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Market Base Solutions for Climate Change

- Role of MRV for Climate Finance-

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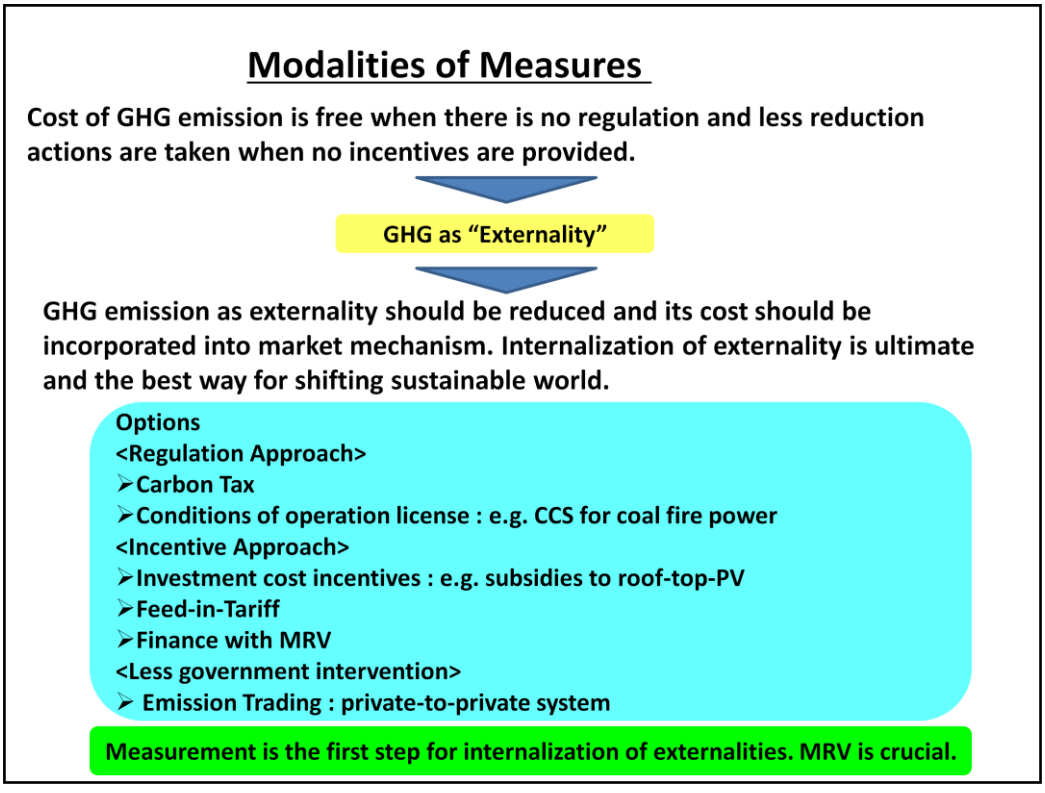
Mr. Takashi Hongo is a Senior Fellow at Mitsui Global Strategic Studies Institute(MGSSI). Before joining MGSSI, he served for Japan Bank for International cooperation (JBIC). He led the drafting the Environment Guideline for JBIC's financing which was renowned as the most advance and practical environment guideline for the public finance. And also he initiated various carbon related financial instruments such the "GREEN + J-MRV" by using these experiences. Recently he focused harmonization of the decentralized Asian Carbon Market including Bilateral Carbon Offset Mechanism (BOCM) and reforms of the financing for the low carbon economy using MRV such as Performance Base Incentive Scheme. He has knowledge contribution for International Energy Agency (IEA), International Renewable Agency (IRENA), IPCC, UNEP and UNEP FI, OECD, ICAO, GLOBE International, ADB and APEC in addition to Japanese government and local authorities through various committees.

This article focus on the role of MRV (Measurement, Reporting and Verification) and climate finance including good practices in Japan and propose innovative financial mechanism for Green Climate Fund (GCF). That is "Performance Base Incentive Mechanism" which may construct the small capacity of GCF by using the expertise of public- and private banks in both developing and developed countries.



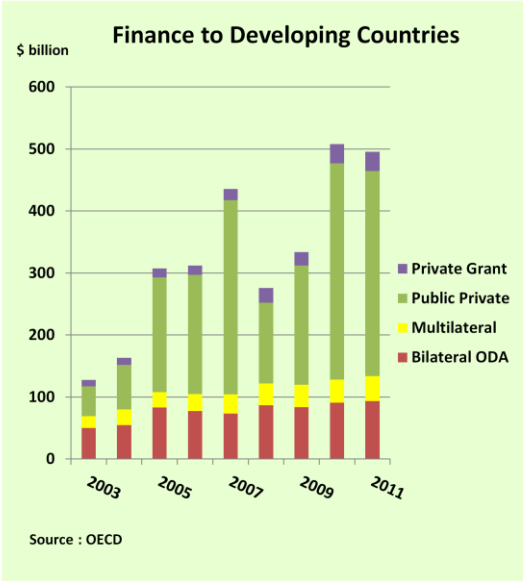
GHG was emitted without any charges before but now we need to reduce it as climate change mitigation. Some national and sub-national government introduced carbon regulation and we should developed to more global actions. The best and ultimate way is internalization of the cost of GHG emission and the benefit of GHG emission reduction into economic system.

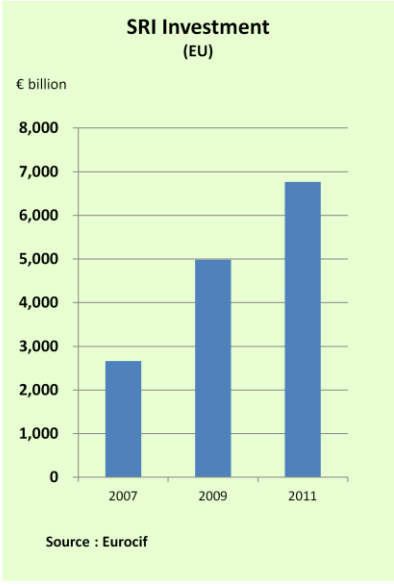
There are 2 options for the internalization.
The first is **"regulation approach"** to put the cost on the emission. Carbon Tax is becoming widely adopted in the world including Australia and Japan. In case of Australia carbon tax is adopted as a transitional measure to the future Emission Trading System. Japan adopts carbon tax as an additional tax on fuel tax from October last year and it will generate JPY270billion in 2016.

The second is **"incentive approach"** such as direct incentives to investment, incentives to the operation. Finance with MRV is an idea using MRV for the confirmation of GHG emission reduction at the project and this is aiming the improvement of awareness of carbon cost.

ETS is a very innovative economic system because once government determine the rules of game, them the private re-allocate the resources to reduce emission effectively. Theoretically ETS is the most advanced market base solution but it is still "learning-by-doing stage".

Role of Private Finance





At the UN climate change negotiation, it was agreed to mobilize USD 100 billion a year in 2020 for supporting climate change mitigation and adaptation in developing countries. This is an additional funding demand (funding gap) and it is expected to be full filled by Public-Private Finance.
Advantage of the private finance is as follows,

- Magnitude of funds is much bigger than ODA.
- Quick decision making for investment
- Familiar with private investment, particularly local small scale investment, more than public finance.

However, it is volatile depending on the fluctuation of the global economy.

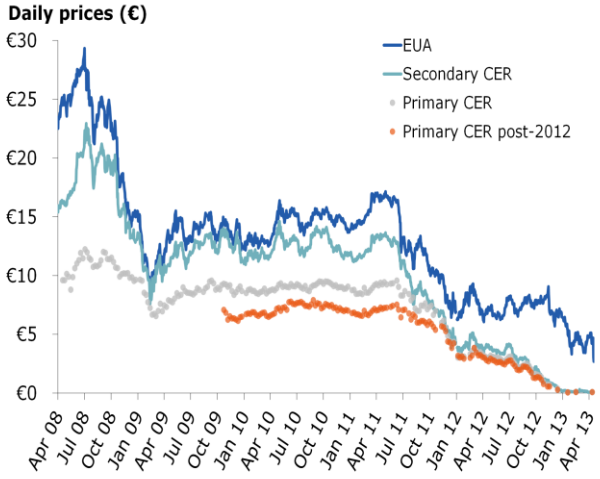
New wave is emerging in the finance market. It is the development of financial market in developing courtiers. For instance, many large scale PV power generation is financed by Thai private banks even though long term finance such as 15 years or longer is required. Financial market in developing countries is growing and we should consider the mechanism of the mobilization of domestic finance.

One of the practical way is a combination of “public and private” and “local and international” finance. Public finance is expected to play catalytic role for the mobilization of private finance.

Institutional investors invest in SRI (Social responsibility Investment) and its amount is increasing because public pressure to institutional investors to make clean investment become stronger year by year. However, it is not easy to find enough amount of proper asset which make environmental contribution with investment grade. Once new financial market is generated, then big amount of funds owned by institutional investors may be mobilized.

Carbon Market Now

Historic low carbon prices



In 2012-13, EUA and CER prices declined in response to macro-economic fundamentals.

Source: World Bank, "Mapping Carbon Pricing Initiatives" (May 2013)

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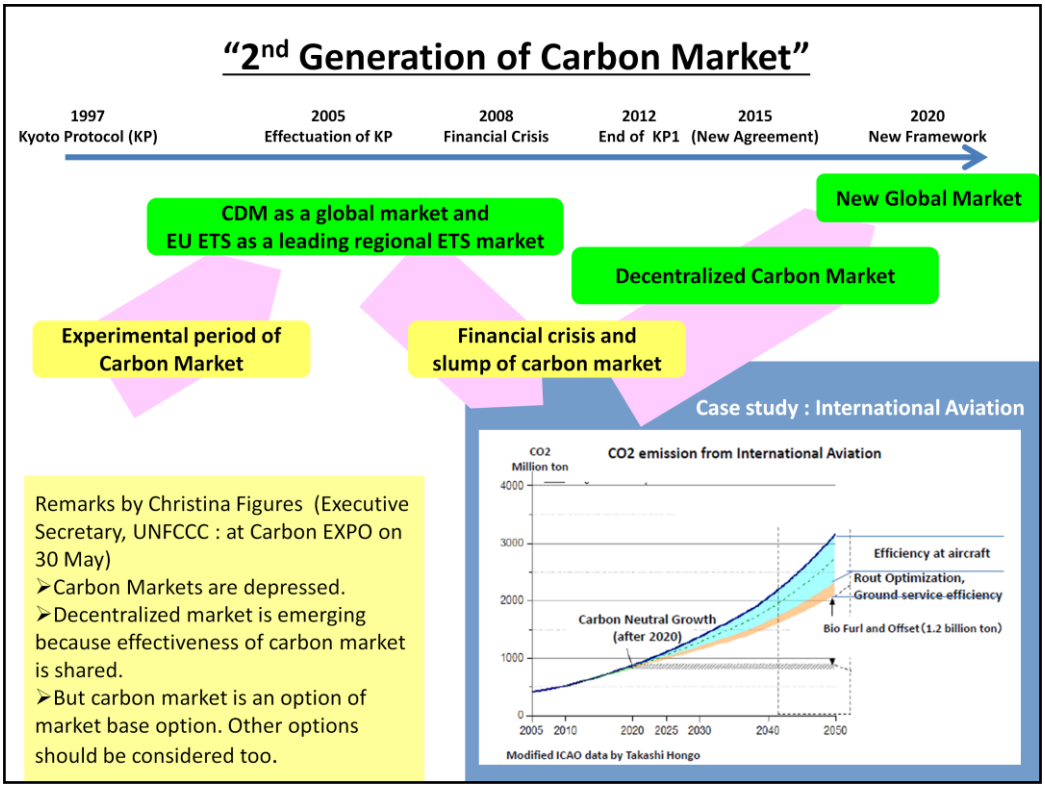
From International Emission Trading Association(IETA)

CDM (Clean Development Mechanism) as a project base emission trading was expected to play an important role for mobilizing finance to climate change mitigation projects in developing countries.
More than 6,800 projects were registered and 1.3 billon ton credits were issued under UNFCCC. Its annual contract amount is a below.

2005 2.6 (USD Billion)
2006 5.8
2007 7.4
2008 6.5
2009 2.7
2010 1.5
2011 1.0

Credits is an incentive for projects and covers a part of investment cost. Therefore much bigger amount of investment were leveraged by CDM contract. It is clear that CDM played an important role for the mobilization of funds.

However, carbon price was sharply dropped in 2008 by the financial crisis because demand for carbon credit was decreased by the drop of the energy consumption. Furthermore, uncertainty of the future carbon regulation provides negative impacts on the price at carbon market.
By the price down, CDM contract amount was peaked out 2007.



Carbon market is depressed seriously but a new trend is emerging. It is a decentralized markets. Non-OECD countries like Brazil, Chile, Costa Rica are considering the adoption of ETS and China started sub-national ETS in June 2013.

As Christina Figures pointed out, 2 dominant markets are in the slump but new markets are emerging. Mr.Ferdnands Tudela, former Deputy Minister of Environment of Mexico said that now carbon market is shifting to the 2nd generation.

"Linking with markets" is an interesting movement. For instance, "EU and Australia" and "California and Quebec" agreed to link and California will use offset credit from state(s) of Mexico and Brazil. Fragmented market has flexibility to improve the system but less liquidity causes higher transaction cost and volatility of price.

The thing we should now is encouraging the development and harmonization of each markets. International Emission Trading Association (IETA) put higher priority on the facilitation of the harmonization of these markets for the future integration to the global market.

One of the good examples of the new framework is for the international aviation sector, led by International Civil Association Organization (ICAO). ICAO has a plan "Carbon Neutral Growth after 2020" and emission trading is an option to realize their challenging target.

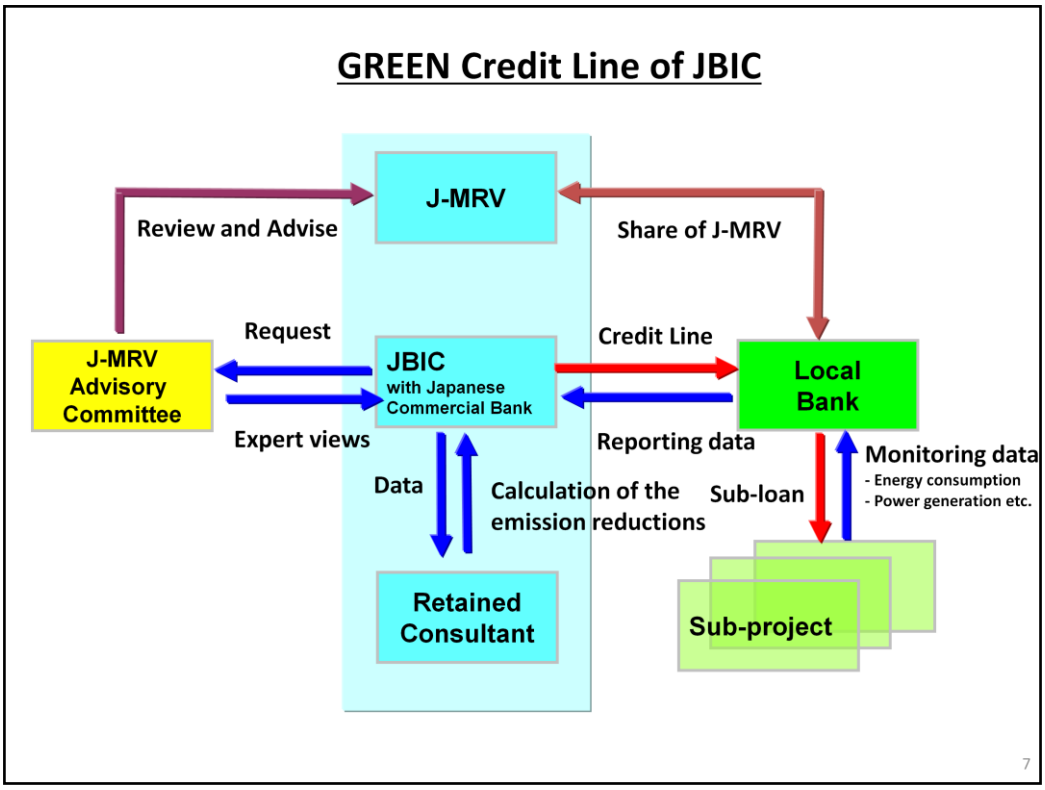
Carbon Pricing in the World

	Outline	Price	CO2 emission
EU	ETS (from 2005)	EURO 4.29/ton(05/July)	3,609
Japan	Carbon tax (from October 2012)	JPY 289/ton(after April 2016)	1,138
US	➢California : ETS from 2013. Link with Quebec ➢New York : ETS (RGGI) from 2009	USD 10/ton or over USD 1.93/ton	393 224
Canada	➢Quebec and Alberta : ETS ➢British Columbia; Carbon tax	- CAD 30/ton	318 63
Australia	➢Carbon tax form Oct.2012 ➢ETS from July 2015. Link with EU ETS	AUD 23/ton - (Early shift is lobbied)	546
Korea	ETS from 2015	-	495
China	➢7 sub-national ETSs(experimental) ➢Plan to national scheme after 2016	-	1,443
India	Energy Efficiency Certificate trading(PAT)	-	1,635

CO2 mission : million ton. Total of the above jurisdiction is 9,864 million ton and 33% equivalent of global CO2 emission

Emission trading is one of the market-base options which provides price on carbon. Carbon Tax put price on the carbon emission too but it is fixed price. National government such as Australia and Japan and local governments such as British Colombia of Canada adopts carbon tax.
In Australia, they are implementing carbon tax and will shift to floating price, say emission trading. Australian system is linked with EU ETS and industry is asking early shift of ETS because now carbon credit price is low and cost of ETS is lower than Carbon Tax.
In Japan Japanese government charge Carbon Tax (Fuel Tax) on coal, petro and gas and Tokyo Metropolitan government is implementing ETS. Therefore some companies are under the 2 different carbon price system.
Combination of “Carbon Tax to ETS” and “Carbon Tax and ETS” is possible.

Following the World Bank report, more than 60 jurisdiction of carbon pricing are implementing or preparing.
More than one third of mission is covered by carbon regulations.(See the table made by Takashi Hongo)



Japan Bank for International Cooperation (JBIC), a government-owned policy lending bank, started its GREEN Initiative in 2010. Under this scheme, JBIC provides finance to GHG emission reduction projects only when they confirm the emission reductions achieved. JBIC developed J-MRV, its own system for MRV, to objectively evaluate the GHG emission reductions achieved by its lending. The bank put a high priority on energy efficiency improvement projects, which are not well served by the Clean Development Mechanism currently. JBIC, with co-financing commercial banks, has provided in excess of $2.3 billion in credit lines to either banks, such as those in India, Turkey, and Central America, or direct to projects, such as energy efficiency improvements at a refinery in Brazil. Co-financing with commercial banks is JBIC's core principle because the mobilization of private sector funds is an important mission. GREEN provides double benefits: GHG emission reductions and the diffusion of MRV through co-financing and intermediary banks.

Takashi Hongo, "Keeping an eye on climate finance", Environment Finance, 06 February 2013

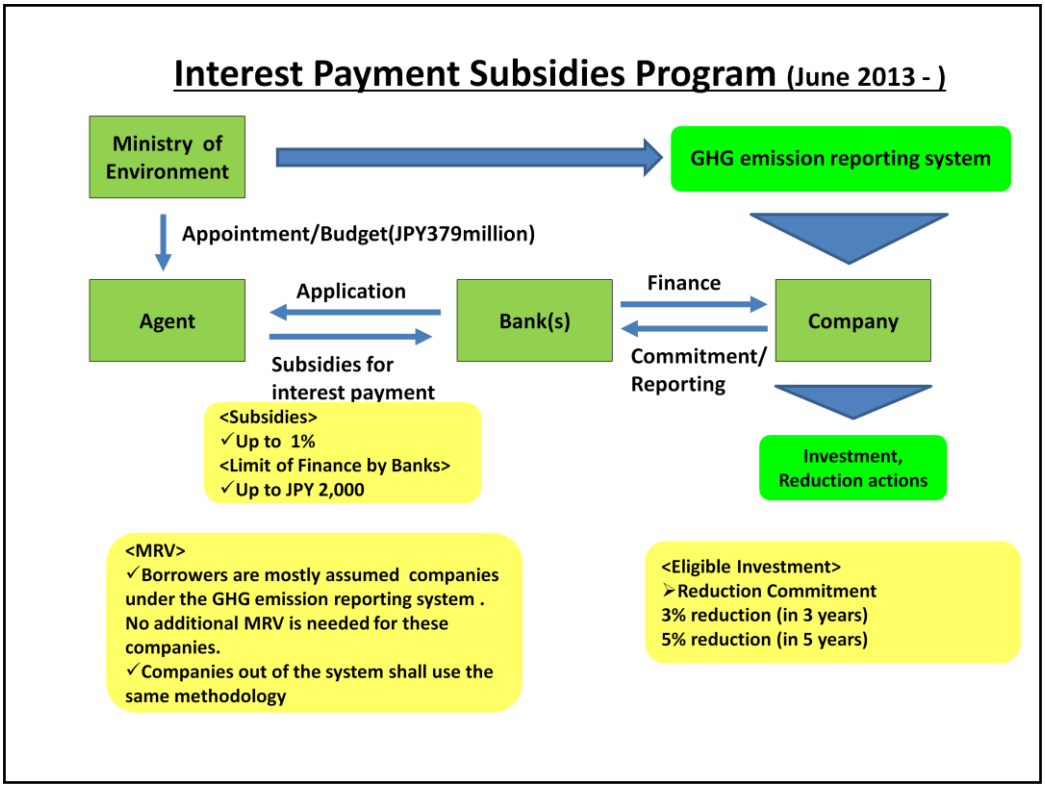
GREEN Credit Line of JBIC

(USD million)

FY	Country	Borrower	Co-finance Amount	JBIC Finance
FY2010	Turkey	Denizbank A.S	20	N.A
	Brazil	BNDES	300	N.A
	Central and South America	CAF	300	N.A
	India	ICICI Bank	200	N.A
FY2011	Mexico	NAFIN	100	N.A
	Central and South America	CABEI	100	60
	South Asia	South Asia Clean Energy Fund, L.P.	N.A	20
	India	ICICI Bank LTD	300	180
FY2012	Brazil	PETROBRAS	1,000	600
	Columbia	Banco de Bogotá S.A.	100	60
	India	ICICI Bank Limited	90	45
	Malaysia	RHB Bank Berhad	80	48
	Turkey	Development Bank of Turkey	100	60
FY2013	India	State Bank of India	90	45
	South Africa	DBSA	50	30
	Turkey	Denizbank A.S	25	15
Total			2,855	

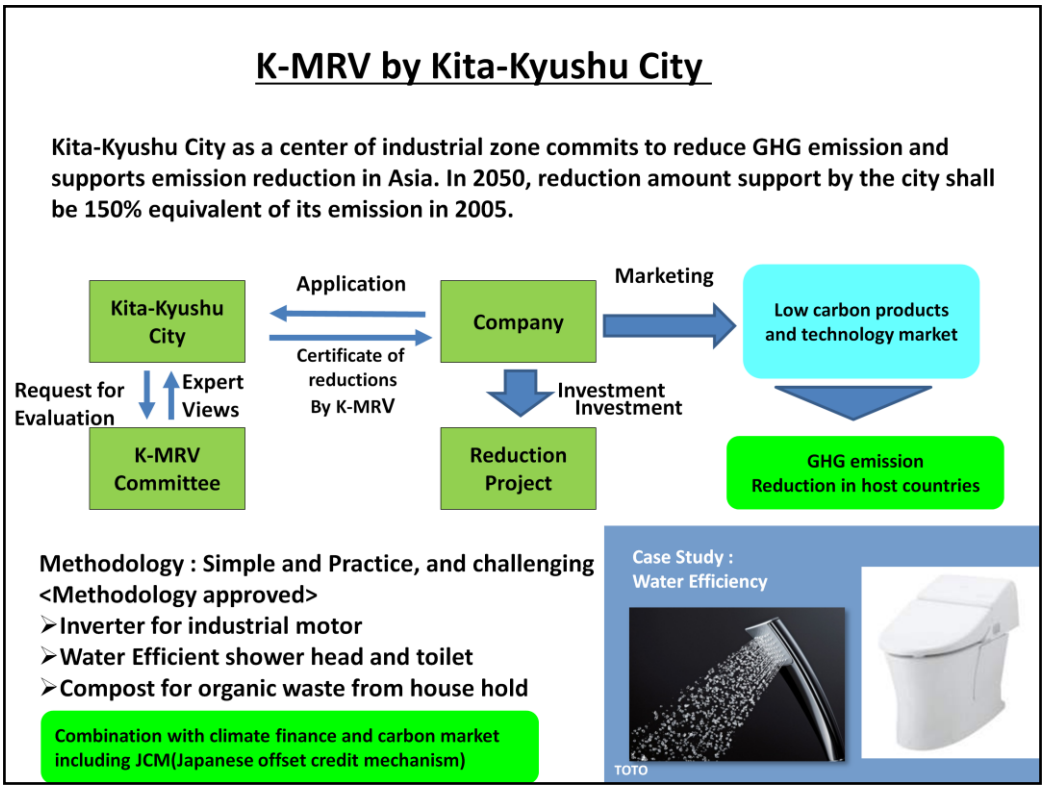
Source : Japan Bank for International Cooperation

JBIC provides finance together with private banks (“Co-finance”) and this is a requirement by Government of Japan. Mostly up to 60% of debt can be financed by JBIC directly. JBIC discloses key requirements of finance to the public although detail condition shall be negotiated and should be transparent. JBIC is expected to play a corner stone investor.



Ministry of Environment (MOE) started "Interest Payment Subsidies Program" in June 2013. This program aims to encourage the reduction actions by providing the subsidies on the interest payment of the borrowing for the reduction actions. This program is implementing by an appointed agent and eligible banks which are approved by the agent.
Eligible activities under this program is defined as the activities which was committed to reduce 3% in 3 years (or 5% in 5 years).

MOE assumed that most of beneficially of this program are companies under GHG emission reporting system (Law Concerning the Promotion of the Measures to Cope with Global Warming) and committed emission reduction is monitored under this system.
Amount of subsidies is not linked with the reduction amount of the activities

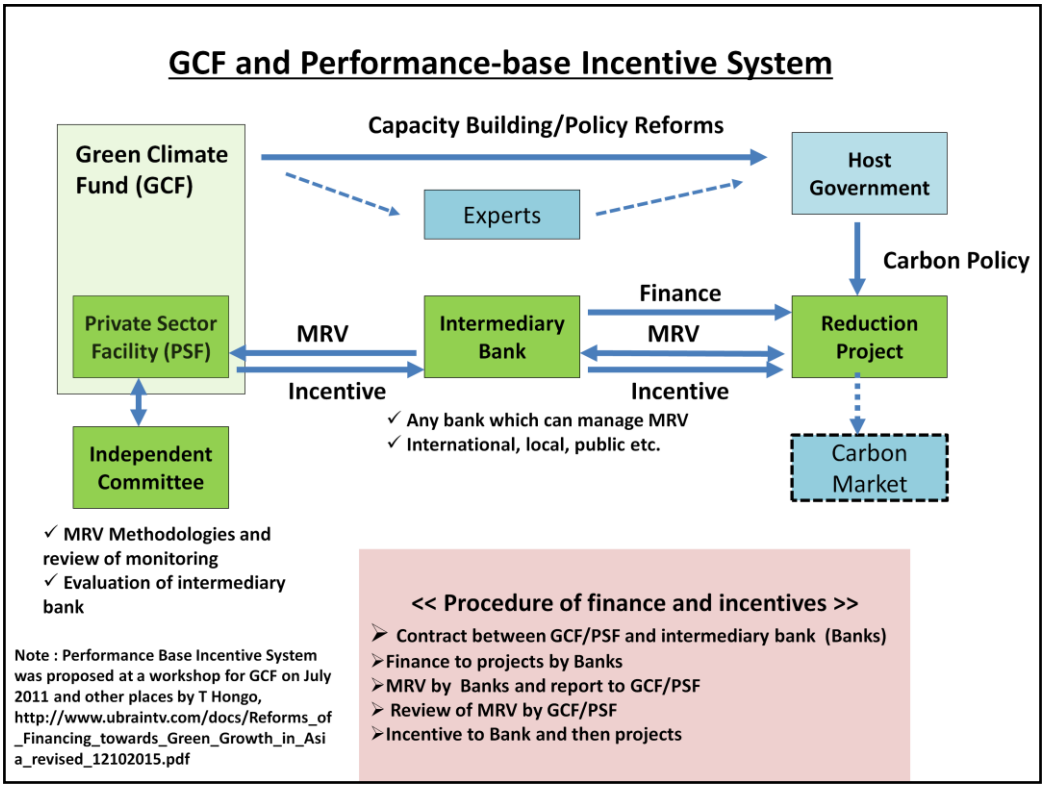


Kita-Kyusyu City used to be one of the four heavy industry area in Japan and has log history for fighting with air and water pollution. In addition to pollution control, they have expertise at energy management because many of the industries located there are energy intensive heavy industry like steel industry. The city has a plan to use their expertise for the environmental improvement in Asian countries and the support of the business by the private sector in or related to Kita-Kyushu City.

Kita-Kyushu city committed to support GHG reduction activities in Asia and planned reduction amount in 2050 is 150% equivalent of GHG emission of the city in 2005, in addition to the reduction in the city. K-MRV Guideline was approved in March 2013 under the support of experts and K-MRV committee was established on June 2013. The committee reviews methodologies and the reduction at projects and submit experts views to the City. City will issue a certificate of reduction and it will be used for the marketing tools of products and technology. It is not a financial incentive mechanism and the city is considering linking with JCM (Joint Credit Mechanism) or other credit mechanism and climate finance.

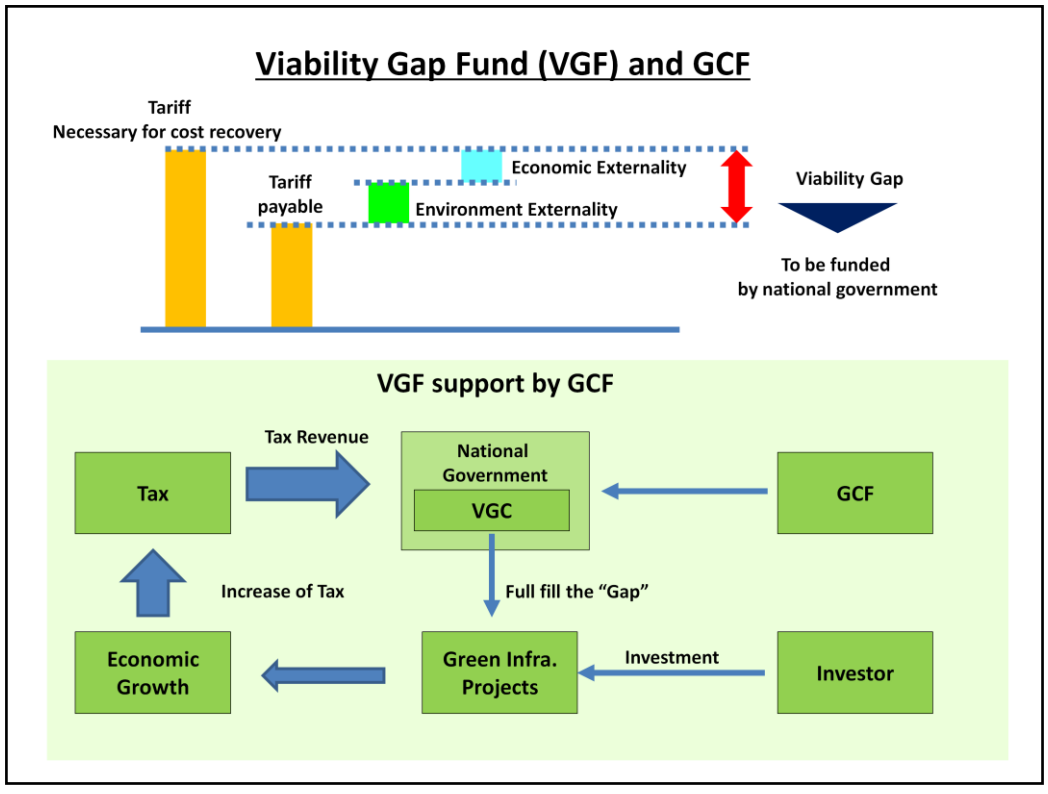
Companies received reduction certificates may use it for marketing tools because reduction certificate show the performance of the products and technology.

They target the area where energy and GHG emission is saving but not covered by CDM or other credit mechanism. This is very challenging approach.



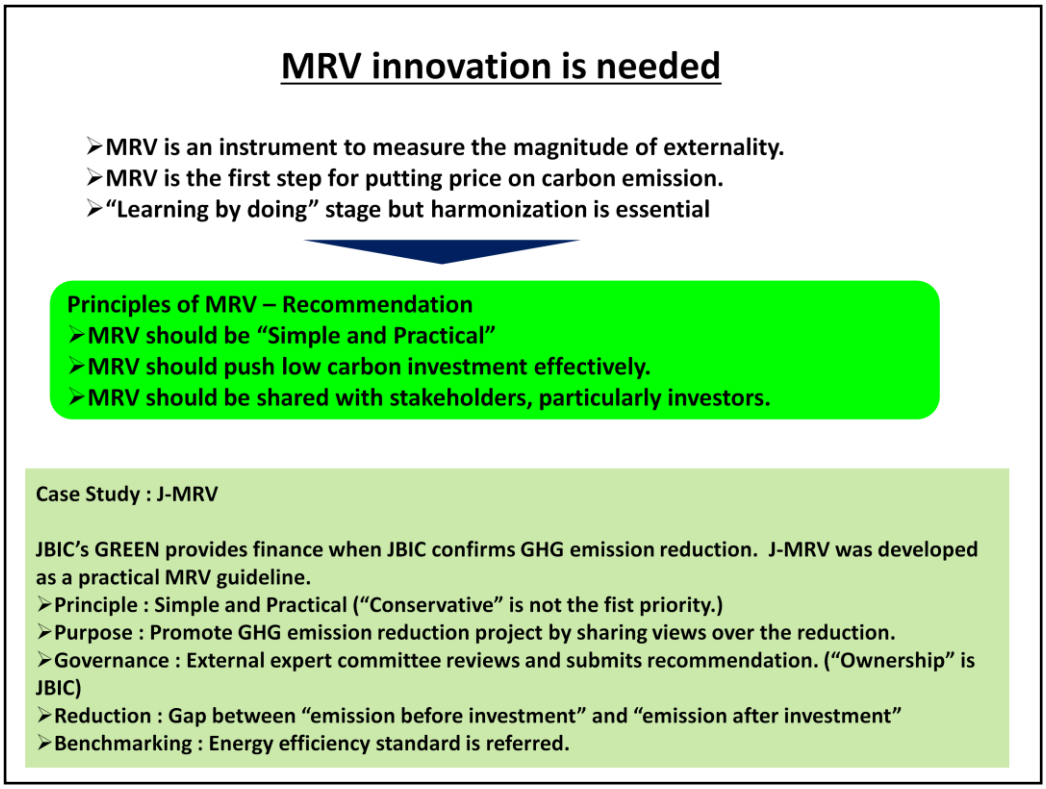
A key feature of such schemes is that the incentives are linked with the volume of reductions delivered. Below the concept, which was originally proposed at a workshop for Green Climate Fund (GCF), is outlined:
Intermediary banks, both domestic and international, provide finance to GHG emission reduction projects when they confirm the GHG emission reductions as well as their economic feasibility;
The intermediary bank measures the emission reductions during operation and reports them to the GCF board, or designated committee;
The GCF board reviews the report and provides payment when it confirms the reduction amount;
The intermediary bank receives the payment and shares it with project partners.
This approach is likely to fit the Asian market because the local financial markets are growing, and both public and private investors are seeking new asset classes. It also boosts the economic return of these investments.

"Keeping an eye on climate finance", Environment Finance, 06 February 2013



Investment to low carbon infrastructure, same as other infrastructure, requires longer pay back period and its expected economic return is not so high because it has externality (both environment externality and economic externality). The gap shall be full filled by the host country in principle but could be supported by GCF. India and Australia has established Viability Gap Fund but its track record is limited.

One of the funding options for GCF is to finance a part of source of funding to VGF.



Investors and technology providers ask for transparency of MRV process and predictability of the measurement outcome by MRV.

One of the way to improve transparency and predictability is the adoption of benchmarking such as energy efficiency standard for the reference emission. They estimate or measure emission after investment easily and they can forecast the reduction more accurately when reference emission is pre-determined and disclosed to the public.

MRV of GHG emission and emission reduction is under the development phase and it is "Learning by doing" stage now. There are many standards such as CDM methodology, J-MRV, voluntary standard and national schemes including JCM/BOCM (Joint Credits Mechanism/Bilateral Offset Credit Mechanism) and by these experiences MRV will be improved. However, investors will be confused when so many standards are there. So harmonization of standards is essential.

It is important to share key principles for the harmonization. Recommendation is as follows,

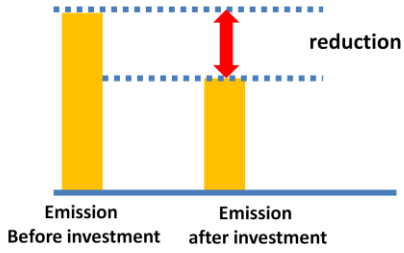
➢**MRV should be "Simple and Practical"**
➢**MRV should push low carbon investment effectively.**
➢**MRV should be shared with stakeholders, particularly investors.**

CDM and J-MRV

	Clean Development Mechanism (CDM)	J-MRV
Purpose	Crediting mechanism under Kyoto Protocol	Confirmation of the emission reductions (A condition of a JBIC's financing program(GREEN))
Principle	Conservativeness	Simple and practical
Facilitation of investment	Facilitate the additional investment	Facilitate the emission reduction projects globally
Reduction	Gap between "Baseline emission" and "Projects emission"	Gap between "Baseline emission" and "Projects emission"
Baseline emission	Emission without the project. Technology and financial additionalties shall be considered	Actual emission before the investment. National average or mission from the installations before investment
Measurement	Physical measurement is in principle	Estimation by using theoretical value and sampling are allowed as practical one
Minor effect	Why "Minor " is needed to be proved	Minor effect can be deducted by the certain rule
Approach	Bottom up	Top down and put high priority on the consistency

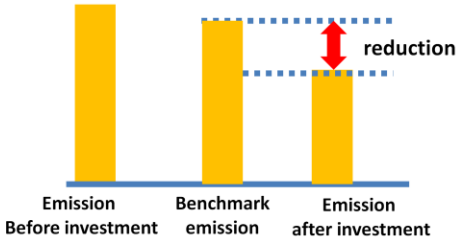
MRV innovation : A key is baseline emission

Case 1 "before and after investment"



- This approach is fit for the rehabilitation of existing installations.
- Reduction by operation change and software can be evaluated.

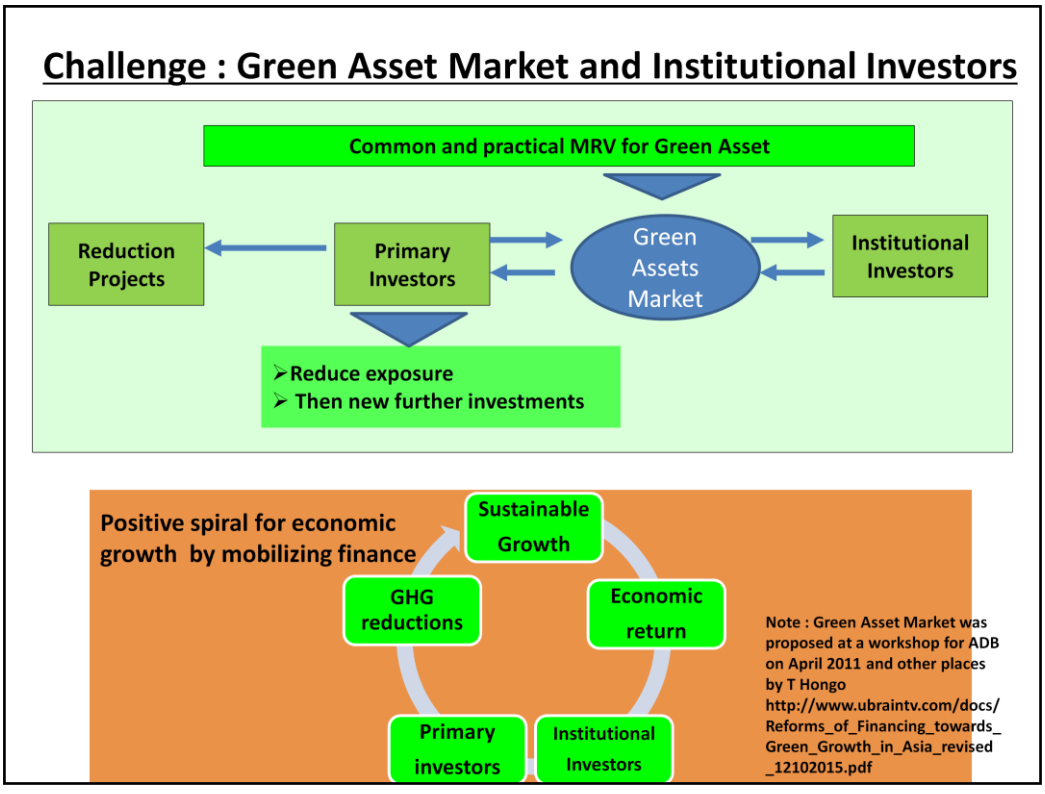
Case 2 Benchmarking



- This approach is fit for the green field investment and fair to all.
- In addition to the value under the regulation, reference value by industrial group can be used as the benchmark.
- Now many groups including steel, aluminum, cement and power are preparing.

A key for simple and practical MRV is "Baseline emission". CDM requires "story of the baseline" to demonstrate that investment is "additional", and it is very difficult to determine whether it is additional objectively.

By "Before and after" and "Benchmarking" approach, we can determine the baseline emission objectively and this is more transparent and predictable manner.



Institutional investors manage around $30 trillion a year, according to the OECD, and invest €7 trillion a year in socially responsible investments (SRI), according to Eurosif. Most of these investments are currently by EU and US firms, but Asian institutional investors are thought to be willing to invest too, because economic growth is boosting their assets and there is strong public pressure to be greener. But Asian investors face barriers, partly due to a lack of experience in direct project investments and partly due to an unclear definition of SRI, with it being used to cover a wide range of investments such as governance, social issues, the natural environment, and climate change. A solution is the creation of a “green asset” as a new asset class, underpinned by rigorous MRV.

This approach envisages a special purpose company being established to acquire assets which have invested in various GHG emission reduction projects. The emission reductions, the environmental benefit of the asset, will be confirmed objectively by MRV.

Half of the demand for capital comes from Asia, such as China, India and other ASEAN nations, and these countries are the driving forces of global economic growth. Investments in these countries are recognized as profitable. The GCF, or other public finance, can encourage these investments by mitigating the risk and giving incentives, making the green asset class more attractive.

Takashi Hongo, “Keeping an eye on climate finance”, Environment Finance, 06 February 2013

Challenge : Policy Reform for the transition to Green Economy

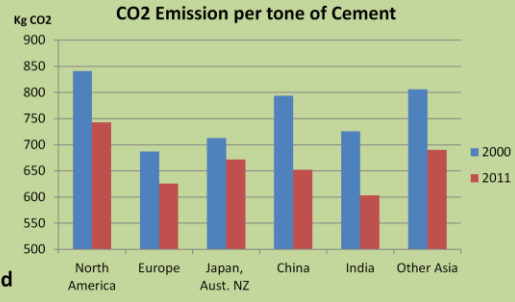
When Commercially Viable Best Available Technology and Climate Finance are available, all barriers for low carbon investment are removed?
NO….
Because companies tend to put higher priority on the investment which may generate higher economic return in short period.

- **Improve awareness of long term carbon risk and potential economic benefit by "political commitment".**
- **Setting policy framework which urges low carbon investment.**

Case Study : Cement Sector

Technology Road Map and Energy Efficiency Measurement Methodology were prepared by Cement Sustainable Initiative under WBCSD.

Next Step
- **Energy and CO2 Efficiency standard**
- **Co-benefit by the use of waste for energy and materials, such as tires and agricultural waste.**



Source : Cement Sustainable Initiative. Data is average of members of CSI

Technology and finance is a necessary for the low carbon investment but not a sufficient condition. They may chose another investment or postpone the investment . When market is growing, they often prefer to make investments which increase their production , not energy efficiency as a cost saving, because commercial benefit of expansion of production capacity is more profitable than energy efficiency investment. Therefore energy related regulations such as energy efficiency standard are essential.

Cement Sustainable Initiative (CSI) developed methodology for evaluating energy efficiency and CO2 efficiency of cement production facilities and gather and analyze the data. Basic infrastructure for the adoption of energy efficiency standard is improving.
Voluntary initiative for improving efficiency by leading companies is not limited to cement industry. Energy intensive industries such as Steel, Aluminum and power sector are taking almost the same approach.

Conclusion

- **MRV is the first step for internalization of externalities.**
- **Reforms of financing and policy is needed.**
- **"Uncertainty" but "Action"**

For more information ;

"Reforms of Financing" by Takashi Hongo
http://www.ubraintv.com/watch.php?id=569
http://www.ubraintv.com/docs/Reforms_of_Financing_towards_Green_Growth_in_Asia_revised_12102015.pdf

"Low-Carbon Green Growth in Asia: Policies and Practices" by ADB Institute
http://www.adbi.org/files/2013.06.28.book.low.carbon.green.growth.asia.pdf

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