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INTEGRATING CLIMATE CHANGE FACTORS WITHIN CHINA'S
ENVIRONMENTAL IMPACT ASSESSMENT LEGISLATION: NEW
CHALLENGES AND DEVELOPMENTS

Xiangbai He

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1

INTRODUCTION OF EIA

Environmental Impact Assessment (EIA) was first introduced in the USA in 1969 as a mechanism which mandated that all levels of governmental decision-making for policies, acts, plans, programmes, approvals and infrastructure projects, should undergo a process to reduce and mitigate adverse environmental impacts.¹ Theoretically, EIA can be divided into three different categories: policy level EIA - EIA that involves the formulation of national or regional policy, legislation of relevant laws and creation of high level economic development plan; plan or programme level EIA - a lower level EIA that focuses on comprehensive or specific planning or programming; and project level EIA - EIA focusing on specific construction projects. The first two categories are usually summarised as Strategic Environmental Assessment (SEA), which envisage a broader vision of the relationship between the environment, economy and society.

Compared to the retrospective 'End of Pipe' treatment approach which advocates 'development first and then pollution treatment', and the punitive 'command and control' approach which advocates the setting of standards and rules enforced by pecuniary and criminal forms of punishment,² EIA is distinguished by its preventative and mitigative nature. It has been demonstrated as an effective tool to assess potential environmental impacts and to prevent adverse impacts. The requirement that a comprehensive EIA should be conducted prior to the final approval of plans and projects is a significant addition to the environmental laws of most countries.³

This requirement, if effectively implemented, will enable environmental impacts to be given equal consideration in the assessment of social, economic and environmental impacts.⁴ In addition to its potential benefits in balancing short-term economic development and long-term environmental protection, the benefits of EIA in disseminating knowledge and information, and in educating the public and reshaping the decision making process, also contribute to the wide adoption of EIA. Over 100 nations have unilaterally adopted EIA,⁵ including China. However, it is uncertain whether the success of EIA in preventing traditional environmental damage can be replicated in the climate change arena.

China has more than three decades of experience in researching and practicing EIA. Current studies of EIA in China mainly focus on the description and elaboration of EIA's framework and operational procedures, as well as the application of SEA in specific sectors such as land use, resource management and urban planning. Although most research outcomes have illustrated the ineffectiveness of EIA in China, few of them have been considered the climate change impacts resulting from, and on the performance of, EIA. To fill the gap, this article explores the possibility of integrating climate change consideration within EIA modality, and identifies important entry points.

2

CLIMATE CHANGE IMPACTS FROM, AND ON, A PROPOSED PLAN/PROJECT

Impacts of a proposed plan/project on climate change

It is well acknowledged that some plans and projects can have great contributions to the emission of

1 C.W. Christopher, 'Success by a Thousand Cuts: The Use of Environmental Impact Assessment in Addressing Climate Change' 9 *Vermont Journal of Environmental Law* 549-613 (2008).

2 M. Jeffery, 'Environmental Impact Assessment: Addressing the Major Weaknesses', in N.J. Chalifour et al. eds, *Land Use Law for Sustainable Development* 451-470 (Cambridge, Melbourne, New York: Cambridge University, 2006).

3 J.B. Ruhl, 'Climate Change Adaptation and the Structural Transformation of Environmental Law' 40 *Environmental Law* 343 (2009).

4 G. Bates, *Environmental Law in Australia* 307 (Chastwood, N.S.W: Lexis Nexis Butterworths, 7th ed., 2010).

5 F.T. Gao, *Paraphrasing of Regulations on the Administration of Construction Project Environmental Protection* 20 (Beijing: China Legal System Press, 1999).

greenhouse gases (GHG) (such as carbon dioxide (CO₂), methane (CH₄), sulphur hexafluoride (SF₆) and nitrous oxide (N₂O)) and thus also to climate change. Transportation, energy development and mining plans and projects are examples of plans and projects resulting in large GHG emissions. As an important environmental decision-making tool, EIA dominates the process of plan/project design, approval and implementation. Therefore, if a plan/project's EIA proceeds without identifying, assessing and mitigating related GHG emissions, the goal to reduce potential adverse environmental effects will be compromised.

Climate change impacts on a proposed plan/project

Climate change has already gone beyond scientific debate and is now regarded as a fact resulting from anthropogenic GHG emissions, both at the international and domestic level.⁶ As a result of climate change, snow cover is decreasing, glaciers are shrinking, lakes and rivers are warming, precipitation patterns are changing, and extreme events are becoming more frequent and severe in many parts of the world.⁷ Likewise, as a developing country with a large population, a low level of economic development, and a fragile ecological environment, China is particularly vulnerable to the adverse impacts of climate change.⁸ Changes within China generally include increased average temperatures, rising sea-levels, glacier retreat, reduced annual precipitation in North and Northeast China, and significant increases of rain in Southern and North-Western China. Extreme climatic events and hydrological events such as floods and droughts are projected to become more frequent in the future, and water resource scarcity will continue across the country.⁹

If climate change impacts fail to be taken into account, they have great potential to affect the performance of EIA. Climate change impacts are likely to impair the security of operating infrastructures, causing severe economic and social losses. Without adequate consideration of the extreme events induced by climate change, dams and reservoirs may fail or be unable to control floods. In addition, in cases where plans and projects are designed to be implemented under certain circumstances or scenarios, climate change impacts may invalidate these plans and projects.¹⁰ For instance, China's giant South to North Water Diversion Project attempts to alleviate the dry situation of Northern China by transferring water from the abundant supplies of Southern China. Unfortunately, as many parts of Southern China are struggling with water deficiency in recent years, the appropriateness of this project needs further investigation.

These impacts resulting from and on EIA performance require that climate change must be given proper consideration to minimise adverse impacts. However, the differences between climate change and traditional environment problems mean that the integration of the two will create additional theoretical and implementation challenges. Traditionally, EIA has been treated as an effective approach to control pollution and prevent environment deterioration. The potential pollution generated by a plan/project is the major consideration to determine whether EIA is needed or not.¹¹ Pollution is also regarded as an important criterion to assess whether a proposed plan/project has significant environmental impacts (mainly pollutant discharge), and the extent of the environmental impacts.¹² However, climate change is not regarded as a traditional pollution issue, thus it is uncertain whether the marginal success of EIA

6 Intergovernmental Panel on Climate Change (IPCC), 'Climate Change: Working Group I: The Scientific Basis (Policymaker Summary)' (2001), available at http://www.grida.no/climate/ipcc_tar/wg1/007.htm.

7 G. Bergkamp, B. Orlando and I. Burton, 'Waking up to Climate Change', in C. Spence ed, *Change: Adaptation of Water Resources Management to Climate Change* (Gland, Switzerland and Cambridge: IUCN, 2003).

8 China, China's National Climate Change Program (CNCCP), 2007.

9 China, China's Policies and Actions for Addressing Climate Change (CPAACC), 2008.

10 S. Agrawala et al., *Incorporating Climate Change Impacts and Adaptation in Environmental Impact Assessments: Opportunities and Challenges* (Paris: OECD Publishing, OECD Environmental Working Paper No. 24, 2010).

11 China, EIA Law, 2002, Chapter 2, Article 13, 14.

12 Y. Wang, R.K. Morganand and M. Cashmore, 'Environmental Impact Assessment of Projects in the People's Republic of China: New Law, Old Problems' 23 *Environment Impact Assessment Review* 543, 543-79 (2003).

in the prevention of pollution can be replicated in a warmer world.¹³ Therefore, this article investigates the challenges and the approaches to integrate climate change considerations within EIA.

3

THEORETICAL DIFFICULTIES IN INTEGRATING CLIMATE CHANGE WITHIN EIA

3.1 Scientific Uncertainties of Climate Change

To date, the assumption of most environmental management practices is 'stationarity', which means 'natural systems fluctuate within an unchanging envelope of variability'.¹⁴ This assumption has supposed that the best basis for managing the environment and natural resources should be and can be captured through the historical record of system behaviour.¹⁵ It implies that any variability (for example, annual stream flow or annual flood peak) has a time-invariant (or one-year-periodic) probability density function, whose properties can be estimated from scientific records.¹⁶ Traditionally, the concept of stationarity has underpinned legal frameworks and management approaches, including EIA.¹⁷ EIA assumes that the surrounding environment of plans and projects is stable, stationary or constant and thus their environment impacts are predictable and can be tracked through

historical records. That is why EIA laws have highlighted the impacts of plans/projects on the environment without investigating the impacts of the environment on proposed plans/projects.¹⁸ For example, during the environmental baseline investigation stage — an indispensable step of EIA, climate change impacts, such as rising temperature, sea level rise, or the intensity and frequency of extreme weather events, are not assessed.

While this environmental stationarity assumption has allowed current EIA legislation and related cost-benefit analysis to maintain their reliability and credibility,¹⁹ it is on thin ice.²⁰ It has already been declared 'dead' as a result of human-induced climate change and its variability.²¹ Its role as a central, default assumption in environmental management has been questioned too. On the contrary, climate change and its impacts are widely acknowledged as uncertain, unpredictable and complex,²² and cannot be tracked through existing databases or records. In other words, the uncertainty and complexity brought about by climate change may exceed the boundaries of environmental stationarity and have a significant impact on the performance of EIAs, disturbing or compromising the predetermined development objectives. Scientific uncertainty concerning climate change means that human systems cannot predict and be thoroughly prepared for climate change due to imperfect knowledge about the probability, magnitude, timing and location of climate change impacts. This could lead to difficulties in assessing climate change impacts in EIA because:

- (1) When it comes to assessing the impacts of climate change on an individual plan/project at a local level, the uncertainty is

13 M.D. Zinn, 'Adapting to Climate Change: Environmental Law in a Warmer World' 34 *Ecology Law Quarterly* 61, 61-105 (2007).

14 P. Milly et al., 'Stationarity Is Dead: Whither Water Management?' 129 *Science* 573 (2008).

15 J.H. Matthews and A.J. Wickel, 'Embracing Uncertainty in Freshwater Climate Change Adaptation: A Natural History Approach' 1/3 *Climate and Development* 272 (2009).

16 See Milly, note 14 above.

17 J. McDonald, 'Mapping the Legal Landscape of Climate Change Adaptation', in T. Bonyhady, A. Macintosh and J. McDonald eds, *Adaptation to Climate Change: Law and Policy* 28 (Sydney: The Federation Press, 2010).

18 J. Xia, C.Z. Liu and G.Y. Liu, 'Opportunity and Challenges of the Climate Change Impact on the Water Resource' 26/1 *Advance in Earth Science* 1-12 (2011).

19 See Ruhl, note 3 above.

20 J.B. Ruhl, 'General Design Principles for Resilience and Adaptive Capacity in Legal Systems: Applications to Climate Change Adaptation Law' 89 *North Carolina Law Review* 18 (2011).

21 See Milly, note 14 above.

22 J. Arvai et al., 'Adaptive Management of the Global Climate Problem: Bridging the Gap between Climate Research and Climate Policy' 78/1 *Climate Change* 217, 217-225 (2006).

even greater due to lack of specific information at this level.²³

- (2) While it is possible to measure the contribution of a region or sector to climate change, it is very difficult to measure an individual plan/project's contribution. This makes setting a certain GHG reduction goal for individual plans/projects hard.

All these uncertainties create barriers to legal action, which is based on evidence. Moreover, being accustomed to making decisions based on scientific certainty through scientific forecasting and historical records, most decision makers are not equipped with the knowledge or ability to deal with uncertainties regarding the scale of climate change impacts.

3.2 Difficulty to Separate Climate Change from Climate Variability

Based on the stationarity assumption, China's current EIA legal framework has listed climate variability as an important parameter in environmental baseline investigations.²⁴ However, to integrate emerging climate change with EIA, it is necessary to first discern climate change from climate variability. Unfortunately, drawing a clear boundary between them has been revealed to be scientifically difficult. Climate variability reflects a year-to-year fluctuation in the climate record, while climate change is an alteration of the composition of the global atmosphere and is in addition to natural climate variability observed over comparable time periods.²⁵ Climate variability may be tracked and predicted through historical databases or scientific models, whereas for climate change, the past has an uncertain impact on the future, and is therefore of little help in the prediction of future trends. Generally, climate

variability could have a large impact on natural resources and ecosystems, such as water resources and agriculture. Climate change is expected to have an even greater and larger scale impact, through changes in precipitation, evaporation and temperature, leading to more frequent and intensive storms, floods and droughts.²⁶ It is also acknowledged that climate change and its impacts distinguish themselves from climate variability by their larger-scale uncertainty and complexity,²⁷ and cumulative effects. Nonetheless, these are qualitative rather than quantitative descriptions - to what extent climate change is different from climate variability has not been researched yet. For example, current EIA has failed to effectively address the cumulative effects of proposed plans/projects due to lack of coordination and cooperation among different sectors and agencies.²⁸ This deficiency is made worse by the new cumulative effects caused by climate change on a new scale,²⁹ which may be 'individually minor' but, when viewed in totality, are 'collectively significant'³⁰ - 'a death by thousand cuts' as described by Zinn.³¹ Unfortunately, it is not always easy to discern whether cumulative effects are a result of climate variability or climate change. In some cases, cumulative effects could modify parameters of climate variability and thus compound the effects of a plan/project.

3.3 Legal and Institutional Difficulties due to the Interaction of Climate Change with Economic Development

Climate change is the by-product of economic development. Most GHGs are emitted during the development process, and thus the issue can only be resolved in the development process. Furthermore, it is obvious that climate change will not only have

23 S. Agrawala and M. van Aalst, 'Bridging the Gap between Climate Change and Development', in S. Agrawala ed, *Bridge Over Troubled Waters: Linking Climate Change and Development* 133-146 (Paris: OECD Publishing, 2005).

24 H.B. Fan and J.X. Zhou, 'Framing Indicator System of Strategic Environmental Assessment - A Case of Watershed Planning' 33/11 *Environmental Science and Management* 192-193 (2008).

25 United Nations Framework Convention on Climate Change, United Nations, UN Doc. FCCC/INFORMAL/84, Article 1, 2 (1992).

26 E. Malone and A. Brenkert, 'Vulnerability, Sensitivity and Coping/Adapting Capacity Worldwide', in M. Ruth and M.E. Ibararán eds, *Distributional Impacts of Climate Change and Disasters: Concepts and Cases* 8-45 (UK: Edward Elgar Publishing Limited, 2009).

27 See McDonald, note 17 above at 23-35.

28 D.J. Shen, 'The 2002 Water Law: Its Impacts on River Basin Management in China' 6 *Water Policy* 345, 345-364 (2004).

29 See Zinn, note 13 above.

30 See Christopher, note 1 above.

31 See Zinn, note 13 above.

an effect on the environment but also on the economy and the social development discourse. Therefore, a projected change in climate is not only an environmental concern, but also has serious social and economic implications. It is not surprising then that the Chinese government has stated that 'climate change is an environment issue, but ultimately a development issue'.³²

Due to its awareness of the impacts of climate change on the environment and the economy, the Chinese government has now undertaken explicit mitigation and adaptation measures to respond to climate change. However, as 'climate change is a cross-cutting international issue with a strong bearing on economic development and foreign affairs',³³ climate change is not primarily managed as an environmental issue. Firstly, as the main factor contributing to global warming, CO₂ is an integral part of the atmosphere and human life, and thus it is not identified as a traditional pollutant. Unlike air, water and land, long-term climate stationarity is not regarded as a protected objective in China's EIA legislation. According to The 'Law of the People's Republic of China on Environmental Impact Assessment' (EIA Law), the environmental impacts of plans/projects assessed in EIA mainly refer to land, water, air and soil pollution,³⁴ without considering their potential impacts on climate change — the GHG footprint was not incorporated within the enumerated pollutants.³⁵ In that case, integration of climate change considerations with EIA requires redesigning assessment indicators and revising relevant laws. Secondly, both policies and institutional arrangements on climate change are different from those on environmental issues, creating some institutional difficulties. For example, unlike most other member countries of the United Nations Framework Convention on Climate Change (UNFCCC) who manage climate change issues through their environmental agencies, climate change

and environmental issues are administered by the National Development and Reform Commission (NDRC) and the Ministry of Environment Protection (MEP) respectively in China. While MEP is the responsible agency for EIA, this division has created institutional barriers to integrate climate change within EIA. Theoretically, NDRC can collaborate with MEP to include climate change considerations in EIA. In practice, unfortunately, the environment-oriented MEP has not been given the bargaining power with the economic-oriented NDRC, making MEP less powerful in climate change issues. MEP has been one of the most enthusiastic authorities working on reducing GHGs by promoting alternative energies and promoting adaptation by improving environmental quality.³⁶ If MEP could approach climate change impacts through EIA, both reduction of GHGs and adaptation could be facilitated significantly.

4

APPROACHES TO INTEGRATE CLIMATE CHANGE WITHIN EIA

According to the definition of 'environment' in the 1989 Environmental Protection Law, the integration of climate change does not conflict with the original purpose of EIA to manage adverse environmental impacts. EIA enables decision-makers and proponents to have the flexibility and discretion to design their own environmental stewardship strategies. Procedural requirements are imposed on responsible agencies, rather than substantial mandates or goals.³⁷ This intrinsic flexibility in the EIA procedure allows for the integration of climate change impacts within the EIA process.³⁸

32 S.R. Wang, *The Impacts of Climate Change on China's Economic and Social Sustainable Development and Response Actions* 181 (Beijing: China Science Press, 2011) [In Chinese].

33 C. Richerzhagen and I. Scholz, 'China's Capacities for Mitigating Climate Change' 36/2 *World Development* 308, 308-324 (2008).

34 See Fan and Zhou, note 24 above.

35 See Christopher, note 1 above.

36 D. Marks, 'China's Climate Change Policy Process: Improved but Still Weak and Fragmented' 19/67 *Journal of Contemporary China* 971, 977 (2010).

37 T. Tang, T. Zhu and H. Xu, 'Integrating Environment into Land-use Planning through Strategic Environmental Assessment in China: Towards Legal Frameworks and Operational Procedures' 27 *Environmental Impact Assessment Review* 243, 243-265 (2007).

38 See Marks, note 36 above.

However, there are gaps between intention, operational guidance and actual implementation. Through expressing its determination to address climate change in the planning/design stage and project construction process, China is clearly in the first stage only.³⁹ Although this expression is not clear and definite enough in terms of employing EIA as a main instrument, it can be roughly regarded as a broad intention. In this section, recommendations will go beyond intention by focusing on operational guidance and actual implementation of integrating climate change within EIA. Simultaneously, this article acknowledges that the research on this topic is in its infancy and requires further efforts to develop effective integration in China.

Canada is probably one of the few countries to recognise climate change considerations within EIA at a very early stage.⁴⁰ It requires the assessment of climate change impacts for major development projects and the implications of the project on GHG emissions. The Canadian Federal Government provides guidelines through the Canadian Environmental Assessment Agency (CEAA)'s 2003 publication: *Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners*. Although challenges still remain after years of practice (for example, climate change uncertainties and inconsistencies among similar projects have not been adequately explained and resolved),⁴¹ Canada has gained relatively rich experience. In this section, Canada will be used as an example to provide insights for China on how to integrate climate change considerations.

4.1 Connecting with Sustainable Development Principle and Precautionary Principle

Uncertainty will prevail in a climate change era and we need to learn to embrace it. This is also in line

with the requirement of the sustainable development principle (SDP) and the precautionary principle (PP). The adoption of SDP and PP provides the rationale for considering climate change impacts in development activities. Decision-makers are required to acknowledge the obvious climate risks and take appropriate measures to manage them, in order to promote sustainable development.

Being a basic principle for any development activity, SDP requires the integration of economic, environmental and social components at all levels without compromising the next generation's ability to develop.⁴² Given the challenges to the environmental and socio-economic development posed by climate change, SD is an ideal concept to guide the response to climate change. Pizarro states that 'sustainable development is perhaps the most appropriate conceptual and practical framework to identify problems, to involve the public, and to devise strategies to deal with climate change mitigation or adaptation in communities large or small in countries of the 'First' or the 'Third World'.⁴³ Entrenched in this principle is intra-generational and inter-generational equity. Any activity which has the potential to undermine intra- or inter-generational equity must be prevented or minimised. In both Canada and China, EIA has been recognised as a powerful tool to help decision-makers achieve the goal of SD.⁴⁴ EIA Law provides the possibility to consider climate change risks by stating that 'the environmental assessment report should include the analysis, prediction and evaluation of *likely adverse environmental impacts* and measures for the prevention or reduction of the impacts' (emphasis added).⁴⁵ Although climate change is not regarded as a typical negative environmental impact, its impacts on ecosystems have resulted in severe environmental problems. This open-structured provision enables decision-makers to consider

39 China, The National 12th Five-Year-Plan for Social and Economic Development (12 FYP) (16 March 2011), available at http://www.gov.cn/2011lh/content_1825838.htm.

40 See Agrawala et al., note 10 above.

41 P.H. Byer and J.S. Yeomas, 'Methods for Addressing Climate Change Uncertainties in Project Environmental Impact Assessments' 25/2 *Impact Assessment and Project Appraisal* 85, 85-99 (2007).

42 Organization for Economic Co-operation and Development, *The DAC Guidelines: Strategies for Sustainable Development: Guidance for Development Co-operation* 21 (2001).

43 R.E. Pizarro, 'The Mitigation/Adaptation Conundrum in Planning for Climate Change and Human Settlements: Introduction' 33/3 *Habit International* 227, 227-229 (2009).

44 Canada, Canadian Environmental Assessment Agency, Canadian Environmental Assessment Act 2012, 2012, S4 (1) (h); China, EIA Law, 2002, Chapter 1, Article 1.

45 China, EIA Law, 2002, Chapter 2, Article 7.

climate change impacts and possible measures to protect the environment.⁴⁶

PP was first expressed in the Rio Declaration and was also adopted in the UNFCCC.⁴⁷ It asserts that precautionary measures should be adopted to anticipate, prevent or minimise the causes of climate change, and mitigate its adverse effects. While climate change is riddled with uncertainty, lack of scientific certainty should not be used as an excuse to postpone cost-effective measures to deal with climate change.⁴⁸ Compared to the current preference of 'sound science' in public policy, PP requires decision makers to adopt a more cautious approach by changing regulatory thinking and embracing uncertainty.⁴⁹ Policies and laws informed by PP require that proactive steps should be taken to reduce risks induced by climate change. Meanwhile, reasonable preparation for those inevitable impacts needs to be undertaken. EIA is an ideal tool to identify, assess and mitigate climate-related risks following a cost-benefit analysis. Recently, PP has been stipulated as a requirement under the Canadian Environmental Assessment Act 2012 (Canadian Act),⁵⁰ while in China's EIA legislation there is no mention of PP.

4.2 Three Approaches of Managing Uncertainties

Accommodating inherent climate change uncertainty is the most important but also the most challenging part when incorporating climate change consideration in EIA. Canada acknowledges that climate change uncertainty has not been addressed very well, and CEAA has funded comprehensive

research to address climate change uncertainties.⁵¹ In the case of China there may not be sufficient information or data available to predict climate change impacts on an individual plan/project either. Therefore, in addition to advancing research on scientific scenarios, developing local and regional climate models is very crucial to increase confidence in the accuracy of the predictions. Since NDRC and the China Meteorological Administration (CMA) have the most advanced technology and information on climate change predictions, a collaborative mechanism (for example, dialogue and communication) between them and MEP could benefit climate change impacts assessment in the EIA process. More importantly, local experience and traditional knowledge should contribute to the identification of climate change considerations. The Canadian Act requires that community knowledge and aboriginal traditional knowledge should be taken into account.⁵² This actually requires engaging with the affected public in the decision-making process. Relevant responsible authorities are even obliged to establish a participant funding program to support public participation.⁵³ Those who are directly affected, who have community or aboriginal traditional knowledge and who have relevant expert knowledge can apply for this funding.⁵⁴ By translating informal knowledge on climate change into the decision-making process, this stipulation in the Canadian Act greatly reduces uncertainty.

Secondly, Canada employs adaptive management as a learning tool in addressing climate change uncertainties. Canada realises that uncertainty about vulnerabilities and risks can be reduced by data gathered from personal experiences; however only if these experiences are identified and passed on (to others) can it benefit other projects.⁵⁵ As an ongoing

46 N. Durrant, *Legal Response to Climate Change* 220 (Sydney: The Federation Press, 2010).

47 Rio Declaration on Environment and Development, in Report of the United Nations Conference on the Human Environment, Rio de Janeiro, UN Doc, A/CONF.151/26 (Vol. I) Principle 15 (1992).

48 See United Nations Framework Convention on Climate Change, note 25 above, Article 3, Principle 3.

49 L. Godden and J. Peel, *Environmental Law: Science, Policy and Regulatory Dimensions* 239 (Oxford: Oxford University Press, 2010).

50 Canada, Canadian Environmental Assessment Agency, Canadian Environmental Assessment Act 2012, 2012, S 4 (2), available at <http://laws-lois.justice.gc.ca/PDF/C-15.21.pdf>.

51 See Byer and Yeomans, note 41 above.

52 See Canadian Environmental Assessment Act, note 50 above, S19 (3).

53 See Canadian Environmental Assessment Act, note 50 above, S57, S58.

54 Canadian Environmental Assessment Agency, 'Basics of Environmental Assessment', available at <http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=B053F859-1#gen01>.

55 The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, *Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners* 20 (2003).

process that continually learns from and adapts to the emerging information about climate change impacts and evolving experience, adaptive management has been advocated as the most promising approach to address uncertainties in the climate change arena.⁵⁶ 'It requires the internalisation of the ability to identify, document and disseminate best practices, and the ability to learn from emerging experiences with adaptation strategies and actions'.⁵⁷ The main elements of adaptive management are widely recognised as: revisit and revise objectives periodically; integrate new conditions and information into future decisions; utilise a range of management options; monitor and evaluate management actions; learn by doing and facilitate stakeholder participation.⁵⁸ While the Chinese EIA practitioners are not familiar with the concept of adaptive management, they can start by adopting and implementing some of its elements, such as periodic review of objectives and learning from experiences. If emerging information, knowledge and lessons are integrated in the EIA process, uncertainties and risks of climate change can be further minimised.

Thirdly, preparation of alternatives is crucial to make optimal choices and reduce risks associated with uncertainty. Climate change is a cross-cutting issue, which involves various aspects such as social choice, economic growth and environmental protection. The consideration of alternatives exhibits the opportunity to consider different ways of achieving or addressing certain goals and issues,⁵⁹ and subsequently selecting the most effective and efficient one. In addition, different climate change scenarios presented by current climate change science require preparation and assessment of alternatives to achieve the same goal in order to

provide resilient choices. In that case, when proposed actions fail to deliver their development outcomes due to uncertain climate change impacts, feasible alternative options should be provided under given climate change scenarios. For example, when unexpected impacts take place, such as the over-emission of GHGs and the degradation of adaptation capacity, alternatives may provide proponents with proper remedial measures at an early stage. Given the intrinsic uncertainty associated with climate change risks, the adoption of alternatives indicates a higher adaptive capacity to respond to these uncertainties and surprises.

The first two approaches have been adopted and well-implemented by Canada in incorporating climate change within EIA. In the Canadian Environment Assessment Act 2012, environmental assessment of the designed project is asked to take into account the 'alternative means of carrying out the designated project that are technically and economically feasible, and the environmental effects of any such alternative means'.⁶⁰ In factoring in climate change, it is assumed that technically and economically feasible alternatives are required to prepare for different climate change scenarios. Alternative provisions in the climate change context are important for China since there is no legal requirement to provide alternatives in the EIA legislation.

4.3 Placing EIA in Climate Change Policy Context

Canada tries to measure and assess the impacts of proposed projects on climate change by placing them in the context of the policy objectives or regulations of the relevant jurisdictions. If applicable, additional tools such as strategic environmental assessment (SEA) of jurisdictional policies, plans or priorities are also used to measure climate change impacts.⁶¹ For example, based on jurisdictional GHG-related policy and plan (for example, *Climate Change Plan for Canada*), projects emitting GHGs will be scoped and identified. For those resulting in medium and

56 A.E. Camacho, 'Adapting Governance to Climate Change: Managing Uncertainty through a Learning Infrastructure' 59 *Emory Law Journal* 40 (2009) and Arvai, note 22 above.

57 A. Patwardhan et al., 'Towards an Integrated Agenda for Adaptation Research: Theory, Practice and Policy' 1 *Current Opinion in Environmental Sustainability* 219, 219–225 (2009).

58 See Ruhl, note 3 above.

59 P.J. Posas, 'Exploring Climate Change Criteria for Strategic Environmental Assessments' 75/3 *Progress in Plan* 109, 109–54 (2011).

60 See Canadian Environmental Assessment Act, note 50 above, S19.

61 The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, note 55 above.

high emissions, measures to reduce emission by existing jurisdictional climate regulations or by pollution management will be undertaken.

This experience is applicable to China. Even though China is not one of the nations listed in Annex I of the UNFCCC, which are required to undertake an obligatory responsibility to reduce GHG emissions, it has nevertheless committed to a specific emission intensity target (for example, the central government has decided to reduce CO₂ by 40-45 percent per GDP until 2020) and has developed its own CO₂ inventory.⁶² The 11th and 12th Five Year Plans have shown how the national target of reducing emissions should be implemented from top to bottom through China's strong administrative framework. Each province is allocated with certain energy conservation and emission reduction targets based on its economic development, industry structure and environmental carrying ability.⁶³ Different sectors such as transportation, manufacturing industry and mining also have been given a reduction goal which is achievable via technical innovation and industrial reconstruction. Although it is impossible to enumerate the percentage of an individual plan/project's contribution to GHG emissions, the targets set in certain regions and sectors (for example, Beijing is allocated with a target of 17 percent to reduce energy intensity)⁶⁴ can be used as benchmarks. With these benchmarks, practitioners and decision makers will be able to identify whether GHG emissions in the proposed plan/project is lower or higher than the overall target. The intensity of GHG emissions per unit of GDP can also be used as a standard to determine the GHG reduction targets. If the plan/project is likely to result in higher GHG emissions or higher intensity than the jurisdictional or sectoral criteria, practitioners should clarify what measures can be undertaken to reduce GHG emissions in EIA.

62 Xinhua News Agency, Understanding China's GHGs Reduction Goal (3 December 2009), available at http://news.xinhuanet.com/fortune/2009-12/03/content_12578961.htm and Chinadaily, China to cut 40 to 45% GDP unit carbon by 2020 (26 November 2009), available at http://www.chinadaily.com.cn/china/2009-11/26/content_9058731.htm.

63 China, Comprehensive Work Plan of Energy Conservation and Emissions Reduction during the 12th Five-Year Guideline Period, Order No. 26, 31 August 2011.

64 *Id.*

4.4 Assessing Climate Change Impacts on Proposed Plans/Projects and Their Environment

For the purpose of EIA, Nova Scotia in Canada identifies three layers of climate change impacts in a hierarchical system: primary - temperature changes; secondary - for example, changes in sea level, wind and precipitation patterns, with increasing frequency and intensity of climate events; and tertiary - changes in physical, biological and social patterns.⁶⁵ In light of that, EIA in Nova Scotia undergoes a systematic consideration of climate change in three layers: (1) changes may occur to primary and secondary climate parameters; (2) impacts of those changes on the Valued Environmental Components within the boundaries defined for the EIA; and (3) changes to the project itself.⁶⁶ To make it more clear, climate change impacts assessments focus on environment interaction, where three different types of climate change impacts should be identified and assessed in EIA:

- (1) impacts on the plan/project, mainly the operation and life of plan/project (climate change '! plan/project);
- (2) impacts on the environment and the social conditions that the plan/project operates in due to the impacts on the plan/project (climate change '! plan/project '! environment);
- (3) direct impacts on the environment and social conditions which may affect the plan/project (climate change '! environment '! plan/project).

To be consistent with climate change policy, these three types of climate change impacts can be further translated to the assessment of the vulnerability and adaptive capacity in a climate change context. Vulnerability of the plan/project and vulnerability of the environment can interact with each other, producing different cases and responsive measures. For example, if both the plan/project's vulnerability to climate change and the risk of climate change impacts on the environment are high, risk assessment, monitoring and

65 A. Bell, N. Collins and R. Young, 'Practitioner's Guide to Incorporating Climate Change into the Environmental Impact Assessment Process', Nova Scotia's Climate Change Adaptation Initiative 5-6 (2003).

66 *Id.*

adaptive management measures should be undertaken to reduce risks or minimise the adverse impacts.⁶⁷

EIA in China can benefit from Canada's experience in identifying, assessing and managing three types of climate change impacts. Whether climate change impacts will compromise the integrity, effectiveness or longevity of current plans/projects directly or indirectly should be appropriately identified.⁶⁸ First of all, to assess climate change impacts on the proposed plan/project, China should redesign the parameters and procedures of EIA to integrate climate change factors. Plans/projects sensitive to changes in climate parameters (for example, precipitation, water levels, wind and temperature) should be screened and identified. Following that, proponents should assess whether any of these parameters are projected to change over the project duration. The potential climate change impacts should be identified in the environmental baseline investigation process. Their potential to affect the proposed plan/project should be assessed dynamically as a part of the EIA Statement. Based on the assessment of climate change impacts on the plan/project, proponents should determine whether the surrounding environment could be affected indirectly through the plan/project. Furthermore, since the enabling environment's sensitivity to climate change may affect the performance and duration of the plan/project, the surrounding environment and the social conditions' vulnerability and adaptive capacity should be assessed as well. Dam construction can be used as an example to illustrate how climate change impacts on a proposed dam and the environment can be assessed in EIA.

(1) The impacts of climate change (such as changing precipitation pattern) on the dam should be assessed.

(2) If the proposed dam may be severely affected by changing parameters, for example failure in controlling floods, its impact on the surrounding environment should be assessed too (in this case, how floods may affect the local people and environment).

(3) The surrounding environment's vulnerability (for example, to what extent is this region bounded by

⁶⁷ See The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, note 55 above.

⁶⁸ Organization for Economic Cooperation and Development (OECD), Policy Guidance on Integrating Climate Change Adaptation into Development Co-operation 4 (2009).

the dam prone to floods) needs to be assessed to understand how the environment may affect the operation of the proposed dam.

4.5 Improving Monitoring and Follow up Mechanisms to Provide New Inputs

Being aware that climate change related knowledge, technology, policy and legislation are evolving and that it is necessary to incorporate any new lessons learned into routine procedures, Canada has highlighted the importance of monitoring and follow up in the EIA process.⁶⁹ Here, the monitoring and follow up mechanisms enable new information and lessons to be integrated in EIA procedures to shape forthcoming steps - a 'learning by doing' paradigm. Although monitoring and follow up is stipulated in China's EIA legislation, it does not include much work on integrating new information or lessons by taking a 'learning by doing' attitude. The purpose and method of monitoring and follow up should be shifted to reflect the need to address climate change.

Relying on a robust capacity to predict and assess the environmental impacts of plans or construction projects and their overall costs and benefits, Articles 15 and 27 of China's EIA Law require all EIAs to carry out assessment to monitor possible adverse environmental impacts. Should adverse environmental impacts become apparent during implementation, mitigation measures must be put forward.⁷⁰ Based on an equilibrium model of the ecosystem and with the assumption of long-term ecosystem stationarity, these provisions rely heavily on human ability and knowledge to predict and manage various scenarios.⁷¹ The aim of follow-up assessment is to monitor whether the implemented measures have led to the achievement of the pre-established goals. It is a linear process, which involves two steps: developing (decision-making) and implementing.⁷² Although it

⁶⁹ See The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, note 55 above.

⁷⁰ China, EIA Law, 2002, Chapter 2, Article 15 and Chapter 3, Article 27.

⁷¹ See Ruhl, note 20 above.

⁷² C. Bruch, 'Adaptive Water Management: Strengthening Laws and Institutions to Cope with Uncertainty', in A.K. Biswas, C. Tortajada and R. Izquierdo-Avino eds, *Water Management in 2020 and Beyond* 89, 89-113 (Berlin: Springer, 2009).

originated as a preventive approach, this provision makes EIA more of an 'End-of-Pipe' method in alleviating the predicted impacts. In addition, this provision is also based on the premise that existing technology and knowledge has the ability to predict possible impacts, which has already been discredited either because of a lack of data collection procedure or because specific causation is inseparable from the contribution of vast cumulative emissions in an increasingly warming world.⁷³

In order to improve the ability to tackle uncertain risks triggered by climate change, attention should be paid to several aspects and the issues addressed. First of all, monitoring should be targeted, providing valuable data and information to evaluate and shape the decision-making process rather than solely concentrating on the environmental status and potential predictable impacts. While current monitoring and follow-up assessments primarily emphasise inevitable environmental externalities, future climate change risks which may present in an unpredicted and surprising way should also be properly monitored and managed.⁷⁴ The monitoring results should be analysed by decision-makers to assess whether there are unintended impacts or whether other factors are unexpectedly affecting the outcomes.⁷⁵

In addition, rather than assuming that all impacts can be predicted and assessed before the decision, an effective follow-up mechanism requires proponents to incorporate emerging information, knowledge and lessons within an ongoing decision adjustment process. Due to limitations of climatic science and technology, it is essential to engage potentially affected stakeholders and the public in the decision-making process and, to transfer related information, knowledge and experience.⁷⁶ A 'learning by doing'

attitude is crucial for proponents in China to constantly collect and integrate emerging information and lessons, reshaping future decision-making.⁷⁷ This new follow-up assessment mechanism is expected to adapt to changing situations more effectively without changing the goals of EIA.

4.6 Inputting Climate Change Factors within EIA Steps

The response to climate change includes mitigation - reducing GHG emissions, and adaptation - adapting to 'locked in' impacts. In this sense, integration of climate change within EIA can be applied in two aspects:

- (1) GHG consideration: where a proposed plan/project can contribute to GHG emissions and thus climate change;
- (2) Impacts consideration: where climate change may adversely affect the proposed plan/project or some aspects of it.

Although the consideration of climate change factors does not result in a fundamental modification of the EIA process, it changes some of the parameters and criteria of EIA. For China, where some of the key procedures are insufficient (for example, alternatives and public participation), it requires an improvement in EIA per se as well. To input climate change factors, entry points to integrate the above two aspects of climate change should be identified at each step of the EIA process. Different plans and projects have different entry points when factoring climate change, depending on the manner in which they are associated with climate change. For example, a transportation plan may focus more on GHG consideration by assessing its GHG emissions, while a water-supply plan may highlight the impacts of climate change on the plan and on relevant water resources.

Although EIA procedures vary slightly between plans and projects, a majority follow the same flow from screening, scoping to monitoring. After inputting climate change factors, an interactive and dynamic relation between the proposed plan/project and the environment can be built (Figure A).

⁷³ See Christopher, note 1 above.

⁷⁴ C. Pahl-Wostl et al., 'The Network Management and Transition Framework - State and Development Process', in C. Pahl-Wostl, P. Kabat and J. Moltgen eds, *Adaptive and Integrated Water Management - Coping with Complexity and Uncertainty* 92 (New York: Springer, 2007).

⁷⁵ See Bruch, note 72 above.

⁷⁶ H. Lange et al., 'Distributional Effects and Change of Risk Management Regimes: Explaining Different Types of Adaptation in Germany and Indonesia', in M. Ruth and M.E. Ibararán eds, *Distributional Impacts of Climate Change and Disasters: Concepts and Cases* 183-207 (London: Edward Elgar Publishing, 2009).

⁷⁷ See Ruhl, note 3 above.

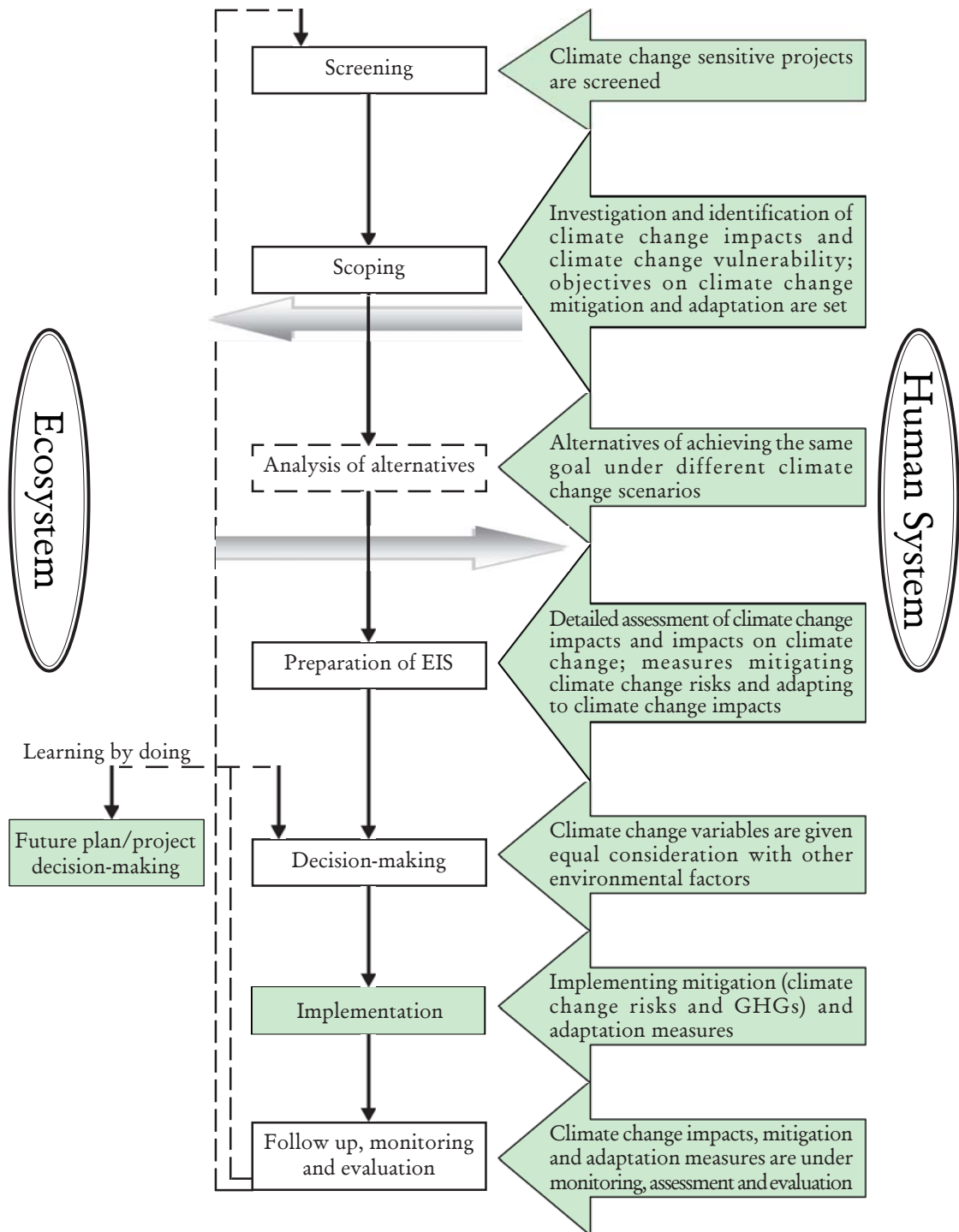


Figure A: An improved EIA process after inputting climate change consideration
 Note: [—] refers to the changes need to be made.

5

DIFFICULTIES AND OPPORTUNITIES IN IMPLEMENTING CLIMATE CHANGE INTEGRATION WITHIN EIA IN CHINA

EIA in China is defined as an approach and procedure to analyse, predict and evaluate potential environmental impacts, to identify effective measures for preventing and reducing adverse impacts and to monitor activities.⁷⁸ In China, EIA is mainly classified as both plan-level and project-level EIA.⁷⁹ Since the concept of EIA was introduced in 1973, China has developed a relatively comprehensive legal framework on EIA.

In the trial version of the Environmental Protection Law (1979), EIA was given legal status as an important environment management approach. The 1998 'Regulations on the Administration of Construction Project Environmental Protection' has served as the basic legal foundation for project-level EIA. Nevertheless, it was not until 'The Law of the People's Republic of China on Environmental Impact Assessment' came into effect in 2003 that certain plans were required to conduct EIA. Later on, the 'Interim Procedures of Public Participation in EIA' (IPPP) was released to provide a detailed procedure for public involvement in EIA. Being aware of the ineffectiveness of EIA Law in promoting plan-level EIA, the 'Regulation on Planning Environmental Impact Assessment' (RPEIA) finally took effect in 2009. Based on and protected by this framework, the recent decades have witnessed rapid extension and development in the application of EIA. For instance, after six years of implementation of EIA Law in China, approximately 500 plan-level EIAs have been undertaken, which represents remarkable progress.⁸⁰

However, through this legal framework, China has developed its own version of EIA. While the above recommendations about integrating climate change

within EIA are innovative and encouraging, putting them into practice is also challenging, especially given the state of EIA in China. Both the deficiencies of EIA design and the great barriers in implementation will impede the effective integration of climate change in EIA in the forthcoming global warming era. Nonetheless, a challenge does not always have negative implications. In Chinese, *weiji* (meaning both challenge and opportunity) is one word, indicating that challenge and opportunity interact with each other and can transform one another. 'Climate change is the latest evidence of our failure to exercise proper stewardship, and constitutes a critical opportunity for us to do better'.⁸¹ In many instances, climate change only reinforces the need to take measures that should be implemented.⁸² Decision-makers in China should grasp the challenges climate change brings and transform them to opportunities for EIA improvement. Therefore, in this section, the barriers to climate change consideration in EIA will be illustrated first, followed by a consideration of the opportunities it provides.

5.1 Barriers Caused by EIA Design in China

The current EIA Law is a compromise between the original EIA theory and China's specific political and social conditions-policy-level EIA is absent, public participation is not institutionalised and alternatives requirements are omitted.⁸³ The deficiencies in the design not only block the effective operation of EIA in China but also impede the effective integration of climate change.

5.1.1 Missing Target of Policy and Some Plan Level EIAs

Unlike EIAs in the USA, which developed from and focus on state agency proposed actions including

78 China, EIA Law, 2002, Chapter 1, Article 2.

79 In Chinese, *Guihua* can represent both plan and programme. In this article, the term plan will generally refer to plan and programme.

80 O. Bina et al., 'Review of Practice and Prospects for SEA in China' 31 *Environmental Impact Assessment Review* 515-20 (2011).

81 Evangelical Climate Initiative, *Climate Change-An Evangelical Call to Action* (2006), available at <http://christiansandclimate.org/statement/>.

82 See Agrawala and van Aalst, note 23 above.

83 D. Zhu and J. Ru, 'Strategic Environmental Assessment in China: Motivations, Politics and Effectiveness' 88 *Journal of Environmental Management* 615-626 (2008) and C. Xu, *Making China's Environmental Impact Assessment A Mere Figurehead* (31 December 2011), available at http://magazine.caixin.com/2011-12-31/100344846_1.html.

policies, legislative proposals, plans, programmes and projects,⁸⁴ China's EIA was initiated from and focused on construction projects by interpreting 'proposed actions' differently.⁸⁵ Due to a compromise between environmental interests and other non-environmental interests,⁸⁶ policy-level EIA was totally removed and certain types of plans (such as plans made by the State Council and county level governments) were excluded from the present EIA legal framework.

The former director of MEP argued that: 'Improper policy is one of the most important factors that have caused severe environmental pollution and ecological degradation. If we cannot make sound judgments at the policy level, preventing environmental degradation will be extremely difficult...environmentally irresponsible policy is the most important cause of [China's] environmental pollution and ecological degradation'.⁸⁷ There is no exception with regard to integrating climate change considerations. If the possibility of GHG emissions and the vulnerability to climate change are not considered in the policy- and plan-level EIA, EIA will lose the opportunity to address climate change. Firstly, it is the government's policies, plans and large-scale projects that contribute to most GHG emissions rather than individual projects. For example, the policy of developing energy and the plan of developing transportation has a much greater and longer-term effect on climate change than site-specific projects; water supply plans and agriculture development plans are more vulnerable than individual projects. Furthermore, climate change uncertainty has a more obvious manifestation over a longer period. Given the long-term nature of most policies and plans, climate change uncertainty will compromise their implementation. In that case, in

order to achieve the goal of reduction of GHGs and to ensure the normal performance of policies/plans, climate change should be better integrated into the EIA process.

5.1.2 Absence of Alternatives in the Chinese EIA Legal System

Developing a set of alternatives is regarded as the 'heart' of the EIA process in the USA.⁸⁸ Nonetheless, according to Article 17 of the EIA Law, there has been no serious consideration of alternatives in China's EIA legal system.⁸⁹ Although this does not imply an utter exclusion of alternatives in China's practice, the ratio of alternatives in the Environmental Impact Statement (EIS) which is submitted to relevant agencies for review and approval is extremely low. For instance, among the Environmental Impact Statements produced in Shanghai from 2003-2005, only 20.83 percent contain alternative analysis.⁹⁰ In practice, the 'alternatives', if they indeed can be defined as alternatives, are considered with limited options. One common option is 'no-action plan' which seldom takes place due to the institutional framework involving EIA,⁹¹ and the other one is 'recommended changes and mitigation measures from the environmental perspective,' which implies that the EIA will be approved with alteration.⁹² In the era of climate change, the absence of alternatives in EIA legal systems and practices makes the plans/projects unable to effectively reduce GHGs and to prepare for unpredicted climate-related risks. As previously discussed, the preparation of alternatives is an important approach to reduce and manage the uncertainties inherent in climate change. Although it may not be an optimal choice, the absence of alternatives in non-climatic plans/projects does not

84 UNEP Environmental Impact Assessment Training Resource Manual (June 2002), available at http://www.unep.ch/etu/publications/EIAMan_2edition_toc.htm and Posas, note 59 above.

85 R.B. Wenger, 'Environmental Impact Assessment in the People's Republic of China' 14/4 *Environmental Management* 429-439 (1990).

86 See Zhu and Ru, note 83 above.

87 G.P. Qu, Integrated Decision-making, Prevention at the Source, *EIA Law Workshop*, 18 December 2002, China Research Academy for Environmental Science, Beijing [In Chinese].

88 A. Steinemann, 'Improving Alternatives for Environmental Impact Assessment' 21 *Environmental Impact Assessment Review* 3-21 (2001).

89 See Wang, Morgan and Cashmore, note 12 above.

90 S. Wang, Why EIA was Trapped in Mire Repeatedly? (15 September 2011) available at http://www.qstheory.cn/st/zyhj/201109/t20110915_110219.htm.

91 See Wang, Morgan and Cashmore, note 12 above.

92 J. Wu et al., 'Strategic Environmental Assessment Implementation in China - Five-year Review and Prospects' 31 *Environmental Impact Assessment Review* 77-84 (2011).

affect the achievement of certain goals. Nevertheless, this may not be the case with climate change. The great uncertainties in climate change and socio-economic scenarios require that alternatives must be provided to adapt to various uncertainties.

5.1.3 Lack of Effective Institutionalised Public Participation

Public participation is an essential and core principle for good EIA practice. Although both IPPP and EIA Law require public participation in the EIA process, their enforcement is extremely weak.⁹³ The large gap between legal regulations and current practice has been well acknowledged by governmental officials and scholars. According to a survey carried out by some scholars in China, more than 77 percent interviewees including participants from government agencies, environmental assessment and consultation institutions, universities and other environmental research organisations, view public participation as insufficient, pro forma or ineffective.⁹⁴ This is partly due to lack of public knowledge and financial support,⁹⁵ but mainly because of lack of effective legal procedures and access to information. Limited access to the decision-making process restrains the role of the public in facilitating more scientific, transparent and credible decisions.

However, addressing climate change demands a higher level of public participation and thus an improvement in EIA is necessary. First of all, an appropriate mechanism for responding to climate change risks depends highly on the affected groups' perception, awareness, identification and experience of risks, therefore it is important to collect their opinions and provide them with the chance to participate in the decision-making process. Secondly, when integrating climate change in EIA, it inevitably needs to balance various development opportunities due to limited resources and investments. In that circumstance, decisions must be made as to which one to choose — decisions that affected people have

to face and assess. If some opportunities have to be sacrificed, it is the people who are directly involved who must be given the opportunity to decide what should be chosen.⁹⁶ Additionally, affected people usually have abundant knowledge and experience in adapting to local variability, which could contribute to the effective identification of entry points in integrating climate change. The important role of the public in addressing climate change may provide a unique chance to promote public participation in China.

5.2 Barriers to Implementation of EIA

In China, the success of EIA as a tool to facilitate environmental protection depends on the government's strong political will, a well-designed institutional framework, and a sound judicial system.⁹⁷ While strong leadership is vital for the implementation of EIA, it reflects the inadequacy of the institutionalisation of EIA.⁹⁸ In the long run, strong political leadership is not enough. An effective institutional framework, along with environmental management capacity must be put in place to facilitate implementation. Due to the fact that proposed plans/projects usually contribute to the core interests of China - economic development and employment,⁹⁹ EIA is usually concluded with 'non-obvious adverse environmental impacts'. The power of environmental authorities in implementing EIA is limited, because they require financial support from economic development-oriented local governments. As a result, environmental authorities cannot play their role as watchdogs of environmental protection in plan and project implementation. A large number of plans/projects have proceeded without implementing the EIA approval process. According to a survey on new projects under construction conducted by SEPA (the predecessor of MEP), NDRC and the Ministry of Land and Resources, the rate of EIA implementation

93 See Wang, Morgan and Cashmore, note 12 above.

94 See Wu, note 92 above.

95 X.P. Duan and T. Li, 'Problems and Solutions of Public Participation for EIA in China' 30/125 *Environmental Protection Science* 56, 56-58 (2004) [In Chinese].

96 A. Sen, *Development as Freedom* 31 (Oxford: Oxford University Press, 2009).

97 See Christopher, note 1 above.

98 See Bina, note 80 above.

99 S. Moore, 'Strategic Imperative? Reading China's Climate Policy in Terms of Core Interests' 23/2 *Global Change, Peace and Security* 147-157 (2011).

is low and the violation of environmental rules is rampant. While provinces claim that EIA was implemented at a rate of 86.9 percent, the central government's own audit found that the rate was much lower, at well below 50 percent.¹⁰⁰

Given the present practice of EIA implementation, there are reasons to doubt how effectively the ambitious initiative to integrate climate change can be implemented in China. Besides, the integration of climate change will inevitably involve various levels of NDRC, which could complicate and challenge current institutional arrangements on EIA. However, climate change may provide a unique opportunity for all the key authorities to collaborate with each other in order to tackle the difficult challenges.

6 CONCLUDING REMARKS

Climate change is best addressed through integration with broad policy documents and planning approaches rather than legislation of specified laws and regulations.¹⁰¹ EIA is one of the most important tools that can address climate change impacts and achieve plan/project development at the same time. Canada has several years of experience in integrating climate change impacts within project-level EIA such as water-retention or tailings-containment structures, bridges, as well as large buildings and linear infrastructure.¹⁰² After reviewing experiences of several projects, however, difficulties have been encountered. For example, climate change uncertainties and inconsistencies among similar projects have not been adequately explained and resolved in most EIAs.¹⁰³ Further research has been carried out to investigate methods to address and communicate the intrinsic uncertainties surrounding

climate change, to benefit relevant agencies and practitioners.¹⁰⁴ Although there are still some difficulties, the integration of climate change within EIA has been adopted and practiced in other jurisdictions such as the European Union and Australia. Both of them have extended climate change consideration from project EIA to plan EIA.¹⁰⁵

EIA in China should not be discouraged by the difficulties of factoring in complex and uncertain climate change, but should push ahead by learning from the experiences and lessons from other countries. Uncertainties have to, and can, be managed properly in various ways. The impacts of plans/projects on climate change and the climate change impacts on plans/projects should be taken into account. Monitoring and managing future climate change risks is essential to shape the EIA procedure and the decision-making model. Nonetheless, as one of the tools promoting sustainable development, EIA cannot over-emphasise climate change. It must act jointly with other instruments such as cost-benefit analysis. While the deficiency of the current EIA framework in China has resulted in great challenges for the relevant agencies, improving the performance of EIA in coping with climate change will be a tough task for them. However, once proponents and decision makers are aware of the great potential of EIA as an effective approach to address climate change, it can play a critical role in this process.

¹⁰⁰People's Daily, EIA Failed to Serve Effectively as a 'Threshold' (18 January 2007), available at <http://env.people.com.cn/GB/5296349.html>.

¹⁰¹See Durrant, note 46 above.

¹⁰²See Agrawala et al, note 10 above.

¹⁰³See Byer and Yeomas, note 41 above.

¹⁰⁴Canadian Environmental Assessment Agency, Addressing Climate Change Uncertainties in Project Environmental Assessments (2012), available at <http://www.ceaa.gc.ca/default.asp?lang=En&n=A246A4F7-1&offset=7&toc=show>.

¹⁰⁵Europe Union, Commission of the European Communities (CEC), *Adapting to Climate Change: towards a European Framework for Action* 13 (6 April 2009) and Australia, Sustainable Planning Act 2009 (SPA), 2009, Act No. 36. Queensland. S5 and 11.

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