

Guangzhou Low Carbon Society2030: A win-win strategy for global climate change and sustainable development of regional economy

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As we entered the 21st century, the issue of energy security and global warming, due to anthropological activities, has aroused wide public concern. Among all the acts tackled the problem, the low-carbon development method aiming at reducing the human footprint has received a greater recognition around the world; it is also the goal of the new era. Form the “low-carbon economy”, which defined as reducing the resource consumption and environmental impact to achieve higher economical profit, to promoting a green way of living and developing a management model of low-carbon society, the concept of low carbon has been promoted rapidly at all levels of the society.

As a developing country, China is in an era of fast urbanization and its total GHG emission is increasing. As a responsible country, China has shown a positive attitude in international state before Copenhagen COP 15, China announced its goal of reducing GHG emissions: to reduce GHG emissions per unit GDP by 40 to 45% of 2005 levels by 2020. How to solve the problem of high carbon-dependent economy and high energy intensive development has become one of the greatest challenges for China. Low carbon development is no doubt a new pathway for city sustainable development. A lot of low-carbon “experiment city” planning is gradually developed.

Guangzhou, as the capital of Guangdong Province, is one of the most economical active cities in China. However, the increase of total energy demand has not been effectively curbed due to rapid overall economic growth. The excessive use of coal and oil has brought great pressure on the environment. So developing low-carbon city in Guangzhou can stabilize the increasing demand of energy; can benefit the industrial competition; and also can reduce city air pollution and GHG emissions.

This analysis uses Extended Snapshot Tool (ExSS) development by Tokyo University and Japan national environmental research institute. By quantifying Guangzhou’s future developing scenario, we predict the social economy and GHG emission level in 2030, in order to achieve the emission reduction goal and realize the policy implementation. Also, we aim to form a suitable methodology for low carbon society research for Chinese cities, so that other cities can learn.

We selected 2005 as the base year. Considered the low carbon technology will be more matured in 2020-2030, we selected 2030 as the target year for low carbon society scenario, and also set two different types of development scenario, the BAU

(Business As Usual) and CM (Counter Measured).

According to the model simulation results, the population of Guangzhou will reach 10.07 million people in 2030, GDP will be approximately 2.17 trillion RMB. The energy consumption and GHG emission has a large mitigation potential by adoption of counter measures for mitigation. For the several numbers of measures, we divided them into five actions.

Action 1: Convenient transport

This action comprises of a shift from private vehicles to public transportation by traffic management system and efficiency improvement. The CO₂ emission reduction from this action contributes to 2% of total CO₂ emission reduction.

Action 2: Green Building

This action focuses on measures of efficiency improvement and natural energy utilization of two sectors (residential and commercial). The CO₂ emission reduction from this action contributes to 22% of total CO₂ emission reduction.

Action 3: Decarbonation of Industry

Industry is presently the major sector of energy consumption and GHG emissions. This action comprises of two main action measures, namely, measures to improve energy efficiency, and measures to restructure the industry. It can contribute 30% of total CO₂ emission reduction.

Action 4: Fuel Switch

The “Fuel Switch” action aims to achieve energy saving and GHG emission reduction through adjusting the fuel structure of industry, construction and transport. It expects to achieve GHG emission reductions of 7%.

Action 5: Low-carbon Electricity

Power supply is one of the major sectors of GHG emissions. It will reduce 39% of GHG emissions through Low-carbon electricity action. This action comprises efficiency improvement of power plant and fuel switch of electricity generation.