

# **Environmental Innovation in China**

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## Preface

In 2008, the China Council for International Cooperation on Environment and Development established a special task force on Building an Environmentally-friendly Society through Innovation. The goal is to explore how China can find a new development model based on environmental innovation. Co-chairs of the task force are: David Strangway, Former President, the University of British Columbia and Feng Zhijun, Counselor, the State Council. Task Force Members are: Meng Wei, President, Chinese Research Academy of Environmental Sciences; Liu Xielin, Professor, Graduate University of Chinese Academy of Sciences; Wang Chunfa, Professor, China Association for Science and Technology; Xue Lan, Professor, School of Public Policy and Management, Tsinghua University; Kelly Gallagher, Director, Energy Technology Innovation Project, John F. Kennedy School of Government, Harvard University; Granger Morgan, Professor, Carnegie Mellon University; Tom Preststulen, Executive Vice President, Corporate Governor Asia, Elkem.

In 2008, members of the international task force held two workshops in Vancouver and Oslo separately. Later, contributors of the book, led by Liu Xielin and D.Strangway, formed a team and served as the main writers for the report and this book.

We acknowledge the Bureau of Environmental Protection, Ningbo city, Zhejiang Province, Ningbo Association of Science and Technology for arranging for us to visit Bailun Power Plant, Zhenhai Chemical Refinery, China Petrochemical Corporation (Sinopec Group) from March 13 to 15, 2008.

We also thank the Bureau of Environmental Protection of Wuhai, Wu Hai Power Plant, Subsidiaries of Shenhua group in Wuhai in Inner Mongolia to allow us to conduct academic interviews from June 12 to 14, 2008.

From September 28-30, we visited the Development and Reform Committee, Bureau of Science and Technology, Bureau of Environmental Protection, High-tech Zone in Baoding city. We also interviewed two green energy companies: Yingli in photovoltaic industry and Huiteng in wind power industry. Without their help, we could not finish the case on Baoting city.

Lastly, we would take the opportunity to thank Mr Guo Jing and Li Yong from thesecretary office of CCICD, it is their kind and valuable support that made the project and book possible.

Liu, Xielin and David Strangway  
Beijing, 2012



# **A National Environmental Innovation Action Plan**

## **Executive Summary**

*China has both the capacity and the need to become a global leader in sustainable development and innovation in environmental technology.*

China has had dramatic and sustained industrial, economic and social development over the past 30 years. Prompt and forceful response to the devastating Sichuan earthquake and the spectacular staging of the 2008 Summer Olympics are clear illustrations of the remarkable transformation that is taking place.

However, economic development has come at a cost. Pollution to air, water and land is having a very serious impact on the health and well-being of the people of China and on the ecosystems of China. The need for China to reduce its emissions is abundantly clear. Many steps are being taken and the problem is fully recognized by China's leadership. Targets on reducing intensity of emissions on a per GDP basis have been set. However, what ultimately matters is not per GDP (or per capita) emission, but the levels of pollution to which people and ecosystems are exposed. *Reduction targets of pollutants on an absolute basis must be established.* If these are to be reduced from today's levels to a healthy level, a new transformation will be needed in which the creative and innovative potential of the people and institutions is further developed!

In this report we review the science and technology system of China and we examine the many steps under way to improve its ability to support innovative and cost effective environmental clean up. We review what drives innovation and the conditions necessary to develop an innovative society. The continuum from basic research in science and engineering to applied research to precompetitive research and new company creation to demonstration to deployment and the interaction between these elements is moving at a dramatic pace. This can be described as an Innovation Ecosystem since all elements interact. The opportunity for technology innovation has never been greater as we discuss in this report.

Science and technology are moving ahead globally at a dramatic pace, creating unique opportunities for solving environmental problems.

*We recommend the establishment of a National Environmental Innovation Action Plan. The elements of this plan are discussed in this report and cover the elements of the innovation process from research and development (R&D) to deployment. MEP needs to be strengthened to support this plan.*

We know that innovation requires a firm market demand. In the environmental area, such

demand will not develop or persist without strong regulatory frameworks. Clear standards and enforced regulations created equitably by government are what create the market for environmental innovation.

*Without strong, clear, stable, and uniformly-enforced regulations and standards, there is no market and hence no incentive for investment in development and wide deployment of innovative environmental technologies.*

*To achieve a more effective nationwide regulatory environment and to bolster public participation, we urge the creation of a National Environment Information System (NEIS). NEIS would be managed by the new Ministry of Environmental Protection (MEP), who would be responsible for collecting, processing, and reporting pollution in an open format accessible to all.*

It will of course be necessary for government to fund the appropriate elements of the National Environmental Innovation Action Plan.

In addition to creating and supporting the NEIS, there are a number of steps that can be taken to strengthen China's environmental capacity. China is in a position to develop a globally competitive capacity in the rapidly developing area of clean technology (CT). There are many dimensions identified in this report under the three themes:

1. **Technology Innovation** for environmental protection and sustainable development
2. **Regulations, Standards, and Enforcement**, and
3. **Public Participation**.

*Technology Innovation* proposes a number of approaches. There is a need to strengthen the various elements of the innovation process as it relates to environment; continue to strengthen basic research; create competence centres; develop industry sector research institutes; create Environmental Innovation Support Networks to assist SMEs; develop incentives to meet energy efficiency standards; funds for international cooperation; support academic-industry linkages; institute internationally recognized prizes; and develop the circular economy.

*Regulations, Standards, and Enforcement* are central to innovation. Within the context of the NEIS, the cost of compliance must become less than the cost of non-compliance. National and international standards need to be set and enforced.

*Public Participation* of citizens and local NGOs is vital in addressing the immediate impacts of pollution which are widely understood as occurring most critically at the local and regional levels. While steps are being taken to strengthen such local involvement, much more needs to be done. China needs to stimulate, empower and mobilize citizens at the local and regional levels to act in the interest of resolving the environmental problems of their communities. This can be reinforced in many ways including education and public awareness campaigns. The power of the citizens to act will be greatly strengthened by access to the independent National Environment Information System.

Much has been done. Much remains to be done to release the innovation capacity of China to provide an example of sustainable development which can be a model to the world. Continuing to grow the GDP, while decreasing pollution through innovations in technology, in institutions, and in society, must be the objective.

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