REGULATING EMISSIONS DATA QUALITY, COST, AND INTERGOVERNMENTAL RELATIONS IN CHINA'S NATIONAL EMISSIONS TRADING SCHEME

Ling Chen and Ruyoing Li*

Emissions data collection and management are crucial to operationalizing an emissions trading scheme (ETS). Regulators need high-quality data to allocate emissions allowances and monitor compliance. However, collecting such data can be costly, challenging various actors. Emitters may misreport data, weighing the cost against their interest, while governments may struggle with limited resources in managing compliance. Third-party verification is a solution but tends to be ineffectual and causes new problems unless with sufficient oversight and support. This quality-cost dilemma becomes even more complex in multi-level ETSs, as in China's national ETS (NETS). Despite increased regulatory efforts to address data challenges, there remains a lack of in-depth legal analysis on the relationship between data quality and cost. This Article establishes a three-element analytical framework—data quality, cost concerns, and intergovernmental relations in data management—to shed light on the nuances of data regulation. Using China's NETS as a case study, we gain a deeper understanding of the three elements in a specific jurisdiction and the legal institutions, practices, and challenges involved. Governments, emitters, and third-party verifiers each have unique roles and limitations in this process. We suggest legal and regulatory strategies for finding solutions. Our actor-centered analytical model and practical recommendations for the NETS can serve as a valuable guide for jurisdictions facing similar data challenges.

Table of Contents

Discussion and Conclusion

Introduction

An emissions trading scheme (ETS) is perceived as a cost-effective and allocative efficient alternative to traditional command-and-control regulations.[1] In the ETS, participants receive a set number of allowances to pollute and can trade any unused allowances.[2] To allocate allowances and monitor multi-actor compliance, the ETS requires high-quality emissions data. Without such data, the ETS can suffer in terms of transparency, credibility, compliance, and enforcement.[3] However, the process of collecting emissions data, primarily known as monitoring, reporting, and verification (MRV),[4] can be complex and costly,[5] adversely affecting the economic efficiency of the ETS for both regulators and emitters.[6]

---

*Ling Chen is a Doctor of Civil Law Candidate at McGill University and a Visiting Scholar with the East Asian Legal Studies program at Harvard Law School. Ruoying Li is PhD Candidate at Peking University of Law School. The authors wish to thank Graham Manderville, Rebekah Robbins, and Alexander Marshall for their extraordinary support during the submission and editing processes and the anonymous reviewers of this journal for their valuable comments.

[1] Thomas H Tietenberg, *Emissions Trading: Principles and Practice*, 2d ed (Washington, DC: Resources for the Future, 2006) at 27; Richard Schmalensee & Robert N Stavins, "Lessons Learned from Three Decades of Experience with Cap and Trade" (2017) 11:1 Rev Envtl Economics & Pol'y 59 at 73–74; for other approaches to understanding ETS, see e.g. Sanja Bogojević, *Emissions Trading Schemes: Markets, States and Law* (Oxford, UK: Hart Publishing, 2013).

[2] See e.g. EC, *Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 Establishing a Scheme for Greenhouse Gas Emission Allowance Trading within the Community and Amending Council Directive 96/61/EC*, [2003] OJ, L 275/32; *Measure for the Management of Carbon Emissions Trading (Trial) [碳排放权交易管理办法(试行)]* (1 February 2021) Ministry Order No 19 [*Trial ETS Measure*]; see also Ling Chen, "Market Mechanisms, Corporations and Article 6 of the Paris Agreement" in Sandrine Maljean-Dubois & Jacqueline Peel, eds, *Climate Change and the Testing of International Law* (Leiden, NLD: Brill, 2023) 421 at 424–25 [Chen, "Market Mechanisms"].

[3] Lawrence H Goulder et al, "China's National Carbon Dioxide Emission Trading System: An Introduction" (2017) 6:2 Economics of Energy and Environmental Policy 1 at 10; Schmalensee & Stavins, *supra* note 1 at 69–70, 72 (both addressing the significance of complete and accurate data to an effective ETS); Chris Green et al, *Evaluation of EU ETS Monitoring, Reporting and Verification Administration Costs*, (Luxembourg: Publications Office of the European Union, 2016) at 3.

[4] See further Felicity Deane, Evan Hamman & Yilin Pei, "Principles of Transparency in Emissions Trading Schemes: The Chinese Experience" (2017) 6:1 Transnational Envtl L 87 at 89–91 (also referring to "M" as measurement); Alexander Zahar & Hao Zhang, "Monitoring, Reporting, and Verification of Greenhouse Gas Emissions in China: A Legal Analysis" in Xiangbai He, Hao Zhang & Alexander Zahar, eds, *Climate Change Law in China in Global Context* (London, UK: Routledge, 2020) 118 at 120 (noting that monitoring includes measurement).

[5] Joe Kruger & Christian Egenhofer, "Confidence Through Compliance in Emissions Trading Markets" (2006) 6:2 Sustainable Development L & Pol'y 1 at 9.

[6] Valentin Bellassen & Nicolas Stephan, eds, *Accounting for Carbon: Monitoring, Reporting and Verifying Emissions in the Climate Economy* (Cambridge, UK: Cambridge University Press, 2015) (reviewing MRV requirements and costs in a wide variety of ETSs); Green et al, *supra* note 3; Peter Heindl, "The Impact of Administrative Transaction Costs in the EU Emissions Trading System" (2017) 17:3 Climate Pol'y 314; Xu

China's national ETS (NETS) has been under development since 2014, but the uneven availability of emissions data across different industries has slowed its full implementation. Actual trading only began in the electricity generation industry in 2021, as it was chosen as a test case for the "incremental roll-out" of the NETS. This was due to the heavy reliance on coal in the electricity generation industry and its significant contribution to China's CO_2 emissions, as well as its relatively higher availability of data compared to other industries.[7]

China also faces varying levels of MRV capacity and data quality across regions. In 2011, the National Development and Reform Commission (NDRC) selected only two provinces (Hubei and Guangdong) and five municipalities (Beijing, Shanghai, Tianjin, Chongqing, and Shenzhen) as pilot jurisdictions for ETS. These pilot ETSs officially started between 2013 and 2014. Another province, Fujian, launched its ETS in 2016.[8] These regions have used experimentation with ETS to develop policies and regulatory measures for controlling greenhouse gas (GHG) emissions,[9] and provide support for national systems of GHG accounting and reporting for the NETS.[10] By contrast, the rest of China has not yet developed comparable MRV capacity and infrastructure.[11] Furthermore, high data costs have had a negative impact on the economic efficiency of China's pilot ETS. A study of 1867 industrial enterprises has identified MRV costs as their primary burden,[12] with significant cost variations across the pilot regions due to their varied experience with MRV, regulatory support, and the industries they cover.[13]

Wang, Lei Zhu & Ying Fan, "Transaction Costs, Market Structure and Efficient Coverage of Emissions Trading Scheme: A Microlevel Study from the Pilots in China" (2018) 220 Applied Energy 657.

[7] *Plan for Building the National Carbon Emissions Trading Market (Electricity Generation Industry) [全国碳排放权交易市场建设方案 (发电行业)]*, (18 December 2017) at para 1.3; "State Council Policy Regular Briefing [国务院政策例行吹风会]" (14 July 2021), online: *State Council* <http://www.gov.cn/xinwen/2021zccfh/30/index.htm> [https://perma.cc/WBS5-HDDX] [State Council Policy Briefing]; Thomas Stoerk, Daniel J Dudek & Jia Yang, "China's National Carbon Emissions Trading Scheme: Lessons from the Pilot Emission Trading Schemes, Academic Literature, and Known Policy Details" (2019) 19:4 Climate Pol'y 472 at 483.

[8] *China's Policies and Actions for Addressing Climate Change (2016)* (Beijing, CHN: National Development Reform Commission, 2016) at 39 [*China's Climate Policies and Actions (2016)*]; Ling Chen, "Are Emissions Trading Schemes a Pathway to Enhancing Transparency under the Paris Agreement?" (2018) 19:3 VJEL 306 at 322 [Chen, "Emissions Trading Schemes"].

[9] Chen, "Emissions Trading Schemes", *supra* note 8 at 324.

[10] See e.g. *China*'s *Climate Policies and Actions (2016)*, *supra* note 8 at 44–47 (documenting China's enhanced capacity of reporting GHG emissions, accounting, and inventory compilation); Government of China, *The People's Republic of China Second Biennial Update Report on Climate Change (Unofficial Translation)* (2018) at 5 (noting the establishment of institutions for national GHG inventories).

[11] Xuelan Zeng et al, "Data-related Challenges and Solutions in Building China's National Carbon Emissions Trading Scheme" (2018) 18:S1 Climate Pol'y S90 at S99.

[12] Wang, Zhu & Fan, *supra* note 6.

[13] *Ibid* at 660–62.

Data collection and management are at the cores of operationalizing an ETS, yet there remains a significant gap in legal scholarship that thoroughly studies their legal institutions, challenges, and solutions. This Article introduces a three-element analytical framework—data quality, cost concerns, and intergovernmental relations in data management—to shed light on the nuances of data regulation in ETS. Our actor-centered analysis distinguishes itself from existing literature that mainly focuses on the functional and technical aspects of MRV.[14] We delve into the public and private aspects of ETS regulation that influence data quality and cost.[15] Data collected by emitters, such as enterprises, and verified by third parties is crucial for governments to allocate allowances and oversee compliance. However, the costs associated with data collection and management can affect the incentives and behaviors of these actors, potentially leading to misreporting. Governments, emitters, and third-party verifiers each have unique limitations and challenges that can be addressed with the help of environmental law and regulation.[16]

The challenge of balancing data quality and cost becomes even more pronounced in a large-scale ETS, where a multiplicity of actors engage in MRV across territorial and jurisdictional levels.[17] In these cases, state intervention is often necessary, despite ETS being designed to reduce emissions through harnessing market power. Thus, governments hold a pivotal role in data management, involving decision-making at multiple levels or scales to steer public and private actors. More specifically, we identify three key relationships that must be managed: the vertical relationship between central and local governments and the horizontal relationships between government departments and between governments across regions. Appropriate legal and regulatory strategies can guide decision-making at different levels and departments of government to support effective data management.

---

[14] For some of such examples, see Zahar & Zhang, *supra* note 4; Tianbao Qin & Meng Zhang, *Carbon Emissions Trading in China: Law, Policy and Mechanisms* (Cheltenham, UK: Edward Elgar, 2023) at 54, 61–62, 136–42, 149, 167–68.

[15] While regulatory efforts to address data challenges have increased, there is insufficient legal analysis of the interplay between data quality, cost, and the stakeholders involved. For the legal scholarship alluding to this topic, see Harro van Asselt, "The Design and Implementation of Greenhouse Gas Emissions Trading" in Kevin R Gray, Richard Tarasofsky & Cinnamon Carlarne, eds, *The Oxford Handbook of International Climate Change Law* (Oxford: Oxford University Press, 2016) 333 at 349; Mingde Cao, "A Case Study on China's Carbon Emission Trading System: Experiences and Recommendations" (2020) 23:2 Asia Pac J Envtl L 106 at 110, 114–15, 119, 130, 133. For general scholarship on this topic, see Heindl, *supra* note 6 at 315; Renhu Tang et al, "Key challenges for the establishment of the monitoring, reporting and verification (MRV) system in China's national carbon emissions trading market" (2018) 18:S1 Climate Pol'y S106 at S118.

[16] For one of such examples, see EC, *Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 Amending Directive 2003/87/EC so as to Improve and Extend the Greenhouse Gas Emission Allowance Trading Scheme of the Community*, [2009] OJ, L 140/63 (In this Directive, the European Union simplified MRV procedures and reduced unnecessary burdens on small emitters).

[17] See e.g. van Asselt, *supra* note 15 at 350 (noting the capacities of different government actors to access emissions data).

The interplay between data quality, cost concerns, and intergovernmental relations in data management is crucial for the successful design and implementation of ETS. In-depth assessments of these three elements within a specific jurisdiction can enrich our understanding of the legal aspects of data collection and management. To this end, we use China's NETS as a case study. As the world's largest ETS,[18] it has undergone significant legal and regulatory developments that can inform how regulation can address emissions data challenges and the broader questions of whether and how ETS can fulfill its intended role in cost-effective emissions reductions. Recent notable advancements in ETS have come from emerging and developing economies, such as Indonesia, Mexico, and Vietnam.[19] These developments align with incentives provided by the Paris Agreement's Article 6, which establishes key legal norms and tools for the formation of transnational carbon markets. They offer countries a strategic avenue to adopt ETS as a means of implementing their nationally determined contributions.[20] The European Union (EU) Carbon Border Adjustment Mechanism (CBAM), targeting imports from select energy-intensive industries, may also stimulate or pressure the expansion of GHG accounting, MRV, and ETS in other jurisdictions. Jurisdictions seeking exemption from the CBAM must adhere to the EU's carbon pricing standards.[21] Moreover, insights into China's data management can contribute to the discussion on power distribution among various government levels and departments in climate governance.[22]

---

[18] World Bank, *State and Trends of Carbon Pricing 2022* (Washington, DC: World Bank, 2022) at 18 (Since launching its first compliance cycle in 2021 for the electricity generation industry, China's NETS has become the largest ETS in terms of covered emissions.).

[19] ETS, mainly including cap-and-trade and baseline-and-credit programs, has gained global traction with 36 initiatives implemented in national and subnational jurisdictions, covering 8.91 $GtCO_2e$ and accounting for 17.64% of global GHG emissions. Like China's NETS, Indonesia's ETS is initially set to operate as a tradable performance standard for coal-fired power plants. Vietnam is on track to implement its ETS, and other countries, such as Brazil, Chile, Colombia, Gabon, Malaysia, Nigeria, Pakistan, Thailand, and Turkey, are considering the adoption of ETS. See further "Carbon Pricing Dashboard" (last updated 31 March 2023), online: *World Bank* <https://carbonpricingdashboard.worldbank.org/map_data> [https://perma.cc/PV7J-ZM43] ["Carbon Pricing Dashboard"]; *State and Trends of Carbon Pricing 2023*, by World Bank (Washington, DC: World Bank, 2023) at 23–26; "Compare ETS" (2023), online: *International Carbon Action Partnership* <https://icapcarbonaction.com/en/compare/83/104/59> [https://perma.cc/Z9TU-WUA7]; for a list of emerging and developing economies, see "World Economic Outlook Database: Groups and Aggregates Information" (April 2023), online: *International Monetary Fund* <https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates>.

[20] *Nationally Determined Contributions under the Paris Agreement, Synthesis Report by the Secretariat*, CMA, 5th Sess, UN Doc FCCC/PA/CMA/2023/12 (2023) at paras 95–98 (reporting that 77% of Parties have indicated plans or potential use of at least one voluntary cooperation mechanism in Article 6 of the Paris Agreement); see further Chen, "Market Mechanisms", *supra* note 2.

[21] EC, *Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 Establishing a Carbon Border Adjustment Mechanism*, [2023] OJ, L 130/52 at art 2, Annex III; see further Xiaoying You, "How Will EU's 'Green Tariff' Impact China's Carbon Market?", (6 February 2023), online: *China Dialogue* <https://chinadialogue.net/en/climate/how-will-eus-green-tariff-impact-chinas-carbon-market/> [https://perma.cc/5243-UCX8]; Ling Chen, *Climate Clubs and the Law* (DCL Thesis, McGill University, 2023), c 3.4 [unpublished].

[22] China's approach offers insights for jurisdictions grappling with regional and sectoral differences. Take Canada, for instance, where a national carbon pricing scheme has been implemented. This includes a fuel

It is important to note that while the three elements can be separated for analytical purposes, they are interconnected and may overlap in practice. Improving data quality can increase costs and *vice versa*. The multi-level and multi-actor characteristics of an ETS further exacerbate this quality-cost dilemma. The coordination and tension between different governments can have a significant impact on data quality management and associated costs. Notably, we recognize that these three elements are by no means exhaustive, but rather provide a foundation for understanding how public and private actors shape emissions data regulation and for analyzing the legal institutions, practices, and challenges involved.

The article is structured as follows. Section 1 analyzes the legal and institutional frameworks that underpin China's emissions trading and data, examining the principal policy and regulatory documents to understand their sources, authorities, and relationships. This analysis sets the foundation for an in-depth case study of China's NETS. Sections 2 and 3 explore the concepts of data quality and cost, respectively. Section 4 looks closely at the role of governments in data management, encompassing multiple levels of governance and various actors. Each section begins with a review of existing literature, incorporating examples from prominent ETSs to support the mapping and analysis of the three elements. We then assess how the legal and regulatory institutions in China address, or fail to address, concerns and challenges related to data quality and cost. We explain the regulatory strategies that have been or should be applied for multi-level data management within the NETS. Finally, we discuss our key findings and propose questions for future research.

1. Legal and Institutional Frameworks for Emissions Trading and Data in China

Understanding regulation on data collection and management for the NETS requires an appreciation of China's legal and institutional frameworks that underpin emissions trading and data. This section pulls together the patchwork of legislative and government efforts from scattered administrative decrees, notices, guidelines, and ETS regulation drafts. On the one hand, these policy and regulatory documents complement one another to establish requirements and processes for implementing ETS and MRV. On the other hand, they feature varying legal strengths and create fragmented rules that may cause confusion and conflicts. Analyzing the principal policy and regulatory documents, their sources, authorities, and relationships allows for a deeper exploration

charge and an output-based pricing system (OBPS), serving as a "federal backstop" when provincial or territorial schemes are less stringent. The OBPS shares characteristics with a baseline-and-credit ETS. Currently, provinces like Alberta, British Columbia, New Brunswick, Newfoundland and Labrador, Ontario, and Saskatchewan have developed their own programs with baseline-and-credit elements, while Quebec operates a cap-and-trade program. Meanwhile, Nova Scotia is shifting from a cap-and-trade model to an OBPS. See further "Carbon Pollution Pricing Systems Across Canada" (5 July 2023), online: *Government of Canada* <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html>; "Carbon Pricing Dashboard", *supra* note 19.

of regulatory issues concerning data quality and cost in the NETS, as well as the intergovernmental relations that complicate these issues.

The 13th Five-Year Plan for Economic and Social Development (FYP) highlighted China's commitment to developing the NETS and improving systems for MRV, accounting, performance evaluation, and accountability.[23] The latest 14th FYP enshrines China's dual goals of peaking carbon emissions by 2030 and achieving carbon neutrality by 2060.[24] Pivotal to these goals are the advancement of market-based emissions trading and the strengthening of environmental information disclosure,[25] forming central pillars of China's modern environmental governance system.[26] Approved by the National People's Congress, China's highest legislature, a FYP establishes overarching policy goals and measures for a five-year period. It serves as the primary basis for the State Council—the top administrative authority—to provide direction and guidance to lower-level governments and market participants.[27] The State Council develops GHG Control Plans to support ETS regulation-making, MRV capacity building, and professional training at the national, local, and enterprise levels.[28]

Initially, the NDRC, a ministerial-level department of the State Council, was responsible for making MRV rules and coordinating the NETS.[29] However, since

---

[23] *13th Five-Year Plan for Economic and Social Development [国民经济和社会发展第十三个五年规划纲要]* (2016), c 46.1.

[24] *14th Five-Year Plan for Economic and Social Development [国民经济和社会发展第十四个五年规划纲要]* (2021), c 38.4 [*14th FYP*].

[25] See further *Measure for the Management of Environmental Information Disclosure of Enterprises [企业环境信息依法披露管理办法]* (8 February 2022) Ministry Order No 24, art 12.4 (requiring enterprises to include carbon emissions information, such as the quantity and related facilities, in their annual environmental information disclosure).

[26] *14th FYP*, *supra* note 24, c 38.5.

[27] Chen, "Emissions Trading Schemes", *supra* note 8 at 326–27; see also Shaikh M S U Eskander & Sam Fankhauser, "Reduction in Greenhouse Gas Emissions from National Climate Legislation" (2020) 10:8 Nature Climate Change 750 at 751; Navroz K Dubash, "Climate Laws Help Reduce Emissions" (2020) 10:8 Nature Climate Change 709 (indicating China's heavy reliance on executive orders for its climate policy and the discernible impact that those orders have had on emissions intensity).

[28] See e.g. *Work Plan for Controlling Greenhouse Gas Emissions during the 13th FYP ["十三五"控制温室气体排放工作方案]* (27 October 2016), Guofa [2016] No 61 at para 6; *Work Plan for Controlling Greenhouse Gas Emissions during the 12th FYP ["十二五"控制温室气体排放工作方案]* (1 December 2011), Guofa [2011] No 41 at para 18.

[29] *Interim Measure for the Management of Carbon Emissions Trading [碳排放权交易管理暂行办法]* (10 December 2014) National Development and Reform Commission Order [2014] No 17, art 5 [*2014 Interim ETS Measure*]; *Notice on Reporting Greenhouse Gas Emissions of Key Enterprises and Public Institutions [组织开展重点企(事)业单位温室气体排放报告工作的通知]* (13 January 2014) National Development and Reform Commission, Climate [2014] No 63 at para 2.3.

2018, the Ministry of Ecology and Environment (MEE) has assumed these duties.[30] This shift in regulatory power, resulting from institutional restructuring, has disrupted progress in passing a national ETS regulation. The NDRC issued the earliest administrative decree for the NETS, the 2014 Interim ETS Measure, which defined key emissions trading elements and laid the groundwork for subsequent, higher-level instruments.[31] The NDRC proposed an ETS regulation to the State Council in 2015,[32] but it was not until 2019 that the MEE released another draft regulation for comments,[33] which was updated in 2021.[34]

State Council regulations hold more legal authority than ministerial decrees and can provide stronger legal protection for the NETS. Decrees can only impose administrative penalties such as warnings, notices of criticism, and modest fines.[35] The 2021 Trial ETS Measure fines major emitters between 10,000 and 30,000 Chinese Yuan for violating reporting obligations,[36] while the 2021 Draft ETS Regulation proposes substantially higher fines (50,000 to 200,000).[37] The regulation also broadens the range of legal remedies by linking regulatory violations to civil and criminal liabilities.[38] The government-led regulatory approach has long been central in addressing non-compliance in MRV or disputes over allowances allocation, trading, or settlement. Although the Supreme People's Court has recognized disputes over trading carbon emissions or sinks as causes of action in contract-based civil

---

[30] This has been done through its Climate Change Department, with a Carbon Emissions Trading Administration Division, to manage activities relating to ETS and GHG emissions. See further "Climate Change Department [应对气候变化司]" (8 October 2018), online: *Ministry of Ecology and Environment* <http://www.mee.gov.cn/xxgk2018/xxgk/zjjg/jgsz/201810/t20181008_644817.html>; State Council, *Notice on the Setup of Institutions [国务院关于机构设置的通知]* (22 March 2018), Guofa [2018] No 6.

[31] *2014 Interim ETS Measure*, *supra* note 29.

[32] "Regulation on the Management of Carbon Emissions Trading (Draft for Review): Drafting instructions [碳排放权交易管理条例(送审稿):起草说明]" (29 March 2016) at para 2, online: *Tanjiaoyi* <http://www.tanjiaoyi.com/article-16320-1.html> ["Regulation Drafting Instructions"].

[33] *Interim Regulation on the Management of Carbon Emissions Trading (Draft for Comment) [碳排放权交易管理暂行条例(征求意见稿)]* (29 March 2019) [*2019 Draft ETS Regulation*].

[34] *Interim Regulation on the Management of Carbon Emissions Trading (Revised Draft) [碳排放权交易管理暂行条例(草案修改稿)]* (30 March 2021), Ministry of Ecology and Environment General Office Notice [2021] No 117 [*2021 Draft ETS Regulation*].

[35] *Law of the People's Republic of China on Administrative Penalty [中华人民共和国行政处罚法]* (originally adopted 17 March 1996, last revised 22 January 2021, entered into force 15 July 2021), art 13 [*China's Administrative Penalty Law*].

[36] *Trial ETS Measure*, *supra* note 2, art 39.

[37] *2021 Draft ETS Regulation*, *supra* note 34, art 24.

[38] *China's Administrative Penalty Law*, *supra* note 35, art 11; *2021 Draft ETS Regulation*, *supra* note 34, art 31; see also *2019 Draft ETS Regulation*, *supra* note 33, art 24 (even leaving a possibility for administrative reconsideration or litigation).

litigation,[39] it remains uncertain whether the ETS authority can request court enforcement for MRV compliance or whether major emitters can challenge the ETS authority's verification or spot check decisions. The regulation aims to enable the pursuit of legal liability for those causing harm to others, endangering market order and security, or committing crimes.[40]

Currently, the MEE relies on the Trial ETS Measure, which mirrors and supersedes the 2014 decree, establishing the major emitter threshold,[41] MRV requirements,[42] and responsibilities of different ETS authorities.[43] To implement ministerial decrees, the central government issues operational rules in the form of administrative notices and technical guidelines. The NETS Launching Notice was a key document, initially planning to include eight major emitting industries: petrochemical, chemical, building materials, steel, nonferrous metals, paper, electricity, and aviation.[44] Annual MRV notices, based on ministerial decrees, GHG Control Plans, and FYPs, guide government agencies at various levels to ensure data quality and strengthen data foundations for the NETS.[45] Concurrently, industries and major emitters must conduct MRV-related work following the Accounting Methodologies, Reporting Guidelines, and Verification Guidelines.[46]

---

[39] *Notice on Issuing the Decision to Amend the Provisions on the Causes of Action of Civil Cases [印发《关于修改〈民事案件案由规定〉的决定》的通知]* (29 December 2020), Supreme People's Court [2020] No 346 at para 22.

[40] *2021 Draft ETS Regulation*, *supra* note 34, art 31.

[41] *Trial ETS Measure*, *supra* note 2, arts 8–13.

[42] *Ibid* at arts 6, 10, 25–27.

[43] *Ibid* at arts 6, 9, 30–32.

[44] *Notice on Earnestly Completing the Key Work for Launching the National Carbon Emissions Trading Market [关于切实做好全国碳排放权交易市场启动重点工作的通知]* (11 January 2016), National Development and Reform Commission General Office, Climate [2016] No 57 at para 2.1 [*NETS Launching Notice*].

[45] See e.g. *Notice on Completing Carbon Emissions Reporting and Verification and the Emissions Monitoring Plan in 2016 and 2017 [关于做好2016, 2017年度碳排放报告与核查及排放监测计划制定工作的通知]* (4 December 2017) National Development and Reform Commission General Office, Climate [2017] No 1989 [*2016-2017 MRV Notice*] (concretizing the general provisions of the 2014 decree and the GHG Control Plan for the 13th FYP).

[46] See e.g. *Notice on Issuing the Accounting Methodologies and Reporting Guidelines for Greenhouse Gas Emissions of Enterprises in the First Batch of Ten Industries [关于印发首批10个行业企业温室气体排放核算方法与报告指南（试行）的通知]* (15 October 2013) National Development and Reform Commission General Office, Climate [2013] No 2526; *Notice on Issuing the Accounting Methodologies and Reporting Guidelines for Greenhouse Gas Emissions of Enterprises in the Second Batch of Four Industries [关于印发第二批4个行业企业温室气体排放核算方法与报告指南（试行）的通知]* (3 December 2014) National Development and Reform Commission General Office, Climate [2014] No 2920; *Notice on Issuing the Accounting Methodologies and Reporting Guidelines for Greenhouse Gas Emissions of*

The NETS has entered its second compliance cycle, following the inaugural cycle where over 2,100 entities in the electricity generation industry surrendered allowances in 2021 to cover their 2019-2020 emissions.[47] As one of the core policy tools for China to progress towards its dual carbon goals, the NETS is fostering market awareness, establishing trading frameworks, and steering businesses to manage their emissions. The allocation of allowances is tied to the carbon intensity of electricity production. The NETS seeks to improve the operational efficiency of businesses and reduce their emissions intensity, aligning with China's continued growth in the economy and overall emissions. Its immediate goal is to acquaint stakeholders with emissions trading principles, guiding them through the processes of MRV, while demonstrating the benefits of compliance. Anticipated enhancements, such as an absolute emissions cap, broader industry coverage, and stronger MRV and legal enforcement, will enable the NETS to fulfill its intended role in emissions reductions in China.[48]

The entities participating in the NETS are no longer part of the pilot ETSs.[49] This raises the question of the pilots' future. According to the 2021 Draft ETS Regulation, no new local ETS will be established, and existing ones will gradually integrate into the NETS.[50] Before full integration, the eight pilot jurisdictions must fulfill their MRV responsibilities to support the NETS while managing their own ETS. They adhere to central government rules, preparing lists of major emitters for the NETS, organizing emissions reporting and verification, and compiling reports for the MEE. Simultaneously, their governments have created provincial or municipal ETS measures, occasionally empowered by legislatures.[51] The varying legislative sources

---

Enterprises in the Third Batch of Ten Industries [关于印发第三批10个行业企业温室气体核算方法与报告指南（试行）的通知] (6 July 2015) National Development and Reform Commission General Office, Climate [2015] No 1722; *Verification Guidelines for Greenhouse Gas Emissions Reporting of Enterprises (Trial) [企业温室气体排放报告核查指南(试行)]* (26 March 2021) Ministry of Ecology and Environment General Office, Climate [2021] No 130 [*2021 Verification Guidelines*].

[47] *List of Major Emitters for Allowances Management in the National Emissions Trading for 2019-2020 [纳入2019-2020年全国碳排放权交易配额管理的重点排放单位名单]* (2020); *China's Policies and Actions for Addressing Climate Change (2023) [中国应对气候变化的政策与行动2023年度报告]* (Beijing, CHN: Ministry of Ecology and Environment, 2023) at 20 [*China's Climate Policies and Actions (2023)*].

[48] See e.g. Huw Slater, "How Can China's National Carbon Market Contribute to Reducing Emissions?" (20 August 2021), online: *China Dialogue* <https://chinadialogue.net/en/climate/how-can-chinas-national-carbon-market-contribute-to-reducing-emissions/> [https://perma.cc/B6DN-EDA5]; You, *supra* note 21.

[49] *Trial ETS Measure*, *supra* note 2, art 13.

[50] *2021 Draft ETS Regulation*, *supra* note 34, art 32.

[51] The legal bases that underpin provincial or municipal ETS measures come from either the administrative decrees of local governments like Shenzhen, Shanghai, Guangdong, Hubei, Fujian or the administrative

grant governments differing degrees of authority and flexibility in developing and enforcing MRV rules.[52]

Due to diverse industrial and energy structures, economic growth, and emissions, the eight pilots encompass different industries and major emitter thresholds. Electricity, iron and steel, cement, and petrochemicals are commonly covered, while some jurisdictions extend to glass, buildings, and other industries.[53] Compared to NETS entities emitting at least 26,000 tons of CO_2e per year,[54] most pilots include entities emitting over 20,000 tons of CO_2e (or with a comprehensive energy use of 10,000 tons of standard coal equivalent). The thresholds are 5,000 tons of CO_2e in Beijing,[55] 3,000 tons of CO_2e in Shenzhen,[56] and 60,000 tons of standard coal equivalent in Hubei.[57] While these pilots have contributed to the progressive establishment of the NETS,[58] regional disparities in data collection and management present challenges, which are further discussed in Section 4.3.

notices of local governments like Beijing, Tianjin, Chongqing. In addition, Beijing and Shenzhen have the decisions of their respective Standing Committee of Municipal People's Congress.

[52] See Maosheng Duan, "From Carbon Emissions Trading Pilots to National System: The Road Map for China" (2015) 9:3 Carbon & Climate L Rev 231 at 233 (explaining the legal bases of local ETS rules and their limits of setting monetary penalties for non-compliance); Valerie J Karplus & Xiliang Zhang, "Incentivizing Firm Compliance with China's National Emissions Trading System" (2017) 6:2 Economics Energy & Envtl Pol'y 73 at 83 (taking Beijing's ETS as an example).

[53] "Coverage of China's carbon trading market [中国碳交易市场覆盖范围]" (3 November 2019), online: *Tanjiaoyi* <http://www.tanjiaoyi.com/article-29305-1.html>.

[54] *Trial ETS Measure*, *supra* note 2, art 8.

[55] Beijing Municipal Ecology and Environment Bureau, *Notice on Issuing the 2019 List of Key Carbon Emitters and Reporting Entities in Beijing [关于公布2019年北京市重点碳排放单位及报告单位名单的通知]* (16 March 2020) Jinghuanfa [2020] No 3.

[56] Shenzhen Municipal People's Government, *Interim Measure for the Management of Shenzhen's Carbon Emissions Trading [深圳市碳排放权交易管理暂行办法]* (19 March 2014) Municipal Government Order No 262, art 11 [*Shenzhen ETS Measure*].

[57] Hubei Provincial People's Government, *Interim Measure for the Administration of Hubei's Carbon Emissions Trading [湖北省碳排放权管理和交易暂行办法]* (1 June 2014) Provincial Government Order No 371, art 5 [*Hubei ETS Measure*].

[58] Hao Zhang & Ping Xu, "Designing Regulation for China's Emission-Trading Pilot Programs Through Trial and Error: An Effective Approach?" (2017) 7:2-3 Climate L 125 at 127, 130.

2. Data Quality

2.1. Regulating ETS Needs High-Quality Data

Reliable and sufficient data is essential for governments to allocate allowances and oversee compliance in ETS.[59] Allowances can be distributed for free, through auction, or a combination of both.[60] The method used for free allocation determines the data requirements: grandparenting allocates allowances based on historical emissions from a base year or period, while benchmarking does so using performance indicators.[61] Effective MRV processes play a crucial role in determining allowances and preserving the integrity of ETS, including the stability of allowances prices. For example, an oversupply of allowances can lead to low prices, which, in turn, can deter active emissions trading and the pursuit of emissions reductions.[62] The price volatility in Phase 1 of the EU ETS partly resulted from insufficient emissions data and the over allocation of allowances.[63]

High-quality data supports compliance oversight,[64] enabling regulators to track emitters' allowances holdings and adherence to emissions reduction obligations.[65] Timely, accurate information on emissions, allowances holdings, and trading is vital for assessing individual compliance and achieving broader environmental goals.[66] Quebec's ETS demonstrates the smooth functioning of an ETS

[59] Kruger & Egenhofer, *supra* note 5 at 2–3; Schmalensee & Stavins, *supra* note 1 at 70.

[60] With free allowances, the regulated can emit to a predetermined level set by the initial allocation and pay only when their emissions are over that level. Regulators sometimes shift to auction that distributes allowances to the buyers who value them the highest. See further van Asselt, *supra* note 15 at 343–44; Easwaran Narassimhan et al, "Carbon Pricing in Practice: A Review of Existing Emissions Trading Systems" (2018) 18:8 Climate Pol'y 967 at 975–78.

[61] "Allocation", online: *International Carbon Action Partnership* <https://icapcarbonaction.com/en/allocation> [https://perma.cc/6QXY-UTC5]; see further Zeng et al, *supra* note 11 at S94 (discussing benchmarking, intensity-based grandparenting, and emissions-based grandparenting).

[62] Narassimhan et al, *supra* note 60 at 979; Sanja Bogojević, "Trading Schemes" in Emma Lees & Jorge E Viñuales, eds, *The Oxford Handbook of Comparative Environmental Law* (Oxford, UK: Oxford University Press, 2019) 926 at 940 (considering overallocation as the main reason for low allowances prices in the EU ETS); see also Djamel Kirat & Ibrahim Ahamada, "The Impact of the European Union Emission Trading Scheme on the Electricity-Generation Sector" (2011) 33:5 Energy Economics 995 at 1003 (analyzing the relationship between the prices and allocations of allowances and the incentives for emissions reductions in the EU ETS).

[63] Schmalensee & Stavins, *supra* note 1 at 69–72.

[64] Kruger & Egenhofer, *supra* note 5 at 2–3.

[65] Lesley K McAllister, "Putting Persuasion Back in the Equation: Compliance in Cap and Trade Programs" (2007) 24:2 Pace Envtl L Rev 299 at 301; van Asselt, *supra* note 15 at 349.

[66] Lesley K McAllister, "The Enforcement Challenge of Cap-and-Trade Regulation" (2010) 40:4 Environmental Law 1195 at 1197 [McAllister, "Enforcement Challenge of Cap-and-Trade"]; Kruger & Egenhofer, *supra* note 5 at 2; Schmalensee & Stavins, *supra* note 1 at 72.

supported by high-quality data, making it an important tool for reducing emissions in the region.[67]

Quality data availability has impacted the implementation of China's NETS.[68] Although the aim was to include the eight major emitting industries,[69] only the electricity generation industry has started trading.[70] The delay in fully operationalizing the NETS stems from challenges in obtaining historical carbon emissions data across these industries.[71] The NETS has primarily employed output-based benchmarking, allocating free allowances according to specific benchmarks reflective of actual production.[72] Yet, historical data is crucial for initial allocations before real-time production data becomes available.[73] While the Accounting Methodologies and Reporting Guidelines have been in place to support GHG emissions measurement and reporting since 2013,[74] data quality remains inconsistent across industries.[75] The electricity generation industry, in contrast, boasts a strong data foundation. It benefits from straightforward products that streamline allowances allocation and data verification. Furthermore, it possesses reliable data measurement facilities and a high level of automation and standardization in data management.[76]

Recently, the MEE has enhanced emissions reporting management by requiring provincial ecology and environment (EE) authorities to organize eligible emitters in the eight major emitting industries to submit and verify emissions data with supporting materials.[77] This effort aims to accurately assess allowance allocation,

---

[67] Jean-Yves Benoit & Claude Cote, "Essay by the Quebec Government on Its Cap-and-Trade System and the Western Climate Initiative Regional Carbon Market: Origins, Strengths and Advantages" (2015) 33:1 UCLA J Envtl L & Pol'y 42 at 55–56.

[68] State Council Policy Briefing, *supra* note 7; Stoerk, Dudek & Yang, *supra* note 7 at 483.

[69] See e.g. *NETS Launching Notice*, *supra* note 44 at para 2; *2016-2017 MRV Notice*, *supra* note 45 at para 1.

[70] "The First Compliance Cycle of the National Carbon Market Officially Launched [全国碳市场第1个履约周期正式启动]", (5 January 2021), online: *Xinhua* <http://www.xinhuanet.com/2021-01/05/c_1126949700.htm>.

[71] Stoerk, Dudek & Yang, *supra* note 7 at 483.

[72] "China National ETS" (2023), online: *International Carbon Action Partnership* <https://icapcarbonaction.com/en/ets/china-national-ets> [https://perma.cc/FW8M-UQQQ].

[73] Zeng et al, *supra* note 11 at S94; Duan, *supra* note 52 at 241.

[74] *NETS Launching Notice*, *supra* note 44 at para 2.2.

[75] Stoerk, Dudek & Yang, *supra* note 7 at 483; Zeng et al, *supra* note 11 at S98.

[76] State Council Policy Briefing, *supra* note 7.

[77] *Notice on Strengthening the Management of Greenhouse Gas Emissions Reporting of Enterprises [关于加强企业温室气体排放报告管理相关工作的通知]* (29 March 2021) Ministry of Ecology and Environment General Office, Climate [2021] No 9 [*Reporting Management Notice*].

settlement, and compliance in the electricity generation industry, while consolidating data for expanding NETS industry coverage and improving allowances allocation.[78]

2.2. Emitters and MRV Obligations

Emitters, as the primary data generators, must adhere to MRV obligations[79] and provide high-quality data. Trust in an ETS and the incentives for emissions reductions can be undermined if any emitter's data is omitted. Data misreported by an ETS-regulated emitter not only affects that emitter but also others within the system. Whether through intentional manipulation or insufficient capacity to monitor and report accurately, underreporting could allow an emitter to profit by selling "extra" allowances to well-reporting entities, hindering their contributions to actual emissions reductions.[80] Jurisdictions like Quebec and California have implemented mandatory reporting regulations to ensure MRV compliance.[81] Covered entities must report their GHG emissions following rigorous protocols, and non-compliance can result in monetary penalties and reputational consequences like naming, shaming, and blacklisting.[82]

The NETS identifies major emitters based on their annual GHG emissions and industry affiliation.[83] These emitters must ensure the authenticity, completeness, and accuracy of their emissions reports,[84] following *ex-ante* procedural requirements, such as developing and implementing a data quality control plan, establishing emissions accounting and reporting rules, maintaining a reliable data management system, regularly servicing measurement and monitoring equipment, and conducting internal reviews of emissions reports.[85] Emitters that submit false or concealed reports or fail to meet their reporting obligations face penalties, such as receiving rectification orders and fines. Those who do not rectify their violations on time will be subject to mandatory emissions measurement and receive reduced free allowances for the

---

[78] *Ibid*.

[79] Simply put, emitters regularly monitor and report emissions and have emissions reductions verified.

[80] McAllister, "Enforcement Challenge of Cap-and-Trade", *supra* note 66 at 1199; Da Zhang et al, "Integrity of Firms' Emissions Reporting in China's Early Carbon Markets" (2019) 9:2 Nature Climate Change 164 at 164.

[81] *Regulation Respecting Mandatory Reporting of Certain Emissions of Contaminants into the Atmosphere, CQLR c Q-2, r 15*; *Regulation for the Mandatory Reporting of Greenhouse Gas Emissions*, Cal Code Regs, title 17 at §§ 95100–63.

[82] See further van Asselt, *supra* note 15 at 349–50; Chen, "Emissions Trading Schemes", *supra* note 8 at 318, 320, 328.

[83] *Trial ETS Measure*, *supra* note 2, art 8.

[84] *Ibid*, art 25.2.

[85] *2021 Verification Guidelines*, *supra* note 46 at 4–5, 15–19.

following compliance year.[86] In one known case, an Inner Mongolian company submitted tampered emissions reports to a third-party verification agency. The local EE authority ordered the company to rectify its violation by re-examining all inspection items and cooperating with the verification agency to provide accurate data.[87] Interestingly, no monetary penalties were mentioned.

Apart from deliberate misreporting, emitters may fail their reporting obligations due to inattention, misunderstanding of reporting rules, or capacity limitations.[88] Guangdong's experience has shown that weak MRV capacities can lead to improper energy metering and flawed recording of monitored data. Some enterprises only knew how to monitor conventional pollutants to meet general environmental protection standards rather than specific parameters indicative of GHG emissions.[89] In contrast, ETSs in Beijing and Hubei have demonstrated that improved reporting capacity can reduce discrepancies between self-reported and verified data.[90] The MEE has organized MRV training workshops, published typical questions and answers, and provided policy and technical assistance via the NETS Help Desk and the National Pollutant Discharge Permit Management Information Platform.[91] Broader MRV capacity building is closely related to cost concerns and financial support, which will be discussed further in Section 3.

2.3. Third-Party Verifiers in Data Quality Management

Incorporating third parties in the verification process has become a vital component of data quality management. Independent, non-governmental actors verify emissions reports before submission to regulators.[92] In the EU ETS, for example, industrial installations and aircraft operators must undergo third-party verification for their monitored and reported data.[93] Since regulators might not have the capacity to review and verify every emissions report, engaging skilled private entities in the verification

---

[86] *Trial ETS Measure*, *supra* note 2, art 39; see also *2021 Draft ETS Regulation*, *supra* note 34, art 24.

[87] For more about this case, see "Inner Mongolia Ordos High-Tech Materials Co., Ltd. False Carbon Emissions Reporting Case [内蒙古鄂尔多斯高新材料有限公司虚报碳排放报告案]" (11 July 2021), online: *Ecological China Network* <https://www.eco.gov.cn/news_info/46857.html> [https://perma.cc/6LKZ-KY7D] ["Inner Mongolian Case"].

[88] Zhang et al, *supra* note 80 at 168.

[89] Daiqing Zhao, Wenjun Wang & Zhigang Luo, *A Brief Overview of China's ETS Pilots: Deconstruction and Assessment of Guangdong's Greenhouse Gas Emission Trading Mechanism* (Singapore: Springer, 2019) at 148–49.

[90] Zhang et al, *supra* note 80 at 164, 168.

[91] *Reporting Management Notice*, *supra* note 77 at para 3.3; *China's Climate Policies and Actions (2023)*, *supra* note 47 at 22.

[92] McAllister, "Enforcement Challenge of Cap-and-Trade", *supra* note 66 at 1209–10, 1228–29; Zahar & Zhang, *supra* note 4 at 120.

[93] Green et al, *supra* note 3 at 16.

process is crucial for effectively implementing MRV standards and ensuring authentic, complete, and accurate verification outcomes.[94] Research has demonstrated that involving third-party organizations improves data accuracy.[95] Studies have also connected China's low-quality energy and emissions data to its long-standing reliance on self-reporting. In this system, regulated entities submit emissions data directly to local governments, which then compile and transmit the data to higher levels of government. The absence of substantial independent oversight exacerbates this issue.[96]

As local ETS pilots emerged in China, governments mandated third-party verification, with different regional strategies to enhance the credibility of the verification process and mitigate potential conflicts of interest. For instance, Hubei established accreditation requirements for third-party verifiers and assigned them to emitters,[97] while Shenzhen and Beijing allowed emitters to choose their verifiers.[98] In Tianjin and Shenzhen, emitters could not select the same verifier for three consecutive years.[99] Fujian's ETS authority conducted spot checks on verification reports,[100] and major emitters could appeal to a government-appointed fourth party if they disagreed with the verification or check outcome.[101] The central government has prioritized data quality management in the NETS,[102] with verified emissions data serving as the sole valid basis for allowances allocation and for major emitters to surrender their allowances.[103]

However, third-party verifiers can add complexities to legal compliance processes, as they oversee reporting but also need regulatory oversight. Their potential lack of competence or rigor may compromise verification quality and undermine

---

[94] See e.g. *Trial ETS Measure*, *supra* note 2, art 26.

[95] See e.g. Xuejiao Niu et al, "Has Third-party Monitoring Improved Environmental Data Quality? An Analysis of Air Pollution Data in China" (2020) 253 J Envtl Management 109698.

[96] Dalia Ghanem & Junjie Zhang, "'Effortless Perfection:' Do Chinese Cities Manipulate Air Pollution Data?" (2014) 68:2 J Envtl Economics & Management 203 at 206; Zhang et al, *supra* note 80 at 164.

[97] *Hubei ETS Measure*, *supra* note 57, arts 34, 36.

[98] *Shenzhen ETS Measure*, *supra* note 56, art 29; Beijing Municipal People's Government, *Interim Measure for the Management of Beijing's Carbon Emissions Trading [北京市碳排放权交易管理办法(试行)]* (3 July 2014) Jingzhengfa [2014] No 14, art 11 [*Beijing ETS Measure*].

[99] Tianjin Municipal People's Government, *Interim Measure for the Management of Tianjin's Carbon Emissions Trading [天津市碳排放权交易管理暂行办法]* (1 July 2020), art 15 [*Tianjin ETS Measure*]; *Shenzhen ETS Measure*, *supra* note 56, art 30.

[100] Fujian Provincial People's Government, *Interim Measure for the Management of Fujian's Carbon Emissions Trading [福建省碳排放权交易管理暂行办法]* (revised 7 August 2020) Provincial Government Order No 214, art 26 [*Fujian ETS Measure*].

[101] *Ibid*, art 27.

[102] State Council Policy Briefing, *supra* note 7.

[103] *Ibid*; *Trial ETS Measure*, *supra* note 2, art 26.1.

emitters' credibility. Research has cautioned that disparities in verifiers' competencies and rigors could impede the detection of reporting errors. Moreover, verifiers could be swayed to align their findings with the data supplied by their paying clients.[104] Hence, it is imperative to define and clarify the competence, regulatory authority, and legal liabilities of third-party verifiers.[105]

The MEE's development of Verification Guidelines provides clarity on verification requirements and procedures,[106] moving away from previous practices that only offered quick reference guides attached to annual MRV notices.[107] While the NETS primarily relies on government-led verification, it also permits the involvement of technical service organizations. Specifically, under the Guidelines, provincial EE authorities are responsible for organizing the verification work, considering tasks, schedules, and necessary resources. Third-party verifiers, when engaged through government procurement services, are mandated to establish robust risk prevention and quality management systems. These verifiers are restricted from conducting activities that could impair the objectivity of the verification process, such as providing emissions-related consultations to major emitters or being involved in carbon asset management.[108] This framework can reinforce the integrity and reliability of third-party verification in the NETS.

In a unique law enforcement initiative to oversee emissions data quality, the MEE formed 31 special working groups that operated from October to December 2021. These groups focused on key technical service organizations and their emitter clients, conducting thorough on-site supervision and review of critical processes, such as coal sampling, coal quality testing, data verification, and report compilation. Common non-compliance issues included falsifying coal samples, tampering with or forging reports, distorting conclusions, and failing to meet verification requirements or procedures. Upon identifying non-compliant organizations, the MEE publicized their names and violations.[109] Those found to be falsifying verifications may face

---

[104] Zhang et al, *supra* note 80 at 165.

[105] McAllister, "Enforcement Challenge of Cap-and-Trade", *supra* note 66 at 1228–29; Chen, "Emissions Trading Schemes", *supra* note 8 at 328.

[106] *2021 Verification Guidelines*, *supra* note 46.

[107] See e.g. *Reference Guide for Verifying Emissions Monitoring Plans and Emissions Reports, Annex 4 to the Notice on Completing Carbon Emissions Reporting and Verification and Emissions Monitoring Plans in 2018* [*关于做好2018年度碳排放报告与核查及排放监测计划制定工作的通知, 附件4: 排放监测计划审核和排放报告核查参考指南*] (17 January 2019) Ministry of Ecology and Environment General Office, Climate [2019] No 71 [*2018 MRV Notice*].

[108] *2021 Verification Guidelines*, *supra* note 46 at 6.

[109] "The Ministry of Ecology and Environment Released Cases of Falsification of Emissions Reports and Other Typical Problems [生态环境部公开碳排放报告数据弄虚作假等典型问题案例]" (14 March 2022), online: *Ministry of Ecology and Environment* <https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202203/t20220314_971398.shtml>

additional sanctions, such as contract termination, documentation of illegal acts in credit records, and inclusion on the national credit information sharing platform. In severe cases, they could be banned from providing verification services for three years.[110] The law enforcement-style supervision, coupled with reputational sanctions through public naming-and-shaming, and economic sanctions like service termination or bans, acted as a powerful deterrent. This strategic combination prompted organizations to commit to proactive rectification.[111]

3. Cost Concerns

3.1. Governments and Administrative Costs

ETS is chosen for its perceived economic efficiency in reducing emissions, with the market playing a significant role. However, it is primarily an environmental regulatory tool, and it entails various costs, many of which relate to emissions data. Regulators incur administrative expenses in establishing data management infrastructure and formulating, implementing, and enforcing MRV rules.[112] These costs escalate if regulators opt for direct monitoring and measurement for compliance oversight. Often, regulators permit self-monitoring and self-reporting,[113] transferring data collection responsibility and expense to emitters.

Operationalizing the NETS requires substantial administrative costs, including the development of data management infrastructures and regulatory measures for compliance guidance and supervision. Governments must invest in supporting systems for MRV,[114] such as refining MRV rules and guidelines, training personnel, enhancing the capacity of localities and emitters, and drafting and consulting on ETS regulations. Costs may increase as a result of managing a larger pool of emitters. The immediate challenge lies in covering nationwide emitters, most

---

[https://perma.cc/U5Q4-SNQV] [Typical Data Problems]; *China's Climate Policies and Actions (2023)*, *supra* note 47 at 21.

[110] *2021 Draft ETS Regulation*, *supra* note 34, arts 26, 30.

[111] See e.g. SinoCarbon Innovation & Investment Co, Ltd, "Statement on the Ministry of Ecology and Environment's Announcement [关于生态环境部相关公告的声明]" (14 March 2022), online: *SinoCarbon* <http://www.sinocarbon.cn/blog/f713b129d51> [https://perma.cc/G8XR-EEPN].

[112] For more about the administrative costs relating to ETSs see Tietenberg, *supra* note 1 at 42; Jeff Pope & Anthony D Owen, "Emission Trading Schemes: Potential Revenue Effects, Compliance Costs and Overall Tax Policy Issues" (2009) 37:11 Energy Policy 4595 at 4600.

[113] McAllister, "Enforcement Challenge of Cap-and-Trade", *supra* note 66 at 1202–09; Zahar & Zhang, *supra* note 4 at 120.

[114] Zhongxiang Zhang, "Carbon Emissions Trading in China: The Evolution from Pilots to a Nationwide Scheme" (2015) 15:S1 Climate Policy S104 at S106 [Zhang, "Carbon Emissions Trading in China"].

of whom have limited experience with ETS and MRV. Expenses will also rise as the NETS integrates additional industries.[115]

Furthermore, the NDRC and its local counterparts had overseen ETS for years until the MEE and local EE authorities assumed responsibility. This transition generated additional costs, as environmental authorities must adapt to the new role of operating the world's largest ETS and developing corresponding regulatory measures.[116] Section 4.2 will delve deeper into the roles of the MEE and the NDRC.

3.2. Emitters and Compliance Costs

High-quality data collection contributes significantly to compliance costs for emitters.[117] Start-up costs involve establishing monitoring and reporting facilities, as well as quantifying emissions for allowances allocation. Recurrent costs arise from regular MRV of emissions, handling sanctions, and risk management.[118] Studies of the EU ETS revealed that compliance with MRV regulations accounted for 65% to 95% of the costs of participating in the ETS.[119]

For major emitters entering the NETS, their compliance costs rise as they need to familiarize themselves with new rules and procedures, modify their data gathering and processing methods, and construct facilities in line with national standards. For example, the NETS aims to monitor, report, and verify a broader range of GHGs than current pilot ETSs.[120] Reporting non-CO_2 GHGs aligns with the

---

[115] Jeff Swartz, *China's National Emissions Trading System: Implications for Carbon Markets and Trade* (Geneva: ICTSD, 2016) at 18 (pointing out the challenge that the sheer size of the NETS is posing to scaling up MRV); Tietenberg, *supra* note 1 at 42 (explaining the administrative costs that comprise setting up and implementing emissions trading, including those for MRV).

[116] See further Green et al, *supra* note 3 at 111 (noting the higher costs the Competent Authority bore because of changing reporting requirements).

[117] See e.g. Wang, Zhu & Fan, *supra* note 6.

[118] Pope & Owen, *supra* note 112 at 4601.

[119] Guillaume Jacquier & Valentin Bellassen, "Trendsetter for Companies and Industrial Sites: The EU Emissions Trading Scheme" in Valentin Bellassen & Nicolas Stephan, eds, *Accounting for Carbon: Monitoring, Reporting and Verifying Emissions in the Climate Economy* (Cambridge: Cambridge University Press, 2015) 139 at 173; Green et al, *supra* note 3 at 22.

[120] *Trial ETS Measure*, *supra* note 2 at art 42.1 (covering carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3). Most pilot ETSs are CO_2-focused, see *Fujian ETS Measure*, *supra* note 100, art 39; *Beijing ETS Measure*, *supra* note 98, art 25; *Hubei ETS Measure*, *supra* note 57, art 52; *Shenzhen ETS Measure*, *supra* note 56, art 82(1); *Tianjin ETS Measure*, *supra* note 99, art 38; Shanghai Municipal People's Government, *Interim Measure for the Administration of Shanghai's Carbon Emissions Trading [上海市碳排放管理试行办法]* (20 November 2013) Municipal Government Order No 10, art 44 [*Shanghai ETS Measure*]; *Guangdong Provincial People's Government, Interim Measure for the Administration of Guangdong's Carbon Emissions Trading [广东省碳排放管理试行办法]* (1 March

guidelines for Annex I Parties to the United Nations Framework Convention on Climate Change.[121] Nevertheless, these requirements pose technical and financial challenges to major emitters, given the complexities and expense of accurately monitoring and measuring emissions from specific gases and activities.[122] Consequently, the NETS must provide additional incentives to achieve its overarching emissions control and reduction goals. The MEE has urged localities to support major emitters in reporting and verifying GHG emissions through special financial arrangements.[123]

Major emitters may have reduced incentives to comply with MRV obligations if the disclosed information puts them at a competitive disadvantage. Business-sensitive information is a primary concern, as reporting requires different levels of specificity (e.g., benchmarking necessitates basic data gathering and disclosure, while auditing imposes strict requirements), which affects not only costs but also stakeholders' behavior.[124] Some enterprises in the pilot ETS were reluctant to share production data, fearing competitors could gain valuable insights, as "carbon intensity data from the same industry with a comparable product lineup will hint at profit margins."[125] The NETS reporting requirements include emissions quantities and factors, activity and production data, and emitter information. This means major emitters must disclose details about their production processes, which could sometimes involve trade secrets or other proprietary information.[126]

2014) Provincial Government Order No 197, art 42 [*Guangdong ETS Measure*]. The only exception is *Chongqing Municipal People's Government, Interim Measure for the Management of Chongqing's Carbon Emissions Trading [重庆市碳排放权交易管理暂行办法]* (26 April 2014) Municipal Government Order No 17, art 40 [*Chongqing ETS Measure*] (covering CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6).

[121] "Reporting Requirements" (2023), online: *UNFCCC* <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/reporting-requirements> [https://perma.cc/JM66-MAY6].

[122] See further van Asselt, *supra* note 15 at 338 (indicating that administrative and compliance costs influence regulators' choices on the scope and coverage of an ETS).

[123] *Reporting Management Notice*, *supra* note 77 at para 3(2).

[124] Jørgen Wettestad, "Monitoring and Verification" in Daniel Bodansky, Jutta Brunnée & Ellen Hey, eds, *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2008) at 979; David Hsu, "How Much Information Disclosure of Building Energy Performance Is Necessary?" (2014) 64 Energy Policy 263 at 265–66.

[125] Caspar Chiquet, "Variant 3: Emissions of a Company/Institution Rather Than a Site: The Case of the Shenzhen ETS" in Valentin Bellassen & Nicolas Stephan, eds, *Accounting for Carbon: Monitoring, Reporting and Verifying Emissions in the Climate Economy* (Cambridge University Press, 2015) 263 at 276.

[126] See further *2021 Verification Guidelines*, *supra* note 46 at 4, 8, 12–15; Chen, "Emissions Trading Schemes", *supra* note 8 at 327–28.

3.3. Benefits and Costs of Third-Party Verification

Data costs concern both public and private sectors in maintaining data quality. Governments often grapple with limited resources, capacity, and fiscal burden in managing individual compliance and overall environmental quality. Emitters may not always adhere to MRV requirements, potentially producing false or substandard data,[127] or withholding detailed or sensitive information to protect trade secrets or confidential business details.[128] Such actions can lead to increased administrative costs as regulators may need to conduct site visits to improve data accuracy.[129]

Third-party verification benefits both governments and emitters by alleviating administrative burdens and enhancing reporting credibility. Independent verifiers are expected to adeptly interpret and apply domestic regulations and guidelines, potentially leading to the development of verification methods that gain recognition as industry standards.[130] Additionally, jurisdictions like the EU, Quebec, and California have aligned their ETS verification and accreditation requirements with harmonized international standards, particularly from the International Organization for Standardization.[131]

Third-party verification is meant to lessen administrative burdens. The distribution of verification costs between governments and emitters is a pivotal aspect impacting the efficiency of ETS. In the EU and California, emitters are responsible for verification fees.[132] In China, however, this responsibility has oscillated between emitters and governments. Guangdong funds spot checks while emitters cover verification fees,[133] whereas Fujian supports both through its provincial public budget.[134] In Beijing, the government initially bore the costs for third-party verification and assigned verifiers to firms. However, in the 2015 compliance year, this financial burden was shifted to the firms. This reallocation was aimed at supporting historical emissions verification for new program entrants, but it raised concerns about verifiers

---

[127] McAllister, "Enforcement Challenge of Cap-and-Trade", *supra* note 66 at 1210.

[128] See e.g. Wettestad, *supra* note 124 at 979.

[129] Zahar & Zhang, *supra* note 4 at 120.

[130] McAllister, "Enforcement Challenge of Cap-and-Trade", *supra* note 66 at 1228–29.

[131] Green et al, *supra* note 3 at 17; Benoit & Cote, *supra* note 67 at 55; California Air Resources Board, "Greenhouse Gas Verification Program: Requirements for Accreditation of Verification Bodies and Verifiers" (October 2011), online: <https://ww2.arb.ca.gov/sites/default/files/classic/cc/reporting/ghg-ver/accreditation_oversight.pdf>.

[132] Green et al, *supra* note 3 at 24; Marion Afriat & Emilie Alberola, "Variant 2: Non-site Level Emissions in an ETS – The Case of Electricity Importers in the California Cap-and-Trade" in Valentin Bellassen & Nicolas Stephan, eds, *Accounting for Carbon: Monitoring, Reporting and Verifying Emissions in the Climate Economy* (Cambridge University Press, 2015) 221 at 243–44.

[133] *Guangdong ETS Measure*, *supra* note 120, art 7.

[134] *Fujian ETS Measure*, *supra* note 100, art 26.

potentially favoring the interests of their paying clients.[135] The trend has recently shifted towards using public funds to reduce MRV costs for major emitters, as endorsed by the 2018 MRV Notice, though specific funding details were not provided.[136] The 2019 Draft ETS Regulation proposed that verification funds be incorporated into the central government's budget, which would exempt major emitters from verification fees,[137] and set penalties for verification agencies that charge emitters.[138] The latest strategy involves government procurement of services, enabling provincial EE authorities to enlist technical service agencies for verification tasks.[139]

While third-party verification plays a key role in ensuring compliance with ETS, it should be addressed that private verifiers are not immune to regulatory capture, and data manipulation could occur if verification standards are compromised by private interests.[140] The phenomenon of regulatory capture, where regulatory agencies or external verifiers may become unduly influenced by the very entities they are intended to regulate, carries profound implications for the integrity of ETS. As evidenced in China's power market reform and Canada's environmental regulatory framework, there are instances where local governments in China have favored local state-owned enterprises by skewing generation quotas, and in Canada, a specific industry has exerted influence over the environmental regulatory process.[141] The intrusion of private interests into verification processes can thus severely distort emissions data and compromise regulatory effectiveness, underscoring the imperative for implementing robust, transparent, and accountable verification mechanisms. These mechanisms must not only adhere to high standards of data accuracy and independence but also be resistant to potential manipulation by vested interests. As a result, regulators should allocate resources to accredit, oversee, and, when necessary, sanction private verifiers to prevent collusion with their clients in data manipulation. This highlights the ongoing challenge of balancing data quality and cost that regulators strive to achieve by involving third parties. Addressing cost concerns is essential when

---

[135] Zhang et al, *supra* note 80 at 165.

[136] See e.g. *2018 MRV Notice*, *supra* note 107.

[137] *2019 Draft ETS Regulation*, *supra* note 33, art 8.

[138] *Ibid*, art 20.

[139] *Trial ETS Measure*, *supra* note 2, art 26; *2021 Verification Guidelines*, *supra* note 46 at 6–9; *2021 Draft ETS Regulation*, *supra* note 34, art 10.

[140] For more about regulatory capture, see e.g. Anthony I Ogus, *Regulation: Legal Form and Economic Theory* (Oxford, UK: Oxford University Press, 1994) at 57–58; Brian Andrew, "Market Failure, Government Failure and Externalities in Climate Change Mitigation: The Case for a Carbon Tax" (2008) 28:5 Public Administration & Development 393 at 398; Steve Cicala, "When Does Regulation Distort Costs? Lessons from Fuel Procurement in US Electricity Generation" (2015) 105:1 American Economic Rev 411; Orr Karassin & Oren Perez, "Public and Private Interactions in Global Environmental Governance" in Michael Faure, ed, *Elgar Encyclopedia of Environmental Law* (Edward Elgar, 2020) 41 at 50.

[141] See further Chenxi Xiang et al, "Assessing the Roles of Efficient Market versus Regulatory Capture in China's Power Market Reform" (2023) 8 Nature Energy 747; Jason MacLean, "The Crude Politics of Carbon Pricing, Pipelines, and Environmental Assessment" (2019) 70 UNBLJ 128.

developing data collection and management regulations. For instance, California considered these concerns while developing ETS regulations,[142] and the EU made regulatory changes to improve MRV requirements, such as clarifying procedures, eliminating unnecessary costs, simplifying monitoring plans, and providing flexibility in monitoring methods.[143] These improvements have been instrumental in reducing regulatory burdens and MRV costs.[144]

Developing regulations for China's NETS should consider cost concerns for both administrative and compliance purposes. Governments can share MRV costs with major emitters by providing subsidies.[145] However, balancing government budgets may generate uncertainties regarding funding sources and the allocation of expenses between governments and emitters. Government-led verification requires financial resources to establish technical working groups and on-site verification teams,[146] with extra costs incurred if provincial EE authorities opt for a written or on-site review of verification procedures and results.[147] Potential regulatory solutions include exempting well-compliant emitters from on-site verification,[148] allocating funding exclusively for fourth-party backchecks,[149] and creating the NETS fund with proceeds from allowances auctions.[150] To address data misuse that could affect business interests, the MEE previously suggested fines, license revocations, or reputational sanctions for verifiers who disclose trade secrets.[151] Yet, the current Trial ETS Measure only requires registration and trading agencies and their staff to refrain from abusing or disclosing proprietary information.[152]

---

[142] *Staff Report: Initial Statement of Reasons, Proposed Regulation to Implement the California Cap-and-Trade Program, Volume II, Appendix D* (Sacramento: California Air Resources Board, 2010) at D-103, D-208.

[143] Green et al, *supra* note 3 at 17; see further EC, *Commission Regulation (EU) No 601/2012 of 21 June 2012 on the Monitoring and Reporting of Greenhouse Gas Emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council*, [2012] OJ, L 181/30; EC, *Commission Regulation (EU) No 600/2012 of 21 June 2012 on the Verification of Greenhouse Gas Emission Reports and Tonne-kilometre Reports and the Accreditation of Verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council*, [2012] OJ, L 181/1.

[144] Green et al, *supra* note 3 at 6.

[145] Wang, Zhu & Fan, *supra* note 6 at 664, 666.

[146] For more about the verification procedures, see *2021 Verification Guidelines*, *supra* note 46 at 5–11; Duan, *supra* note 52 at 241 (noting the challenges for local governments to secure verification funding).

[147] *2021 Verification Guidelines*, *supra* note 46 at 11 (discussing the review of verification results).

[148] *Ibid* at 9.

[149] Zhang et al, *supra* note 80 at 169.

[150] *2021 Draft ETS Regulation*, *supra* note 34, art 21.

[151] *2019 Draft ETS Regulation*, *supra* note 33, arts 20, 23.

[152] *Trial ETS Measure*, *supra* note 2, arts 33, 38.

4. Intergovernmental Relations in Data Management

ETS, spanning across jurisdictions, involves multiple governance levels and the interaction of public and private actors at each level. In the monitoring and reporting processes, high-level regulators typically establish standards, while lower-level regulators are responsible for implementation and enforcement. Emitters follow these standards to fulfill their MRV obligations. Third-party verification introduces a decentralized regulatory element to the verification process, engaging self-regulatory agencies and reducing local regulatory burdens.[153] However, as highlighted by environmental law scholarship[154] and our analysis in this section, these multi-level and multi-actor characteristics can significantly complicate the balance between data quality and cost by causing duplication, inefficiencies, conflicts, and fragmentation of policies and laws. The degree to which a diverse range of actors and institutions can mitigate varying MRV performances and minimize unnecessary costs depends on their interactions and harmonization. Governments occupy a pivotal role in this multi-level governance structure. We explain three key relationships as entry points for data management and the concomitant regulatory strategies that have been or should be employed to inform decision-making.

4.1. Central-Local Relationship

Dividing issues *ex-ante* on a geographic or functional basis can clarify regulatory responsibilities and encourage collaborative governance.[155] ETSs in the EU, the United States, and China emphasize the importance for central authorities to cooperate with local governments, which generally have better access to emissions data and are responsible for implementing and enforcing ETS regulations.[156] Regulatory provisions can delineate responsibilities of different ETS authorities to improve coordination efficiency and prevent policy conflicts and costly consequences.[157]

To minimize confusion and conflict while promoting cooperation, MRV management in the NETS is divided between central and local governments. The national ETS authority defines the scope of GHGs, industries, and emitters that require

[153] See e.g. Zhang & Xu, *supra* note 58 at 136–37.

[154] See e.g. van Asselt, *supra* note 15 at 350; Daniel Bodansky, Jutta Brunnée & Lavanya Rajamani, *International Climate Change Law* (New York: Oxford University Press, 2017) at 263; Sébastien Jodoin, Ling Chen & Carolina Gueiros, "Vice or Virtue? Flexibility in Transnational Environmental Law" in Veerle Heyvaert & Leslie-Anne Duvic-Paoli, eds, *Research Handbook on Transnational Environmental Law* (Edward Elgar, 2020) 284 at 290–93.

[155] Bodansky, Brunnée & Rajamani, *supra* note 154 at 263; Kruger & Egenhofer, *supra* note 5 at 11.

[156] van Asselt, *supra* note 15 at 350; Zhang et al, *supra* note 80 at 164.

[157] See e.g. *2014 Interim ETS Measure*, *supra* note 29, art 5; Stoerk, Dudek & Yang, *supra* note 7 at 482–83 (indicating the costly consequences of overlapping policies in the EU ETS).

regulation and publishes MRV standards.[158] Besides, it supervises local authorities in their reporting and verification management and investigates data problems.[159] Local authorities, on the other hand, develop accounting methods, guidelines, and reporting platforms,[160] organize emissions reporting and verification, and submit lists of major emitters to the national authority.[161]

Fulfilling these responsibilities requires a coordinated effort from governments at different levels. However, localities may have varied interests and capacities, potentially causing delays in policy implementation or weak legal enforcement.[162] Scholars argue that officials might manipulate emissions data when their performance in environmental management is evaluated.[163] Moreover, some local governments struggle with poor-quality data to support the NETS.[164] To address these concerns, the central government employs a top-down mechanism to provide guidance, supervision, and review to lower-level authorities.[165] The focus and frequency of supervision and review depend on the emissions verification results of major emitters. Regulators implement a "double random, one disclosure" approach, randomly selecting inspectors and inspectees for inspection and promptly disclosing the inspection results to the public.[166]

4.2. Interdepartmental Relationship

Data management in the NETS is influenced by interdepartmental relationships. The MEE's takeover of the NDRC's role in administering NETS is justified by its expertise in environmental monitoring, environmental impact assessment, and pollutant discharge permits. The MEE is well-equipped to consolidate environmental and

[158] *Trial ETS Measure*, *supra* note 2, arts 4, 8; *2014 Interim ETS Measure*, *supra* note 29, art 6.

[159] *Trial ETS Measure*, *supra* note 2, art 6; "Typical Data Problems", *supra* note 109.

[160] *China's Climate Policies and Actions (2016)*, *supra* note 8 at 46–47 (documenting the development of GHG emissions reporting in the pilot ETSs and some non-pilot regions).

[161] *Trial ETS Measure*, *supra* note 2, arts 6, 9, 26; *2014 Interim ETS Measure*, *supra* note 29, arts 7, 37.

[162] Genia Kostka & Jonas Nahm, "Central–Local Relations: Recentralization and Environmental Governance in China" (2017) 231 The China Quarterly 567 at 568–69; see also William P Alford et al, "The Human Dimensions of Pollution Policy Implementation: Air Quality in Rural China" (2002) 11:32 Journal of Contemporary China 495 at 496 (noting the persistent challenges of implementing and enforcing environmental policies in China, and the frequent occurrence of local environmental abuse that was driven by strong economic incentives to exploit natural resources for immediate financial gain).

[163] Ghanem & Zhang, *supra* note 96.

[164] Tang et al, *supra* note 15 at S108.

[165] *14th FYP*, *supra* note 24, c 38.5; *Trial ETS Measure*, *supra* note 2, art 30.

[166] *Trial ETS Measure*, *supra* note 2, art 31.

energy data, oversee MRV compliance, and allocate allowances.[167] However, as a reorganized ministry focusing on environmental protection, the MEE has less experience with market-based instruments than the NDRC, which excels in economic planning and industry and energy policy.[168]

In a recent development, while the MEE continues overseeing the NETS, the NDRC is now charting the overall emissions reduction plan to achieve China's carbon peak and neutrality goals.[169] Departmental tension and coordination remain ongoing challenges. In 2015, the NDRC opposed a "Ministerial Joint Conference" for NETS management, arguing that involving multiple departments could obstruct unified management and create bureaucratic inefficiencies.[170] On the other hand, the MEE, with less power and influence than the NDRC, may confront greater data-sharing challenges and require support from other departments to coordinate national MRV and harmonize ETS rules with existing environmental and energy policies.[171]

Experience from prominent programs demonstrates that higher-level governance mechanisms or umbrella institutions can guide, coordinate, and reconcile different or overlapping policies and regulatory actions. The European Commission has played this role for the EU ETS, while the US Environmental Protection Agency has done so for the Acid Rain Program.[172] In China, although the MEE proposed a national mechanism for researching and coordinating NETS issues in the 2019 draft regulation,[173] this mechanism was omitted in the 2021 draft. Instead, the draft only encourages collaboration among departments responsible for development and reform, industry and information technology, energy, and market, securities, and banking supervision. Their joint efforts would address various aspects of NETS, including determining covered GHGs and industries, setting emissions allowances, and

---

[167] Xiaoye Shi, *Research on the Regulation of Carbon Emissions Rights [碳排放权法律规制研究]* (Beijing: Beijing University of Posts and Telecommunications Press, 2017) at 57; Stoerk, Dudek & Yang, *supra* note 7 at 483.

[168] The NDRC has a dedicated division leading energy conservation, clean production, and green development. See "Department of Resource Conservation and Environmental Protection" (2023), online: *National Development and Reform Commission* <https://en.ndrc.gov.cn/aboutndrc/BandD/202105/t20210526_1280928.html>.

[169] "China Puts Most Powerful Agency in Charge of Climate Policies" (6 July 2021), online: *BNN Bloomberg* <https://www.bnnbloomberg.ca/china-puts-most-powerful-agency-in-charge-of-climate-policies-1.1625745> [https://perma.cc/7U2X-FHTH].

[170] "Regulation Drafting Instructions", *supra* note 32 at para 5.2.

[171] *Trial ETS Measure*, *supra* note 2, art 6.1; Duan, *supra* note 52 at 241; Stoerk, Dudek & Yang, *supra* note 7 at 482.

[172] Jacqueline Peel, Lee Godden & Rodney J Keenan, "Climate Change Law in an Era of Multi-Level Governance" (2012) 1:2 Transnational Environmental Law 245 at 252; Bodansky, Brunnée & Rajamani, *supra* note 154 at 264; McAllister, "Enforcement Challenge of Cap-and-Trade", *supra* note 66 at 1218–19.

[173] *2019 Draft ETS Regulation*, *supra* note 33, art 4.

managing registration and trading agencies.[174] Given the value of multiple departments contributing their expertise, regulating the NETS should involve delineating departmental responsibilities and enhancing coordination. A regulation issued by the State Council, rather than the MEE's decrees,[175] can bind all departments, offering greater authority and certainty in enforcing MRV rules.

4.3. Interregional Relationship

Harmonizing and integrating MRV rules across regions can address emissions spillover effects.[176] When governments apply regulations with varying stringency, the risk of emissions leakage arises, as companies may meet stricter targets by relocating production activities to areas with looser regulations or outside regulated boundaries. However, such practices undermine actual reductions and the environmental integrity of an ETS, an issue shared by both the EU ETS and the Regional Greenhouse Gas Initiative (RGGI).[177] In response, the European Commission established uniform monitoring and reporting rules for all EU authorities and industries, preventing inconsistencies among Member States.[178] In its early phase, the EU ETS experienced significant variation in the stringency of verifier accreditation.[179] Harmonizing verification and accreditation rules was essential for mutual recognition of verifiers and peer evaluation of national accreditation bodies.[180] In cases where formal governing authorities are absent, some ETSs have aligned their program stringency through networks, like the RGGI and the Western Climate Initiative, to enhance communication, bolster policy implementation, and minimize transaction costs.[181]

---

[174] *2021 Draft ETS Regulation*, *supra* note 34, arts 4, 5, 6.3, 8.1.

[175] The MEE has no authority to require departmental cooperation in the State Council.

[176] See e.g. William J Baumol & Wallace E Oates, *The Theory of Environmental Policy*, 2d ed (Cambridge: Cambridge University Press, 1988) at 287 (explaining the idea of transboundary externalities); Donald N Dewees, "Economic Considerations in the Selection of Pollution Control Legislation" (1972) 10:3 Osgoode Hall LJ 627 at 641–42 (arguing that, across a large geographical area, it is easier to devise one set of rules and standards, than to design a number of them for each particular area).

[177] Dieter Helm, "EU Climate-change Policy—A Critique" in Dieter Helm & Cameron Hepburn, eds, *The Economics and Politics of Climate Change* (Oxford: Oxford University Press, 2009) 222 at 231; but see van Asselt, *supra* note 15 at 345 (indicating the minimal to non-existent evidence of leakage in the first phases of the EU ETS and RGGI, despite the frequent mentions of leakage as concerns for regulators).

[178] Jonathan Verschuuren & Floor Fleurke, *Report on the Legal Implementation of the EU ETS at Member State Level: Deliverable D2.4 ENTRACTE – Economic iNsTRuments to Achieve Climate Targets in Europe* (Tilburg: Tilburg Sustainability Center, 2014) at 29; Jacquier & Bellassen, *supra* note 119 at 146–47.

[179] Kruger & Egenhofer, *supra* note 5 at 11.

[180] See e.g. EC, *Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the Verification of Data and on the Accreditation of Verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council*, [2018] OJ, L 334/94.

[181] Bodansky, Brunnée & Rajamani, *supra* note 154 at 262; Chen, "Emissions Trading Schemes", *supra* note 8 at 332–34.

Data management for the NETS must address regional disparities, as most regions have not yet reached a level of MRV capability comparable to ETS-experienced places like Beijing, which boasts more comprehensive and effective governance.[182] Pilot jurisdictions display differences in industry coverage, major emitter thresholds, and locally adapted MRV rules, resulting in varying requirements for emissions factor selection, emitter-verifier relationship management, third-party verifier accreditation, and verification quality review.[183] Each jurisdiction implements an accountability system for MRV or broader ETS violations[184] and a credit-record tracking system.[185] These disparities lead to variations in data quality and cost across jurisdictions.[186]

When interregional allowances trading expands, these variations could affect the cost-effectiveness of the NETS, as fictitious allowances from MRV-lenient jurisdictions may undermine the abatement efforts of other regions.[187] Building the NETS with greater MRV uniformity can help to mitigate regional disparities in data collection and management. A unified market ensures a level playing field for emitters across different regions, fostering informed investments, preventing competitive distortion, and enhancing data quality and market integrity.[188] For example, an enterprise regulated by Beijing might be less likely to relocate to non-pilot provinces like Hebei to avoid environmental responsibilities. With the focus shifting away from corporate competitiveness, local governments may be more inclined to collaborate and learn from each other to improve data quality and consistency across regions.[189]

Nonetheless, debates on uniformity and differentiation persist. During the 2015 ETS regulation drafting process, differentiated treatments reflecting regional differences were proposed for setting standards. The NDRC supported uniform rules on key issues to avoid excessive discretion, while committing to consider local opinions, differences, and concerns of less-developed regions in formulating and

---

[182] Zhang et al, *supra* note 80 at 169; Zeng et al, *supra* note 11 at S99.

[183] See further Duan, *supra* note 52 at 233–34; Goulder et al, *supra* note 3 at 6–7.

[184] *Fujian ETS Measure*, *supra* note 100, arts 34–38; *Hubei ETS Measure*, *supra* note 57, arts 46–51; *Guangdong ETS Measure*, *supra* note 120, arts 36–40; *Shenzhen ETS Measure*, *supra* note 56, arts 70–79; *Chongqing ETS Measure*, *supra* note 120, arts 37–39; *Shanghai ETS Measure*, *supra* note 120, arts 37–43; *Tianjin ETS Measure*, *supra* note 99, arts 32–37; *Beijing ETS Measure*, *supra* note 98, arts 22–24.

[185] *Fujian ETS Measure*, *supra* note 100, art 32; *Beijing ETS Measure*, *supra* note 98, art 19; *Guangdong ETS Measure*, *supra* note 120, arts 63, 65.1; *Tianjin ETS Measure*, *supra* note 99, art 29; *Shanghai ETS Measure*, *supra* note 120, art 40(1); *Hubei ETS Measure*, *supra* note 57, art 43.

[186] Zhang, "Carbon Emissions Trading in China", *supra* note 114 at S114.

[187] Zhang et al, *supra* note 80 at 169.

[188] Duan, *supra* note 52 at 237.

[189] See e.g. Goulder et al, *supra* note 3 at 9–10 (indicating that some local governments are disincentivized to enforce MRV rules because they prioritize protecting the competitiveness of enterprises within their jurisdictions).

promulgating operational rules and guidelines.[190] Furthermore, research on pilot ETSs has suggested that the NETS should differentiate MRV costs among regions, particularly easing the financial burden on major emitters in central and western regions.[191]

Discussion and Conclusion

Designing and implementing an ETS requires careful consideration of the interplay between data quality, cost, and intergovernmental relations. Zooming in on each element helps to understand the legal institutions, practices, and challenges involved in data collection and management, as well as the roles and limitations of governments, emitters, and third-party verifiers. High-quality data is vital for governments to allocate allowances and monitor compliance, yet the cost of collecting and managing this data can be a deterrent for different actors. Emitters may misreport data, weighing the cost against their own interest, while governments may grapple with limited resources and significant fiscal burdens in managing individual compliance and overall environmental quality. Third-party verifiers can alleviate administrative burdens and enhance emitters' reporting credibility, but they may also manipulate data or lack the necessary competence and rigor. Additional costs emerge from accrediting, overseeing, and even sanctioning private verifiers. The complexity of a large-scale ETS further intensifies these challenges, requiring coordination and cooperation among multiple actors and institutions across different governance levels. As such, governments play a crucial role in navigating these challenges and ensuring that data quality and cost concerns are effectively balanced within the ETS.

Admittedly, not all data problems have straightforward solutions. By carefully examining the nuances of these challenges, we have identified potential legal and regulatory solutions. To improve MRV compliance, implementing rigorous protocols and imposing monetary and reputational sanctions may prove effective. To address cost concerns, regulators can simplify MRV requirements and procedures, permit flexible implementation, and minimize unnecessary burdens. Third-party verifiers can maximize their potential by clarifying regulatory powers and legal liabilities, receiving adequate oversight and support, and adhering to established standards. Clear definitions of responsibilities, the creation of governance mechanisms, and the harmonization of MRV rules can guide decision-making across multiple levels and actors to ensure effective data management.

Our case study of China's NETS enriches the analysis of the three elements' manifestations and legal implications in a specific jurisdiction. The significance of this case study lies in the enormous challenges China has encountered in data collection and management to operationalize the NETS, as well as the unparalleled MRV infrastructure and capacity required. Inconsistent data quality across regions has

[190] "Regulation Drafting Instructions", *supra* note 32 at para 5.3.

[191] Wang, Zhu & Fan, *supra* note 6 at 666.

delayed the NETS launch, a challenge that extends beyond the electricity generation industry and hinders its full implementation. Moreover, the NETS inevitably brings increased administrative and compliance costs. Governments need additional funding to manage a larger number of emitters and support nationwide MRV, while emitters face increased financial burdens as they comply with new and more stringent requirements and adapt their data-gathering and processing methods. The cost of third-party verification has been a contentious issue between governments and emitters. Currently, provincial EE authorities lead verification efforts, which they may also outsource to technical agencies through government procurement services.

The Chinese government has long employed a regulatory approach in response to non-compliance and disputes in data collection and management. The MEE regularly issues administrative notices to prioritize emissions reporting and strengthen the NETS data foundation. Besides guiding industries, emitters, and verifiers with updated methodologies and technical guidelines, the MEE has organized special working groups for data quality supervision as part of its law enforcement efforts. Publicly exposing non-compliant entities by showcasing examples of falsified reporting and verification can serve as a deterrent to similar violations. In one case, the Inner Mongolian EE authority ordered a company that had falsely reported to rectify its violation. However, monetary penalties have not yet been imposed. To address capacity-related misreporting, the MEE has conducted training workshops, published frequently asked questions with answers, and offered policy and technical assistance through online platforms. Building broader MRV capacity requires significant financial support. The MEE has encouraged localities to allocate special funds, but budget constraints create uncertainty. One potential solution is the creation of the NETS fund using proceeds from allowances auctions. While simplifying verification for well-compliant emitters and not funding all verifications could reduce administrative burdens, relying solely on government resources is insufficient.

Following the regulatory efforts to enforce MRV compliance and enhance the data foundation, there is a growing interest in fostering public participation to share governance responsibilities. The transparency afforded by making the list of major emitters, their emissions reports, and trading activities publicly accessible[192] enables oversight by both authorities and citizens.[193] Public "letter and visit" campaigns, such as the one initiating the Inner Mongolian case,[194] and the subsequent public interest lawsuit filed by the All-China Environment Federation against the exposed verifier[195]

---

[192] Major emitters can only withhold information involving state or trade secrets from public scrutiny. See *Trial ETS Measure*, *supra* note 2, art 25.

[193] *Ibid*, arts 9–10, 25, 35; for an example of such information sharing platforms, see: "National Carbon Market Information Network [全国碳市场信息网]", online: <https://www.cets.org.cn/>.

[194] "Inner Mongolian Case", *supra* note 87.

[195] Qian Zhang, "Formal Case Filed! A Social Organization Initiates the First Public Interest Lawsuit against Carbon Emissions Data Falsification [正式立案！社会组织首次提起碳排放数据造假公益诉讼案件]"

have heightened civic engagement. Similarly, the whistleblower reward system in Shandong province[196] and the China Certification and Accreditation Association's development of registration guidelines for GHG verifiers[197] aim to enhance public supervision, reporting, and feedback mechanisms. Capacity building within Guangdong's ETS exemplifies the crucial role of research institutes, consultancy firms, financial institutions, and civil society organizations, who, through various training and exchange programs, equip ETS regulators, emitters, and verifiers with the necessary MRV acumen and foster an environment conducive to broader participation in overseeing emissions data and trading.[198] These developments warrant further research because they signify a shift towards a more inclusive and dynamic governance model, where public involvement and non-state actors can significantly contribute to shaping and supervising climate policies.[199]

Managing emissions data for the NETS is an enormous undertaking that requires coordination among central and local governments, government departments, and local governments. The sheer size and complexity of the NETS have made it challenging to coordinate the decision-making of different governments. Effective MRV management, for example, requires collaboration at different governmental levels, yet variations in interests and capacities may impact policy implementation and legal enforcement. Additionally, shifting departmental responsibilities has created tensions and increased administrative costs. The transition and coordination of regulatory power between the MEE and the NDRC have stalled progress on ETS regulation. Moreover, data management is complicated by regional disparities, resulting in variations in data quality and cost. All these would cumulatively affect the economic efficiency of the NETS and compel a revisit of the question of what pricing emissions can achieve at what price.

We have identified several regulatory strategies as the entry points for dealing with those problems. One strategy is to implement a centralized, top-down mechanism, where higher-level authorities provide stronger guidance, supervision, and review to lower-level authorities. Another approach involves the "double random, one disclosure" method for supervision and review. Furthermore, a State Council regulation can coordinate departmental expertise by binding all departments to a common guide. In contrast, administrative decrees and notices lack such authority, nor

---

(23 June 2022), online: *CE News* <https://www.cenews.com.cn/news.html?aid=985806> [https://perma.cc/2X9D-C38U].

[196] "Implementation Plan for Rewarding Whistleblowers Against Fraudulent Reporting [控排企业碳排放报告质量弄虚作假有奖举报实施方案]", (2 April 2022), online: *Tanpaifang* <http://www.tanpaifang.com/zhengcefagui/2022/040284406.html> [https://perma.cc/L79Z-MH77].

[197] China Certification and Accreditation Association, *Guidelines for Registration of Greenhouse Gas Verifiers [温室气体核查员注册准则]* (10 August 2021), CCAA-C-401-01.

[198] See further Alex Y Lo et al, "Towards Network Governance? The Case of Emission Trading in Guangdong, China" (2018) 75 Land Use Policy 538.

[199] See especially *14th FYP*, *supra* note 24, c 38.5.

can they establish legal certainty in harmonizing MRV rules or addressing local concerns. Implementing a higher, stronger tier of regulation for the NETS can improve MRV uniformity and enhance data quality, consistency, and environmental integrity. However, the adoption of this regulation has encountered significant hurdles. Although the NDRC submitted a draft regulation to the State Council as early as 2015 and the MEE released two subsequent drafts, none has been adopted. Factors contributing to these delays include cumbersome legislative procedures, the State Council's insufficient emphasis,[200] and the influence of various lobbying groups.[201]

There is an urgent need for further research to explore legal mechanisms for addressing the challenges discussed, as well as to gather more empirical evidence to better understand the role of regulation in improving data collection and management. Another important area of inquiry is the connection between regulatory and judicial approaches, and how regulation can facilitate the use of litigation and other legal remedies in cases of non-compliance or disputes related to emissions data. While the implications may differ for each ETS, our study provides a valuable example of the myriad legal institutions, challenges, and solutions that may arise in data collection and management. This research is both academically and practically significant. Scholars can use our actor-centered analytical model to gain deeper insights into the legal dimensions of emissions data regulation, while our practical strategies and recommendations for the NETS can serve as a useful guide for jurisdictions facing similar data and climate governance challenges.

---

[200] The State Council prepares a legislative plan each year, during which the ETS was addressed in 2016 and 2021-2023. When a project does not fall within the legislative priorities, then it must wait for another year or years to be (re)considered. See *Notice on Issuing the 2016 Legislative Work Plan of the State Council [关于印发国务院2016年立法工作计划的通知]* (13 April 2016) State Council General Office [2016] No 16; *Notice on Issuing the 2021 Legislative Work Plan of the State Council [关于印发国务院2021年度立法工作计划的通知]* (27 May 2021) State Council General Office [2021] No 21; *Notice on Issuing the 2022 Legislative Work Plan of the State Council [关于印发国务院2022年度立法工作计划的通知]* (5 July 2022) State Council General Office [2022] No 24; *Notice on Issuing the 2023 Legislative Work Plan of the State Council [关于印发国务院2023年度立法工作计划的通知]* (31 May 2023) State Council General Office [2023] No 18.

[201] Hongqiao Liu, "In-depth Q&A: Will China's Emissions Trading Scheme Help Tackle Climate Change?" (24 June 2021), online: *CarbonBrief* <https://www.carbonbrief.org/in-depth-qa-will-chinas-emissions-trading-scheme-help-tackle-climate-change/> (noting the multi-year long negotiation between regulators, enterprises, and industry associations).