmental protection action for everybody. In the clothing industry, on one hand, every brand donates themselves into low-carbon clothing activities, encouraging consumers to participate in low-carbon behaviors. On the other hand, consumers begin to reposition themselves. They purchase clothes rationally, reuse the clothes with imagination and reduce discarding. In the low-carbon age, designer's creativity should start from human; the design displays human nature thoughts. The slow fashion ideas gradually return to fashion and lifestyle. The low-carbon concept of clothing rose to humanistic, low-carbon concept is connected with the behavior of human beings. All these actions make low-carbon concept become the basic demand and sense of responsibility.

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