Sustainable Development of Tourism Industry in China under the Low-carbon Economy

Z. Tang\textsuperscript{a,b}\textsuperscript{*}, C.B. Shi\textsuperscript{a}, Z. Liu\textsuperscript{c}

\textsuperscript{a}School of Tourism and Cuisine, Harbin University of Commerce, Harbin 150076, China
\textsuperscript{b}School of Environment, Beijing Normal University, Beijing 100875, China
\textsuperscript{c}School of Foreign Language, Harbin University of Commerce, Harbin 150028, China

Abstract

Low-carbon economy is an effective solution to the sharp conflict between rapid economic growth and high CO\textsubscript{2} emission. Low-carbon tourism is a radical approach to implement sustainable development under the background of low-carbon economy. This paper analyzes the fundamental conception of low-carbon tourism and reviewed the main research on low-carbon tourism within and outside China. Some countermeasures for the sustainable development of tourism industry are discussed in view of the benefits of tourist administration, tourism enterprises, tourism attractions and tourists in order to achieve higher quality of tourism experience and greater economic, social and environmental benefits with energy saving and emission reduction.

© 2011 Published by Elsevier Ltd. Open access under CC BY-NC-ND license.
Selection and peer-review under responsibility of RIUDS

Keywords: Low-carbon economy; Tourism industry; Low-carbon tourism; Sustainable development

1. Introduction

With the growing concern about climate change, the international communities had reached a consensus on the construction of low-carbon economy for tackling global warming. Low-carbon economy is increasingly drawn worldwide attention since British Energy White Paper “Our Energy Future: Creating a Low Carbon Economy” was first drafted in 2003. Low-carbon economy perhaps will become “the fourth industrial revolution” after UN Climate Change Conference in Copenhagen, Denmark. According to the World Tourism Organization, China will become the largest tourist destination country

\textsuperscript{*}Corresponding author. Tel.: +86-158-0462-7871; fax: +86-451-8677-1133.
E-mail address: tzh9@163.com.
and the fourth largest tourist source country in the world by 2020. The State Council of China formulated Principle of Speeding up the Development of Tourism Industry in 2009, which advocates vigorously greenhouse gas reduction by conserving energy of tourism industry, and cut down the electricity consumption and water consumption by 20% at star-rated hotels and scenic spots in five years. The low-carbon development of tourism industry not only can reduce energy consumption and achieve the target of energy saving and CO$_2$ reduction, but also can cut down the operating cost and increase the profit of tourism industry. As a new traveling form, low-carbon tourism is the guarantee of the sustainable development of tourism industry.

2. Theory of low-carbon tourism

2.1. Connotation of low-carbon economy and low-carbon tourism

Low-carbon economy is an economic mode based on low energy consumption, low pollution and low emission, which is another significant civilization following the agricultural civilization and industrial civilization. According to the guidance of sustainable development, new energy development and other means, the essence of low-carbon economy is to minimize the high-carbon energy consumption of coal, oil, and other fossil fuels, to reduce greenhouse gas emission, and to achieve the win-win patterns of economic and social development and ecological environment protection, through technical innovation, system innovation and industrial restructuring [1].

The concept of low-carbon tourism dates back to World Economic Forum “Go to Low-carbon Travel and Tourism Industry” in 2009. Low-carbon tourism is a new way of sustainable development which can achieve the greater tourism economic, social and environmental benefits, through using the low-carbon technologies, setting up a mechanism for carbon sink mechanism, and promoting the implementation of low-carbon tourism consumption [2]. The core of low-carbon tourism is to obtain a higher quality of tourism experience with low carbon emission and less pollution in the process of transportation, accommodations, sightseeing, shopping and entertainment [3].

2.2. Reviews of low-carbon tourism

The overseas researches put particular emphasis on quantitative assessment on carbon emission of tourism industry. For instance, Beckena et al. proposed that the total energy use of international tourists is four times that of domestic tourists. Transportation contributes 65–73% of the total energy consumption, and becomes a priority to energy saving [4]. Richard accounts for the carbon tax on aviation fuel would particularly affect long-haul flights and short-haul flights, which implies that tourist destinations that rely heavily on short-haul flights or on intercontinental flights will decline in international tourism numbers [5]. Smith and Rodger assessed competing offsetting options for aviation emissions of international travel from comprehensive national-level and showed that no single offsetting scheme targeted inside the country appears physically and/or politically realistic [6]. Kuo and Chen used Life Cycle Assessment (LCA) to explore environmental impacts of island tourism on transportation, accommodation, and recreation activity sector [7]. Peeters and Dubois found that tourists cause 4.4% of global CO$_2$ emissions and the emissions are projected to grow at an average rate of 3.2% per year up to 2035 [8]. Form the study of Lin, the CO$_2$ emission of private car reveals a higher value due to its lower load factors. Moreover, CO$_2$ emissions per person are diversely influenced by the attributes of travel distance and transport mode [9].
In China, researchers put stress on qualitative explanation on the concept and countermeasures of low-carbon tourism. For example, Liu thought low consumption and low pollution are the core of low carbon tour [3]. Huang put forward a low-carbon in the domestic tourist attractions in order to lay a good foundation for the creation of low-carbon city [1]. Huang and Yao researched the applications of Low-Carbon Society in leisure industry area by Delphi method [10]. Li et al. established a primary low carbon tourism community assessment system to promote low-carbon tourism conception [11]. Cai and Wang thought that low-carbon tourism pattern could be achieved by creating low-carbon tourist attractions, building low-carbon tourism facilities, and so on [2].

3. Sustainable development countermeasures of tourism industry under low-carbon economy

3.1. Tourist administration department guiding low-carbon tourism

Government should develop low-carbon tourism as a most important task and put low-carbon tourism into National Twelfth Five-years Plan with the circular economy, energy saving and CO2 mitigation, and environmental protection. Government should establish the laws and regulations of low-carbon tourism, which promote the standardization and institutionalization of low-carbon tourism from the legal and institutional aspects. Governmental department should strengthen the low-carbon appraisal system of tourism-related business through stricter low-carbon standards for tourist attractions, tourism transport and tourist hotels. Government should encourage tourism enterprises to develop energy conservation, reduce CO2 emissions and use renewable energy, and support tourism enterprises in tax reduction, fiscal subsidies, government procurement, and green credit. Government should establish the special funds of low-carbon tourism to support tourism enterprises to develop low-carbon projects. Government should not only strengthen the cooperation between various departments in co-advertising and co-promotion low-carbon tourism, but also strengthen the public’s environmental awareness on understanding the low-carbon tourism, and promote public initiative to low-carbon tourism. Government should develop international cooperation in low-carbon economy in order to promote the competitiveness of tourism industry by adopting advanced management.

3.2. Tourism enterprises supplying low-carbon products

- Travel agency
  As an important component of tourism enterprises, travel agency plays an important role in the low-carbon tourism. From the viewpoint of tourism industry, travel agency should act as the propagandist of low-carbon tourism. Travel agency should propagate the idea of low-carbon tourism and specially develop low-carbon tourism products and routes to meet the needs of tourists on low-carbon tourism. For instance, travel agency can properly design hiking and bicycle travel routes to guide tourists to return to nature, love nature, protect nature, in a bid to reduce carbon emissions and maintain the sustainable development of tourism.
- Tourism hotels
  Firstly, tourism hotels should greatly raise the level of low-carbon management through the establishment, demonstration and popularization of green standard comprising of saving energy, of cutting down the consumption of raw materials, of environmental protection, of green procurement, of green marketing, and so on. Secondly, tourism hotels can use low-carbon technology, new materials and intelligent control system in construction, heating, air conditioning, lighting, electrical use and water use. Tourism hotels should take full advantage of solar energy, biomass energy, organic energy and other clean energy. Thirdly, tourism hotels should establish a system of incentive arrangements for energy
conservation. For example, tourism hotels can encourage frugality in staff training and guest consumption, so as to provide tourists with the spirit of the tourism experience.

- **Tourism traffic**

  Tourism traffic may save tremendous energy because of strong adaptability to emission reduction. The low-carbon travel traffic need advocate buses, electric cars, bicycles and other low-carbon or carbon-free transportation mode. Low-carbon traffics can significantly reduce the emissions of greenhouse gases, carbon monoxide and pollutant particulates. For instance, airlines can implement the “Carbon Offset”, which tourists can exchange their frequent flyer miles points seedlings for their own travel to conduct a “carbon offset”. Air traffic can reduce fuel consumption by decreasing the capability of water tank to make the plane lighter. Certainly, the development of alternative fuels, especially biofuel, is a long-term measure to save energy and reduce emission.

### 3.3. Tourism attractions creating low-carbon tourism patterns

As a part of the tourism activity, tourism attraction is an important place to reduce carbon emissions. Tourism attractions must keep low carbon in mind from planning, development and construction of scenic spots. Namely, tourist attractions should achieve the closed-loop feedback cycle of “resources, products, renewable resources” in the resource development and tourism activities, with the ideas of “reduction, reuse, recycling”, which integrates the clean production of tourist areas, the comprehensive utilization of tourism resources, the eco-design of tourism products, and the sustainable consumption of tourists. Meanwhile, the idea of low carbon can be applied to develop natural resource, to determine the reasonable capacity, to implement environmental evaluation system, to supplement supporting infrastructure, to use clean energy, to set attraction items and facilities, and to publicize scenic areas. Tourist attractions should strengthen the low-carbon management and minimize the consumption of water, power, paper, and so on. In addition, the scenic areas can also promote the electronic tickets, and develop the low-carbon sanitation.

### 3.4. Tourists implementing low-carbon consumption patterns

As the subject of tourist activity, tourist is the main force to promote low-carbon tourism. The idea of low carbon can be run through each link in the tourism process of catering, accommodations, transportation, sightseeing, shopping and entertainment. For catering, tourists should prefer green food, ecological food, and avoid using disposable chopsticks and lunch boxes. For accommodations, tourists can choose green hotels, small hotels or youth hostels, etc., coming with essential daily necessities. For transportation, tourists can give preference to hiking, bike, bus, rail and other relatively low-carbon transportation. For sightseeing, tourists should contribute to low-carbon tourism while enjoying the natural scenery, such as consciously disposal waste, preservation environment. For shopping, tourists should try to purchase the original eco-tourism products and souvenirs against excessive packaging. No trade of rare plant and animal species and their products should be involved in maintenance of ecological diversity. For entertainment, tourists should respect the local culture with the possible participation of local and cultural activities, recreational activities and carbon sinks. For example, tourists can experience with the traditional festival, life rituals of rich activities and rich local customs and cultural, and participate in local gardening, tree planting and other activities for carbon sink [12]. In this way, tourists not only enjoy a healthy tourism environment, but also create a healthy tourism environment, and promote the sustainable development of low-carbon tourism.

### 4. Conclusions
As a new mode of tourism development, low-carbon tourism will demonstrate powerful demonstration effect and guiding values. From the low-carbon economy viewpoint, as the tourist subject, tourist object, tourist carrier, and tourist media, tourist, tourism attraction, tourism enterprise, and tourist administration constitute the tourism industry chain. The saving energy and emission reduction in each chain should be improved from catering, accommodations, transportation, sightseeing, shopping and entertainment of tourism.

Acknowledgements

This research is funded by project of philosophy and social sciences for research and planning of Heilongjiang Province (08E011). Special thanks should go to Zheng Liu of School of Foreign Language, Harbin University of Commerce, for his zealous help in polishing the manuscript.

References