Dialogue Facility on ETS Development in Asia
Monitoring, Reporting, Verification and Accreditation (MRVA) systems

Meeting report

Overview

The Asia Society Policy Institute convened a series of private dialogue meetings that brought together experts in emissions trading system (ETS) development from select Asian jurisdictions. This initiative seeks to support the successful design and implementation of national ETSs in Asia, while building foundations for future market connectivity at Asian and international levels.

This meeting, held on 27st and 28th February 2023 by videoconference, focused on monitoring, reporting, verification and accreditation (MRVA) systems, which form one of the most critical building blocks of any ETS.

The monitoring and reporting of greenhouse gas emissions must be robust, transparent, consistent and accurate for an ETS to operate effectively. Such a system also needs to have the support of the covered entities through efficiency and cost-effectiveness and will require substantial capacity building of relevant stakeholders. Furthermore, as collection of high-quality emissions data of covered entities needs to begin well before an ETS is formally launched, starting an effective MRVA system is an important initial priority for any ETS.

Achieving these goals and balancing the different requirements is a challenging task. However, there is now an increasing body of best practice to study in order to establish effective systems more quickly. The leading example of a well-established MRVA system is the EU ETS, although the Korean ETS is also a good reference with eight years of operation, and substantial experience has also been gained in China and several other jurisdictions.

This meeting examined the key topics for building effective MRVA systems, including ensuring consistently high-quality data, building the capacity and competence of verifiers, ensuring cost-effectiveness, and developing an overall roadmap for system development. Leading MRVA experts from the EU, China, Korea and other Asian jurisdictions shared their latest experience and examples of best practice, and discussed challenges, solutions and learnings.

Summary

This meeting enhanced understanding of the importance, framework and details of MRVA systems in ETSs. Presentations focused on global best practices and lessons learned in implementing these systems, along with updates on development from various Asian jurisdictions. A roadmap for efficient development and implementation of MRVA systems was also presented. A summary of key points is given below.

ETS MRVA framework

*Introduction to MRVA systems and design choices*

Accurate emissions data is the foundation for ETS design because this data determines how many allowances covered companies must surrender in an ETS, as well as ensures public and stakeholder trust. Robust MRVA systems can achieve high-quality emissions data. The four system elements are described in the table below.

	Monitoring	**Reporting**	**Verification**	**Accreditation**
What	Fuels & raw material consumption, production, exported heat/energy, waste gases, calculation factors, GHG emissions, etc. Usually measured by a device or calculated.	Fuels and raw material consumption, production, exported heat/energy, waste gases, calculation factors, GHG emissions, etc. Report to national, regional, international authorities.	To assure the quality of the data and GHG emissions calculations.	To designate and manage verification bodies, including validation and surveillance assessments.
By whom	Facilities, companies, etc.	Facilities, companies, etc.	Government inspectors/regulators, independent experts hired by the regulator or third-party verifiers.	Government regulators / accreditation authorities.

The design of an MRVA system depends on various factors, including the existing legislative framework and institutional structures, available resources, ambition levels for GHG emissions reductions, plans for international cooperation or system linking, scope of the ETS (sectors and gases involved), and application of international standards. Existing greenhouse gas reporting mechanisms can be used as a basis for MRVA requirements to ensure reporting entities are familiar with the system. Limited resources might necessitate a smaller scale, more simplified monitoring methodology, with gradual improvements over time. When linking to other systems or planning such links, it is useful to closely examine and incorporate relevant elements of those systems. The Swiss ETS, for example, modeled its MRVA framework on the EU ETS.

Compliance cycle

The compliance cycle of an ETS typically follows the pattern shown in the figure below. The regulated entity will monitor emissions throughout the year, and will prepare and submit an emission report at the end of the year to an independent verifier. The verifier will check the data and generate a verification report, and both the verification report and emission report will be submitted to the regulator. Any issues will require follow-up with the regulated entity.
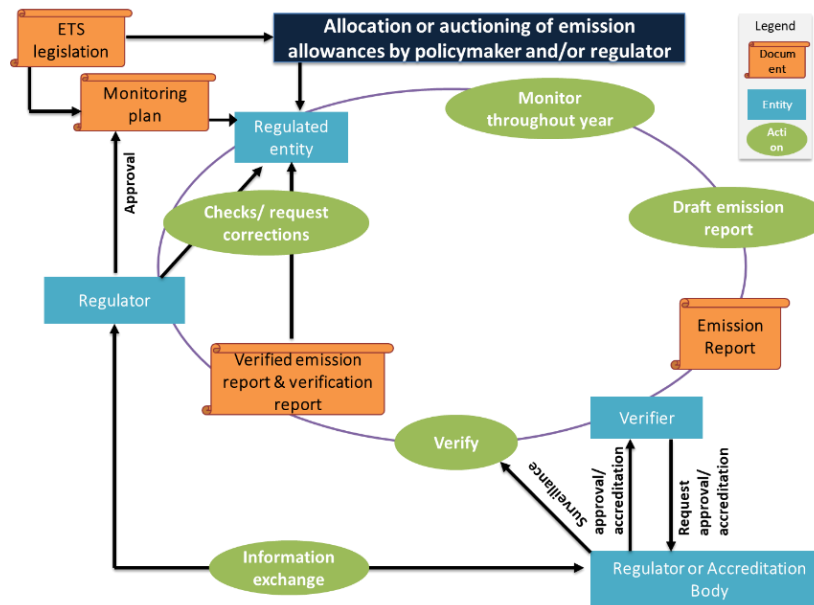
Source: *"Monitoring, reporting & verification", Machtelt Oudenes, at ASPI meeting "Dialogue Facility on Monitoring, Reporting, Verification and Accreditation (MRVA) systems for ETS in Asia," February 2023.*

Legal and institutional framework[1]

The legislative framework usually consists of primary and secondary law, which needs to be legally binding and of sufficiently high status, otherwise there can be issues with enforcement. M&R rules should be closely connected to verification rules. Developing rules in parallel is good practice.

The most efficient process is to use existing MRVA law, including rules in existing overarching environmental law[2], align with existing reporting mechanisms[3], and ensure consistency with UNFCCC reporting.[4] It is common practice to apply international standards, including technical standards for quality assurance and control, sampling or measurement, and general MRVA standards such as ISO 14064 and 14065, while making sure the rules are ETS-specific.

Other countries' experience is valuable and should be applied by starting with the most appropriate elements then building on them. Contacting the relevant experts is beneficial, to more fully learn from the other systems and gain help in how to apply the learning to the specific context. Where appropriate, copying parts of other jurisdiction's regulations can be useful, freeing up time to focus on implementation.

Some lessons learned from other ETS schemes include to define clear roles and responsibilities of stakeholders in law; coordinate and exchange information efficiently between multiple regulators, if applicable; carry out capacity building and preparation of stakeholders well before the ETS starts, and continue such capacity building and stakeholder involvement after the ETS is in operation.

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[1] During the meeting several surveys were conducted. "Legal and institutional framework is not fully equipped" was the most popular answer to the question "In your country, what would you see as the biggest obstacles for accurate MRV?"

[2] e.g. standards, methodologies, default values, reporting codes.

[3] e.g. using common IT/online systems to report.

[4] e.g. IPCC factors, using ETS data for UNFCCC reporting.

<u>Lessons learned from EU, Korea and China</u>

EU ETS

The EU ETS initially faced two major challenges in implementing an effective MRVA system: the need to provide accurate data in a cost-efficient manner and to address how rules were applied in different EU countries. The EU tackled these challenges by introducing a tiered approach to monitoring; creating robust quality assurance and control (QA/QC); a requirement for entities to establish a monitoring plan; enhanced verification and accreditation systems; utilization of IT systems; and regulations on monitoring and reporting (MR) and verification and accreditation (VA). These measures have proven effective in ensuring consistency and credibility of the ETS.

The **tiered approach** is a cost-efficient way **to monitor emissions and manage risks** with higher tiers having stricter rules for accuracy. Tier 1 uses energy statistics and international default values while higher tiers (3 and 4) use more specific data such as actual measurements of installation data. Large and medium emitting installations are subject to the highest tiers, while smaller installations have less stringent requirements. Derogations are possible but require approval from the regulator to ensure equal treatment of all installations. This approach allows for improvement over time, encouraging installations to move up tiers.

Another requirement is to have **robust QA/QC** to ensure the quality of monitoring and reporting. The EU ETS regulations require installations to set-up specific QA/QC procedures such as for calibration, document management and internal review of data.

A **monitoring plan supported by templates, checklists and calculation tools** is a key facilitator for achieving accurate emissions data and ensuring consistent application of monitoring methods. It provides clear instructions to installations on how the monitoring should be carried out, promotes equal treatment between entities, and facilitates compliance checks by regulators. Contents include monitoring boundaries, monitoring methodology, data flow and quality control activities and procedures. The monitoring plan must be approved by the regulator.

The EU ETS has established **clear rules for accreditation and verification** based on ISO 14065 but tailored to be more specific for the ETS, and covering scope of verification, materiality, requirements for site visits, verification reporting, requirements for competence and impartiality, and accreditation and surveillance of verifiers. Accreditation bodies are subject to peer evaluation organized by the European Cooperation for Accreditation (EA) to ensure their competence. Verification bodies provide training for verifiers and implement internal procedures to ensure competence and impartiality. Sanctions, including withdrawal or suspension of accreditation, can be imposed by accreditation bodies for non-compliance.

Most EU countries have implemented **IT systems** to enhance the efficiency, effectiveness and accuracy of MRVA processes; facilitate workflow between installations, authorities, and verifiers; and enable recording and tracking of all relevant information. The complexity of these systems varies, with some having simple systems that optimize workflow, while others have sophisticated structures with automated checks to reduce administrative burden.[5]

There was some discussion in the ASPI dialogue meeting on **whether measurement-based methods are more accurate than calculation-based methods**. This depends on several

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[5] Finland, Germany, and the UK have developed effective IT systems for MRV processes, with Finland's being cost-effective yet sophisticated, Germany's having auto check functions and providing access to all parties, being good but complex, and the UK's being sophisticated based on XML and accessible on the UK regulator's website. The European Commission has created the EU ETS reporting tool, which supports workflow, optimizes communication with operators and verifiers and improves MRV processes.

factors, such as the installation's condition, whether it is fully equipped to apply a measurement-based system, the calibration and quality assurance of the measurement systems, and other relevant factors. In the EU ETS, most installations use calculation-based methods as they are easier to monitor and can provide equally accurate results. Measurement-based methods, such as continuous emission monitoring, require robust quality assurance in line with international standards, as well as sophisticated monitoring systems in the installation's stacks, and can be very costly to implement. However, for N_2O emissions, measurement-based methods are necessary.

Korean ETS

The development of the MRVA system in the K-ETS learned from **best practices of the EU and the US**, and built on the **Target Management System** (for energy consumption and GHG emissions) through which Korean gained experience, expertise, and knowledge in designing and implementing MRVA systems. These all contributed to the smooth introduction and implementation of the current MRVA system in Korea.

Potential cross-national connection of ETSs relies heavily on **equivalence with MRVA systems globally and associated peer evaluations**. To that end, the National Institute of Environment Research (NIER), the K-ETS accreditation authority, has mutual recognition agreements with the International Accreditation Forum (IAF) and Asia-Pacific Accreditation Cooperation (APAC) for the accreditation of verification bodies. To be consistent with these international standards, ETS law and regulations in Korea have been revised, including the re-delegation from the Ministry of Environment to NIER of entire authority over the management of verification bodies.

A key practical issue is checking that the raw data related to emissions factors on-site from the measurement devices, the data in the calculation spreadsheets and the data in the emissions reports are consistent and correct.

Verifiers need **competencies** in verifying emission reports, knowledge of the relevant ETS installations, data processing, comparison of trends, detection of errors and keeping up-to-date with changes in legislation. The approaches to **managing verifier's competency** include quarterly seminars to discuss monitoring plans, emissions reports, and relevant policies; Q&A pages on websites providing solutions on key issues; and on-the-job training with trainees conducting audits for a year under the mentorship of senior auditors. Verifiers are evaluated annually by witness auditors and given feedback to improve their skills, with contracts cancelled for those failing to meet the requirements.

Challenges include the difficulty of utilizing verifiers throughout the year due to the fluctuating workload with intensive work for a relatively short period and then long periods of less intensive work; the burden of responsibility for verification bodies with high financial penalties from the government if mistakes are made, and associated liability insurance costs (which increase in line with the carbon price), compared to income from verification work; and maintaining a pool of sufficiently competent verifiers.

China's National ETS

China has operated its sub-national pilot ETSs for more than 10 years and its National ETS since 2021, which is still within its the trial operation phase. The pilot ETSs as well as experience in the EU and elsewhere provided a valuable source of learning. The ETSs covers a large number of facilities with varying measurement and management capabilities. Performance is regarded as 'so far, so good,' with over 99% compliance, an acceptable carbon price of $8/t at the early stage of implementation, and over 50% of entities engaging in trading.

To improve the precision and operability of GHG emissions monitoring and reporting, **default carbon contents** per net calorific value for different power generation units are given; **parameters related to GHG emissions calculation are distinguished into key parameters and auxiliary parameters corresponding to different accuracy requirements;** the number of formulae related to GHG emission calculations has been reduced; and requirements of the data quality control plan have been improved. **Mandatory monthly activity data and relevant evidence documents are submitted** by emitters before the deadline to help prevent data fraud. Moreover, **industry-specific verification guidelines** have been introduced to make verification activities more targeted and accurate.

However, there remain some **challenges** and areas for further development of China's ETS MRVA system. The lack of a national law leads to insufficient punishment for data fraud and there are reported to be insufficiently clear responsibility boundaries for verification bodies. There is reported to be inadequate management and capability accreditation of verification bodies, with some verification bodies having inadequate professional capabilities. Emissions data quality still needs to be improved with some emitters not fully equipped with suitable measuring instruments,[6] reports of monthly data submitted by emitters not reviewed in a timely or effective manner, and some information such as carbon content and energy consumption relying too much on manual verification and not cross-checked by big data. In particular, the wide variety of coal used in power plants in China, and the large quantity of emissions and amount of emitters, requires the optimization of empirical values for important parameters related to coal quality, such as carbon content per calorific value, to help automatically detect abnormal data.

Development of MRVA systems in Asia

Thailand

In a pilot implementation project during 2018-2020, Thailand conducted MRV testing for companies from several industrial sectors, including steel, petrochemical, and plastic industries. Recently, Thailand conducted a voluntary emission reduction project to promote carbon trading in the Eastern Economic Corridor, which included capacity building on the MRV system. A key issue is that no decision has been made yet on whether the ETS will be the selected carbon pricing policy in the national legislation (compared to a carbon tax), with a decision expected in 2023.

Japan

Japan is now implementing a national ETS, initially on a voluntary basis, covering 600 companies and more than 40% of Japan's emissions. Companies set their own emission reduction targets and their actual emissions will be publicly disclosed. While Japan already has a reporting system for energy and emissions that has operated for 10 years, more detailed rules on monitoring and reporting are needed for the ETS. The government is working on establishing MRVA rules for the ETS with a reporting system to be launched in 2024. In order to ease the burden on companies and the government, Japan plans to adopt a tiered approach based on the experiences of the EU and Korea, and use the Korean monitoring and reporting system as a model for the initial design of their own reporting system. As the existing system does not require third-party verifiers, training sufficient new verifiers will be a challenge.

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[6] Although there is an increasing amount of actual measurements of calorific value and carbon content, now over 90%

Indonesia

The Ministry of Energy and Mineral Resources (MEMR) has undertaken power sector emission inventory data collection since 2003. Recently, MEMR has issued regulation 16/2022 which provides the legal basis for implementing the ETS for power generators, and a mandatory ETS for coal-fired plants was launched in February 2023. In the ETS, the covered entities are required to submit emission reports to MEMR. A challenge of the MRVA system in Indonesia is capacity building and recruiting sufficient verifiers.

Vietnam

Vietnam has a relatively short history of developing ETS and MRVA systems. Vietnam issued the first legal document in 2022, requiring a specific entity to report greenhouse gas emissions. Related ministries are developing MRVA guidelines, which are expected to be completed in two years. Challenges include the heavy workload to launch the MRVA system for all five major sectors and more than 20 subsectors within two years, with limited resources in terms of monitoring and reporting consultancy and verification agencies; and companies not experienced in doing this work to the required levels of data quality.

Malaysia

Malaysia is exploring two options for implementing carbon pricing—carbon tax and an ETS—and is currently conducting a study to identify the best practices and gaps for implementing an ETS, including how the MRVA will carried out. Emission data reporting is currently at a national level, with only voluntary reporting of company-level data. The country is now developing the climate act to be released in the next one or two years. It would be advantageous for Malaysia to include regulations on company-level emission data reporting in the upcoming climate act.

Taiwan

Taiwan's Environmental Protection Agency (EPA) started encouraging large industries to report GHG emissions in 2005. In 2015, the GHG Reduction and Management Act was passed, requiring reporting and third-party verification for entities emitting over 25,000 tons per year. Currently, there are 289 regulated entities emitting 233 million tons of GHGs. To reach net-zero emissions by 2050, Taiwan revised the Act, imposing carbon fees instead of implementing an ETS. The Climate Change Response Act has also come into force, with revisions to improve monitoring, simplify uncertainty assessment, and enlarge domestic verification capabilities.

Expert's reactions

Establishing an MRVA system is difficult in any country where companies are unfamiliar with GHG reporting and have limited resources. There is no better way than to start to collect the data and improve everyone's understanding. Countries can start simply with one sector, using some elements of existing regulations that reporting entities are familiar with, but keeping in mind that ETS requires more specific facility level reporting. Limited resources can also be addressed by developing IT systems, which can be simple or built on existing ones, with support from international organizations.

<u>Designing an ETS MRVA roadmap</u>

A roadmap with three major blocks, including primary legislation, secondary legislation, and guidance, has been advised for the establishment of a MRVA system.

Primary legislation includes the legal base of the MRVA system. It sets out the rules and sanctions for the system and includes elements such as the verification, accreditation, and legal obligations for all parties involved in the system. It is essential to develop this legal basis before going into the details of the system.

Secondary legislation includes more detailed rules and regulations that are easier to adapt and may change over time. Elements such as the monitoring boundaries, accounting, and very detailed MRVA rules are included in the secondary legislation. The secondary legislation is intended to work together with the primary legislation and learn from lessons and experiences over time to improve the legislation.

Guidance materials include practical tools, templates, and guidance to help all parties involved in the system do their jobs as effectively as possible. Standardized templates make it easier to aggregate data at various levels, provide a better understanding of what information to find and where, and help to meet deadlines, assisting all parties involved, including the verifier, government, and operators.

Capacity building and training are also critical elements and should be started at the earliest opportunity, helping stakeholders to prepare in time and supporting effective implementation.

These elements are shown in the figure below and will ensure that the MRVA system has a solid legal basis, clear roles and responsibilities, timelines and rules for monitoring, reporting, and verifying GHG emissions. They will also ensure that all parties involved in the system can do their jobs as effectively as possible.
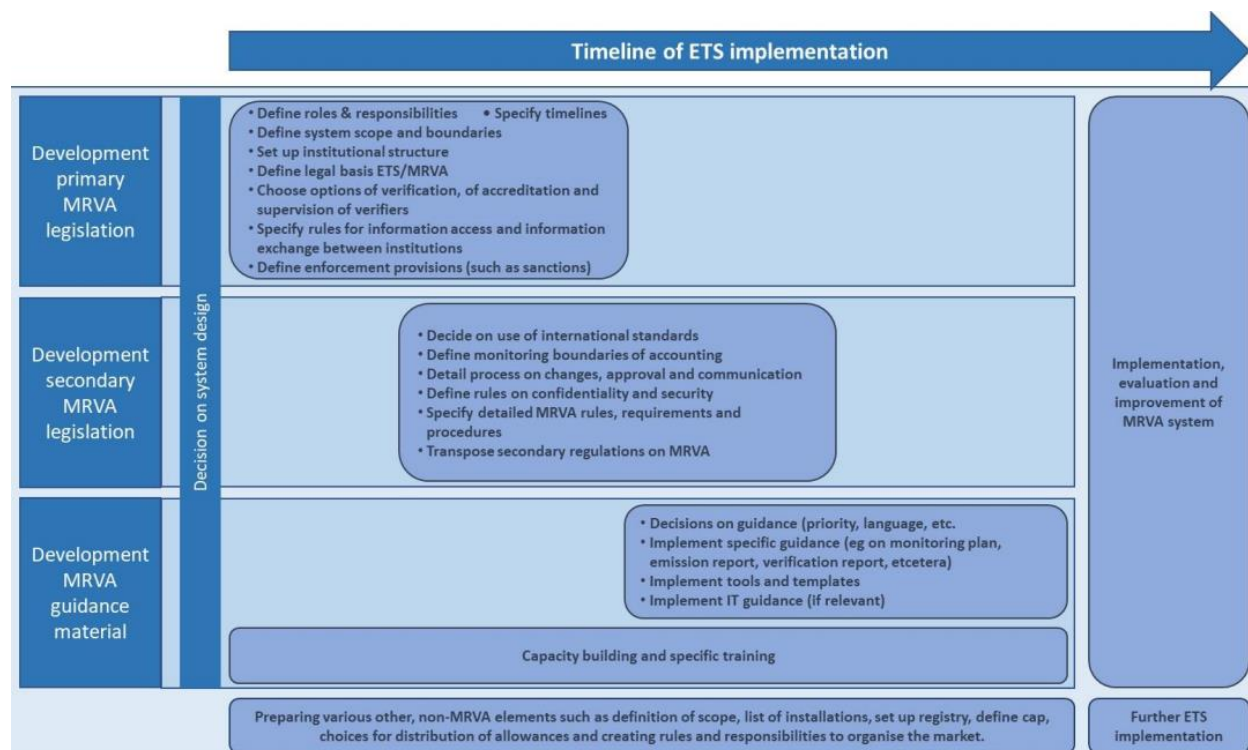
Source: "Designing an ETS MRVA roadmap", Monique Voogt, at ASPI meeting "Dialogue Facility on Monitoring, Reporting, Verification and Accreditation (MRVA) systems for ETS in Asia", February 2023

Finally, the earliest possible establishment of the MRVA systems at the installation/company level is important, ideally well before the actual start of the ETS. Good quality data obtained through MRVA helps governments set caps on emissions and distribute allowances, helps operators design a good carbon response strategy that lowers their costs of compliance, and is critical for the effective implementation of an ETS.

Annex 1: Agenda

Day One:	27 February 2023 (Monday)	
Session 1: Welcome and introduction		
5 mins	Welcome remarks and introduction	Alistair Ritchie Asia Society Policy Institute
Session 2: Overall ETS MRVA framework		
25 mins	Key elements of an ETS MRVA framework including MRV principles, legal framework, institutional structure, compliance cycle, roles and responsibilities and enforcement	Machtelt Oudenes & Monique Voogt SQ Consult, Netherlands
15 mins	Q&A and discussion	
Session 3: EU ETS		
25 mins	Ensuring consistently high quality data, building capacity & competence, role of IT systems, ensuring cost effectiveness for small emitters, and challenges, solutions and learning points	Machtelt Oudenes SQ Consult, Netherlands
30 mins	Q&A and discussion	
10 mins	Break	
Session 4: Korean ETS		
20 mins	Accreditation process and tasks including supervision and evaluation of verification bodies, enforcement, regulations / guidance, international recognition, and challenges, solutions and learning points	Jaehyun Lim National Institute of Environmental Research, Korean Ministry of Environment
15 mins	Q&A and discussion	
20 mins	Verification process and tasks including document review and on-site assessment and audit, management and supervision of auditor's competence, and challenges, solutions and learning points	Yu Shim Jeong Korean Foundation for Quality (KFQ)
15 mins	Q&A and discussion	

Day Two: 28 February 2023 (Tuesday)		
Session 5: Welcome and introduction		
5 mins	Review of key lessons discussed on Day One and introduction to Day Two	Alistair Ritchie Asia Society Policy Institute
10 mins	Special remarks: Update on status of implementation of China's National ETS and key developments planned for 2023 including MRVA improvements	Zhang Xiliang Tsinghua University
Session 6: China National ETS		
25 mins	Key elements of China's MRVA system including legal framework, institutional structure, latest developments and future plans, and challenges for accreditation of verifiers	Liu Qingzhi China Environmental Certification Center Co., Ltd (CEC), China
25 mins	Q&A and discussion	
Session 7: Development of MRVA systems in Asia		
	Status of MRVA system development, next steps, challenges, issues, learning from other systems, Q&A and discussion. Covering the following:	
10 mins	7a) Thailand	Pathom Chaiyapruksaton, TGO
10 mins	7b) Japan	Nakayama Ryutaro, Ministry of Economy, Trade and Industry, Japan
10 mins	7c) Indonesia	Anandini Mayang, Ministry of Energy and Mineral Resources, Indonesia
10 mins	Break	
10 mins	7d) Vietnam	Tran Do Bao Trung, Ministry of Natural Resources and Environment, Vietnam
10 mins	7e) Chinese Taipei	James Yu, ESTC, Chinese Taipei
10 mins	7f) Malaysia	Muhammad Ridzwan bin Ali, Natural Resources, Environment and Climate Change, Malaysia
10 mins	Further Q&A, reactions and suggestions	MRVA experts
Session 8: Roadmap for ETS MRVA framework		
20 mins	Key elements, tasks and resources for roadmap for implementing MRVA framework, considerations for time efficiency and interaction with other ETS elements	Monique Voogt SQ Consult, Netherlands
10 mins	Q&A and discussion	
Session 9: Closing session		
5 mins	Summary of best practice, challenges and solutions Concluding remarks	Alistair Ritchie