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总 编/王 战 潘世伟

上海资源环境发展报告

(2013)

资源环境风险与发展转型

ANNUAL REPORT ON RESOURCES AND ENVIRONMENT OF SHANGHAI (2013)

名誉主编/张仲礼

主 编/周冯琦 汤庆合 王利民

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《上海资源环境发展报告（2013）》
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摘　要

党的十八大报告将生态文明写入党章，强调经济、社会、政治、文化以及生态文明五位一体的总体战略布局。经济社会与资源环境的和谐发展越来越得到应有的关注。改革开放以来，中国经济发展取得了令世人瞩目的成绩，但资源相对不足、环境容量有限的约束越来越明显，资源环境风险不断累积，所产生的经济社会影响不断增大，迫切需要化解资源环境风险，探索发展转型路径。

上海根据国家对上海“十二五”发展的总体要求和部署，出台了一系列环境保护相关发展规划及标准，于2012年启动了第五轮“三年环保行动计划”，上海资源环境发展取得了积极的成效。但同时我们也应该看到，随着上海城市规模的不断扩张，经济、人口增长、人口向郊区转移，偏重的工业结构和以煤为主的能源消费结构，生活方式的变化等，使得资源消耗和环境污染仍处于高位；而人们对资源环境质量的诉求无论是质和量都有新的提升，由环境诉求所引发的社会矛盾以及所产生的经济和社会影响越来越大；与此同时发展所带来的新型环境污染问题、跨界环境污染转移问题与传统环境问题交织，潜在的资源环境风险不容忽视。

一是水质性缺水的风险。上海市地处长江和太湖流域下游，河湖众多、水网密布，水资源量丰富，但本地河网水质普遍较差，水功能区达标率低，本地水污染排放压力不减，面临着严重的水质型缺水问题。虽然上海已加大了水环境综合整治力度，但由于历史上污染过多积累、使现实的排污量大且污水处理标准偏低、城市面源污染严重，加之太湖流域上游省界地区来水水质较差，在短期内上海市水体水质难以明显

改观。

二是土地污染的潜在风险。与大气污染、水污染不同，土地污染具有隐蔽性、复合性、积累性和滞后性等特点，一直以来受到关注程度有限。但是，近年来土地污染在中国已经成为日益严重的问题，成为影响农产品、水产品及食品安全的潜在因素。源于重化工产业发展的水土污染累积、城市产业布局结构调整所带来的“棕地”污染、与城市快速发展相伴而生的污水处理所产生的污泥污染等土地重金属污染的风险在上海逐步显现。

三是复合型的大气污染风险。上海在传统大气环境问题治理方面取得了较显著成效，但酸雨、扬尘等问题仍未彻底解决；与此同时，PM2.5（可入肺颗粒物）、挥发性有机物、臭氧、恶臭等新型大气环境问题却凸显出来，呈现出复合型污染的态势。复合型大气污染对城市居民健康的累积影响有所显现。

四是能源外部依赖和化石结构依赖风险。上海对外部能源资源的依赖性越来越大，上海经济增长与能源消费总量之间存在显著的正相关关系，能源使用效率还低于发达国家的水平，上海能源消费结构中90%以上为化石能源，能源消费是导致环境污染尤其是大气污染的首要原因，存在较大的外部性风险。展望未来，上海的能源风险在短期内不会发生较大的变化，能源风险的可控性逐渐增强。

五是突发性环境事件发生频次上升的风险。近年来，上海积极推进环境应急管理体系建设和重点领域环境应急管理工作，防范和妥善处置了各类突发环境事件，有效降低了突发环境事件的社会影响，保障了城市环境安全。但是近年来上海市突发环境事件数逐年递增，其中80.9%是水污染和大气污染事件，并呈现以下特征：从污染源上看，39.8%的事件是由有毒物质泄漏引发的；从空间分布看，事件集中在上海东北部与西南部区（县），以郊区为主，其中浦东新区事件发生最为频繁；从事件原因看，生产安全事故是引发环境事件的最主要因素。

虽然近年来从产业发展转型和污染治理投入以及环境治理力度来

看，上海的资源环境风险得到了一定程度的管控，但不断上升的突发环境事件频次及其所造成的社会影响之大，环境污染的健康风险不断加剧等表明上海仍需加大对资源环境风险的源头控制和预防管理。

第一，产业发展转型，减少资源环境风险源。从世界各大城市发展的经验来看，产业发展转型是有效减少资源环境风险来源的重要路径之一。上海现在面临的资源环境风险问题，很大程度上与上海的工业布局分散、重化工产业比重偏高、规模发展过快、技术水平相对落后有关。减少资源环境隐患、降低环境风险，必须对上海未来的工业布局结构进行优化，工业要向园区集中，涉危化工企业向化学工业区集中；同时进行产品结构调整和优化升级，加强技术升级改造，对小化工企业进行重组整改，从源头上防控风险。

第二，企业发展转型，降低资源环境风险概率。企业是环境风险防范的第一线责任主体，降低资源环境风险概率，必须要加强企业的环境风险意识、环境风险责任意识、环境风险防范意识、突发环境事件应急处置的责任意识。一方面加强全过程的环境风险防范措施，另一方面推动企业发展转型，把环境成本纳入企业成本核算之中，把环境风险管理纳入企业经营管理全过程。尽快建立健全环境风险损害评估与污染赔偿制度，倒逼企业集约发展、转型发展、可持续发展，降低资源环境风险概率。

第三，环境管理转型，提高资源环境风险管理效率。近年来，上海资源环境管理体系不断完善，逐步形成了国家政策、地方规划、地方标准、行政管制、经济政策激励等制度体系，但目前的环境管理模式主要是以污染控制为目标导向的环境管理模式，这种环境管理模式对于城市经济社会的快速发展只能被动响应，导致环保工作整体处于被动局面。环境管理政策应从污染控制型向宏观经济影响型转变，主动减少污染源。资源环境管理应从行政命令型向市场导向性转型，降低政府的环境管理成本。通过强制环境责任保险制度，使政府主导的环境监督向社会主导的环境监督转型，动员社会力量参与环境监督管理。通过跨区域的

合作共享共治，解决跨界污染难题。

上海资源环境发展报告（2013）除了总报告外，全书以资源环境风险与发展转型为主线；综合篇对上海转型发展面临的人口风险、土地污染风险、能源对外依赖和化石结构环境风险以及上海的大气环境污染潜在风险进行了研究和评估；专题篇分别从上海的水质性缺水挑战和水风险评估、上海的水足迹以及食品行业水足迹研究、多方参与的流域综合治理多方位研究上海的水风险及应对；管理篇对上海突发性环境事件、上海环境风险来源及防控以及垃圾分类减量的经济激励做了分析；案例篇研究了欧美日在环境风险防控制度体系方面的经验。

Abstract

The 18th CPC National Congress included Ecological Civilization into the Party Constitution, emphasizing that the integrated development strategy should attach importance to Economy, Society, Politics, Culture and Ecological Civilization simultaneously. Harmony between socio-economic development and resources-environmental conservation is drawing more and more attention, which it deserves. Since its Reform and Opening-up, China's economy has reached eye-striking achievements, but the limited resources and environmental capacity is exerting more and more stringent constraint on its development, accumulating risks and intensifying negative impacts. All this calls for development mode transition to mitigate resources and environmental risks.

Answering to the requirements of National Government for development during 2011 – 2015, Shanghai adopted a series of environmental plans and standards, and launched the Fifth 3-year Environmental Protection Campaign in 2012, which has witnessed positive achievements. But, it should be noticed that owing to city expansion, economic growth, population proliferation, migration from downtown to suburban areas, too much heavy industry, dependency on coal and materialized life style, resources consumption and environmental pollution are still at a considerable height; while the general public assert a claim for better resources and environment in terms of both quality and quantity, which brings about the conflicts between different social groups, impacting the economy and society more and more greatly; furthermore, new-type and trans-boundary pollution issues intermingle with traditional ones, causing unignorable potential risks.

First, the risk of shortage of clean water. In the lower reaches of the Yangtze River and Taihu Lake, Shanghai confronts the problem of poor water

quality though it boasts overlapping river-net and abundant water quantity, causing serious scarcity of clean water. Shanghai does pay greater efforts to protect water environment, but its water quality is hard to improve in the short run due to pollution accumulation in the history, large-scale pollutants effluent at present, inadequate treatment of waste water, severe non-point pollution and dirty water from the upper reaches.

Second, the potential risk of soil pollution. Unlike air and water pollution, soil pollution is more complex, which is concealed in the short term, accumulates with time passing by and bursts out some time later, so it has been overlooked for long. But, in recent years, soil pollution is worsening in China, potentially threatening food security of agricultural and aquatic products. Accumulated pollutants from chemistry industries, brown fields left by the relocated factories and sewage sludge from the expanding city are contaminating Shanghai's soil with more and more heavy metal.

Third, the complex risk of air pollution. Shanghai has attained great achievements in abating traditional air pollutants; however, the problems of acid rain and dust haven't been settled completely and new-type air pollution problems such as PM 2. 5, VOC, oxygen and fetor is becoming more serious, which are intermingled with each other. And, the health effect of the complex risk of air pollution is accumulating and arising.

Fourth, the risk of energy dependency on imports and on coal. Because of growing energy consumption with growing economy and poorer energy efficiency compared to developed nations, Shanghai is more and more dependent on imported energy. Besides, fossil fuels account for over 90% of Shanghai's energy consumption, making energy utility the prime source of environmental pollution, especially air pollution, which causes significant externality risks. To look into the future, Shanghai's energy risk cannot be reduced substantially in the short term, but it is becoming controllable.

Fifth, the risk of higher frequency of environmental accidents. In recent years, Shanghai is trying to improve environmental emergency management system, especially that in key fields, so as to effectively prevent and control several environmental accidents, minimizing their negative impacts and

safeguarding the city's environmental security. But, the environmental accidents are becoming more frequent in these years, 80.9% of which are water and air pollution accidents. These accidents are characterized by such features: as to the sources, 39.8% of the accidents are caused by poisons leakage; as to spatial distribution, the accidents concentrate in the northeast and southwest suburb of the city, especially Pudong; as to the cause, failure in HSE management is the primary factor.

Although Shanghai has put resources and environmental risks under control to some extent by investing more in industries transition and pollution abatement, the rising frequency of environmental accidents and their growing negative impacts society and public health show Shanghai still needs to intensify the control and prevention of resources and environmental risks from the source.

First, reduce sources of resources and environmental risks through industries transition. From the experience of giant cities around the globe, it can be learned that industries transition is one of the most important measures to effectively reduce sources of resources and environmental risks. To great extent, Shanghai's resources and environmental risks result from dispersed factories, too much heavy industry, fast expansion of manufacturing industries and poor technology. In order to reduce potential resources and environmental risks, Shanghai should try to optimize the distribution and structure of its manufacturing industries. On one hand, the factories should be concentrated in industry parks, especially the dangerous chemistry factories. On the other hand, the products mix should be optimized, the technologies should be promoted and the small chemistry factories should be recombined, so that the risks can be controlled from the source.

Second, reduce probability of resources and environmental risks through enterprises transition. Enterprises are the prime accountable entities in preventing environmental risks, so reducing probability of resources and environmental risks calls for the awareness of risks and responsibilities of enterprises and their capabilities to deal with the risks. Enterprises should be pressed to transit, including the environmental cost into the total operation

cost and integrating environmental risk management into the entire process of business operation. The institutions for environmental risk assessment and compensation should be established and optimized as soon as possible, so as to press enterprises to transit to efficient and sustainable development, reducing probability of resources and environmental risks.

Third, improve resources and environmental risk management efficiency through environmental management transition.

In recent years, Shanghai's resources and environmental management is improving, approaching the integrated institutional system including national policies, local plans, local standards, administrative regulations and economic incentives, but the current environmental management mode is pollution-control-oriented, passive to respond to rapid development of the city's socio-economic development. Environmental management mode should try to actively influence the macro-economy, reducing pollution sources instead of merely abating pollution from these sources. Resources management mode should make good use of the market function instead of merely depending on administrative measures, so as to reduce the environmental management costs of the government. With the help of mandatory environmental responsibilities insurance, the general public will make greater contributions than the government to monitoring the enterprises. With the help of inter-regional cooperation, trans-boundary pollution problems can be mitigated.

Besides General Report, *Annual Report on Resources and Environment of Shanghai (2013)* takes resources-environmental risks and development mode transition as the main clue. Comprehensive Reports study and assess the population, soil pollution, energy dependency, fossil-fuel pollution and air pollution risks during Shanghai's development mode transition. Special Topics deal with Shanghai's water risks in the perspectives of clean water shortage, water risk assessment, water footage, food industry water footage and stakeholder cooperation in the valley. Management Practices analyze Shanghai's environmental emergency management, environmental risks source control and waste sorting incentives. Case Studies tell successful stories of environmental risks management in Europe, the USA and Japan.

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