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Emissions Trading in China: An opportunity for renewable energy?

A survey of expert opinions

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April 2015

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Executive Summary

Emissions trading schemes (ETSs) are being rapidly developed in China. As of November 2014, there are seven ETS pilots in operation, respectively in Beijing, Tianjin, Shanghai, Chongqing, Guangdong Province, Hubei Province and Shenzhen. Building on the experiences of the pilot systems, the Department of Climate Change, under the National Development and Reform Commission, has stated publicly that a national emissions trading scheme will be established in 2016 (China Environmental News, 2014).

China has become the world leader in renewable energy deployment due to strong government support, such as the use of subsidies to renewable energy production. However, experts are concerned that existing sources of revenue to support renewable energy, primarily the renewable energy surcharge on electricity consumption, are not sufficient to cover the cost of implementing national renewable energy targets. In this context, the International Institute for Sustainable Development (IISD), in collaboration with the China National Renewable Energy Center (CNREC), has embarked on a project to review the possibility of earmarking the revenue from emission trading to subsidize renewable energy in China. Prior to this paper, the two institutions studied the international experiences of adopting earmarking approaches to finance renewable energy.

This paper summarizes a series of interviews with experts in carbon trading and energy, to review the key issues and debates around earmarking revenues from emissions trading schemes to renewable energy. The aim of this paper is to highlight a number of key issues for further research that will form part of subsequent phases of this project. The findings are grouped around the motivation and feasibility of a national ETS, the prospect of earmarking revenues to support renewable energy and the governance structures needed to ensure the smooth operation of the scheme.

China's ETS

The result of these interviews suggest that the main drivers for the adoption of the ETS are the Chinese government's commitment to reduce emissions, the government's willingness to deploy market-based instruments and the emerging capacity to administer such a scheme. Establishing a national ETS has high-level political backing and is likely to be implemented by 2016. Yet it remains uncertain if strong political support can be guaranteed in the longer term, which remains the major challenge to the development of the ETS. Compared to tax-based systems, market-based instruments were found to be more acceptable, practical and effective (in reducing emissions). The auctioning of emissions allowances is considered to be the principal method to raise revenues from an ETS, while respondents also suggest the possibility of introducing a (carbon) tax and charging transaction fees as complementary measures. It is expected that, in the short term, auctioning revenues would stay relatively small but could grow to be significant in the longer term. Respondents suggest that the market should play the primary role in determining carbon prices, but in some circumstances, government intervention and protecting measures may be required.

Renewables and Earmarking

Renewable energy has seen rapid development in China. This success in deployment has led to high renewable energy subsidy costs and has raised concerns that additional sources of revenue are needed if support is to be maintained. Scenarios modelled by CNREC identify a subsidy cost of US$10 billion to $12 billion per year in the period 2013–2015, which may rise in the future as deployment rates rise. Despite this context, respondents generally did not consider a lack of available finance as a major challenge. There was a consensus that earmarking the revenue to further develop renewables is feasible and desirable, but respondents proposed that revenues should be primarily

allocated to less mature renewable technologies, such as tidal power, rather than established ones, such as onshore wind and solar photo voltaic (PV) power. Wider consultations are needed for the allocation of any revenues and to consider other low-carbon projects and capacity building to manage the ETS system. To make up the financing gap, private sector investments should be brought into renewables projects and the auctioning revenues could focus on forming and facilitating public-private partnerships. Earmarking is generally considered to be feasible, but there is a need to ensure political backing, public acceptance and corporate awareness. There may be some opposition, particularly from sectors competing for finance.

Governance

Opinions vary on how the governance could be structured. It may be possible to use an existing institution such as the Clean Development Mechanism (CDM) fund or to form a new agency. A new agency might be built in a cross-departmental manner or be hosted by a single department. Whatever structure is used, it could make use of existing human capacity and should be transparent and accountable. There remains some debate about the role of subnational entities in monitoring and ensuring compliance, and about which entity should take the lead. The ability to use regional pilots to test out different approaches is considered an asset of the pilot schemes before entering a national scheme. There are arguments for and against retaining revenues within regional systems or allocating them from a central authority. Further work is needed to determine which of these approaches is preferable. Regardless of which approach is adopted, the governance of an ETS system requires transparency and accountability, whereas stakeholder consultation and outreach around a proposed scheme is expected to help ensure widespread support. The governance structure is expected to balance financial interests, environmental benefits and social sustainability, and should include experts in each of these areas.

Conclusions

The prospects for a national ETS appear to be positive. The pilot schemes have laid much of the groundwork for a national scheme and provided a wealth of information that can be used to develop a successful design. The concept of earmarking revenues for low-carbon and renewable energy projects appears to enjoy some support, however, in that short-term revenues are expected to be relatively small. There are a number of challenges to establishing an effective governance structure. Future research should concentrate on quantifying the financing gap of renewable energy development, identifying potential target projects and finding out the preferable model of governance.

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1.0 Introduction

Emissions trading schemes (ETSs) are being rapidly developed in China. So far, there are seven ETS pilots in operation, in Beijing, Tianjin, Shanghai, Chongqing, Guangdong Province, Hubei Province and Shenzhen. Building on the experiences of the pilot systems, the department of Climate Change (DoCC), under the National Development and Reform Commission (NDRC), has stated publicly that a national ETS will be established in 2016 (China Environmental News, 2014).

FIGURE 1: MAP OF CHINA WITH ITS SEVEN ETS PILOTS HIGHLIGHTED

Source: Swartz (2013)

China has become the world leader in renewable energy deployment due to strong government support, including its use of subsidies to renewable energy production. According to the International Energy Agency (IEA, 2013), renewable-based electricity generation in China reached 814 terawatt hours (TWh) in 2011 and accounted for 17.1 per cent of total energy generation nationwide. However, experts are concerned that existing sources of revenues to support renewable energy are not sufficient to meet demand. Over the period of the 12th Five-Year Plan, the China National Renewable Energy Center (CNREC, 2013) estimates that the funds for government programs to support renewable energy and related programs will rise to US$12 billion per year by 2015. Therefore, the cost of the renewable energy subsidies will outstrip the amount raised from the electricity surcharge by approximately US$26 billion, whereas the remainder has to be either raised from other sources or allocated from government spending (Bridle & Kitson, 2014).

In this context, the International Institute for Sustainable Development (IISD), in collaboration with the CNREC, has embarked on a project to review the possibility of earmarking the revenue from emissions trading to subsidize renewable energy in China. Prior to this paper, the two institutions have studied the international experiences of adopting earmarking approaches to finance renewable energy, and two papers have been produced: *Public Finance for Renewable Energy in China: Building on International Experience* (Bridle & Kitson, 2014) and *Green Revenues for Green Energy: Environmental Fiscal Reform for Renewable Energy Technology Deployment in China* (Jacqueline, et al., 2013).

This paper summarizes a series of interviews with experts in carbon trading and energy to review the key issues and debates around earmarking revenues from ETSs to renewable energy. The aim of this paper is to highlight a number of key issues for further research that will form part of subsequent phases of this project. The findings are grouped around the motivation and feasibility of a national ETS, the prospect of earmarking revenues to support renewable energy and the governance structures needed to ensure the smooth operation of the scheme. Respondents expect strong governmental commitment leading to the burgeoning of the national ETS. Yet they hold conservative opinions about the potential to raise a significant amount of money through auctioning ETS allowances in a short run. Although all respondents support the idea of earmarking ETS revenue, most do not see developing renewable energy as the best way to use the money, and a number of alternative approaches were proposed. Opinions vary on how the governance could be structured, and controversies exist in retaining revenues within regional systems or allocating them from a central authority. At the heart of good governance and management is transparency and accountability.

The article is divided into four parts: introduction, methodology, analysis and discussion, and conclusion. After this introduction, the methodology section sets out the research design, interview questions, selection of respondents, as well as scope and limitations. The analysis and discussion section analyzes a summary of answers, and the paper concludes with some recommendations for further research.

2.0 Methodology

This research aims to answer the question: should the revenue raised from ETSs in China be earmarked to support renewable energy? Considering the novelty of the research topic and the availability of data, a qualitative approach was chosen—primarily, interviews.

In total, 12 interviews were conducted. Respondents were selected from various sectors, including academia, non-governmental organizations (NGOs) and the private sector. The selection process was primarily based on respondents' research interest, expertise in emission trading or renewable energy, and their familiarity with the specific case of China. The following table sets out the list of interviewees.

NAME	ORGANIZATION
CHEN Bo	Central University of Finance and Economics (CUFE)
HART Craig A.	Renmin University of China (RUC)
HESS Zhuli	Verified Carbon Standard (VCS)
LI Shuo	GreenPeace
LIANG Xi	Central University of Finance and Economics (CUFE)
SONG Ranping	World Resource Institute (WRI)
SWARTZ Jeff	International Emission Trading Association
UPSTON-HOOPER Karl	GreenStream
WANG Xin	Institut du développement durable et des relations internationales (IDDRI)
WU Qian	Ecofys
Two Anonymous respondents	International organization in the carbon-trade industry

The interviews were semi-structured, consisting of open-ended questions for the interviewee to expand where they saw fit. Hints and prompts were also provided in cases where areas of interest were not naturally discussed. The research focused on a wider range of aspects than the actual self-generation of data. Therefore, prompting interviewees was not considered as a biased data-influencing action.

Originally, 13 questions were proposed and categorized into five sections. Based on the trial and error of earlier interviews, the researcher developed a general set of questions that proved most effective in generating the necessary data for the research. In practice, the researcher had to modify a few questions and skip some based on available time and the willingness of respondents. Upon the agreement of interviewees, transcripts or interview notes were made and were then used as the primary base for codification and further analysis. Through codification, the researcher identified repeated answers to specific questions, as well as other insightful and important points.

Interview questions were structured into three sections, each of which comprised up to four questions:

- The first set of questions related to emissions trading in general, aiming to illicit the stakeholder's opinion on the prospect of ETS in China, the challenges encountered and the potential to generate promising revenue.
- The second set of questions focused on renewable energy and earmarking. This part is purported to enquire about a stakeholder's opinion about the current finance condition of renewables, the need to earmark, feasibility and potential oppositions.

- The last set of questions touched upon the governance issue of this earmarking scheme, eliciting the stakeholders' opinions about the institutions in charge, the potential complications among different levels of government and other possible barriers.

2.1 Scope and Limitations

Three points deserve attention with regards to the scope and limitations of this research: timeline, quantitative data availability and terminology.

First, when doing the interviews, the researcher did not specify the timeline of establishing this earmarking scheme because of the uncertainty of emissions trading market development. Since there is no clear timeline, the researcher has to allow some level of vagueness in phrasing. When talking about "long term," the researcher means "after the establishment of a national market"; "short term" refers to the period before a national ETS is established.

Second, the lack of widely recognized estimates and projections of the cost of renewable energy subsidies and the context of a potential shortfall in funding for renewable energy may influence respondents' attitudes to earmarking. Little quantitative research is available on the potential size of ETS revenues, and it is too early to gauge revenue-raising potential from the ETS pilots. Greater availability of data and analysis on these topics would likely inform the debate on the use of revenues from emissions trading.

The third problem pertains to language and terminology. Originally, the research aimed to talk about carbon pricing, including both carbon taxation and carbon trading. However, as more interviews were conducted, it became clear that the focus of this research is the ETS, not carbon pricing. Some respondents have pointed out that they prefer to specifically address the research objective as ETSs, whereas no carbon tax actually exists in China. In order to eliminate confusion, the article harmonizes the terminology by addressing emission trading, which is indeed the central object of research.

Despite the uncertainty, data availability and definitions involved, the principal aim of this article, consulting expert opinions on this issue of earmarking, is well fulfilled.

3.0 Analysis and Discussion

3.1 ETS in China

In part one of the interview, interviewees were asked six questions about the reasons for China to adopt an ETS, a comparison between an ETS and a carbon tax, the prospect of the ETS development in China, potential barriers and challenges, approaches to raise revenue, whether or not an ETS in China would be able to raise a significant amount of revenue, and whether or not price regulation is necessary.

1. Reasons for China to adopt emission trading scheme

Among the eight respondents answering this question, six of them suggested that controlling and reducing emissions is the most compelling reason for the Chinese government to establish an ETS. This appears to be in line with the recent political commitment made by Vice Premier Zhang Gaoli at the UN Climate Summit, on behalf of the Chinese government, that the Chinese government is determined to tackle climate change and reduce carbon emissions (Ministry of Foreign Affairs of PRC, 2014).

Five respondents suggested that the government is now willing to adopt market-based instruments due to their worldwide popularity and also recognized achievements and high efficiency in emission reductions (as compared to command-and-control measures). Moreover, one respondent suggested that a reduction of coal consumption is the major driver behind emissions trading. Additionally, one respondent pointed out that the human capacity established in the development of a Clean Development Mechanism (CDM) is also pushing forward the establishment of the ETS. Those people, who have accumulated relevant experience and acquired skills in emissions trading from past CDM projects, have now become interested in working on China's ETS.

2. Emissions trading versus a carbon tax

Five responses were collected with regards to a comparison between emissions trading and a carbon tax. Two of them suggested that, although there is no carbon tax at the moment, it remains possible that a "carbon tax" could be introduced under the name of an "environment tax." One respondent mentioned that a "carbon tax" could complement the ETS by covering other non-covered installations, such as housing and transportation.

Considering the question of why at its current stage the Chinese government prefers the ETS to carbon tax, three respondents suggested that the ETS is theoretically more effective than a carbon tax in emissions reductions. Two respondents suggested that it is politically hard to introduce any new tax, including a carbon tax, as China is characterized by a high tax rate compared to most countries in the world. In 2014 the World Bank's Doing Business report suggested that China's total tax rate is 64.5 per cent and ranks it 120 out of 189 countries in terms of paying taxes (World Bank Group, 2014). By contrast, introducing market-based instruments might receive more public acceptance.

3. The prospect of ETS development in China

All respondents agreed that a national market will be successfully established on the basis of existing pilots. Five respondents are confident in a strong and bright future for the ETS in China. They found that the Chinese government had done an excellent job establishing the ETS in a short time. Nevertheless, the rest of the respondents thought that it is too early to predict the ETS's future development, as it largely depends on the continuity of political will and the design of supportive policy.

4. Potential challenges

There are three different perspectives concerning the potential barriers and challenges impeding the advancement of the ETS in China. First, four respondents were concerned about whether the government will provide ongoing political support to develop the ETS. The second point refers to the development of a secondary market on the basis of auctioning market. One respondent specified the importance of upgrading the current spot market to a more liquid market with options and futures. Third, all respondents mentioned the need to improve the technical designs of the scheme—for instance, standard setting (i.e., monitoring, reporting and verification [MRV]), the introduction of an absolute cap, transparency, the dispersed market, compliance mechanisms, etc.

5. Approaches to raise revenue

All respondents agreed that auctioning emission allowances is and will remain the principal approach to raise revenue from national and regional ETSs. At the same time, respondents proposed using alternative approaches, as a supplement to auctioning. These approaches consist of charging transaction fees, issuing a tax similar to the CDM adaptation tax, imposing non-compliance fines and charging a carbon tax from installations not covered in the ETS. However, most respondents did not see these alternatives as capable of raising as much revenue as auctioning.

6. A source of promising revenue?

Seven respondents agreed that, in the short term, it is unlikely for a large scale of revenue to be raised through the operation of the ETS. There are two reasons for this. First, all seven pilots are now in their experimenting stage of development, where the focus is to find the "best practice" instead of generating revenue. Secondly, allowance auctions are not widespread and only exist in a few pilots. This narrow coverage and the small proportion allowance auctioned suggest that the revenue might be small in scale.

Once again, five respondents suggested that it mainly depends on the political will and policy formulation. They argued that, as long as the Chinese government sticks to its commitment of further developing the ETS, one could expect promising revenue in the long run. Yet it remains too early to comment at the moment.

However, looking into the long future, one respondent stressed that, as the ultimate aim of emissions trading is mitigation rather than revenue generation, the declining volume of carbon emission and emissions trade will eventually lead to lower market activity levels and a smaller scale of revenue.

7. Price regulation

All respondents agreed that there should not be any (direct) price manipulation from government, as government intervention might result in market distortion. Unlike the case of the European Union (EU) ETS, the Chinese government is used to regulating the market, and there is no need to worry about lacking protective measures. According to three respondents, unless government announces the details of its intervention (i.e., how and when intervention will take place) every time in advance, it makes it hard for market participants to make investment decisions. One should let the market play its role and allow the ETS to perform its function in discovering price. Otherwise, there is no difference between the ETS and command-and-control measures.

Six respondents thought that government could implement certain protective measures other than directly affecting price—for instance, setting environmental goals, modifying the total number of allowance and setting an absolute emission cap.

Four respondents thought that some level of government intervention is understandable and acceptable. For instance, currently in some pilots, local governments are setting a base price in reference to international price. They also find it necessary to introduce a reasonable level of price cap and price floor, to avoid a price crash such as in the case of the EU ETS.

3.2 Renewables and Earmarking

The second part of the interview dealt with the central question, should ETS revenue be earmarked to support renewable energy and, if yes, how? Four questions were used to gauge opinions about the use of revenues. Respondents were first consulted about their personal opinion regarding the current financial situation of renewable energy and whether they agree with the idea of earmarking the ETS revenue to renewables. They were then asked about the feasibility of adopting such an earmarking approach as well as potentially opposing ideas.

8. The current state of renewable energy finance in China

While all respondents agreed that the overall development of renewable energy in China still demands more investment, half of the respondents thought that the problem does not lie in the lack of "absolute" amount of investment. Rather, the problem is three-fold. First, certain types of renewables are mature and have abundant finance. Second, current investment is not managed in a cost-effective manner. The third problem lies in the imbalance between funding from public and private sources.

Seven of the interviewees pointed out that some particular types of renewable energy, at least wind and solar photo voltaic (PV) energy, are well financed and developed. It is expected that, in the near future, these two types of renewables are going to become as competitive as conventional fossil fuels in terms of cost. However, the respondents did not provide any quantitative evidence. The actual financial needs of renewable energy need to be carefully reviewed. As a result, respondents stressed that it is important to move away from the general concept of renewable energy finance towards a more detailed look into the financial situation of one specific type of renewable energy or one particular project. For instance, geothermal and tidal energy are both in need of finance, as they are not prioritized by the government and involve higher risk.

Five respondents pointed out that every industry has an incentive to claim a lack of finance, and incoming funding is always welcome. On the one hand, the opinion of the CNREC and the renewable energy industry should be well considered. On the other hand, one should also consult more interest groups, not limited to those belonging to renewable sectors, for their opinions on the use of revenue raised from emissions trading.

The third issue is the imbalance between public funding and private investment. With strong government support, abundant public investment was channelled to the renewable energy industry through state-owned enterprises (SOEs), which has helped develop wind power and solar PV projects. At the same time, SOEs benefit from preferential policies, including access to low-cost finance. By contrast, pure private investment remains small and private investors are marginalized in China's renewable energy industry. According to some respondents, since SOEs are backed with plenty of public funding and often need to prioritize public policy purposes, they do not always put maximum profit and efficiency at the top of their list. Respondents suggest that the private sector's role should be increased through public-private partnerships (PPP), so that more financial resources would become available and be managed more efficiently.

9. Views on earmarking

All respondents agreed that earmarking the ETS revenue to finance renewable energy is one possible approach, yet it might not be the best one to maximize environmental and economic benefits. Three reasons were put forward. First, as discussed in Question 8, more than half of the respondents do not perceive that renewable energy, specifically wind power and solar PV, is in urgent need of finance. Second, investing in alternative renewable energy could generate greater marginal benefits. These new projects are characterized by an urgent need for finance, higher risk and relatively low return of investment. Given the same amount of investment, tidal energy might be able to generate more marginal benefit than more developed renewables, for example, wind power. Third, one should consider the readiness of ETS revenue. As discussed in Question 6, in the short run, the revenue is not likely to account for a large proportion of renewable subsides. But as the industry develops, it might be able to contribute more significantly in the longer term. In this vein, it might be more compatible to use the limited financial resources to support the development of alternative renewable energy, whose demand for investment is smaller in scale.

Respondents then proposed a few alternative ways to earmark. The main suggestion was to use the revenue as a guidance fund, to display the political will and government support. For instance, five respondents suggested that the revenue be invested into relatively new types of renewables, such as geothermal and tidal energy. In this way, private investors become aware of the government's interest in developing these energies or projects and then are motivated to make further investments in them. In this way, public funding takes the lead in financing risky projects and becomes a model for private investors. Similarly, five respondents also suggested that the money be used to finance low-carbon technology projects—for instance, carbon capture and storage (CCS) technology. Other alternative ways include: using the ETS revenue for capacity building, tax neutralization and addressing equity issues. Two respondents proposed capacity building, which provides training to build human capacity and improves the work of local and national ETSs. One respondent recommends earmarking the revenue to address equity issues, to pay back the incurred social costs or to compensate affected groups.

Lastly, it is equally important for one to bear in mind that, although renewable energy has been well funded to date, additional revenues may be needed to meet the projected shortfall in funding between revenues from the renewable surcharge and subsidy spending. This potential shortfall is not widely known and was not cited as a key factor by respondents.

10. Feasibility

All respondents believed that adopting an earmarking approach is feasible for two reasons. On the one hand, international experiences like the Regional Greenhouse Gas Initiative in the United States, the Green Investment Bank in the United Kingdom and the Energy and Climate Fund in Germany all exemplify that this approach is feasible internationally. On the other hand, the CDM fund, in operation in China since 2010, also suggests the feasibility of building a similar earmarking scheme for renewable energy in the context of China. Although the feasibility of the idea is widely recognized, respondents have pointed out that a few factors can influence the effective operation of the earmarking scheme—for instance, political support, enabling policy design, public acceptance and corporate awareness.

11. Opposing opinions

No respondent opposed the idea of earmarking revenue to develop low-carbon technologies and subsidize renewable energy. Yet, they did suggest that controversy might arise when it comes to a later stage of implementing the idea, such as financial management and administration. Six respondents suggested that some interest groups, especially those that otherwise would have gotten the funding, might not be content with allocating the financial resources to renewable energy.

3.3 Governance

12. Institution building

Three types of opinions could be generalized from interviewees' responses about institution building. The majority of respondents (seven out of twelve) thought it is necessary to create a new office, or at least a new position, to undertake this new responsibility. They argued that establishing a new managing entity would reveal the government's commitment in reducing emissions. Both the Green Investment Bank (UK) and the Energy and Climate Fund (Germany) have set good examples of creating such a new, specialized entity. However, respondents suggested that the new entity make use of existing human capital, in particular those that have past experience with the CDM fund or the national Voluntary Emissions Reduction market, rather than hire inexperienced new people. Another four respondents preferred allocating this new responsibility of earmarking to some existing entities, for example the CDM fund. They argued that this approach could help reduce bureaucracy, maximize the utility of existing capacity, save cost and ease management. Three respondents foresaw that a new entity would cause great hardship unless the volume of finance involved is very big and unmanageable with the established capacity. The third possibility is establishing a collaborative group under the auspices of several different ministries, following the model of the CDM fund. Yet not everyone was in favour of this proposal. One respondent criticized the model of the CDM fund for being bureaucratic and inefficient.

Four respondents stressed the point that, whether the entity is new or not, the priority is to make it work. Hence, one has to carefully design and manage the scheme, and make it both transparent and accountable. Another significant element is the composition of staff. Four respondents mentioned that, in addition to civil servants, financial experts and environmental scientists should also be included, so that it is possible to achieve both environmental and economic goals at the same time.

Finally, four respondents remarked that it is technically hard to make the new entity absolutely independent, especially in terms of finance. There is little possibility that revenue from carbon trading could be channelled to the entity directly, bypassing the Department of Finance. Therefore, the new entity eventually has to operate under the auspices of one or more existing departments—for instance, the Ministry of Finance (MoF), NDRC or the National Center for Climate Change Strategy and International Cooperation (NCSC) of China.

13. Governance complication

The complication of governance is two fold. On the one hand, complication exists between different levels of government (i.e., central, provincial and municipal). On the other hand, it refers to the complicated relationship among different regional governments.

First, it remains uncertain at which level earmarking will be managed and how much autonomy local governments can enjoy in this regard. It also remains unclear how responsibilities—such as MRV, auctioning, offset and compliance—and benefits—such as affiliation of revenue—would be divided among different levels of government. Aware of the complication, five respondents suggested that the respective roles of central and local governments be clearly defined. For instance, one mentioned that, "while MRV and offset be put under the oversight of central government, provincial government could take care of allocation, auction, registry and compliance." Meanwhile, three respondents were expecting that the central government allow enough flexibility and room for local government to try different models. Before the national market is finally established, it is important for local government to try out different measures and gain experience.

Second, more than half of the respondents mentioned the importance of harmonization of rules (in particular MRV) across regions, as well as the hardship in deploying cross-regional. However, in the case of China, certain levels of diversity and flexibility are important, as the huge territory and large population base create barriers to implementing the same rules everywhere. Even if it is for the benefit of renewable energy, it is politically hard to justify earmarking revenue collected from one province, such as Guangdong, to another, such as Inner Mongolia.

Two solutions are proposed. Some respondents suggested that, once a consolidated national market is established, wherein finance is managed collectively by central government, a state-level agency is able to allocate financial resource projects regardless of its location. The other solution is to manage the fund at the local level and recycle the locally collected revenue to local projects. For example, provincial and municipal governments could use the revenue to subsidize local renewable energy projects on top of the national subsidy, as is currently happening in Jiangsu and Zhejiang.

14. Governance challenges

Respondents made three points regarding governance challenges of the ETS and the earmarking scheme: transparency and communication, financial management and harmonization of rules. Seven respondents specified that one critical challenge is to guarantee transparency and public communication. The entity should be accountable for the source and the use of its financial resources and be able to justify its investment. Meanwhile, in order to make the mechanism work, the government should convey the idea to both the general public and key stakeholders, such as SOEs, by integrating it into high-level policies, such as the national Five-Year Plan. Another challenge lies in how to effectively manage financial resources. Three respondents point out that the new entity should invest in projects with both environmental potential and economic profits. This can help keep the entity financially sustainable and independent. To this end, one respondent specified the need to include both investors and environmentalists on the team. The last challenge is the harmonization of rules, specifically MRV, as discussed in Question 13 about complication of governance.

4.0 Conclusion

Despite the always-existing uncertainty, the Chinese government seems to be committed to promoting a national ETS. Although, in the short term, revenue might not be significant compared to the scale of the cost of renewable generation, in the long run, promising revenue is very possible. The concept of earmarking is feasible and widely recognized; however, respondents generally did not see earmarking to renewable energy as the best option. Instead, they proposed a number of alternative sectors or projects awaiting finance. Respondents also pointed out potential challenges for the earmarking scheme, including transparency, MRV and harmonization of rules. Future research should concentrate on the provision of solid quantitative evidence and governance issues of this earmarking mechanism. Lastly, although this research placed a lot of emphasis on finance and revenue generation, one should always bear in mind that the objective of an ETS and supporting policies is to fight against climate change, rather than making profits.

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Published by the International Institute for Sustainable Development.

International Institute for Sustainable Development
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