Operationalizing the Paris Agreement Article 6 through the Joint Crediting Mechanism (JCM)

Key Issues for Linking Market Mechanisms and the Nationally Determined Contributions (NDCs)

Climate and Energy Area, IGES
IGES Discussion Paper May 2016

IGES
Institute for Global Environmental Strategies

About this Paper

Authors: Kazuhisa KOAKUTSU, Area Leader/Principal Policy Researcher
Aryanie AMELLINA, Policy Researcher
Alexis R. ROCAMORA, Policy Researcher
Chisa UMEMIYA, Policy Researcher

Market Mechanism Group, Climate and Energy Area
Institute for Global Environmental Strategies (IGES)

Scope of the report:
The Market Mechanism Group of IGES has been supporting the implementation of the JCM in Asia and the Pacific through capacity building activities and development of technical tools. This report aims to inform the current progress and lessons from the JCM and how they will contribute to the efforts in climate mitigation, especially for the Post-2020 to achieve the Nationally Determined Contributions (NDCs) in the context of Article 6 of the Paris Agreement. Upon the analysis of IGES researchers, this report offer findings from the JCM as inputs for the JCM partner countries, Parties, and international negotiators for the further development of the cooperative approaches as market mechanism options to support Parties towards achieving their NDCs.

Acknowledgements:
The authors wish to sincerely thank all IGES Climate and Energy Area researchers and staffs for their valuable insight and support, without which this report would not have taken into shape. Authors also would like to thank key stakeholders of the JCM partner countries, whose valuable experiences and inputs have contributed to the enhancement of the JCM.

Institute for Global Environmental Strategies (IGES)
2108-11 Kamiyamaguchi, Hayama, Kanagawa, 240-0115, Japan
Tel: +81-46-826-9592 | Fax: +81-46-855-3809
E-mail: mm-info@iges.or.jp URL: http://www.iges.or.jp/en/climate-energy/mm/index.html

IGES Publication Code DP1601

Table of Contents

List of Figures

List of Tables

Abbreviations

ADB	Asian Development Bank
CDM	clean development mechanism
CER	certified emission reductions
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
COP	Conference of the Parties
EB	CDM executive board
ETS	emissions trading schemes
EU-ETS	EU emission trading system
GEC	Global Environment Centre Foundation
GHGs	greenhouse gases
GOJ	Government of Japan
IGES	Institute for Global Environmental Strategies
INDCs	Intended Nationally Determined Contributions
JC	Joint Committee of the Joint Crediting Mechanism
JCM	Joint Crediting Mechanism
LDC	least developed country
MOEJ	Ministry of the Environment, Japan
METI	Ministry of Economy, Trade, Industry, Japan
MRV	measurement, reporting, and verification
NDCs	Nationally Determined Contributions
NEDO	New Energy and Industrial Technology Development Organization
PDD	project design document
REDD+	Reducing Emissions from Deforestation and Forest Degradation including enhancement of forest carbon stocks
TPE	Third Party Entity
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

Chapter 1. INDCs and Market Mechanisms

- **International finance and market mechanism will be a key element for enhancing climate mitigation in developing countries**

  As many developing countries' INDCs clearly mention the amount of financial support they need to achieve higher climate mitigation and the Paris Agreement officialises the pledge for international support, developed countries should effectively deliver on the commitment to ensure ambitious mitigation in developing countries.

- **The potential of market mechanisms is greater than its role claimed in INDCs**

  A majority of countries claim using market mechanisms in their INDC. The role and potential of market mechanisms is greater than mentioned in the INDCs. Future NDCs should include use of all market mechanisms for a complete understanding of the climate actions planned through these instruments.

- **A virtuous cycle of transparency and accountability rule development could foster effective INDC and market mechanisms development**

  Adoption of international transparency and accountability rules will be essential for the effective implementation of INDCs, notably concerning market mechanisms, and its improvement under review cycle. Rules under existing market mechanisms should serve as reference for the international rules under the new climate regime.

Chapter 2. Decision on Market Mechanisms in COP21 and Paris Agreement: Co-existence of decentralized and centralized approaches

- **The Article 6 of Paris Agreement will be of high significance for Parties to achieve their NDCs**

  As efficient and cost effective mechanisms are necessary to enhance the ambition of the NDCs and actual implementation of the Paris Agreement, Article 6 of the agreement will be of high significance. The Article 6 consists of the three important components: cooperative approaches, a mechanism for mitigation and sustainable development, and a non-market approach.

- **The JCM is an example of a mechanism under the Article 6**

  The JCM is one of the cooperative approaches under the Paris Agreement as it meets its important criteria, namely involvement of ITMOs towards NDCs.

- **Experience from implementation of the JCM rules and accounting procedures can provide inputs for the international rulemaking**

  The JCM is going to generate credits as ITMOs to be utilized for the achievement of both Japan's and host country's NDCs, under robust accounting guidelines for avoidance of double counting. The JCM experience can provide crucial insights for the international rulemaking on environmental integrity and double counting for market mechanisms under the Paris Agreement.

Chapter 3. Lessons from the Progress of JCM Project and Methodology Development

- **Number of projects have been increasing, but enhanced matchmaking and local stakeholder engagement to develop local project initiatives are still needed**
  There are more than 70 financed projects being implemented and 10 JCM Projects registered. But promotion is still needed to support partner country initiatives especially in underrepresented countries. Enhanced business matchmaking, local stakeholders' engagement, and mobilization of companies are necessary to support strategic programs, such as those mentioned in INDCs or Technology Needs Assessment, efficiently.
- **Technical guidance based on experience could be useful for methodology development**
  21 approved methodologies are available and more will be needed. A technical guidance from the JC, covering guidance for determination of reference emissions, update requirements, recommendations for scope of methodology, and responsibility of parties, may be helpful to develop simple yet robust methodologies in the future.
- **Local stakeholders capacity and contribution in MRV is essential for environmental integrity**
  In addition to its technical simplicity, efficient use of time and cost are the attraction factors of the JCM. It is important to ensure, however, that efficiency does not trade off with rigor in ensuring environmental integrity. Strengthened capacity of the partner country in implementing MRV and transparent public consultation process are important factors.

Chapter 4. How does an accounting system with the involvement of international transfer of units look like in a post-2020 climate regime? A case of the JCM in Indonesia

- **Clear definition of how the JCM and its units link to the country INDCs are needed to fully utilize market mechanisms**
  Japan will account accumulated emission reductions or removals through the JCM covering all the GHGs. A clear accounting policy of credits towards the NDCs in the communication of subsequent Indonesia's NDCs is still needed to support full utilization of market mechanisms potential while ensuring environmental integrity.
- **Need to prevent disconnection between multiple years contribution to single-year target**
  Unless Indonesia's future NDCs contain the contribution for multiple years, there is a risk of disconnection between JCM credits for years outside the single target year of the contribution and the NDCs. A Party's intention on how to utilize the credits to be generated outside the target year for the NDCs needs to be clarified.
- **Domestic policy to prevent double counting risks at the national level are needed**
  The JCM rules and guidelines and accounting by the JCM Registry system established in Indonesia appear to reduce the double counting risks within the scope of the JCM. Domestic policy and procedures beyond the scheme may still be needed to prevent double counting as there will be more than one mechanism and registry involving the use of units towards the NDCs.

Introduction

The 21st session of the Conference of the Parties (COP 21) held at the United Nations Climate Change Conference in Paris in December 2015 marked a major milestone in the climate policy history by reaching a universal agreement to tackle climate change. The Paris Agreement incorporated self-established mandatory national climate strategies known as INDCs, coming from both developed country and developing country signatory Parties. These INDCs include domestic measures aiming to reach the mitigation objectives.

Three possible new market mechanisms to support mitigation objectives are visible from the Article 6 of the Paris Agreement; 1) cooperative approaches, 2) a mechanism for mitigation and sustainable development, and 3) a non-market approach. The use of market mechanisms for realizing the contributions intended by Parties is highly potential, judging from the majority of the INDCs submitted by the Parties that claim use of international, regional, and bilateral market mechanisms.

The JCM, a bilateral mechanism initiated by the Government of Japan, facilitates diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributes to sustainable development of developing countries. The mechanism fits in the cooperative approaches as it meets the important criteria for the cooperative approaches: the involvement of internationally transferred mitigation outcomes towards NDCs. In its inception, the JCM intends to use its GHG emission reductions or removals to achieve Japan's emission reduction target described in Japan's INDC. Moreover, bilateral agreements between Japan and 16 partner countries also stated that the JCM credits may be used for partner country's mitigation pledges (INDCs).

The current design and lessons from the operation of the JCM, including determination of net emissions reductions, practical guidance for project implementation, and accounting policies to avoid double counting of the JCM credits, will be useful for the development of cooperative approaches, integrating the NDCs and market mechanisms to operate effectively to enhance the mitigation activities while promoting sustainable development, to achieve common objectives under the new climate regime.

Chapter 1
INDCs and Market Mechanisms

Alexis R. ROCAMORA
Policy Researcher, Climate and Energy Area

Key messages

- **International finance and market mechanism will be a key element for enhancing climate mitigation in developing countries**
  As many developing countries' INDCs clearly mention the amount of financial support they need to achieve higher climate mitigation and the Paris Agreement officialises the pledge for international support, developed countries should effectively deliver on the commitment to ensure ambitious mitigation in developing countries.
- **The potential of market mechanisms is greater than its role claimed in INDCs**
  A majority of countries claim using market mechanisms in their INDC. However, the role and potential of market mechanisms is probably greater than mentioned in the INDCs. Future NDCs should include use of all market mechanisms for a complete understanding of the climate actions planned through these instruments.
- **A virtuous cycle of transparency and accountability rule development could foster effective INDC and market mechanisms development**
  Adoption of international transparency and accountability rules will be essential for the effective implementation of INDCs, notably concerning market mechanisms, and its improvement under review cycle. Rules under existing market mechanisms should serve as reference for the international rules under the new climate regime.

Introduction

One essential element of the Paris Agreement resides in the incorporation of national climate strategies known as INDCs. The Agreement sets the principle of a self-established mandatory contribution from all Parties (cf. Article 4.2). While under the Kyoto Protocol regime only some developed countries made a common commitment on climate action, the new regime under the Paris Agreement requires a contribution from all signatory Parties, with the scope of the commitment being fixed nationally by each Party's government.

INDCs have been communicated by the Parties to the UNFCCC Secretariat throughout the year 2015. The decision 1/CP.21 adopted by the Conference of the Parties in its twenty first

session (COP21) invites the Parties that have not yet submitted their INDC to do so well before the COP22 in November 2016. INDCs are set to become Nationally Determined Contributions (NDCs), as formulated in the Paris Agreement Article 4, from the next round of submissions after the entry into force of the Agreement. Countries that made their INDC mitigation commitments with a time frame up to 2025 are specially invited to submit their NDC by 2020, in order to spur them into launching early implementation measures.

NDCs include domestic measures aiming to reach the mitigation objectives and Parties are encouraged to move eventually towards economy-wide emission reduction (cf. Article 4.4). An essential element of NDCs is their flexibility, as Parties are engaged to communicate updated INDCs every five years (cf. Article 4.9). Furthermore, this INDC review cycle is set to ensure a progression in mitigation objectives over time (cf. Article 4.3).

Overall, the system of NDCs combines the advantages of a decentralized approach, each country drafting and updating its INDC by taking into account national characteristics and capabilities, and the advantages of centralized approach, with the UNFCCC Secretariat maintaining a public registry of NDCs (cf. Article 4.12). The Paris Agreement also includes a regional approach by welcoming submission of NDCs from regional economic integration organizations, such as the European Union (cf. Article 4.16 to 4.18). With aim to fulfil the goals set in the Article 2, Parties should formulate long-term low greenhouse gas emission development strategies (cf. Article 4.19). Those strategies might be directly included in future NDCs, or may be part of NDC implementation measures.

As of May 2016, 189 of all 196 countries Parties to the UNFCCC had submitted their INDC (UNFCCC 2016). Those policy plans from most of the world countries and organized by the UNFCCC secretariat (UNFCCC 2015) provide an unprecedented overview of the global efforts that will be made in sectors impacting climate change, with quantified targets for the short, mid and long term.

This chapter uses the INDCs and Market Mechanism Database developed by the Institute for Global Environmental Strategies (IGES 2016) to analyse the information disclosed in INDCs. It will first present the diversity of INDCs' climate mitigation pledges, in their target types, baselines and climate finance aspects (section 1.1). It will then analyse the role of market mechanisms in INDCs, and provide an interpretation on the potential development of market mechanisms use by countries (section 1.2). Lastly, this chapter will introduce the challenges ahead in implementing INDCs, regarding the adoption of international rules on transparency and accountability (section 1.3).

1.1. The diversity of mitigation targets in INDCs

Various INDCs mitigation target types for different level of ambition

Regarding climate mitigation, a major element of each INDC is the GHG emission reduction target set by each country. The diversity of those targets is one of the first elements to consider when analysing INDCs (Figure 1):

- **73% of countries** committed themselves to a relative emission reduction target by reducing a certain percentage of GHG emissions by a pre-established date (e.g. Australia, the European Union countries, the United States)

  E.g. (the EU's INDC) "*The EU and its Member States are committed to a binding target of an at least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990, to be fulfilled jointly, as set out in the conclusions by the European Council of October 2014.*"

- **6% of countries** have opted out for a list of domestic sectoral measures whose impact is still to be assessed in the future (e.g. Qatar, South Sudan)

  E.g. (South Sudan's INDC) "*South Sudan aims to undertake the policies and actions in following sectors: energy generation and use; Land Use and Land use Change; and Transport, to address its future emissions that are likely to result from growth strategies.*"

- **4% of countries** have fixed a target consisting of an increase in the share of renewable energies in the country's energy mix (e.g. the Cook Islands, Samoa)

  E.g. (the Cook Islands' INDC) "*The Cook Islands is committed to a future powered by renewable energy with targets of 50% of islands transformed from diesel based to renewable sourced electricity by 2015, to 100% coverage by 2020.*"

- **3% of countries** have set up an absolute emission reduction target in tons of CO_2 emissions avoided (e.g. Saudi Arabia, Mozambique)

  E.g. (Mozambique's INDC) "*The country estimates, on a preliminary basis, the total reduction of about 76.5 MtCO2eq in the period from 2020 to 2030, with 23.0 MtCO2eq by 2024 and 53,4 MtCO2eq from 2025 to 2030.*"

- **2% of countries** have pledged to reach carbon neutrality (e.g. Papua

New Guinea, Uruguay) or to remain carbon neutral (e.g. Bhutan).

E.g. (Bhutan's INDC) "*Bhutan intends to remain carbon neutral where emission of greenhouse gases will not exceed carbon sequestration by our forests, which is estimated at 6.3 million tons of CO_2.*"

- **The rest 22% of countries** have set original targets such as: energy consumption decrease (e.g. Brunei Darussalam), GHG emission growth until a peak at a certain period (e.g. Oman, South Africa) or per capita emission reductions (e.g. Malawi).

E.g. (South Africa's INDC) "*South Africa's emissions by 2025 and 2030 will be in a range between 398 and 614 Mt CO2eq, as defined in national policy.*"

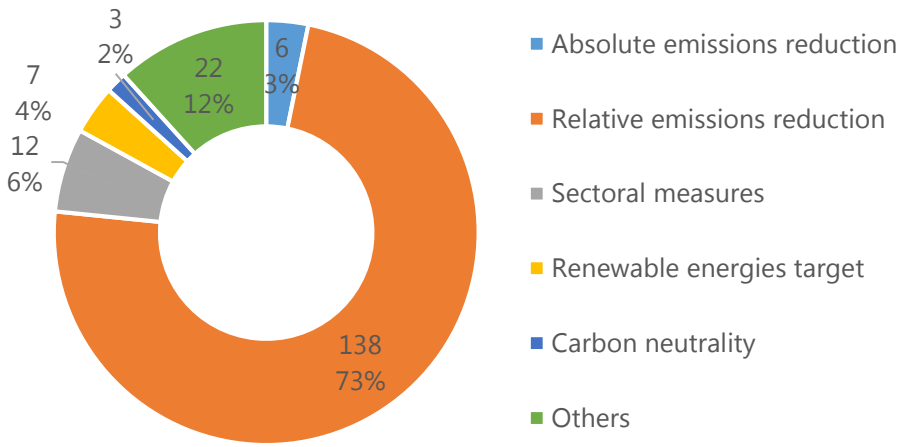


Figure 1: INDCs quantitative target types (by number of countries)

Even among countries having adopted a quantified emission reduction target (relative or absolute), differences remain regarding the baseline used for the target (Figure 2). As an emission reduction percentage is relative to the emission level of a country at a certain time, the choice of a stringent baseline will be conditional to various factors such as the industrial development history of the country, population growth, land use, and transportation changes.

While 43% of countries have chosen the "business as usual levels" (BAU) as a reference, which is calculated using current emission data and assumptions on the emission levels that would be reached in case of inaction, the other 57%

of countries have opted for a fixed reference year, spanning from 1990 (e.g. EU, Russia) to 2013 (e.g. Japan) or 2015 (e.g. Solomon Islands).

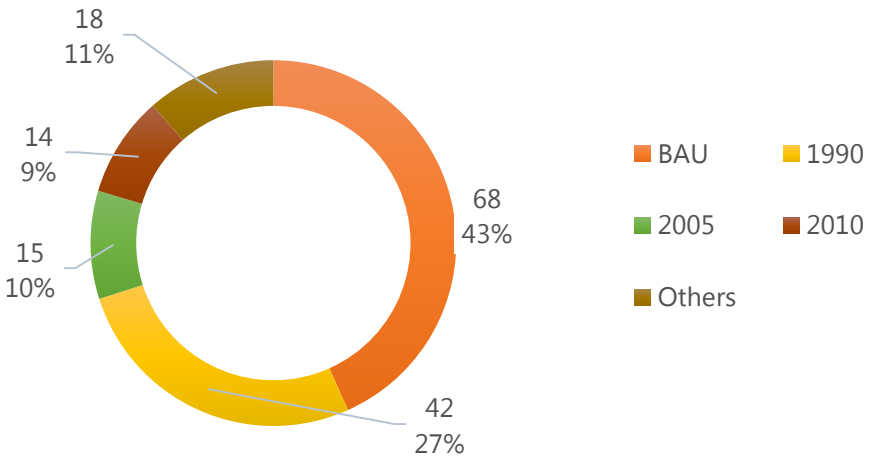


Figure 2: INDCs baselines among countries with a quantified GHG emission reduction target (by number of countries)

It is important to keep in mind, when looking into each INDC mitigation target, that, as explained hereinabove, those targets are likely to be revised and upgraded along with the submission and improvement of NDCs from 2020. Nonetheless, the targets expressed in the INDCs are not self-sufficient, but depend on implementation measures that need to be taken by national governments in the years to come. Consequently, some INDCs with targets that are effectively followed by implementation measures might prove to create more impact than INDCs with higher targets that are not followed by such measures. Similarly, INDCs with non-quantified targets, such as sectoral measures, can, if effectively implemented, generate more mitigation outcomes than INDCs with quantified targets (absolute or relative). Concrete national implementation measures are thus no less important than the ambition level of mitigation targets expressed in the INDCs in order to effectively tackle climate change.

Conditional targets: the need for increased international support and potential for higher mitigation

While the Paris Agreement encourages transparency and accountability of climate actions, a certain level of uncertainty in policy targets cannot be avoided, as ambitious climate action, especially in developing countries, relies heavily on external factors such as international support.

While 49% of countries have opted for a single unconditional mitigation target in their INDC, the rest of targets leaves room for increased ambition upon domestic efforts or international support.

Indeed, 26% of countries, among which mostly developing countries (e.g. Sri Lanka, Lesotho), have set a dual target: an unconditional target, representing their mitigation goal according to their current financial and technological capabilities, and an additional conditional target, more ambitious, reflecting the mitigation potential reachable with sufficient international support (Figure 3).

This configuration of developing countries stating publicly in a national policy plan document their financial support needs to implement ambitious climate action offers a unique visibility on climate finance future potential developments. Calculations of future emission reductions also need to account for this potential enhanced mitigation in developing countries originating from international support.

Another uncertainty factor in climate mitigation targets lie in minimum and range targets. Indeed, 18% of countries having set a minimum mitigation target, consisting for instance, of "*at least* 40% of GHG emission reductions" (e.g. Norway, EU countries). Also, 7% of countries have opted for a target range, single or with duality (an unconditional target and an additional conditional one).

Minimum and range targets add uncertainty to the exact measurement of countries' expected mitigation actions, but offer at the same time room for higher mitigation results upon sufficient international support and national policy implementation.

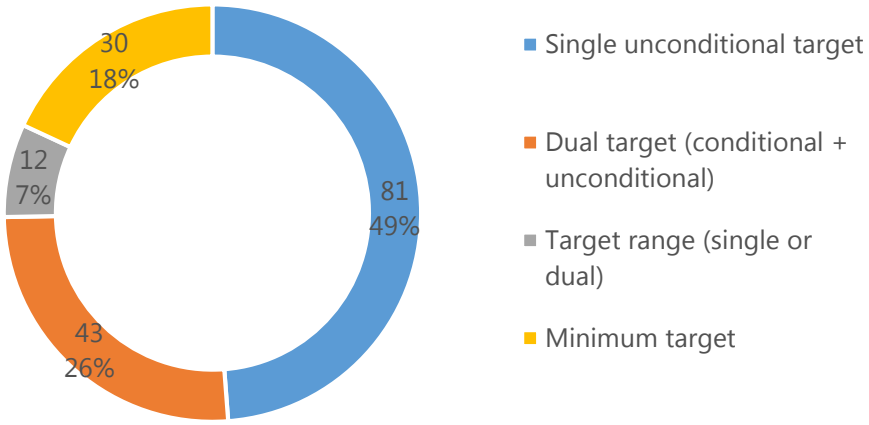


Figure 3: INDCs quantitative target types (by number of countries)

1.2. The role of market mechanisms in INDCs

Market mechanisms in INDCs by market type and region

Market mechanisms means market-based approaches to climate mitigation. They can be implemented as international, regional or bilateral mechanisms for "internationally transferred mitigation outcomes" (cf. Article 6 of the Paris Agreement) in the form of carbon credits that can be bought and sold (for instance with the UNFCCC's Clean Development Mechanism – CDM).

They can also take place as a component of a domestic carbon pricing policy, consisting in cap-and-trade systems, or emission trading schemes (ETS). In the first case, countries allow credits earned from GHG emission mitigation projects implemented in a different country to count them as their own emission reductions. In the second case, non-state actors, like private companies or other economic actors affected by a domestic cap-and-trade system, earn credits that allow them to emit emissions above the cap fixed by national authorities.

Among the 189 countries having submitted their INDCs, 122 (64%) claim use of market mechanisms. Specifically, 81 countries state their intention of using international market mechanisms, 37 their intention to use regional market mechanisms and 9 their intention to use bilateral market mechanisms (Figure 4). Many countries referring to market

mechanisms in their INDC also claim potential use of several types of market mechanisms (international and regional market mechanisms, regional and bilateral).

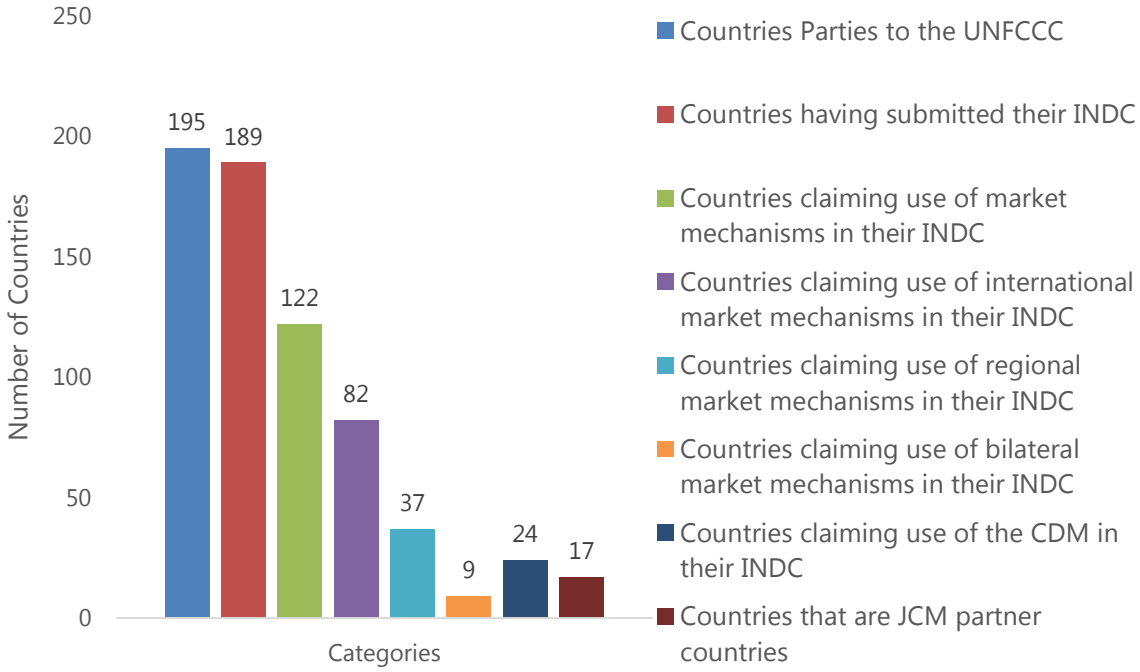


Figure 4: INDCs and Market Mechanisms Overview (source: IGES 2016)

A regional analysis of the role of market mechanisms in INDCs reveals some valuable insights (Figure 5). Many African countries for instance claimed their intention to welcome projects from international market mechanisms, notably the Clean Development Mechanism (CDM), as a mean for financial support and technology transfer. European countries, although they did not mention it in their INDC, are already taking part in the European ETS, a regional market mechanism. Many non-EU Member countries in Europe (e.g. Switzerland, Iceland) also mentioned their intention to participate to the EU ETS through appropriate linkages. In Latin America and Asian, international market mechanisms are prevalent in countries' INDCs, though bilateral market mechanisms are also fairly mentioned.

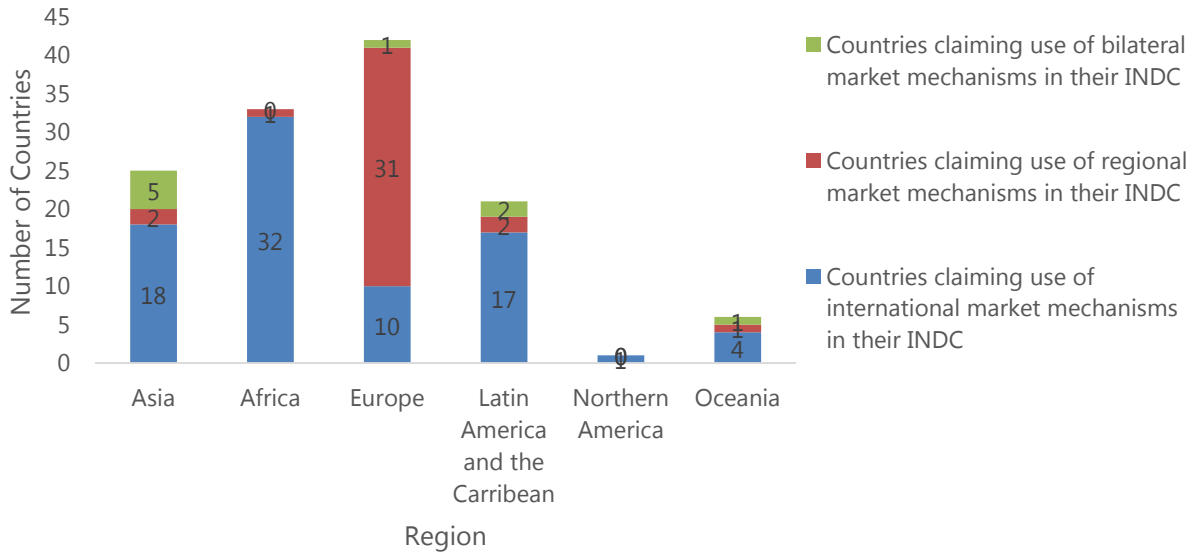


Figure 5: Countries claiming use of international, regional or bilateral market mechanisms in their INDC by region (source: IGES 2016)

The coverage of market mechanisms in INDCs: a potential for increased market mechanism development

As with climate mitigation targets, the writing of how countries intend to use market mechanisms differs greatly between INDCs. Indeed, 53% of countries clearly mention their interest in using market mechanisms (Figure 6). Among them, some claim their interest in starting or continuing to use specific market mechanism instruments such as the CDM (e.g. Bhutan, Burkina Faso), while others simply state their intention of using market mechanisms without more specification (e.g. Botswana, Cape Verde). 11% of countries are more ambiguous in their formulation, as they mention that the country "does not rule out" the possibility using of market mechanisms (e.g. Kenya, Zambia), "may" use them (e.g. Canada) or is "willing to explore the potential" of such mechanisms (e.g. Belize, Guatemala).

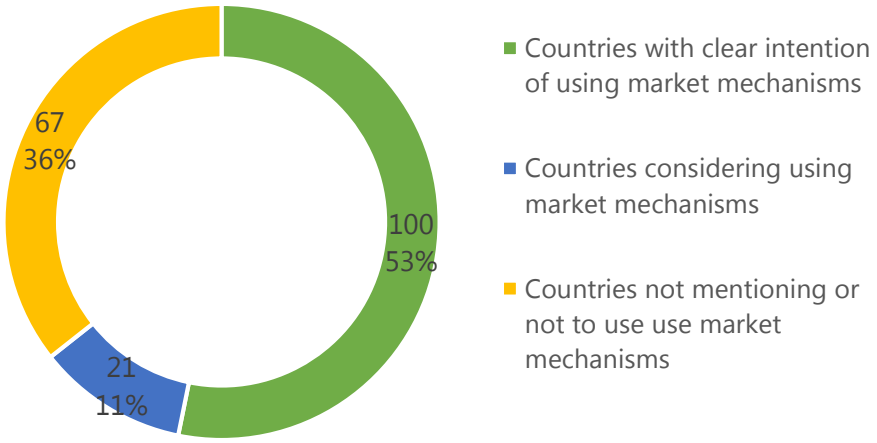


Figure 6: Intention of using market mechanisms in INCs (by number of countries)

The countries mentioning their interest in using market mechanisms in their INDC sometimes mention how the market mechanism is going to account in implementing their mitigation target.

Some countries deliberately claim their intention of using international credits to meet part of their emission reduction target (e.g. Republic of Korea, Switzerland, Turkey), or consider using them in case domestic measures shall prove insufficient to reach their target (e.g. Monaco). For others, market mechanisms will count as additional contribution to national targets (e.g. Japan, Iceland). Some countries also mention their intention of transferring credits through international market mechanisms (e.g. Ethiopia, Peru).

On the other side, 36% of countries openly state that they have no intention of using market-based mechanisms (e.g. Malaysia, Jamaica). However, whether this is clearly specified or not, in most of cases this intention of not using market mechanisms probably signifies that the country does not plans to use credits to achieve its emission reduction target.

This interpretation could mean that countries that do not mention or do not intend to use market mechanisms in their INDC may just not consider acquiring credits from international mechanisms, but may nonetheless take part in other forms of market mechanisms such as domestic, bilateral or regional carbon markets.

Marginally, some countries do make a clear distinction by mentioning that they

will not acquire credits to reach their emission reduction target, but that they will welcome projects from international climate mechanisms on their territory (e.g. Senegal, Gambia).

This may reflect a different approach to climate change policy, according to countries' political priorities and which policy they intend to promote on the international stage (Kachi 2014). For instance, the EU countries or the United States of America claim their intention of not using market mechanisms, and do not mention in their INDC the ETS that they are domestically developing or improving. On the contrary, some countries provide more information on non-international market mechanism instruments they intend to use. For instance, China explains in its INDC the major role that its national ETS currently under development will play in the future, and Japan provides details of its Joint Crediting Mechanism (JCM), a bilateral mechanism.

These observations tend to imply that the presence of market mechanisms in the INDCs may only be tip of the iceberg of the actual role that all market mechanisms will play from now on in the Paris Agreement regime (Hohne et al. 2015 and Marcu 2014).

1.3. The way forward in implementing INDCs: the adoption of international transparency and accounting rules

The Paris Agreement will enter into force in 2020, after at least 55 countries accounting for at least 55% of the total global GHG emissions have ratified the Agreement (cf. Article 21). Taking this into account, we can now foresee three different implementation periods: a short-term preparation period pre-2020, a mid-term implementation period between 2020 and 2030, and a long-term implementation period between 2030 and 2050.

The immediate focus for countries during the pre-2020 period is to prepare for the full implementation of INDCs for when the Paris Agreement enters into force. A major task to undertake is notably to adopt at the international level rules and procedures for transparency and accounting (cf. Article 13), which can provide guidelines on what is being taken into account in the calculation of a country's GHG emissions, the results and progress of its mitigation actions, and the international support received and given towards the achievement of NDCs.

The decision 1/CP.21 of the COP21 mandates the Ad Hoc Working Group on the Paris Agreement to develop, by 2018, recommendations for the modalities, procedures and guidelines for the transparency of action and support. Those modalities, procedures and guidelines will be adopted during the next session of the Conference of Parties serving as the meeting of the Parties to the Paris Agreement (CMA). They will be built upon and replace the current MRV system established under the Convention.

The Paris Agreement transparency and accountability framework will provide universal and harmonized MRV requirements that ensure accuracy, completeness, consistency, comparability, flexibility and environmental integrity. This framework will depend on solid reporting system including national communications, biennial reports (for developed countries), biennial update reports (for developing countries), the international assessment and review process (which includes technical expert reports) and international consultation and analysis.

Regarding flexibility, it is to be noted that although the framework is designed to foster ambition and accurate MRV rules, it also takes into account the situation of countries that do not have the capacity to establish and implement such heavy MRV. The transparency framework, as described in the decision 1/CP.21 of the COP21 paragraphs 90 and 91, includes special provisions for developing countries, for instance requiring from them lighter reporting details at fewer frequencies.

The requirement of submitting reports on a biennial basis under the transparency framework is also made optional for the least developed countries and small islands developing States with less capacity, which can submit this information at their discretion. Additionally, the later decision also established a Capacity Building Initiative for Transparency to build institutional and technical capacity supporting, upon request, developing countries to meet enhanced transparency requirements.

The development of international rules under the transparency and accounting framework for market mechanisms can be undertaken upon the experience of already existing market mechanisms (Figure 7).

Rules from international mechanisms, such as the CDM, regional, such as the EU ETS, or bilateral, such as the JCM, can serve as a reference to establish common rules and guidelines under the Paris Agreement regime. Reciprocally,

once adopted, those international rules on transparency and accounting will be used as a basis and common framework for the development of new market mechanisms, or the adoption of improved rules for existing mechanisms.

Advanced MRV following consistent transparency and accounting rules will be essential in establishing regularly a global stocktake, and thus in assessing the universal progress of mitigation actions in tackling climate change (Dagnet et al. 2014).

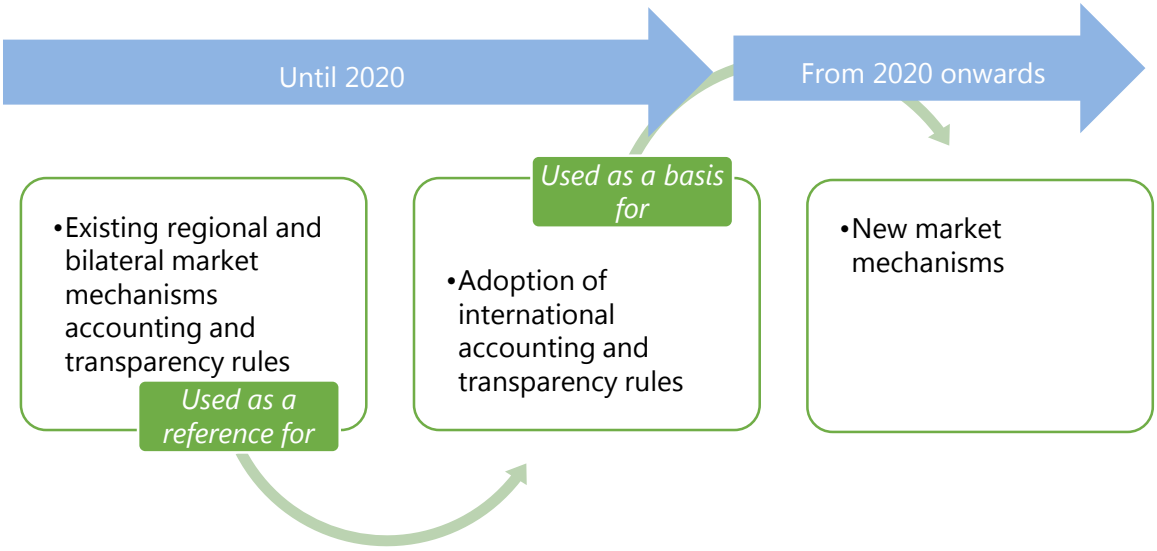


Figure 7: The virtuous cycle of transparency and accountability rule development

Chapter 2
Decision on Market Mechanisms in COP21 and Paris Agreement: Co-existence of decentralized and centralized approaches

Kazuhisa KOAKUTSU
Leader/Principal Policy Researcher, Climate and Energy Area

Key messages

- **The Article 6 of Paris Agreement will be of high significance for Parties to achieve their NDCs**
  As efficient and cost effective mechanisms are necessary to enhance the ambition of the NDCs and actual implementation of the Paris Agreement, Article 6 of the agreement will be of high significance. The Article 6 consists of the three important components: cooperative approaches, a mechanism for mitigation and sustainable development, and a non-market approach.
- **The JCM is an example of a mechanism under the Article 6**
  The JCM is one of the cooperative approaches under the Paris Agreement as it meets its important criteria, namely involvement of ITMOs towards NDCs.
- **Experience from implementation of the JCM rules and accounting procedures can provide inputs for the international rulemaking**
  The JCM is going to generate credits as ITMOs to be utilized for the achievement of both Japan's and host country's NDCs, under robust accounting guidelines for avoidance of double counting. The JCM experience can provide crucial insights for the international rulemaking on environmental integrity and double counting for market mechanisms under the Paris Agreement.

Introduction

The long discussed topics on the utilization of the market mechanisms under the UNFCCC has finally come together in Paris Agreement. Article 6 of the Paris Agreement clearly recognize both the various approaches "implemented individually or jointly" (decentralized approach) and a new market-based mechanism, operating under the

guidance and authority of the Conference (centralized approach). It is a remarkable decision in a way to accommodate various forms of market mechanism operated under the UNFCCC framework, however, it characterize the nature of the Paris Agreement, which is comprehensive, durable, progressive and applicable to all.

The real question for the implementation of the Article 6 of the Paris Agreement is how we could develop robust accounting guidelines integrating the NDCs and market mechanisms to operate effectively to enhance the mitigation activities while promoting sustainable development.

This chapter will present the decentralized and centralized approaches included in the Paris Agreement, introducing the JCM as one of the Cooperative Approaches (section 2.1), assessment on the operationalization of Article 6.2 of the Paris Agreement, particularly how ITMOs could be utilized towards NDCs (section 2.2), and propose inputs for the further implementation of the Article 6.2 (section 2.3).

2.1. Decentralized approach and centralized approach under the Paris Agreement

The Article 6 of the Paris Agreement consist of the three important components. They are namely, **(1) Cooperative approaches** (Article 6, paragraph 2 and 3), **(2) A mechanism for mitigation and sustainable development** (Article 6, paragraph 4 to 7), and **(3) A non-market approach** (Article 6, 8-9).

Cooperative Approach (Article 6, 2-3)

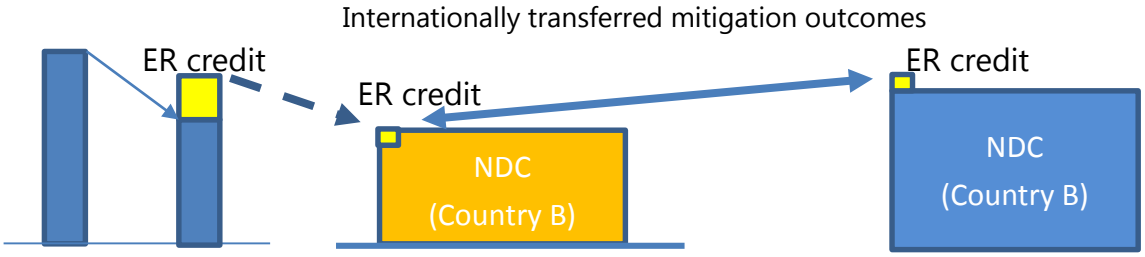
2. Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. 3. The use of internationally transferred mitigation outcomes to achieve nationally determined contributions under this Agreement shall be voluntary and authorized by participating Parties.

(UNFCCC (2015) Paris Agreement: FCCC/CP/2015/L.9/Rev.1.)

Key feature of the Cooperative Approaches: international transfer of mitigation outcomes towards NDCs

For the cooperative approaches, there are 3 important elements in the decision. Firstly, they will involve "(1) the use of **internationally transferred mitigation outcomes**" Secondly, they will use to meet (2) towards **nationally determined contributions.** And, lastly, (3) they shall "(3) apply **robust accounting to ensure the avoidance of double counting** consistent with guidance by Meeting of Paris Agreement (CMA)"

In essence, the Article 6.2 enables such approaches to transfer the emission reduction credits internationally (across the border) to meet the country's NDCs (or commitments under the Paris Agreement) while subject to the guidance on double counting. What it means to the practical application to the mechanism? It basically opens the window for any mechanisms or approaches to transfer the mitigation outcomes for the purpose of meeting NDCs while subject to the application of the guidance on double counting. Those approaches will include, for example, the JCM and internationally linked emission trading scheme (ETS) at this point of time.



(Source: Author, based on Article 6.2)

Figure 8: Concept of cooperative approaches

The JCM as one of the Cooperative Approaches

The JCM is one of the cooperative approaches. In its inception of the mechanism, it intended to use its GHG emission reductions or removals to achieve Japan's emission reduction target. In Japan's INDC, the JCM is referred in such a way that "Japan establishes and implements the JCM in order to appropriately evaluate contributions from Japan to GHG

emission reductions or removals in a quantitative manner." The amount of emission reductions and removals acquired by Japan under the JCM will be appropriately counted as Japan's reductions." (GOJ 2016)

In this sense, the JCM meets 2 important criteria in the cooperative approaches, 1) "the involvement of internationally transferred mitigation outcomes" and 2) "towards nationally determined contributions."

Interpretation of Cooperative Approaches in the context of UNFCCC discussion on market mechanism

The discussion on the market mechanism under the Convention started in 2007 COP13 in Bali (Table 1).

Table 1: UNFCCC Discussion on Market Mechanism

2007 (COP13, Bali) Market mechanism under the Convention
Enhanced national/international action on mitigation of climate change, including, (v) Various approaches, including opportunities for using **markets**, to enhance cost effectiveness to promote mitigation actions.
2010 (COP16, Cancun) Principle of market mechanism
Voluntary participation, compliment NAMA, broad segments of the economy, environmental integrity, net decrease and/or avoidance, to meet part of mitigation targets, governance and regulation
2011 (COP17, Durban) Various approaches and new market-based mechanism
Various approaches: standards that deliver real, permanent additional and verified mitigation outcomes, avoid double counting, achieve net decrease and/or avoidance **New market-based mechanism (NMM)**: Operating under the guidance and authority of the COP.
2012 (COP18, Doha) Elaboration and Technical Specification
FVA: a. purpose, b. scope, c. criteria and procedure for environmental integrity, d. technical specifications to avoid double counting, e. institutional arrangements **New market-based mechanism**: Elements of the mechanism; standards, MRV, broad segment of the economy, ambitious reference level, and recording and tracking of units.

For the followers of market mechanism negotiation process, the 3 components embedded in the Article 6 looks quite familiar to the structure of the agenda discussed under the Subsidiary Body for Scientific and Technological Advice (SBSTA) for the topics of (Table 2) framework of various approaches (FVA), new market-based mechanism (NMM), and non-market approaches (NMA). In this sense, what it will be discussed is to

follow the previous discussion and it can be built on what was discussed.

Table 2: Reference to FVA, NMM, and NMA

SBSTA	Paris Agreement (Article 6)
Framework of various approaches (FVA)	Cooperative Approach (Article 6, 2-3)
New market-based mechanism (NMM)	A mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development (Article 6, 4-7)
Non-market approaches (NMA)	A Non-Market Approach (Article 6, 8-9)

2.2. Operationalization of Article 6.2 of the Paris Agreement: Application to the JCM

In order to achieve the ambitious objectives of the Paris Agreement, efficient and cost effective mechanisms to enhance the ambition of the NDCs will be needed. Therefore, Article 6 of the Paris Agreement will be of high significance for the actual implementation of the agreement. The JCM can be seen as an example of the cooperative approaches mentioned in Article 6.2 of the Paris Agreement.

Article 6.1 calls for market mechanism to be operated under the Paris Agreement

In implementing the Paris Agreement and meeting its objectives, as defined in Article 2, the Parties will have to enhance their mitigation and adaptation actions beyond their currently submitted NDCs. Holding the increase in global average temperature to "well below 2 degrees above pre-industrial levels" and to "pursue efforts to limit the increase to "1.5 degrees" would necessitate significant financial sources and new ways of involving the public and private sectors. The Article 6 of the Paris Agreement could provide a solution through the so-called "cooperative approaches" to allow for higher ambition and to promote sustainable development as well as environmental integrity.

The question for the articulation of the Article 6.1, therefore, is what kind of approaches and/or mechanisms would be available for the Parties to use in the implementation of their NDCs and its enhancement. Article 6.1 indicates that

some Parties already started to initiate voluntary cooperation for the implementation of their NDCs and the subsequent paragraphs provide possible approaches to pursue.

Article 6 of the Paris Agreement basically consists of the three important components. They are namely, (1) Cooperative approaches (Article 6, paragraph 2 and 3), (2) A mechanism for mitigation and sustainable development (Article 6, paragraph 4 to 7), and (3) a non-market approach (Article 6, 8-9).

The JCM as a case for Article 6.2

For the elaboration of Article 6.2, there are three important elements in the paragraph as follows (UNFCCC, 2015).
(1) Internationally transferred mitigation outcomes (ITMOs),
(2) towards nationally determined contributions (NDCs), and
(3) application of robust accounting to ensure the avoidance of double counting consistent with guidance.

The operationalization of the Article 6.2 will require the elaboration of such elements. As the JCM already is at the implementation stage, the JCM can be seen as a "real-life example" for the operationalization of this paragraph.

The current status of the JCM

The basic concept of the JCM is to facilitate the diffusion of leading low carbon technologies, products, systems, and services while appropriately evaluating greenhouse gas (GHG) emission reductions or removals in order to use them to achieve Japan's emission reduction target under the UNFCCC. As of April 2016, there are 16 countries which have established the JCM[1] (GOJ 2016).

Based on these, a Joint Committee (JC) consisting of representatives from both countries is established, rules and guidelines for the JCM are adopted, methodologies are approved, and projects are registered. As of 1 April 2016, 21 JCM methodologies have been approved and ten projects have been registered (JCM 2016). In preparation for the issuance of credits, the development of the JCM registry from Japanese side has been completed as of November

[1] Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar, and Thailand.

2015[2] and the JCM registry in partner country is now underway. With the adoption of the "Outline of Japan's JCM Implementation" the actual implementation of the JCM has been carried out (JCM Registry, 2016).

As of today, nearly 70 JCM projects are in the pipeline supported directly through the finance program by the Government of Japan. More information on the status of JCM projects will be explained in Chapter 3.

How can ITMOs be applied to the JCM?

The JCM is going to generate ITMOs soon, based on its rules and institutional arrangements. Based on agreed documents (e.g. Low Carbon Development Partnership, Memoranda of Cooperation), the institutional arrangements for the JCM including the "verified emission reductions or removals of GHG" can be used for internationally pledged mitigation efforts. Double counting of emission reductions or removals will be avoided by taking specific measures, see below[3]. ITMOs will be generated in the JCM based on the project cycle of the JCM, which includes robust MRV (monitoring, reporting and verification) provisions, validation and verification by a TPE for the project design document and monitoring reports for the JC, which registers the JCM project and issues the credit (ITMOs).

It is important that the final decision will be made by the JC for the generation of the ITMOs as this ensures the authorization of participating Parties as stated in the Article 6.3 (UNFCCC, 2015).

Use of ITMOs for the NDC in relation to the JCM

The JCM will utilize the ITMOs for the achievement of the NDCs (from both Japan's and the host country's point of view). The function of the JCM in Japan's INDC is to enhance the ambition level of its INDC. For example, in Japan's INDC, the reduction target of fiscal year (FY) 2013 was set at the level of a reduction of 26.0% compared to FY2013 (GoJ, 2015).

According to the INDC, *"the JCM is not included as a basis of the bottom-up calculation of Japan's emission reduction target, but the amount of emission reductions and removals acquired by Japan under the JCM will be appropriately*

[2] JCM Registry System (https://www.jcmregistry.go.jp/)

[3] For the details of bilateral documents between partner country and Japan, please see the JCM official website (https://www.jcm.go.jp/) and look for the bilateral document under the Rules and Guidelines.

counted as Japan's reduction (GoJ 2015). In order to so, the government of Japan will undertake JCM programs within its annual budget to generate emission reductions amounting to 50 to 100 million tCO_2 (GoJ 2015). The JCM therefore is a way to enhance the ambition level of Japan's NDC. At the same time, this will also be true for the partner country, as many of them are mentioning the use of market mechanism for the achievement of their NDCs (IGES, 2016).

Guidance for the avoidance of double counting in relation to the JCM

The JCM could in fact provide a specific example for the development of robust accounting guidelines for the avoidance of double counting. In this context, it is important to take a deeper look into the meaning of "double counting" and ways to develop a set of measures to address the related issues.

There are four types of double counting (Table 3): (1) double registration, (2) double issuance, (3) double usage, and (4) double claiming (Schneider et al. 2014). The following table summarizes the approaches taken by the JCM in relation to the measures and equivalent documents that will be used to address each type double counting.

Table 3: Types of double counting

Types of Double Counting	Measures to Apply	JCM in Practice
Double registration	• Minimum information regarding projects under each scheme should made publicly available • An administrator of the mechanism should be required to check whether a proposed project for registration/issuance has not been registered/issued under other mechanisms before registration/issuance of the project.	• Defined in Bilateral Documents • Rule of Implementation of the JCM • JCM Guideline for Validation and Verification
Double issuance		
Double usage	• By confirming the decrease of the amount of units in the transferring account of a registry and increase of the same amount on units in the receiving account of another registry.	• JCM Registry • Outline of JCM Implementation

	• By checking whether units to be transferred have not been retired or canceled before a transaction	
Double claiming	• Guidance to be developed under Article 6.2 and 6.3	• N/A

(Source: New Market Mechanism in CHARTS, 2015 and JCM Website, 2016)

2.3. Way forward to Article 6.2

From the 44th Subsidiary Body (SB 44) meetings, it is expected that the negotiations will start to discuss and elaborate the guidance on possible double counting of the cooperative approaches and the development of modalities and procedures for the mitigation and SD mechanism. It is planned that those rules will be adopted at the first meeting of the Parties to the Paris Agreement in 2020. The JCM experience can provide crucial insights for the international rule-making on environmental integrity and double counting for the market mechanisms under the Paris Agreement.

Chapter 3
Lessons from the Progress of JCM Project and Methodology Development

Aryanie AMELLINA
Policy Researcher, Climate and Energy Area

Key messages

- **Number of project is high, but enhanced matchmaking and local stakeholder engagement to develop local project initiatives are still needed**
  There are more than 70 financed projects being implemented and 10 JCM Projects registered. But promotion is still needed to support partner country initiatives especially in underrepresented countries. Enhanced business matchmaking, local stakeholders' engagement, and mobilization of companies are necessary to support strategic programs, such as those mentioned in INDCs or Technology Needs Assessment, efficiently.
- **Technical guidance based on experience could be useful for methodology development**
  21 approved methodologies are available and more will be needed. A technical guidance from the JC, covering guidance for determination of reference emissions, update requirements, recommendations for scope of methodology, and responsibility of parties, may be helpful to develop simple yet robust methodologies in the future.
- **Local stakeholders capacity and contribution in MRV is essential for environmental integrity**
  In addition to its technical simplicity, efficient use of time and cost are the attraction factors of the JCM. It is important to ensure, however, that efficiency does not trade off with rigor in ensuring environmental integrity. Strengthened capacity of the partner country in implementing MRV and transparent public consultation process are important factors.

Introduction

The JCM promotes low-carbon development through diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions (GOJ 2016). It is implemented under a bilateral agreement between Japan and partner countries (Figure 9).

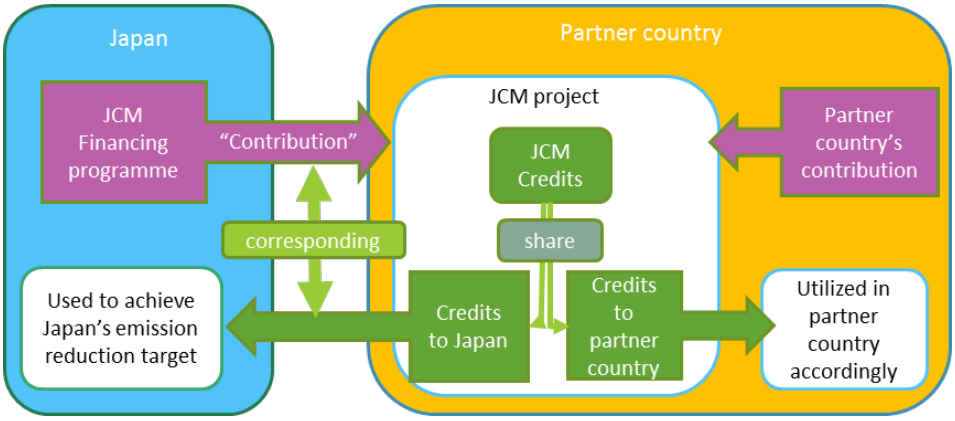


Figure 9: The JCM Bilateral Scheme

Central government and the private sector are the main stakeholders in the JCM. Active roles in making possible the transition to a low-carbon future, by both reducing GHG emissions and developing and bringing to market the necessary technologies and solutions (Morgan et al., 2015) may be enhanced by the JCM, which encourages low-carbon technology investments through partnerships between countries.

The current JCM scheme provides several financing programmes for projects. These programmes are called the JCM Model Projects, the JCM REDD+ Model Projects, the Japan Fund for JCM, and the JCM Demonstration Projects. Each financed projects are required to follow the JCM Project Cycle Procedure which includes monitoring, reporting, and requesting issuance of verified emission reductions after they are officially registered by the Joint Committee as the JCM Project.

The emission reductions from these Projects shall be calculated in a conservative way to ensure net emission reductions using the JCM methodologies and verified by the designated TPEs. These methodologies describe the ways to calculate *reference emissions, project emissions,* and *emissions reductions* including an Excel-based monitoring sheets. As of 1 April 2016, 21 approved methodologies are available to use for energy efficiency, renewable energy, transportation, biogas, and waste gas/heat utilization activities.

This chapter will present the current status of the JCM projects and methodologies. First, the progress of financial support programmes by the GOJ are introduced (section 3.1). Then, the registered JCM Projects in partner countries are introduced (section 3.2). Features of the JCM methodology as MRV tool for the JCM projects are then described with examples from the 21 approved methodologies (section 3.3). The chapter will then touch upon the process and time for methodology and project approval (section 3.4). Finally, the chapter will summarize the findings and propose inputs for further improvement of the JCM implementation (section 3.5).

3.1. Progress of the JCM Financing Programme

The JCM Financing Programme

The Government of Japan has supported 397 feasibility studies in more than 37 countries under financial support from the Ministry of Environment Japan (MOEJ) and Ministry of Economy, Trade, and Industry, Japan (METI) since 2010 (IGES 2016). These studies aimed to investigate the feasibility of using the JCM in the country, potential projects, needed technologies, and the potential emissions reductions.

Since 2013 Japan started four financing programmes for project implementation (Table 4). MOEJ has three support programmes; the JCM Model Project, the JCM REDD+ Model Projects, and the Japan Fund for JCM (JF JCM). METI works with NEDO for the implementation of the JCM Demonstration Projects financing programme.

Table 4: Active JCM support programme under MOEJ and METI

Support programme	Financial support structure
JCM Model Project	• Up to half (<50%) of the initial investment cost for facilities, equipment, vehicles, etc. that reduce CO_2 from fossil fuel combustion. • The upper limit of finance rate (%) for projects depends on, among other factors, the number of already selected projects using a similar technology in each partner country. • May be implemented in collaboration with JICA and other government-affiliated financial institute.
JCM REDD+ Model Project	• Finances part of the project cost. • Encourages participatory monitoring of illegal logging, disaster prevention, forest restoration, and provision of alternative livelihoods.
Japan Fund for JCM (JF JCM, ADB Trust Fund)	• Applicable for projects co-financed by the ADB. • Grant for incremental cost of technologies public and state-owned entities projects. • Interest subsidy to ADB-financed loans for non-government projects, private sector borrowers and financial institutions.
JCM Demonstration Projects	Supports the project cost necessary to verify the amount of GHG emission reduction (for MRV), e.g. cost of design, machines, materials, labour, and travel.

Source: MOEJ (2016), METI (2016), and ADB (2016), author's summary

Progress of Financed Projects

As of 1 April 2016, 59 projects are being implemented under MOEJ financing programme, comprising 56 JCM Model Projects, 2 JCM REDD+ Model Project, and 1 JF JCM project (Table 5). Energy efficiency remains as the most attractive project sector in the JCM Model Project, with specific activities related to electricity saving, fuel saving, and energy loss reduction. Renewable energy is becoming more popular, with solar photovoltaic (PV) projects contributing to more than 95% of activities in this sector. 9 Model Projects have been registered as JCM Project.

Table 5: MOEJ JCM Model Project, JCM REDD+ Model Project, JF JCM

Type of Project	FY 2013	FY 2014	FY 2015
JCM Model Project			
Energy Efficiency	6	6	20
Renewable energies	1	6	10
Waste gas/heat utilization		1	
Biomass			1
Methane avoidance			1
Transportation		1	
Biogas		1	
Co-generation			2
JCM REDD+ Model Project			
LULUCF/REDD+			2
JF JCM (ADB)			
Renewable energies		1	
Total	7	16	36

Estimated emission reductions from the above JCM Model Projects accumulated to 531,815 tCO_2/year, with an estimated average of 37,987 tCO_2/year per project. It is observed that the biggest estimated reductions from individual projects could be achieved from REDD+ projects (140,000 and 86,520 tCO_2/year) and waste heat utilization for 30 MW power generation at cement factory (122,000 tCO_2/year). Considering the potential of emission reductions from REDD+ project and the availability of funds, the finalization of guidelines for development of REDD+ as well as afforestation and reforestation projects will be an important milestone for the JCM implementation.

The number of JCM Demonstration

Project program under METI has also been increased since 2013. The projects promote energy efficiency and solar power energy (Table 6).

Taking into account that some support were granted for project development for more than one year, there are currently 17 individual JCM Demonstration Projects. The total estimated emission reductions, from available data, is 60,807 tCO_2/year with an average of 6,080 tCO_2/year per project. One JCM Demonstration Project has been registered as the JCM Project.

Table 6: Financed JCM Demonstration Projects

Type of Project	FY 2013	FY 2014	FY 2015
Energy Efficiency	5	7	9
Renewable energies	1	1	1
Total	6	8	10

Enhancing future project development

The number of projects selected to receive the JCM financial support has been increased since the first signing of the JCM bilateral agreement in 2013. In total, 75 financed projects in 14 countries are being implemented under JCM financing support including co-financing with ADB (Figure 10). These projects, including the registered projects, are expected to reduce 592,622 tCO_2/year.

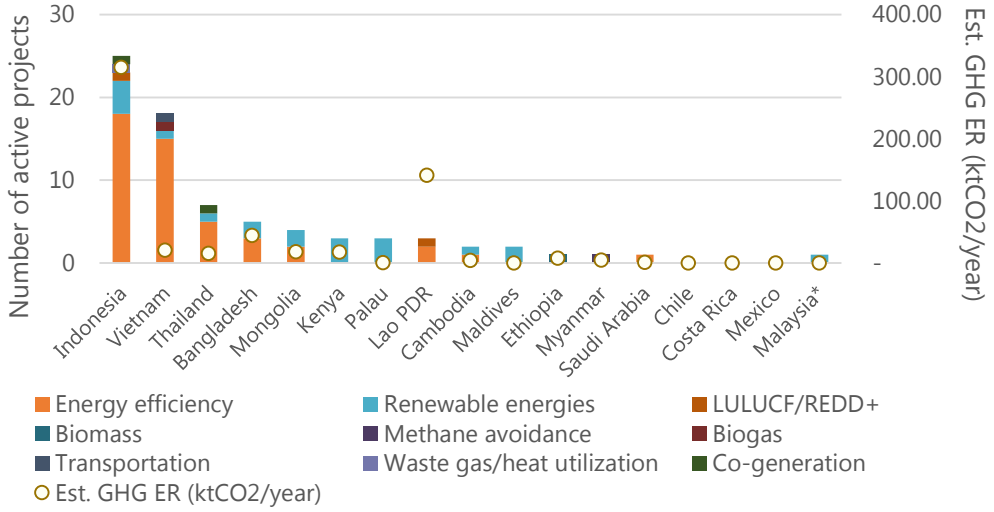


Figure 10: JCM financed projects and potential emission reductions (source: IGES 2016)

However, as shown in Figure 10, provision of the JCM support has been focused on projects in Indonesia (33%), Vietnam (24%), and Thailand (9%).

There is an evident need for more projects promotion in underrepresented countries especially LDCs such as Lao PDR, Maldives, Cambodia, and Myanmar, and countries in other region such as Chile, Costa Rica, and Mexico.

To contribute to sustainable development in a wider scale while utilizing the available budget[4] optimally, Japan, partner countries, and supporting organizations need to enhance the efforts in project development.

It should aim to support partner country's programs, such as those mentioned in INDCs or Technology Needs Assessment, and initiatives from local businesses.

Particularly, promotion is needed for larger scale projects in renewable energies (e.g. geothermal) and vital projects such as waste treatment and transportation. Public sector involvement seems essential for large scale infrastructure projects while appropriate JCM financial support through JICA and ADB as well as other financial institutions are available.

Partner countries' initiatives and mobilization of companies should be strengthened to support the local needs. Capacity building activities, engagement with local businesses and associations, and available matchmaking platforms should be further enhanced.

In conducting capacity building, experiences in the benefits of projects such as lower initial cost, reduced investment risk, and reduction of energy consumption could be highlighted. Other experiences such as withdrawals by candidate project participants are also important to be shared among countries as lessons learned.

3.2. JCM Registered Projects

Selected projects under JCM financing programme shall be registered by the Joint Committee of the host country to be officially recognized as the JCM Project. After registration, participants are required to monitor the emissions reductions projects.

As of 1 April 2016, 10 JCM projects have been registered in Indonesia, Mongolia, Palau, and Vietnam (see Annex). They cover energy efficiency (8 projects), renewable energy (1 project), and transportation (1 project) activities.

The energy efficiency projects typically promote energy-efficient chiller, boiler, air-conditioning, and refrigerator. The

[4] The draft budget for projects implementation under the JCM financing programmes accumulated to around 5.88 billion JPY (51.27 million USD) per year from 2016.

use of these equipment will reduce electricity or coal consumption in the project sites, resulting in reduced CO_2 emissions.

The calculation methodologies used as a basis of these projects require the project participants to monitor two data; (1) electricity consumption or net heat supplied by the project equipment and (2) operating hours of those equipment.

Small scale solar power plants for commercial facilities in island states (Palau, PW001)

This project introduces a total of 370.5 kW grid-connected solar photovoltaic (PV) systems on top of two buildings, replacing grid electricity derived from diesel for self-consumption. The PV modules are certified under IEC 61215 (design qualifications), IEC 61730-1, and IEC 61730-2 (safety qualification). A remote monitoring system is also installed.

The project participants will conduct monitoring of the project according to the expected operational lifetime of project based on legal requirements, which extends from 7 to 20 years with an average of 12.65 years.

The emissions reductions to be reported, however, so far extends only to the year 2020 as required by the current JCM rules. The registered projects so far are estimated to reduce emissions equivalent to 1,592 tCO_2/year.

3.3. Progress of JCM Approved Methodologies

The emission reductions achieved by the JCM Projects shall be measured, reported, and verified according to the approved methodologies.

As of 1 April 2016, 21 JCM methodologies developed by project participants and consultants have been approved by the Joint Committees in six countries[5]. These methodologies cover five types of project (Figure 11) and various technologies; energy efficiency (high efficiency centrifugal chiller, LED lighting, boiler, etc.), renewable energies (solar PV and hydro power), transportation (digital tachograph), biogas (anaerobic digestion), and waste gas/heat utilization (for electricity generation at cement factory). Each methodology can be applied to multiple

[5] Indonesia, Kenya, Maldives, Mongolia, Palau, Vietnam.

projects.

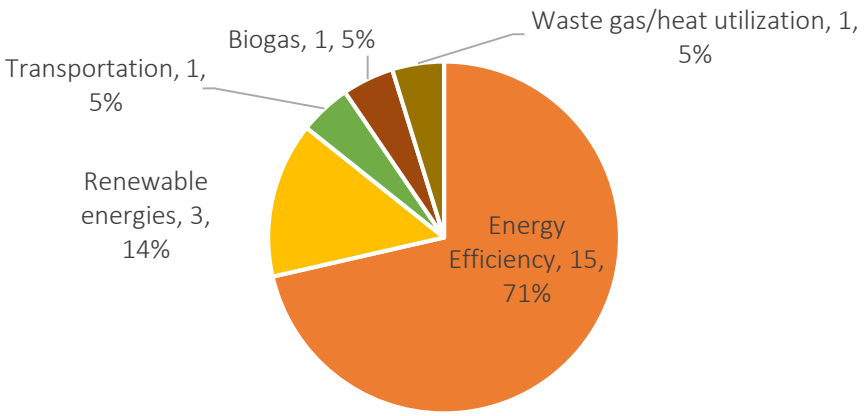


Figure 11: Type of project covered by approved methodologies (source: IGES 2016)

The methodologies features three key components: *ensuring net emissions reductions by conservative determination of reference emissions*, *eligibility criteria*, and *simple monitoring methods*.

The JCM methodology includes methodology form and monitoring plan. The methodology monitoring plan takes form as Excel spreadsheets, which provide calculation formula, default values, data collection methods, and project monitoring structure.

The use of methodology standardized document reduces the burdens for project participants in making calculation formulas and collecting data.

Ensuring net emissions reductions by conservative determination of reference emissions

In the JCM, emission reductions to be credited are defined as the difference between reference emissions and project emissions (GOJ 2016). They are calculated in a conservative manner to ensure they are not overestimated.

The "reference emissions" are the level of plausible emissions in providing the same outputs or service level of the proposed JCM project in its reference conditions in each host country, which are set below business-as-usual emissions. The JCM Guidelines on Developing Methodology approved in the partner countries provides possible methods to determine reference emissions (Table 8).

More than half of approved methodologies consider the current situation and performance of a related technology/site as a reference condition (Table 8). For example, the methodology

ID_AM010 "Introducing double-bundle modular electric heat pumps to a new building" based its reference emissions on the GHG emissions from electricity and oil consumed by oil-fired boiler and packaged air conditioner as reference equipment commonly used in buildings in Indonesia. This reference setting ensures conservative calculation by including equipment efficiency in the reference emissions formula.

Default values used in emissions calculation are taken from sources such as market survey in the host country, national or international standards, and average historical data from a reference condition. More than half of the approved methodologies use default values obtained through market surveys by methodology developers through interviews with technology providers as well as users in the country.

Table 7: Reference emissions determination method used in approved methodologies

Determination method (number of methodologies)	Example of reference emissions concept
The current situation and performance (13)	Emissions from electricity output of the solar PV system multiplied by the conservative emission factor of the existing diesel-powered grid and captive electricity (PW_AM001 "Displacement of Grid and Captive Genset Electricity by a Small-scale Solar PV System")
Best available technology in the country (1)	Emissions from power consumption of reference lighting, calculated based on the maximum luminous efficiency value of LED commercially available in Indonesia as reference lighting (ID_AM005 "Installation of LED Lighting for Grocery Store")
Average historical performance of the reference equipment (3)	Emissions from the fuel consumed by freight vehicle per distance travelled, based on the same freight vehicle as reference and project (VN_AM001 "Transportation energy efficiency activities by installing digital tachograph systems")
Performance of similar products and technologies which compete with the project technology (2)	Emissions from the power consumption of reference air conditioning system, calculated based on the maximum Coefficient of Performance of non-inverter type air conditioning systems (ID_AM004 "Installation of Inverter-Type Air Conditioning System for Cooling for Grocery Store")
Using relevant existing standards and targets (1)	Emissions from no-load losses of the reference transformer, taking into account blackout rate at a set default value. (VN_AM005 "Installation of energy efficient transformers in a power distribution

	grid"
Using more than one method (1)	1. For avoidance of methane emissions, reference emissions are calculated based on the weight of organic waste prevented from disposal using first-order decay (FOD) model adopted in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories 2. For displacement of fossil fuel-powered technologies, reference emissions are calculated based on the monitored amount and Net Calorific Value of biogas and emissions from the reference fossil fuel (VN_AM004 "Anaerobic digestion of organic waste for biogas utilization within wholesale markets")

Eligibility criteria

The JCM methodology also defines eligibility criteria or technology and project. They are specific requirements approved by the Joint Committee for each project and technology type to be eligible as a JCM Project and to apply the relevant methodology. The criteria are described in a simple checklist to reduce the risk of rejection (GOJ 2016). The number of eligibility criteria defined by each methodology ranges from two to seven, with an average of four (IGES 2016).

The commonly observed criteria are specification of equipment (e.g. maximum capacity, minimum efficiency), eligible type of activity (e.g. replacement and/or new installation), and the required components of an equipment system. Some eligibility criteria are set to require the project to be designed above the reference. For example, one of the eligibility criteria set by methodology MN_AM002 is project boiler catalogue efficiency of 80% or higher, based on the reference that Mongolian national standard requires boilers to have more than 75% efficiency.

Eligibility criteria consist of not only quantitative criteria, to ensure net emissions reductions, but also qualitative standard, which promotes higher quality and standards than typical projects. For example, methodology ID_AM005 sets a criterion for room illumination of at least 300 lux and PW_AM001 requires solar PV modules to be certified under international design and safety qualifications (by International Electrotechnical Commission, IEC).

International and national standards

and regulations are popular references for setting eligibility criteria. The use of these references should be maintained and further promoted as they simplify the development process, appropriate for domestic circumstances, and approved by international process.

Simplified monitoring methods

The third feature of the JCM methodology is simplified monitoring methods to reduce the burdens of project participants. The JCM Methodology Guidelines allows three options to be used for collecting the data needed for project monitoring[6].

For example, "Option C: Monitored Data based on the actual measurement using measuring equipment" is used by registered project participants to collect necessary data of electricity consumption of equipment and net heat supplied by the boiler in the registered projects in Mongolia. Solar PV and digital tachograph projects also choose this option to measure the electricity generated by solar PV system and the fuel consumed by the vehicles.

Using Option C is convenient since project equipment are usually furnished with remote monitoring system connected to the internet. Some project participants also add manual data collection or invoice collection procedures as a back-up. Project participants are also required by the methodologies to calibrate measurement equipment they use, although some methodologies need to state clearer requirement.

Option B, for example, is used for collecting data on equipment operating hours using invoices issued by electricity companies.

The number of parameters to be monitored ranges from one to seven, with an average of two. This is a relatively small number and most of the parameters are those that would have been monitored by project participants regardless of the JCM, such as electricity consumption from the grid.

[6] Option A: Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and specifications); Option B: Based on the amount of transaction which is measured directly using measuring equipment (Data used: commercial evidence such as invoices); Option C: Based on the actual measurement using measuring equipment (Data used: measured values).

Enhancing future methodology development

More methodologies will be developed in addition to the 21 approved methodologies. A technical guidance from the JC may be helpful for future methodology development to balance practicality and robustness. It could provide guidance for determination of reference emissions, update requirements, recommendations for scope of methodology, and responsibility of parties.

The technical guidance could set standard or procedure of conducting market survey for determination of reference emissions. For example, a certain sample size could be required.

The guidance should set a standard for periodical update of default values to make sure they are always conservative, considering the reference emissions improve over time. As an example, default Coefficient of Performance (COP) values used in the methodologies that are obtained through market surveys are already required to be updated every three years. This concept needs to be adopted in all methodologies.

As methodology development consumes time and cost, scope of each methodology is an important consideration. The use of approved methodologies for multiple projects and their adjustments and adoption in different countries has already been observed, for example the approved methodology of centrifugal chiller for Bangladesh (BD_PM001) adopted many features of the methodology covering similar technology approved for Indonesia (ID_AM002). To support this, future methodologies need to cover broader scope, for example approving methodologies for 'buildings' instead of 'public buildings'.

Last but not least, the guidance could recommend a clear arrangement of responsible parties in conducting survey, data collection and updating reference condition. These guidance could support smooth development of methodology and project implementation by participants.

3.4. Progress of Project and Methodology Approval Process

In addition to its technical simplicity, the efficient use of time and cost are important attraction factors for the implementation of the JCM.

So far, the average time taken for each methodology approval is 100 days, or

around 3-4 months, from the time it is proposed (IGES 2016b). In comparison, it is shorter than the approval time for CDM small-scale methodology, which is around 213 days or around 7 months after its submission (UNEP DTU Partnership 2016a). An average of 73 days or 2-3 months are spent to approve a final proposed JCM methodology after closing of public comment (2016b).

A time-efficient approval is made possible by a number of factors. First, the governance structure of the JCM as a bilateral mechanism and close consultations between stakeholders during project preparation period play a substantial role in making.

Furthermore, the process benefits from the practicality and simplicity of MRV system, including streamlined standard methodologies and the use of various references, which eases assessment process by the countries involved. Streamlined methodology also helps making validation process easier compared to experiences under other mechanisms.

There is no experience to date, but verification can be conducted simultaneously with validation and by the same TPE. This would also lead to accelerate future process.

These practicalities benefit project registration process. For the 10 registered projects, 42 days are observed from starting date of call for public inputs until the date of request for registration of a JCM project (IGES 2016b). This is relatively short compared to the time needed for CDM projects registration, which used to reach more than 500 days from start of public comment in the past (year 2008-2009, IGES 2012), although it has decreased to 100 days in the more recent years (UNEP DTU Partnership, 2016b).

The JCs spent an average of 20 days from receiving request for registration to project registration. So far, there has been no recorded case of rejection of official request for project registration.

It is important to ensure, however, that time efficiency does not trade off with rigor in ensuring environmental integrity. Strengthened capacity of the partner country stakeholders in implementing MRV, from methodology development, review process, and supported by transparent public consultation process are important for this purpose. The capacity for accounting and transparency would also be needed in the future.

Chapter 4

How does an accounting system with the involvement of international transfer of units look like in a post-2020 climate regime? A case of the JCM in Indonesia.

Chisa UMEMIYA and Aryanie AMELLINA
Policy Researcher, Climate and Energy Area

Key messages

- **Clear definition of how the JCM and its units link to the country INDCs are needed to fully utilize market mechanisms**
  Japan will account accumulated emission reductions or removals through the JCM programs covering all the GHGs. However, a clear accounting policy of credits towards the NDCs in the communication of subsequent Indonesia's NDCs is still needed to support full utilization of market mechanisms potential while ensuring environmental integrity.
- **Need to prevent disconnection between multiple years contribution to single-year target**
  Unless Indonesia's future NDCs contain the contribution for multiple years, there is a risk of disconnection between JCM credits for years outside the single target year of the contribution and the NDCs. A Party's intention on how to utilize the credits to be generated outside the target year for the NDCs needs to be clarified.
- **Domestic policy to prevent double counting risks at the national level are needed**
  The JCM rules and guidelines and accounting by the JCM Registry system established in Indonesia appear to reduce the double counting risks within the scope of the JCM. Domestic policy and procedures beyond the scheme may still be needed to prevent double counting as there will be more than one mechanism and registry involving the use of units towards the NDCs.

Introduction

The Paris Agreement establishes a system of decentralized approaches involving international transfer of units in Article 6.2. This is known as "Cooperative Approaches". Units transferred internationally under the cooperative approaches can be used by Parties to attain their nationally determined contributions (NDCs).

The cooperative approaches must apply robust accounting systems to ensure, inter alia, avoiding double counting and other possible issues. Double counting can be defined as counting a single GHG emission reduction or removal, achieved through a mechanism issuing units, more than once towards attaining mitigation pledges or financial pledges for the purpose of mitigating climate change (Schneider et al. 2015).

The JCM is considered to be part of the cooperative approaches. The JCM is not the only bilateral mechanism, but it can be a pioneer case for other cooperative approaches. Also, the JCM can bring lessons and experiences for the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) to adopt guidance in order to implement such approaches.

In this chapter, the JCM, in particular the JCM in Indonesia, is used to test how an accounting system for cooperative approaches look like. We then discuss what potential accounting issues, specifically double counting, may occur, and in such cases, how the cooperative approaches as part of the new international climate regime should address to those issues.

So far, the JCM has developed its own registry system only in Indonesia among other JCM partner countries. The experience of this development is relevant not only to other JCM partner countries, but also any other countries which may engage with decentralized market-based mechanisms towards their NDCs in the future.

This chapter first presents the concept of an accounting system based on literature (Section 2). Following this is the description of the accounting system, taking the JCM in Indonesia as a case study. This includes Indonesia's intended nationally determined contribution (NDC), a JCM registry, Indonesia's national registry and national GHG inventories (Section 3, 4, 5, and 6). We then discuss potential double counting issues, followed by a summary of key discussion points (Section 7).

4.1. An accounting system for international transfer of units

Accounting has two major functions. One is to clarify *ex-ante* a Party' NDC and its projected GHG emissions reductions impacts. The other is to track *ex-post* a Party's efforts in terms of GHG impacts towards meeting with the Party's contribution (Prag et al. 2013). *Ex-ante* elements of accounting are to ensure that emissions reductions activities are within the scope of the contribution. If

the activities are outside the scope, there is a potential risk that Parties do not ensure the environmental integrity of emissions reductions by the activities, due to the lack of political incentive, yet they may account the emissions reductions towards achieving its contribution (Kreibich and Obergassel 2015). This has to be avoided to ensure that Parties' contributions make real climate mitigation impacts, and as a result, contribute to achieving the objective of the Paris Agreement as described in Article 2.1.

There are three key elements consisting of the accounting system involving the international transfer of units (Kreibich and Obergassel 2015):

- NDCs
- GHG inventories
- Accounting for unit transfers

In this report, we take the JCM in Indonesia as an example of mechanisms with international transfer of units. NDCs are to clarify ex-ante the comparability of the JCM with the contribution. GHG inventories and accounting for unit transfers are to track the progress made through the JCM activities, i.e. ex-post accounting of GHG impacts. With the JCM in Indonesia, accounting of unit transfers is undertaken by the JCM registry and national MRV system of Indonesia.

4.2. Nationally Determined Contributions (NDCs)

Overview

At COP19, all Parties were invited to "initiate or intensify domestic preparation for their intended nationally determined contributions (INDCs), without prejudice to the legal nature of the contributions" (Decision 1/CP.19, para. 2).

Parties were also invited to communicate them well in advance of COP21 in December 2015. At COP20, Parties agreed that "in order to facilitate clarity, transparency and understanding", the INDCs communicated by Parties may include, as appropriate, inter alia:

- quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage
- planning processes
- assumptions and methodological approaches including those for estimating and accounting for anthropogenic GHG emissions and, as appropriate, removals
- how the Party considers that its INDC is fair and ambitious.

Communicated INDCs can be found on the UNFCCC website. As of 18 March

2016, 161 INDC submissions can be found.

At COP21, Parties agreed to "urge those Parties whose INDC contains a time frame up to 2025 to communicate by 2020 a new NDC and to do so every five years thereafter" and "request those Parties whose INDC contains a time frame up to 2030 to communicate or update by 2020 these contributions and to do so every five years thereafter" (Decision 1/CP.21, para. 23-24). Parties also agreed that further guidance needs to be developed regarding information to be provided by Parties of their NDCs. This indicates additional information elements may be required in order to enhance the clarity, transparency and understanding of NDCs.

Comparison between INDCs and the JCM between Indonesia and Japan

Based on the basic information elements of NDCs (Kreibich and Obergassel 2015), we compare the information contained in between the Indonesia's INDC and the JCM (Table 9). Indonesia submitted its INDC in September 2015. It signed the bilateral document with Japan to initiate the JCM in August 2013 (JCM Indonesia-Japan 2016). This comparison is based on the information which is available up to the present. As mentioned, Parties will submit NDCs by 2020 following their earlier INDCs. Rules and guidelines of the JCM are also subject to change or updates based on a bilateral consultation between Indonesia and Japan.

Table 8: Comparison of information between Indonesia's INDC and the JCM between Indonesia and Japan

	Indonesia's INDC	Comparability with JCM
Ambition level	– Unconditional: 26% of its GHGs against the business as usual scenario by the year 2020 and 29% by 2030. – Conditional: 41% reduction in emissions by 2030. This includes bilateral, regional and international market mechanisms.	– Both sides mutually recognize that verified reductions or removals from the mitigation projects under the JCM can be used as a part of their own internationally pledged greenhouse gases mitigation efforts (Bilateral Cooperation, para.7). – The net emission reductions from JCM projects are accounted as Indonesian domestic emission reductions (Joint Crediting Mechanism

		Guidelines for Developing Proposed Methodology, para.9)
Reference level	Projected emissions in 2030 is approximately 2,881 $GtCO_2$-e.	– Reference emissions are calculated for each project following the approved methodology.
Sectors covered	Energy, Industrial Processes and Product Use, Agriculture, LULUCF, Waste	12 sectoral scopes are defined, covering energy, industries, agriculture, REDD-plus (Joint Crediting Mechanism Guidelines for Designation of a Third-Party Entity., Annex 1)
Geographical area	Nationwide	Nationwide
Timeframe	Single-year target by 2020 or 2030	– The JCM partnership covers the period until the operationalization of a new international framework (i.e. 2020) and considers possible extension of this partnership (Bilateral Cooperation, para.13). – Projects started on or after 1 January 2013 are considered eligible for the JCM (Rules of Implementation, para. 40). – A time frame for such calculation depends on life time of each project.
GHGs covered	CO_2, CH_4, N_2O	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3 (Rules of Implementation, para. 2)

Comparing the Indonesia's INDC and the JCM, it is consistent that the emissions reductions attained through the JCM will be counted as part of Indonesia's conditional contribution, i.e. 41% by 2030. The JCM document can also be interpreted as that non-credited emissions reductions will be counted as Indonesia' domestic emissions reductions. However, it is not clear what these domestic emissions reductions could exactly mean in the context of Indonesia's climate policy. It could mean part of the unconditional emissions

reductions, i.e. 26%, or the contribution which is claimed only at the national level.

The reference level for the INDC is estimated on a national scale toward 2030, containing all sectors. On the other hand, the project-level reference emissions is estimated for the project activities involved during the project's lifetime. According to the IGES's JCM Database, the average life time of six JCM Model projects currently implemented in Indonesia is about 9 years. Under the JCM, projects starting after January in 2013 are eligible. Overall, it is therefore not feasible to directly compare the two reference levels.

The sectors covered for the INDC and the JCM appear to be similar. The LULUCF sector under the INDC and REDD+ of the JCM are identical, both covering emissions and removals from the forest sector.

The INDC is presented for 2020 and 2030 in Indonesia. The operational period of the JCM is at least up to 2020 with possible extension. Because the Japan's INDC toward 2030 contains contributions from the JCM (GOJ 2015), it is reasonable to consider it is highly likely that the JCM is extended to be operated until 2030, provided that both governments agree to do so. However, while the INDC is structured as a single-year contribution, the JCM projects generate credits over project's lifetime. If a project was started in January 2013, it can generate JCM credits over time for multiple years until project's lifetime finishes (i.e. 9 years on average of JCM Model projects in Indonesia).

It is not yet clear how the JCM emissions reductions generated in the years outside the single-year target would be treated by Indonesia. Apparently, these JCM credits not occurring in the target year are not eligible to be counted as part of the INDC.

The intention on how to utilize the credits to be generated outside the target year for the NDCs needs to be clarified. Accounting system with the same level of robustness need to be applied to all types of credits regardless of the year the reductions occurred. Another way to ensure the credits utilization could be to require all Parties to establish continuous multi-year NDCs, eliminating single-year NDCs (Kreibich and Obergassel 2016).

The JCM rules permit to cover GHGs, which are not covered under the INDC, i.e. HFCs, PFCs, SF_6, NF_3. If a project reducing these emissions takes place under the JCM in Indonesia, it is yet to be clear how these emissions reductions can be accounted for in the relationship to the INDC. So far, the most popular JCM project activity types in Indonesia appear to be the improvement of energy

efficiency to reduce CO_2 emissions (IGES JCM Database 2015).

4.3. JCM Registry in Indonesia

Overview

The verified emissions reductions from the JCM projects are issued by Japan and partner country as credits, in the form of "credit serial number" recorded in a JCM Registry. Put simply, registry is a form of electronic database which keeps the record of issued credits and manages actions such as holding, transfer, acquisition, cancellation and retirement of credits.

Under the Kyoto Protocol, registries or registry systems tracks and records all transactions under the Kyoto Protocol's GHGs trading system and under mechanisms such as the Clean Development Mechanism (UNFCCC 2016).

The CDM Registry System consists of Annex I Parties own National Registries, CDM Registry for Non-Annex I Parties (administrated by UNFCCC Secretariat), and Transaction Logs to electronically verify transactions (UNFCCC 2014b). A NAMA Registry is also operational under the UNFCCC and an NDC Registry is under development. Central registries are also used in domestic and regional voluntary market-based schemes such as EU-ETS Registry and Japanese J-VER Registry. Thailand will establish a registry for its Energy Performance Certificate Scheme and ETS (TGO 2014).

Under the JCM, registries may be established and maintained separately by the Japanese and partner country side (Rules of Implementation, para 13(b)). If they are established separately, the JCM registry system will consist of JCM Registry of Japan and JCM Registry of a partner country.

The web-based system JCM Registry of the Japanese side has been operationalized since 2015 (https://www.jcmregistry.go.jp/). It can be used by Japanese as well as non-Japanese (foreign) entities, not limited to the JCM project participants.

Partner countries can maintain their own JCM Registry with the functions and settings agreed with Japanese side under the "Common Specifications of the JCM Registry".

So far, Indonesia is the only partner country with a working JCM registry. The current system is based on Macro-enabled Microsoft Excel program, but the Indonesian side plans to establish an online system later. The online-based

JCM Registry of Indonesia is expected to be linked with the national registry system being prepared by the Indonesian government (Indonesia JCM Secretariat 2016).

The accounting procedures under Japanese and Indonesian registry systems are adopted as "Common specifications", in line with the UNFCCC Decision 13/CMP.1 "Registry requirements", which specifies modalities for the accounting of assigned amounts under the Kyoto Protocol. The common specifications for JCM registries describe the minimum functions and standards to be performed under both side's registries (Table 10).

Table 9: Common specification of the JCM Registry

Component	Specification
Types and number of accounts managed by the registry	1) One holding account for the government; 2) One holding account for each entity authorized by each side; 3) At least one cancellation account for the purpose of cancelling JCM credits; 4) One retirement account for the purpose of retiring JCM credits
Types of transactions facilitated by the JCM registry	1) Issuance of credits: recording increase of a specified amount of JCM credits into holding accounts. 2) Transfer of credits: moving a certain amount of JCM credits from its holding account into the other accounts established in the JCM registry. 3) Acquisition of credits: receiving a certain amount of JCM credits into a holding account established in the respective JCM registry. 4) Cancellation of credits: transferring a certain amount of JCM credits to a cancellation account so that the JCM credits are not further transferred. Each side may cancel JCM credits by transferring credits to cancellation accounts in its JCM registry. 5) Retirement of credits: transferring a certain amount of JCM credits to a retirement account so that the JCM credits are used as a part of the internationally pledged greenhouse gases mitigation efforts by the respective countries and not further transferred.
Rules of JCM credit serial number	The serial number should at least have 4 components: 1) Identifier of the scheme: "JCM"; 2) Identifier of the host country: two-letter country code defined by the International Organization for Standardization (ISO 3166), of the host country where the JCM project is registered;

	3) Identifier of the country of issuance: two-letter country code defined by the International Organization for Standardization (ISO 3166), of the country where the JCM credits are issued; 4) Unit: a number unique to the JCM credit for the country of issuance.
Maintenance of transaction record and public information	Each side establishes and maintains a transaction record to verify the validity of transactions of the JCM credits and makes non-confidential information publicly available on the Internet.

Source: Common Specification of the JCM Registry between Japanese and Indonesian side (2015)

In addition to managing above accounts and transactions, the JCM Registry of Indonesia also consists of JCM project database, credits database, account holders information including the credits they own and transactions done on their behalf, account balance sheet issuance, and the history of all registry manager activities.

Accounting functions and possible issues

The main purpose of the JCM registry is to manage JCM credits in an accurate, transparent and efficient way. Complementary to the JCM bilateral rules and guidelines regarding credits issuance (GOJ 2015), the JCM registry has to have enough provisions to ensure the JCM credits are not double counted at the scheme level, and as much as possible, avoid the possibilities of double counting at the country level.

Double counting of mitigation efforts could occur within the JCM scope or within the broader scope of national government, in several ways (Schneider et al. 2015).

a. Double issuance occurs when more than one unit is issued for the same emission or emission reduction by a scheme or more than one schemes (Schneider et al. 2015). Under the JCM, such occurrence may happen if project participants claim the project reductions through other means, such as registering the JCM project to the CDM, then issue credits for its reduction.

Within domestic scope, double issuance can occur if the project participant report the reductions as a result of business as usual or other programs to a related national or sub-national government authorities (e.g. ministry or local government)

that have a mandate to collect this information.

There is a risk the authorities include reductions from the JCM projects in their jurisdiction into other national mitigation report. The project participants are required to make an oath to prevent this, and the TPEs are also obligated to validate and verify. A policy recommendation from the JC and communication from project participants during local stakeholders' consultation may also be helpful to prevent this.

Double issuance also could happen if credits are issued by both the Japanese and partner country registry managers for the same verified emissions reductions. The JCM rules and Registry System prevents this by making sure each JCM credit is held in only one JCM Registry (Japanese or partner country) at a given time.

JCM credits will only be issued based on the government approval to project participants' request to the Joint Committee, using the JCM Credits Issuance Request Form (Joint Committee between Japan and Indonesia 2015).

The unique serial number, which is to be assigned to each ton of CO_2, also increases transparency and reduce the risk of over-issuance and miscalculation. For example, the credits to be issued in the JCM Registry of Indonesia will be assigned with serial number organized as follows (Table 11).

Table 10: Example of credits serial number to be issued in the JCM Registry of Indonesia

Scheme	Host country	Project reference number	Sectoral scope	Number of issuance	Issuance country	Credit ID issued
JCM	ID	001	01	01	ID	000,000,001-000,000,100
JCM-ID-001-01-01-ID-000000001 to JCM-ID-001-01-01-ID-000000100						

Source: Indonesia JCM Secretariat (2016)

The transaction of credits is approved by a registry system, based on the balance of credits in its project database, credits database, holding account, cancellation account, and retirement account. If the amount of credits in the transferring (exporting) account is not sufficient to do the requested transaction (i.e. issuance, transfer, cancellation, or retirement), the JCM Registry cannot complete the

transaction. The individual pages in the JCM Registry for each holding account, project data, and credits data enable the JCM registry manager to track movements of each credit. History of every transaction and balance of all accounts are recorded in the system.

b. Double claiming occurs when the same emission reduction credits is counted twice towards attaining mitigation pledges, by the country where the reductions occur and by the country using the unit issued for these reductions (Schneider et al. 2015).

The JCM Registry System prevents double claiming at the scheme level by performing cancellation of credits, transferring the JCM credits to a cancellation account. The Registry prohibits any transaction using cancelled credits in the JCM Registry of Indonesia, making sure they cannot be further transferred, retired, or accidentally deleted when they are in the cancellation account.

c. Double use occurs when the same issued unit is used twice to attain a mitigation pledge (Schneider et al., 2015). Such occurrence may happen if the credits to be used are not retired properly at the scheme level.

The JCM Registry reduces this risk by systematically prohibiting any transaction using transferred out credits left in the transferring (exporting) account, including those transferred out to retirement account.

After they are transferred out from the holding account, for example, each credit in the account holder credits database will be locked for any activity and flagged with the actions undertaken (e.g. "transferred out, "retired"). The balance of credits in the holder account will be cut and the balance in the acquiring account will be increased accordingly (Indonesia JCM Secretariat 2016).

Double use may also occur if the retired credits are not stored in a centralized database such as the National Registry System or national GHG inventories of Indonesia, which should be the only source for reporting achievements to attain mitigation pledge at the country level.

The JCM Rules requests governments of both sides to ensure the avoidance of double counting on GHG emission reductions or removals by not using mitigation projects registered under the JCM for the purpose of other international climate mitigation mechanisms (Joint Committee between Indonesia and Japan, 2015).

d. **Double coverage** occurs when the same emission reduction is accounted under two different types of targets, such as a GHG goal in one country and a non-GHG goal in the other (Hood et al. 2014). The non-GHG goal could be finance-related goals such as international support and technology transfer (in Indonesian side) or ODA and international pledge for funding (for Japanese side). These risks should be prevented at the national level through consensus among the JC.

Transparency of credits management is another important aspect of the JCM Registry system. Unlike the Japanese registry, the account information stored in the JCM Registry of Indonesia is so far not directly accessible to the account holders. To improve transparency, the public information systems being prepared by Japanese and Indonesian registry should show the track of credits. For detailed credit information, the JCM Registry managers can consider communicating each account's balance certificate to its holder in a regular basis.

4.4. The National MRV System of Indonesia

Overview

The government of Indonesia is preparing the implementation of National MRV system regulated under Environment Ministerial Regulation Number 15 Year 013 on MRV of Climate Change Mitigation Action (Figure 12). It regulates the overall MRV structure for Climate Change Mitigation Actions and sets specific procedures for measurement, reporting, verification, and assessment of results. The information in National MRV System will be treated as official information for national and international purposes.

So far, no discrepancy is observed between the requirements under the JCM MRV and the National MRV System of Climate Change Mitigation Actions. In fact, many similarities have been observed such as the way of setting conservative baseline emissions and the outline of MRV system.

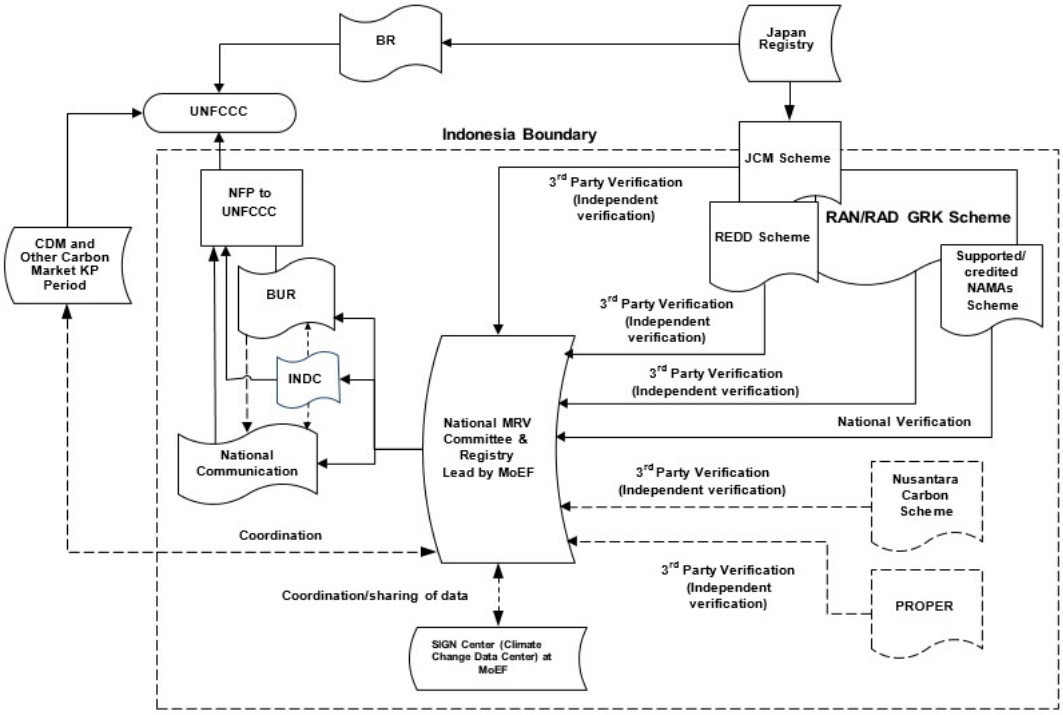


Figure 12: Concept of linking accounting for the JCM and other mitigation activities in Indonesia within the national framework (source: Indonesia JCM Secretariat 2016)

Accounting functions and possible issues

However, the said regulation set an outline of report on climate change mitigation action to be used by "the Responsible Person for Mitigation Action" (presumably project participants) when they submit their action report to the National MRV Commission to be included in the National Registry System. It is unclear whether mitigation actions that already have a scheme-specific report such as the JCM projects may be allowed to use their scheme report, or they are obliged to produce a different report based on this outline.

The regulation also requires some detailed information not provided in the JCM Project Design Document (PDD) and other documents, such as estimated and real cost of mitigation actions and constraints and barriers in implementation.

According to the national regulation, reports from the Responsible Person for JCM projects that are approved by the National MRV Commission may be granted a certificate and the mitigation actions submitted to the National Registration System (Figure 1).

To avoid double usage of JCM credits, when an approved report is to be submitted to the national registration system, the relevant credits recorded in the JCM Registry of Indonesia should be retired by the JCM Registry manager on the basis of Joint Committee notification.

The emission reductions recorded in the national registry, including the JCM credits, may be directly used to be reported in its biennial update reports (BURs). In the future, the means to prevent double use and proper accounting of JCM credits should be included in the inventory system rules (*Sistem Inventori Gas Rumah Kaca Nasional,* SIGN).

Indonesia and Japan have agreed that at least 10% of the credits issued from JCM projects will be allocated to the Government of Indonesia (*Laporan Pertemuan* Fifth Joint Committee Meeting, 2015), in addition to those allocated to the project participants from Indonesian side. In practice, the JCM Registry manager of Indonesian side may issue the allocated 10% to the Indonesian government holding account in the JCM Registry of Indonesia, and the remaining 90% to holding accounts in both Japanese and Indonesian registries based on the project participants' request.

However, there is still an uncertainty in how the exact portion (10% "or more") will be decided and whether the same portion will be applied to all projects. There is also a need to clarify how this decision applies to credits from REDD+ projects that are already subject to the limit of up to 49% credits allowed to be transferred to the non-domestic parties (Ministry of Forestry Indonesia 2012).

4.5. National GHG Inventories

Overview

National GHG inventories estimate the total GHG emissions and removals of a country in a particular year. They can be used as the basis for assessing whether and to what extent a Party has made progress and eventually achieved its NDC. National GHG inventories of non-Annex I Parties are submitted as part of national communications (NCs). At COP16, Parties agreed that non-Annex I Parties submit BURs, in addition to NCs, in order to enhance their national reporting. The basic elements of NCs and BURs defined by the COP decisions are shown in Table 12.

Table 11: Basic elements of NCs and BURs based on UNFCCC (2014)

Elements	NCs	BURs
Timeframe for target year of inventories	– 1st NC: 1994, or alternatively 1990 – 2nd NC: 2000	At a minimum, the inventory for the calendar year no more than four years prior to the date of submission or more recent

Timeframe for submission	Every four years	1st BUR by December 2014
Methodologies	– Revised 1996 IPCC Guidelines – IPCC good practice guidance	– Revised 1996 IPCC Guidelines – IPCC good practice guidance – IPCC good practice guidance for LULUCF
International verification	Not applied	International consultation and analysis (ICA) to increase the transparency of mitigation actions and their effects

At COP21, Parties agreed to establish an enhanced transparency framework for actions and support "in order to build mutual trust and confidence and to promote effective implementation" (Article 13, Paris Agreement). This includes, but not limited to, national GHG inventory reports. Parties also agreed that national reporting by Parties undergo a technical expert review. Furthermore, Parties agreed to participate in "a facilitative, multilateral consideration of progress with respect to efforts under Article 9[7], and its respective implementation and achievement of its NDC".

Accounting functions and possible issues

Indonesia's NDC is expressed in terms of GHG emissions reduction compared to the baseline. Because the baseline emissions for 2030 are known (i.e. 2,881 $GtCO_2$-e), it seems possible to assess the attainment of its NDC based on its national GHG inventory estimated for the year 2030.

This, however, would depend on the quality of baseline estimation and GHG inventories. So far, non-Annex I Parties have not been required to use the latest IPCC 2006 guidelines (noted Indonesia used the latest IPCC 2006 guidelines for the development of its INDC).

It is also recognized that due to the data availability issue, many of them are not able to apply the higher-tire methods, which are considered more representative of country's circumstance with GHG emissions and removals.

It is also worth mentioning that GHG inventories of non-Annex I Parties have

[7] Article 9 focuses on the provision of financial resources from developed countries to developing countries.

not been subjected to international expert review. ICA has been applied to BURs more recently, although its main purpose is to increase transparency. The expert review can be the incentive for a country to establish a national system for developing GHG inventories and become the opportunity for it to learn and build necessary capacities.

With the involvement of international unit transfer, national GHG inventories of both credit exporting and importing countries have important roles in accounting units. The amount of exported credits (units) should be added on to the national GHG inventory of the export county, because the amount is claimed by an importing country as its contribution. If not, double claiming occurs, i.e. the same reduction is claimed as national contributions by two Parties (Schneider et al. 2014).

Given the quality of GHG inventories of some non-Annex I Parties is yet to be improved, it is therefore wise and practical to report separately the units transferred internationally from the total GHG emissions and removals of a country to ensure the avoidance of double claiming by two Parties.

Currently, it is only biennial reports (BRs) of Annex I Parties which have a respective reporting section for the use of units from market-based mechanisms, including the Common Tabular (UNFCCC 2012).

Similar specifications ought to be made for BURs of non-Annex I Parties, through which they can report on the use of units at the country level. This however would make a risk of possible double use, i.e. the same emissions reduction is used twice in GHG inventories and as the units of international transfer in the separate reporting. Mechanisms to avoid such issues as double use need to be in place, for example, by applying the existing ICA of BURs.

Annex. List of JCM Registered Projects

Reference number	Project title	Project Participants	Methodo-logy	Summary of technology
ID001 (Indonesia)	Energy Saving for Air-Conditioning and Process Cooling by Introducing High-efficiency Centrifugal Chiller	• PT. Primatexco Indonesia • Nippon Koei Co., Ltd. • Ebara Refrigeration Equipment & Systems	ID_AM002 Ver1.0	High-efficiency centrifugal chiller for processing in a textile factory
ID002 (Indonesia)	Project of Introducing High Efficiency Refrigerator to a Food Industry Cold Storage in Indonesia	• PT. Adib Global Food Supplies • PT. Mayekawa Indonesia • Mayekawa Mfg. Co, Ltd.	ID_AM003 Ver1.0	High efficiency refrigerator with natural refrigerant (CO_2) for food cold storage
ID003 (Indonesia)	Project of Introducing High Efficiency Refrigerator to a Frozen Food Processing Plant in Indonesia	• PT. Adib Global Food Supplies • PT. Mayekawa Indonesia • Mayekawa Mfg. Co, Ltd.	ID_AM003 Ver1.0	High efficiency refrigerator with natural refrigerant (CO_2) to a frozen food plant
ID004 (Indonesia)	Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Karawang West Java	• PT. Nikawa Textile Industry • Nippon Koei Co., Ltd. • Ebara Refrigeration Equipment & Systems Co., Ltd.	ID_AM002 Ver2.0	High-efficiency centrifugal chiller for air-conditioning and cooling in a textile factory
ID005 (Indonesia)	Energy Saving for Air-Conditioning at Textile Factory by Introducing High-efficiency Centrifugal Chiller in Batang, Central Java (Phase 2)	• Primatexco Indonesia, • Nippon Koei Co., Ltd. • Ebara Refrigeration Equipment & Systems	ID_AM002 Ver2.0	High-efficiency centrifugal chiller for air-conditioning and process cooling in a textile factory

MN001 (Mongolia)	Installation of high-efficiency Heat Only Boilers in 118th School of Ulaanbaatar City Project	• ANU-SERVICE CO., LTD. • SUURI-KEIKAKU CO., LTD.	MN_AM002 Ver1.0	Coal-fired high-efficiency heat only boilers (HOB) for hot water supply system in school building
MN002 (Mongolia)	Centralization of heat supply system by installation of high-efficiency Heat Only Boilers in Bornuur soum Project	• ANU-SERVICE CO., LTD. • SUURI-KEIKAKU CO., LTD.	MN_AM002 Ver1.0	Coal-fired high-efficiency heat only boilers (HOB) for hot water supply system for public facilities
PW001 (Palau)	Small scale solar power plants for commercial facilities in island states	• Western Caroline Trading Company • Surangel and Sons Company • Pacific Consultants Co., Ltd. (PCKK) • InterAct Inc.	PW_AM001 Ver1.0	Grid-connected solar photovoltaic (PV) systems on top of two buildings
VN001 (Vietnam)	Eco-Driving by Utilizing Digital Tachograph System	• Nippon Express (Viet Nam) Co., Ltd. • Nippon Express Co., Ltd.	VN_AM001 Ver1.0	Digital tachograph system (hardware, software, driver training system) for diesel-fired trucks and trailers
VN002 (Vietnam)	Promotion of green hospitals by improving efficiency / environment in national hospitals in Vietnam	• Energy Conservation Center Ho Chi Minh City • Mitsubishi Electric Corporation • Mitsubishi Corporation • Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.	VN_AM002 Ver1.0	Room air conditioners with inverters in two hospitals

Source: IGES Joint Crediting Mechanism (JCM) Database.

References

Chapter 1. Intended Nationally Determined Contributions (INDCs) and Market Mechanisms

Dagnet, Y., T. Fei, C. Elliott, and Y. Qiu. 2014. Improving transparency and accountability in the post 2020 climate regime: a way forward. (Available at: http://act2015.org/ACT%202015_Improving%20Transparency%20and%20Accountability.pdf)

Hohne, N., C. Warnecke, T. Day, and F. Roser. 2015. Carbon market mechanisms, role in future international cooperation on climate change. (Available at: https://newclimateinstitute.files.wordpress.com/2015/06/carbonmarketmechanisms_futureinternationalcooperation_june2015.pdf)

IGES (Institute for Global Environmental Strategies). 2016a. IGES INDCs and Market Mechanism database (as of February 2016). (Available at: http://pub.iges.or.jp/modules/envirolib/view.php?docid=6147)

Kachi A., D. Tanzler, and W. Sterk. 2014. The Clean Development Mechanism and Emerging Offset Schemes: Options for Reconciliation? (Available at: http://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/climate-change_06_2014_komplett.pdf)

Marcu, A. 2014. The Role of Market Mechanisms in a Post-2020 Climate Change Agreement. (Available at: https://www.ceps.eu/sites/default//files/article/2014/05/20140430_No87_TheRole_of_Market_Mechanisms_formatted.pdf)

Secretariat of the United Nations Framework Convention on Climate Change (2016) INDCs submission page. (Available at: http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx)

UNFCCC. 2015 Synthesis report on the aggregate effect of the intended nationally determined contributions. (Available at: http://unfccc.int/resource/docs/2015/cop21/eng/07.pdf)

Chapter 2. Decision on Market Mechanism in COP21 and Paris Agreement

IGES. 2015. New Market Mechanism in CHARTS (updated March 2015) (Available at: http://pub.iges.or.jp/modules/envirolib/upload/3352/attach/new_mech_charts.pdf)

IGES (Institute for Global Environmental Strategies). 2016a. IGES INDCs and Market Mechanism Database (Updated February 2016) http://enviroscope.iges.or.jp/modules/envirolib/view.php?docid=6147

JCM Registry. 2015. Guidelines for the Implementation of the JCM in Japan (Provisional Translation) https://www.jcmregistry.go.jp/contents/JP/Summary/guidelines_en.pdf

Government of Japan. 2015. Japan's Intended Nationally Determined Contributions (INDCs) (Available at: http://www4.unfccc.int/submissions/INDC/Published%20Documents/Japan/1/20150717_Japan's%20INDC.pdf)

Government of Japan. 2016. Recent Development of the Joint Crediting Mechanism (JCM). February 2016, http://www.mmechanisms.org/document/20160203_JCM_goj_e_rev.pdf

Schneider, Kollmuss, and Lazarus. 2014. Addressing the risk of double counting emission reductions under the UNFCCC. Stockholm Environment Institute.

United Nations Framework Convention on Climate Change (UNFCCC). 2015. Paris Agreement. FCCC/CP/2015/L.9/Rev.1.

Chapter 3. Progress of the Joint Crediting Mechanism Methodologies and Projects

IGES (Institute for Global Environmental Strategies). 2012. Towards the CDM 2.0: Lessons from the capacity building in Asia. (Available at: http://enviroscope.iges.or.jp/modules/envirolib/view.php?docid=4295, accessed March 2016)

IGES (Institute for Global Environmental Strategies). 2016b. IGES Joint Crediting Mechanism (JCM) Database. (Available at: http://enviroscope.iges.or.jp/modules/envirolib/view.php?docid=6185, accessed April 2016)

Government of Japan. 2016. Recent Development of The Joint Crediting Mechanism (JCM), February 2016. (Available at: http://www.mmechanisms.org/document/20160203_JCM_goj_e_rev.pdf

UNEP DTU Partnership. 2016a. Approved CDM methodologies. (Available at: http://www.cdmpipeline.org/cdm-methodologies.htm, accessed April 2016)

UNEP DTU Partnership. 2016b. CDM/JI Pipeline Overview Page. (Available at: http://www.cdmpipeline.org/overview.htm, accessed April 2016)

Morgan, J., K. Levin, J. Song, and J.P. Osornio. 2015. Driving Transformative Change: The Role of the Private Sector in Advancing Short-Term and Long-Term Signals in the Paris Climate Agreement. Washington D.C.: World Resources Institute. (Available at: http://www.wri.org/driving-transformative-change)

Chapter 4. How does an accounting system with the involvement of international transfer of units look like in a post-2020 climate regime? A case of the Joint Crediting Mechanism in Indonesia

Bilateral Cooperation on the Joint Crediting Mechanism for the Low Carbon Growth Partnership between Japan and the Republic of Indonesia. (Available at: https://www.jcm.go.jp/rules_and_guidelines/id/file_09/JCM_ID_bilateral_document.pdf)

Government of Japan. 2015. Guidelines for the Implementation of the JCM in Japan. (Available at: https://www.jcmregistry.go.jp/contents/JP/Summary/guidelines_en.pdf)

Government of Japan. 2015b. Submission of Japan's Intended Nationally Determined Contribution (INDC). (Available at: http://www4.unfccc.int/submissions/INDC/Published%20Documents/Japan/1/20150717_Japan's%20INDC.pdf)

Hood et al. 2014. GHG or not GHG: accounting for diverse mitigation contributions in the post-2020 climate framework. Paris: Organisation for Economic Co-operation and Development and International Energy Agency. (Available at: http://www.oecd.org/env/cc/GHG%20or%20not%20GHG_CCXGsentout_May2014_REV.pdf)

IGES (Institute for Global Environmental Strategies). 2016b. IGES Joint Crediting Mechanism (JCM) Database. (Available at: http://enviroscope.iges.or.jp/modules/envirolib/view.php?docid=6185, accessed March 2016)

Indonesia JCM Secretariat. 2015. *Laporan Pertemuan* Fifth Joint Committee Meeting (meeting report, in Bahasa Indonesia). (Available at: http://jcm.ekon.go.id/en/index.php/content/MzU%253D/joint_committee_results)

JCM Indonesia-Japan. 2016. https://www.jcm.go.jp/id-jp

JCM Joint Committee of Japanese and Indonesian side. 2015. Common Specification of the JCM Registry (version 1.0). (Available at: https://www.jcm.go.jp/opt/id-jp/rules_and_guidelines/download/JCM_ID_Spec_Registry_ver01.0.pdf)

JCM Joint Committee of Japanese and Indonesian side. 2015. Joint Crediting Mechanism Guidelines for Designation of a Third-Party Entity. (Available at: https://www.jcm.go.jp/rules_and_guidelines/id/file_07/JCM_ID_GL_TPE_ver03.0.pdf)

JCM Joint Committee of Japanese and Indonesian side. Joint Crediting Mechanism Guidelines for Developing Proposed Methodology. (Available at: https://www.jcm.go.jp/rules_and_guidelines/id/file_05/JCM_ID_GL_PM_ver01.0.pdf)

Kreibich and Obergassel. 2015. Carbon Markets after Paris: How to account for the Transfer of Mitigation Results? (Available at: http://www.carbon-mechanisms.de/fileadmin/media/dokumente/publikationen/PP_2016_01_Accounting_bf.pdf)

Ministry of Forestry Indonesia. 2012. *Peraturan Menteri Kehutanan Indonesia No. P.20/Menhut-II/2012 tentang Penyelenggaraan Karbon Hutan* (Minister of Forestry Indonesia Regulation No. P.20/Menhut-II/2012 on Forest Carbon Implementation, in Bahasa Indonesia). (Available at: http://theredddesk.org/sites/default/files/ministerial_regulation_on_implementation_of_forest_carbon_3.pdf)

JCM Joint Committee of Japanese and Indonesian side. Rules of Implementation for the Joint Crediting Mechanism (JCM) (Available at: https://www.jcm.go.jp/rules_and_guidelines/id/file_01/JCM_ID_RoI_ver01.0.pdf)

Schneider, Kollmuss, and Lazarus. 2014. Addressing the risk of double counting emission reductions under the UNFCCC. Stockholm Environment Institute.

Schneider, Spalding-Fecher, and Cames. 2015. Delivering Results-Based Funding Through Crediting Mechanisms: Assessment of Key Design Options. Öko-Institut e.V. Institute for Applied Ecology.

Thailand Greenhouse Gas Management Organization. 2014. Thailand's Market Readiness Proposal (MRP). (Available at: https://www.thepmr.org/system/files/documents/Final%20MRP_Thailand_07022014.pdf)

UNFCCC. 2002. Decision 17/CP.8

Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention. FCCC/CP/2002/7/Add.2.
(Available at: http://unfccc.int/resource/docs/cop8/07a02.pdf#page=2)

UNFCCC. 2005. Decision 13/CMP.1
Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol, II. Registry requirements. FCCC/KP/CMP/2005/8/Add.2
(Available at: http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf)

UNFCCC. 2011. Decision 2/CP.17
Annex III: Biennial update reporting guidelines for Parties not included in Annex I to the Convention. FCCC/CP/2011/9/Add.1.
(Available at: http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf#page=39)

UNFCCC. 2012. Decision 19/CP.18
Common tabular format for "UNFCCC biennial reporting guidelines for developed country Parties". FCCC/CP/2012/8/Add.3.
(Available at: http://unfccc.int/resource/docs/2012/cop18/eng/08a03.pdf)

UNFCCC. 2014a. Handbook on Measurement, Reporting and Verification for Developing Country Parties. (Available at:
https://unfccc.int/files/national_reports/annex_i_natcom_/application/pdf/non-annex_i_mrv_handbook.pdf)

UNFCCC. 2014b. Data Exchange Standards for Registry Systems under the Kyoto Protocol Technical Specifications (Version 1.0) Annex A: Glossary of Terms. (Available at:
https://unfccc.int/files/kyoto_protocol/registry_systems/application/pdf/des_full_ver_1.1.2_fullversion.pdf)

UNFCCC. 2015. Decision 1/CP.21. Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. Addendum. Part two: Action taken by the Conference of the Parties at its twenty-first session. FCCC/CP/2015/10/Add.1.
(Available at: http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf)

UNFCCC. 2016. Glossary of climate change acronyms.
(Available at: http://unfccc.int/essential_background/glossary/items/3666.php)

IGES Market Mechanism Group Publications

All the publications are downloadable from
http://www.iges.or.jp/en/climate-energy/mm/publication.html

New Market Mechanisms
- New Market Mechanisms in CHARTS
- INDC and market mechanism database

Joint Crediting Mechanism (JCM)
- JCM Database
- JCM in CHARTS (Cambodia, Lao PDR, Mongolia, Vietnam)

Climate Policy and MRV
- Climate Policy and Market Mechanism Status Report: Cambodia, China, India, Indonesia, Korea, Lao PDR, Mongolia, Myanmar, the Philippines, Thailand, and Vietnam
- One Hundred Questions & Answers about MRV in Developing Countries

Kyoto Protocol Related Information
- CDM in CHARTS
- GHG Emissions Data
- National Registry Database

CDM/JI Project Database (Updated every month)
- CDM Project Database
- CDM Project Data Analysis and Forecasting CER Supply
- CDM Cost Database
- CDM Monitoring and Issuance Database
- CDM Review and Rejected Project Database
- CDM Investment Analysis Database
- CDM Review and Rejected Project Data Analysis
- CDM Programme of Activities (PoA) Database
- JI Project Database
- Summary of review & rejected CDM projects

Grid Emission Factors Data / Emission Reduction Calculation Sheet Series
- List of Grid Emission Factors
- CDM Grid Emission Factor Calculation Sheet
- CDM Methodology Parameter Data
- Emission Reductions Calculation Sheet (ACM0010, ACM0012, ACM0014, AMS-III.D, AMS-III.F, AMS-III.G, AMS-III.H)

CDM Reform Reports & Papers
- Towards the CDM 2.0: Lessons from the capacity building in Asia
- CDM Reform 2011: Verification of the Progress and the way forward
- Towards CDM Reform
- IGES-TERI CDM Reform Paper Series (Power and Cement)