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Effects of Building Layout on air temperature in community

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Abstract

In the light of lack of strategy for coping with climate change in the process of urbanization in our country, low carbon planning of a national sustainable development of experimentation area, chengyang area, qingdao city, was researched around the technology for controlling carbon emission resource, expanding carbon sink and town low carbon construction planning. The contribution of architectural layout to low carbon emission and the contribution of afforest to carbon sequestration capacity were studied. In addition, influence of afforest imbalance ratio for town carbon emission was researched in the paper.

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Keywords: carbon emission, architectural layout, green balance, low carbon planning

1. Introduction

As national sustainable experimentation communities, Chengyang district passed acceptance of the national ministry of science and technology in December 2010. Hereafter, exploring the path to suit for comfort conditions of district and requirements of ecological civilization development is one of key tasks in urban planning and construction in the city. The scientific urban planning is the first step to build a low carbon town, but there is no national and international authoritative standards introduced recently. Researchers’ works are mainly focused on the connotation, planning and design principles and methods of low carbon city at home and abroad. However, uniform evaluation indexes or index system don’t form. Now, “Evaluation system of low carbon city in China”(2011 Edition) is authoritative, which is published by the national low carbon economy media alliance, where the evaluation system consists of 10 indexes, including low carbon city development planning index, media spread index, new energy and renewable energy and low carbon product application rate, urban green coverage ratio, low carbon travel index, index of city low carbon buildings, urban air quality index, urban direct carbon reduction target, public satisfaction and support rate, one vote veto indicators.

2. General situations of low carbon city

Chengyang District is located in the east longitude 120 °12', north latitude 36 °20', is a warm temperate continental monsoon climate, at 12.6°C annual average temperature. The lowest monthly mean temperature appears in January, -2°C, however, in August, the highest month average temperature appears at 25.7°C. Mean annual precipitation is 700 mm on 5.532 square kilometers in all. There are about 500 thousands populations live in 8 street agency jurisdiction, 230 residents’ committee today.

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Chengyang District is located at north of Qingdao, which has plain on two sides, hills on one side and the sea on one other side. The region's total land area is about 5.53 million hectares, including agricultural acreage 1.66 million hectares, reclaimable wasteland 0.02 million hectares, garden 0.21 million hectares, forest 0.64 million hectares, urban construction land 0.07 million hectares, other 2.92 million hectares, respectively accounting for the total land area of 30%, 0.4% and 3.86%, 11.5% and 1.43%, 52.81%.

There are more than 300 species of pine, including lodgepole pine, Japanese larch, gold Chinese catalpa wood, silver Chinese catalpa wood, chinaberry, heaven tree, fraxinus velutina, dawn redwood, Chinese white poplar, paulownia, triploid populus tomentosa, narrow crested poplar, Poplar and various fruit trees, tea and other woody plants and vines. The eastern mountain mainly contains wet evergreen tree species, and central hills is mainly contains semi wet type of broadleaf trees, fruit trees, shrubs and other hybrid alternate. However, artificial forestation is mainly located in western plains.

3. General situations of low carbon city

Main measuring equipments are including thermometer, anemograph, digital illuminance meter, digital temperature and humidity meter, digital thermometers, and other equipments for measurement, such as shown in Fig. 1.

Optimal layout method was used in this data collection. In the same area, according to certain rules selected a series of points, kinds of data were measured at the same time, and errors were inspected and checked in time. Measuring air temperature, relative humidity and wind speed on pedestrian level is at 1.5-2.0m apart from the ground, and illumination is measured on the ground. At the same time, with the method of flow observation, wind speed was measured every 5-10m at different points. Fig.s 2-4 shows measurement process for field survey. In measurement area, measuring points are random arranged, and application of dynamic measurement is to make it universal and representative. This measurement is for studying influence on the energy consumption of wind, heat, light and humidity factors under different construction, different layout and different underlying surface.
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