

## Executive Summary

# **China's Provincial and City Low Carbon Pilot Programs: A New Opportunity for Global Emissions Reductions from "Low Carbon Accounting, Management and Credit System"**

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This paper will investigate how China can successfully plan and achieve its low carbon province and city pilot program. In 2010 China's National Development Reform Commission (NDRC) announced a program for five low-carbon pilot provinces and eight low carbon pilot cities. The NDRC low carbon pilot provinces and cities are expected to lay the groundwork for a national low carbon assessment, planning and management system that should include guidelines for industry, society and the economy—indeed all the energy used in China as well as other forms of national greenhouse gas emissions, primarily carbon. In order to be successful, planning, implementation and ongoing management of such a system should be based on what we are referring to as the "Low Carbon Accounting, Management and Credit System," (LCAMC) which consists of three major elements: 1.) A holistic carbon accounting system within China's five pilot provinces and eight pilot cities based on operational and embodied (life cycle) energy use. The system needs to include a benchmarking of relevant embodied energy, operational energy use, national energy "flows" and associated greenhouse gas emissions; 2.) A strategic management system, including performance measures for government at national, regional and local levels. The management system would be based on a methodology that is currently in successful use in China in more than a hundred well-respected commercial organizations. 3.) An international carbon credit system based on total lifecycle international energy/ product flows. With the successful implementation of #1 and #2 on a national basis in China and agreement from other nations, an international carbon credit system could provide verifiable carbon emission reduction credits for nations that export products used elsewhere, including renewable energy products. The nation exporting products would be eligible to deduct those carbon emissions from actual total national emissions and possibly earn financial credit.

Two case studies are presented. The first case provides an assessment of how embodied and operational energy were analyzed and modeled in aggregate by the Lawrence Berkeley National Laboratory (US Department of Energy) for the city of Suzhou, China in 2010. The second case considers the NDRC Low Carbon Pilot Program city of Baoding, China, and, using the proposed "Low Carbon Accounting, Management and Credit System," applies the Suzhou energy analysis model to Baoding. Finally, eight steps for implementing the proposed Low Carbon Accounting, Management and Credit System are provided: 1. Integrate provincial and city 12<sup>th</sup> Five Year Plans with provincial and city Low Carbon development planning; 2.) Establish research investigation for local measurement and data collection; 3.) Clarify a new strategic framework for integrated Five Year and Low Carbon planning to establish new patterns of thinking; 4.) Develop comprehensive guidelines for advanced planning; 5.) Cascade the integrated Five Year and Low Carbon plan to local industry for optimizing the energy structure; 6.) Improve the efficiency of energy consumption and fossil fuel use in the economy; 7.) Improve financial credits for carbon emission reductions and product exports (embodied energy credits), particularly renewable energy technologies; 8.) Clarify action initiatives, prioritize tasks and develop specific measures for regional GHG emission control, for the reduction of carbon intensity.

**Key Words:** "Low Carbon Pilot Provinces and Cities," "embodied energy," "operational energy," "Low Carbon Accounting, Management and Credit System," "carbon credits," "energy flows," "Suzhou, China," "Baoding, China," "renewable energy," "product exports" "National Development Reform Commission," "economic development," "carbon lock-in," "energy price and supply volatility," "energy security," "infrastructure," "sprawl," "life-cycle assessment," "low carbon indicators"