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Points and Proposals for the Emissions Trading Regime of Climate Change

—For Designing Future System—

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This report summarizes the points of the two flexibility measures, GHGs emissions trading and joint implementation, focusing on former instrument, adopted in the Kyoto Protocol, aiming at identifying the issues for designing how the regime works efficiently and what points should be settled. Proposals are also mentioned especially focusing on the emissions trading based on the author's current opinion. This is the second version and therefore on developing stage of inviting comments and opinions related to this issue. Redistribution and citation with this version number are also welcome.

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I. Basic Understandings

I.1 The meaning of the Kyoto Protocol

The Kyoto Protocol adopted in December, 1997 is a *landmark* in the meaning of providing the *framework* of global measures for the issue of climate change in the 21st century. Especially, the newly introduced mechanisms utilizing the market called *Emissions Trading* (Article 17), *Joint Implementation* within Annex I (Article 6) and the *Clean Development Mechanism* (Article 12) are the three powerful and promising tools expected to be the framework to tackle the climate change issue in future.

I.2 Recognition of current situation (emissions trends and outlook)

Here we survey the CO_2 emissions trends up to now from 1990, reference year of the Protocol. According to the International Energy Outlook 1998 by US/DOE/EIA, the followings are the records and outlook of CO_2 emissions originating in fossil fuels in comparison to 1990 level which consist largest part of the GHGs emissions.

	1990(emissions)	1996(results)	2000	**2010**	Low/High Growth
Western Europe	971 Mt-C/yr	–2%	+1%	**+13%**	+27 to +40% ('10)
North America	1,472 Mt-C/yr	+9%	+17%	**+34%**	+5 to +23% ('10)
Japan/NZ/Australia	364 Mt-C/yr	+7%	+12%	**+27%**	+16 to +38% ('10)
Former USSR	991 Mt-C/yr	–38%	–34%	**–20%**	–28 to –2% ('10)
Eastern Europe	299 Mt-C/yr	–24%	–17%	**–6%**	–14 to +15% ('10)
Developing Countries	1,689 Mt-C/yr	+30%	+53%	+120%	+81 to +157% ('10)

(The Low/High Growth indicates the sensitivity range in 2010 in the case of low to high economic growth scenarios). For quasi-Annex I as a whole, including the whole Former Soviet Union countries, CO_2 emissions in 2010 would be **+12%** from 1990 level by reference scenario, given the latitude of **+4%** to **+24%**, showing great difference from the **–5%** prescribed in the Protocol (though in fact the figures are the total of the six GHGs including the sink).

The energy situation of the big contributors of the CO_2 emissions can be summarized in the followings:

EU: Reductions are mainly owing to two biggest countries Germany and the UK and others for increase, however, potential of fuel switching from gas to coal left in the UK is small and the deregulation on EU power/gas market cannot be expected to be much effective for GHGs reductions;[1]

JUSSCANNZ: All of them has exceeded by almost +10% already at current stage from 1990 level, which means they might exceed by 20–30% in 2010 as business-as-usual;

Russia: Although being one of the countries with loose quantified commitment, an outlook was provided at subsidiary body meeting in Bonn (1998) that Russian CO_2 emissions might almost go back to the 1990 level by 2010 due to future economic growth.

It indicates the fact that the Kyoto Protocol targets are "very difficult level" and that it is almost impossible to achieve without drastic reduction from the business-as-usual of Annex I as a whole.

Taking these *difficult* situations into account, consideration on the *effectively* and *workable* emissions trading system designing should be given.

I.3 Implication of Emissions Trading

I.3-1 The merits of the emissions trading system

The merits of the emissions trading system for the countries concerned are that it

[1] M. Sasaki and S. Kondo, "Will EU's Single Power Market (Electricity Liberalization) Lead to Carbon Reductions?", forthcoming in Energy in Japan, Jan. 1999.

seeks the *economic* efficiency by giving more *cost-effective* measures as incentive for implementation, and that it provides the independence of the concerned sectors (mostly merits for the Annex I countries).[2]

Moreover, the so-called *win-win* characteristic of the *trading* itself is also effective for the case of emissions trading and it can be expected to become a powerful tool for the issue of climate change, in which strong measures can not be adopted easily.

From the *environmental* aspects, the global merit is that the GHGs emissions of the concerned countries (whole Annex I countries) can be capped. Some view points of this merit can be noted;

- **Utilization of the moral of *business* deal which is stronger than the moral of environmental treaty (compliance enforcement);**
- **Less non-compliance countries by averaging the increased and decreased amount of emissions of the Annex I countries;**
- **Emissions 'reduction' to the commitment level (cap) from business-as-usual by the power of market mechanism (persistence of quantified commitment).**

The last and most important point indicates that, *in case of supply shortage of permits (in case some country are incapable of compliance), the permit price would rise and suppliers may appear through emission reductions.* It is a major characteristic of this system.

Of course, to utilize these merits, it is *pre-conditional* that the market of emissions trading is *effectively functioning*. How to *design* a workable market would be a task.

Other important view points are potential incentive setting for energy saving for EITs (Economy in Transition Countries), and for non-Annex I countries for voluntary capping (though it depends on the initial allocation formula).[3]

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[2] CO_2 emissions which are the major contributors of climate change emerge mostly from all human activities, therefore, generally it matches well with a measure utilizing the market mechanism, as a *framework* to shift economic society itself to less CO_2 one.

[3] Incentive for non-Annex Parties to participate in the trading regime is a politically sensitive matter. However, it can be beneficial for them depending on the establishment formula of initial allocation or quantified targets (mentioned later).

I.3-2 Can the emissions trading *reduce* emissions?

Naïvely, the emissions trading system may not affect the GHGs emissions since it only *shifts* emissions. Though it is logical in a sense, it is *not* quite realistic.

Emissions trading system has two dependent parameters; total emissions amount and total payable cost. The followings are the two extreme cases:

(1) Under the condition that the "total emissions amount" is fixed,[4] the introduction of the emissions trading system would reduce the cost but not emissions;

(2) Under the condition that the "total payable cost" is fixed, the introduction of the emissions trading system would contribute to greater emission reductions.

The situation of (1) is that "emissions trading is just a transfer of emissions and it would *not* contribute to emissions reduction". This is equal to the assumption that "condition (1)—fixed emissions—is independent on the introduction of the emissions trading system". It means that the compliance of the Protocol would be maintained *without* the introduction of the trading system.

The interpretation of (1) seems to be reasonable, however, it needs to be examined how much it reflects the reality. For example, many developed countries set their voluntarily national targets of "emission stabilization at 1990 level by 2000", however, achievement of that voluntarily commitment seems almost impossible. Most countries would not take the risk to sacrifice their own economic or political situations to take strong measures for the climate change issue. Moreover, it is well known that the introduction of the emissions trading system was *conditional* for the US to adopt the quite tough "−7% commitment" in the Kyoto negotiations.

Taking these points and the quite severe commitment level of the Protocol into account, it can be said that situation of (2)—there is certain limit of the cost we can pay to achieve the GHGs emission reduction targets—reflects more of the reality.

Therefore, at lease supposing the tough goal of the Kyoto Protocol as existing,[5] the introduction of the emissions trading system would realize the emission *reductions*.

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[4] In other words, it is the case that most country succeeded in compliance even *without* emissions trading. It is characteristic of emissions trading that a country can achieve the compliance by purchasing the permits from the market. Therefore, (without the case of no compliance intention) **existence of non-compliance means *there are not enough permits available in the market* (market is not effectively functioning) *in spite of price increase***.

[5] If the quantified commitments of the Protocol is not severe, compliance would be attained without emissions trading. It means the total emissions amount do not depend on the introduction of emissions trading in this case.

In other words, if the system is not introduced (or if it does not properly function), many countries would fail to comply with the Protocol.

It means that the activated and fluid market would be *necessary* to achieve Annex I commitments regardless of the principle of supplementarity in which mechanisms like emissions trading are regarded as supplemental options for domestic measures.

However, the so-called issue of "Hot Air" is ignored here. We will discuss the issue later in the section of Russia and Ukraine.[6]

I.3-3 The basic stance for the introduction of the emissions trading system

As mentioned above, it is indispensable that the market properly functions in order not only to have the merits of the emissions trading but also to maintain and develop the framework of the Protocol. However, in this trend of emission growth, it should be noted that we do not have enough time to wait for the complete market design. Therefore, at system designing, the basic stances should be:

(1) Start with gaining experiences by *early implementation* though it is incomplete;

(2) Start with a *simple* and *workable* system taking the lack of experience into account; and

(3) Intend system designing which admits *try-and-error*.

[6] The author's opinion is that "hot air" is necessary to stimulate market with proper functioning. This is from the recognition that the commitment levels of the Protocol are very severe. On the other hand, it should be noted that the Protocol does not have the concept of hot air in itself.

II. Common Issues for Regime Design

II.1 Monitoring Uncertainty and Market Credibility

Awareness of the issue

Credibility of the market is one of the essential points in order to have the emissions market function properly. It is necessary to have certain accuracy in monitoring on the *amount* of the commodity to be traded.

Points

Certainty of the monitoring depends on the following items:

Tradeable GHGs by Source/Sink;

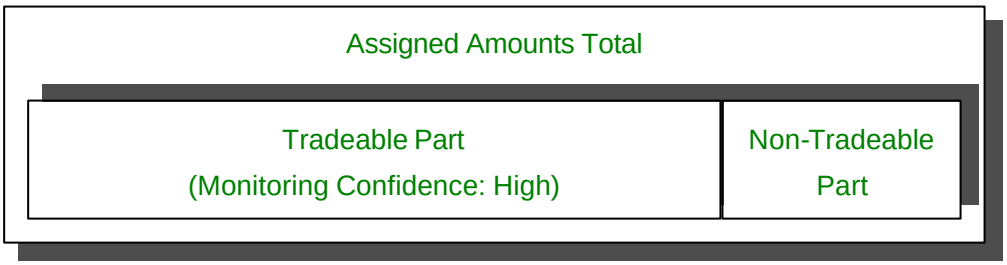
Accuracy depends on the type of source/sink than type of gas. In general, industrial GHGs (*e.g.*, CO_2 by fossil fuel combustion and by industrial processes and PFCs, HFCs and SF_6 by industrial processes) are more accurate than biological GHGs. The confidence levels are listed qualitatively or quantitatively in the national communication reports and it is possible to standardize these.[7] Therefore, by establishing uncertain level (*e.g.*, ±10%), we can restrict the tradeable gases with smaller uncertainty than the figure by each source/sink.

In principle, it is *possible* to agree internationally with the establishment of "restrictions" on the *tradeable* GHGs by source/sink. Especially, such restrictions are preferable to keep the market credibility in the initial stage of the trading. However, quantified commitments in the Kyoto Protocol are set comprehensively on the basket of the GHGs as a whole as each country's

[7] For example, in the second national communication of NZ, the uncertainty of CO_2 emissions from energy combustion and industrial process is ±5%, CO_2 absorption by land use change/forestation (LUCF) is ±25%, CH_4: ±20% (agriculture) to ±50% (energy and LUCF), N_2O: more than ±50%. According to the US, only CO_2 emissions from energy combustion and industrial process, CH_4 from coal producing and N_2O from industrial process belong to High Confidence in Estimation (PFCs, HFCs and SF_6 are not estimated).

"assigned amount". This implies that such restrictions need a re-negotiation for setting *new* quantified commitments of the *tradeable* part of the whole assigned amounts,[8] and amendment of the Protocol itself. In order to realize this, it is possible to set the quantified commitments of tradeable gases as a basket in proportional to those of whole assigned amounts.

On the other hand, each Annex I Party can set up a rule voluntarily which part of its assigned amounts are tradeable. This procedure is more realistic because it does not need any decision at COP/MOP, especially with broad agreements across the Parties.



Choice of Trading Rule (Cap-and-Trade or Baseline-and-Credit?)

In general, the risk of hot air trading is considered to be smaller in the baseline-and-credit type of trading rule (post-verification) compared with the cap-and-trade type (pre-verification). The former type enables trading to start after estimating how much was actually reduced annually while the latter type admits the trading in the form of assigned amounts.[9] This former rule naïvely applies to the CO_2 sequestration by reforestation/afforestation. Cap-and-trade and baseline-and-credit rules can coexist as the cap-and-trade

[8] This means quantified commitments of 6 gases (+sink) and the quantified commitments of the *tradable* part co-exist. If commitments are set only for all assigned amounts, the possibility of reporting false figure of smaller emissions amount for non-tradeable part could be pointed out. However, taking into account the fact that governments are entrusted with the emissions monitoring and reporting, it can be said that there is not much meaning in pursuing perfection in this.

[9] For example, methane emissions in Russia is 155 Mt-C(eq)/yr in 1990. It is admitted in the Protocol to assign all amount of 1990 emissions. By limiting tradeable part to the *difference* from 1990 (tradeable after verification), it can be consistent with taking actual measures. For instance, by estimating the effectiveness of a measure by *baseline* method regarding methane emissions from ruminant with large error bar, monitoring accuracy will be greater than those of tradeable methane emissions given as total assigned amounts. In other words, monitoring accuracy for uncertain source/sink is better for "project-level monitoring" than "change of assigned amounts" than "absolute value of assigned amounts". It also contributes to minimize hot air trade originating in monitoring inaccuracy. Of course, monitoring accuracy is better in cap-and-trade method based on fossil fuel consumption regarding CO_2 of fossil fuel combustion. In general, the accuracy of baseline method depends greatly on the establishment process of the baseline formula.

applied for those more accurate and the baseline-and-credit regime for those less accurate.

Monitoring Standards for each Annex B Parties;

Monitoring accuracy differs across the Parties. It is possible to impose an embargo on the emissions trading itself for non-attainment Parties of the monitoring standards (the compliance of the quantified commitments is an obligation), however, this is problematic for international cooperative purport of the Convention. (JI can be applicable for the Party even if the emissions trading are not admitted). Discounting of the tonne or price depending on the attainment of the standards, or organizing supporting system to attain the levels (and hybrid of these) are also possible. The former is related to the buyer's liability which is to be discussed later.[10]

Differentiated Standards for Economy in Transition Parties?

In relation to the above discussions, it is possible to set looser standards for the Annex B Parties in economic transition (only for the first commitment period). In this case, incentive setting to attain the standard levels is important. For example, discounting rate connected with the monitoring accuracy or setting buyer's liability nature for the tradeable emission permit is possible (discussed later).

Time-Lag between Emissions and Monitoring;

In general, in the current system of emissions monitoring/reporting, two years (or more) are needed to fix the amount of emissions. This time-lag is preferred to be shorter for the efficient market functioning.[11]

In addition, some Party uses statistics based on fiscal year instead of calendar year. This may have some effect on the market.[12]

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[10] The idea of "discounting" in buyer's liability is that the market decides the price of permits depending on compliance confidence, however, here it is decided by a certain procedure based on "achievement of monitoring standard".

[11] Regarding CO_2 emissions from fossil fuel combustion, it is possible to eliminate the time-lag by linking sales/purchase amount and permits.

[12] For instance, if the difference of the time of this record preparation links with the difference of the time of compliance settlement, the permits demand and change in price may become more complicated. However, it might not be only bad effects the dispersion of timing would have.

Proposals

The COP/MOP agrees to set the international **guidelines** (uncertain level ±10%) for the monitoring accuracy and reporting of **tradeable GHGs by source/sink**. Each Party is responsible for estimating and attaining the guidelines. Expert in-depth review process mentioned in the Protocol checks the compliance of the guidelines. Trades between different category of tradeable GHGs by source/sink are applicable admitted by both Parties.

In case that the trades of uncertain gases are permitted, the trading rule should be restricted to baseline-and-credit type with post-verification for them.

Each Party is responsible for following the guidelines. No Party is permitted for non-attainment (for monitoring) GHGs by source/sink. On the other hand, looser guidelines than OECD countries (uncertain level ±15%) are applied to the economy in transition Parties in the 1st commitment period. However, the common one will be applied in the 2nd period; this means that the Parties without efforts to improve the monitoring system will not be able to trade in the 2nd period. The tradeable permit has the attribute of *seller's* liability only (discussed later).

The **time-lag** between emissions and monitoring (when the emissions amount is fixed statistically) can be reduced to zero through the following conditions: appropriate permits are needed in advance for the inevitable activities (*e.g.*, fossil fuels purchasing for down-stream regulation and fossil fuels production/import for up-stream regulation) to emit GHGs. This procedure enables the *automatic* compliance. In addition, electronically centralized management of the fossil fuels sales packaged with permits dealing in each Party followed by the communication to the Administrative Body reduces time-lag and transaction cost of tracking the permit transfer.

However, this procedure cannot be applied for methane and/or N_2O emissions /reductions from the agricultural sector, for example. In this case, if trading are admitted, the accounts for the trading must be settled separately after two years time of each commitment period. At least within this two-year period, each Party must acquire/transfer the related permits in accordance with the *certified* emissions or reductions.[13]

[13] If the above mentioned proposal is not implemented for CO_2 emissions from fossil fuels (in case of retroactive acknowledgement by the usual statistics), it is possible to have the settlement of the accounts of permits at two years after the expiration of each commitment period and have "the consistency of permits consumption and actual emissions amount" at least within these two years (with reference of the interim report after one year).

As for the issue of time-lag between calendar year and fiscal year, any of them can be applied for the base year (1990) on the basis of the communication to the FCCC Secretariat (already done). On the other hand, only calendar year is applicable for the calculation during the commitment periods.

There can be a grace period of six months after regulating the quantified commitments until the possibility of the compliance of the concerned countries is settled. In the meantime, the countries should conduct the final adjustment.

II.2 Attributes Associated with the Permits

Awareness of the Issue

Operating emissions trading regime very much depends on the attributes of the tradeable emission permits, *i.e.*, what kinds of characters are associated with them and also to what extent.

Points

Followings are considerable characters associated with the permits:

Serially Numbered or Not;

(Electronically) serially numbered method as in the case of SO_2 allowance trading regime in US can clarify the information of the permits such as date of issue and (initial) origin. (Each Party can have more detailed system than the international one such as specification of the original company, *etc*). However, it is another thing to associate some *meaning* with this number. In case that the permit has buyer's liability nature, we need such kind of information. On the other hand, we simply use it to secure the administrative tracking of the permits and to protect forgery. We can select the method with serial number in the early stage and remove it when useless. Each Party can select its original way as far as it is compatible with the international one.

Those who assign serial numbers (who issue the permits) are generally COP/MOP or emissions trading administrative body as subordinate, however, governments can also be entrusted.

Buyer's Liability or Seller's Liability?

We can introduce buyer's (or shared/shared/hybrid) liability character for permits trading.[14] In this case, the carbon equivalent value of the permits purchased will be lost or discounted related to the degree of compliance credibility.[15] It means that buyers need to estimate the risk of non-compliance of the country of the initial origin.[16] In other words, this method corresponds to giving the character of securities such as credit or stock (of different brands) to tradeable permits (on the other hand, seller's liability corresponds to treat the permit as a real commodity with single price).[17]

This buyer's liability method can make incentives for seller Party to have accurate monitoring/tracking system and to comply with its quantified commitment through the *market mechanism*.[18] It can also be designed to keep the total emissions within cap for Annex B Parties in case of non-compliance of some Parties by giving discounting suitable for the degree of non-compliance.

However, the buyer's liability method will make the trading regime more complicated by incorporating the additional *risk* taken by the buyers. Moreover, the value of the permits will be clarified *after* the settlement of the seller Party's compliance; the operation of the trading regime must have some mechanism to compensate this time lag. The buyers tend to hesitate to participate in trading due to the risk of defaulting. Since it could especially happen in the phase of regime introduction with no experiences, therefore the

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[14] The *complete* buyer's liability is not feasible. In this sense, it should be discussed how much and in what kind of form should the buyers and the sellers share the liabilities. It should be noted that this *liability* is the responsibility for the value (tonne) of the traded permits, *not* the responsibility for compliance of the Protocol commitments.

[15] "Compliance" usually means the compliance to meet the quantified commitment, however, it is possible to have several kinds of compliance such as commitments for accurate monitoring, permits tracking and submitting national communication in a packaged form.

[16] Even when there is a domestic emissions trading scheme and allocation for national enterprises, "compliance" here means the compliance of the nation (government) and not of the enterprises concerned. It is feasible to take a measure for default by losing validity of the permits by its issue date from new one, however, if permits for five years' commitment period is issued at once, this system would not work. The task of settling defaulted permits still remains.

[17] Permits will have several prices depending on compliance risk of the country that originated the permits. However, the "movement" of the price is expected to show the same kind of movement as a certain band representing the risk (the price of permits will not have independent movement from its origin).

[18] It is possible to take other measures (*e.g.*, non-compliance or enforcement mechanism) for incentives for compliance to establish the accurate monitoring system and/or to meet its quantified targets.

market might *not* function properly. In case of private sector trading, the contract will be complex; it *reduces* their incentives to participate in the emissions trading regime. We can envisage the situation that the permit will be reselled many times (liquidation sale). Since non-compliance of a country would affect the compliance situation of other countries, there is fear of chain bankruptcy (non-compliance). Due to these points, the emissions reduction (or stabilization) effect through the market mechanism might *not* be fully demonstrated under buyer's liability system. It could bring about many non-compliance Parties *against its purpose* under the quite tough quantified targets of the Kyoto Protocol.[19]

To have this system function properly, it is essential that the ranking/grading system (by some private firms) effectively works and it provides the market with accurate and transparent information.

This issue is also related deeply with the effectiveness of enforcement measures such as non-compliance procedures. All existing (domestic) tradeable permit schemes are based on seller's liability. This might be explained through the strong enforcement by the governments. On the other hand, the lack of experiences as the emissions trading scheme for the buyer's liability might be concerned.

We must note that the Emission Reduction Units (ERUs; a portion of assigned amounts) specified in the Article 6 (JI) of the Kyoto Protocol have buyer's liability to some extent (discussed later).

As for CDM credits (CERs; certified emission reductions), it is reasonable to characterize them with 100% validity when they are converted to permits (assigned amounts) even the buyer's liability is introduced, since it is envisaged that these credits emerge from the certifying processes *after* the

[19] It needs to activate the market because the market mechanism contributes to have strong effect to keep the cap (total emissions) even under the increasing trends of GHGs emissions, as mentioned in the last chapter. However, it can be pointed out that the liquidity of the market would be maintained by buyer's liability in which prices are selective. The purpose of participation in the market differs between speculators and real demanders. There is an opinion that buyer's liability would not cause any actual harm to real demanders since speculators prefer permits with high risk and actual demanders prefer low risk (Saito, IGES 2nd Brainstorming Forum on Emissions Trading, August 1998). However, it is questionable if permits demand of OECD would be supplied just with the permits with low risk under the tough quantified targets of the Kyoto Protocol from the perspectives of energy economics.

emission reduction amounts are *fixed*.[20]

Development of Derivative Commodities;

Tradeable permits are nothing but the *Spot* commodity that is based on the assigned amounts specified in the Protocol (the Administrative Body and/or each Government can also establish the *Advance*[21] as well as in the US SO_2 allowance trading scheme). However, derivatives like *Forward*, *Futures*, some *Options* can make the market more fluid and effective, in general. It can be expected that these commodities will be developed step-by-step through the needs of private sectors.

In the case of GHGs emissions trading, it is expected that the market autonomously develop these kinds of commodities after the whole scheme of the trading rules is settled before the first commitment period. Secondary market through the Exchanges is expected to work well for the standardized commodities of *Futures* and *Options* contracts.[22] Trades through the Exchanges are transparent, anonymous, and make it easier to trace transfer of the permits. Appearance of speculators in the secondary market is ethically problematic, however, they are needed for the fluid and effective market as risk-takers.

Unit of the Permit, *etc.*;

In general, *tonne of carbon equivalent* (t-C(eq)) might be the appropriate unit of the permit. In case of developing countries' opt-in with *growth target* in the future, we can install some mechanism which allows the unit varies in proportion to the growth rate. Each Party can use smaller unit like kg-C(eq) *coin* domestically to operate the system more liquid.

Banking is applicable (eternally) for the permit, so it is no use to set the

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[20] CDM credits itself can be discounted related to the monitoring accuracy or uncertainty of baseline setting, however, this should be limited within the framework of CDM and at the stage of converting them to permits, market do not need to have proper information of the projects. Otherwise it would complicate the market.

[21] Establishment of the *Advance*, which will be valid (become *Spot*) after some fixed years, is nothing but the distribution of the future *Spot* (a portion of assigned amounts) in advance. In this regard, it might be issued by the Administrative Body of the emissions trading regime, on the other hand, each Annex I government can issue it under its responsibility (by engaging to exchange it by Spot). As for the buyer, *Advance*, *Forward* and *Futures* have the same effects to be valid for future emissions certificate.

[22] Primary markets based on over-the-counter (OTC) contracts have much more variety of contracts. However, information including price and so on tends to be unclear. However, like other commodities, large deals might be based on OTC (under the price signals of exchange). On the other hand, as for governmental trading, some say it requires information disclosure including the price information, even if it is based on OTC.

expire date/year. It does not need to use the unit of t-C(eq) *per annum.*

Proposals

It may be better to assign **serial numbers** in order to trace the transfers of the permits perfectly (for debugging) regardless of buyer's or seller's liability nature. In the beginning, we should have some flexibility for try-and-error. This is mentioned in the proposals of both umbrella group and CEE/EU group at subsidiary body meeting in Bonn, June 1998. The assignment of the serial numbers can either be just for tradeable permits mentioned above, or for the whole assigned amounts. The COP/MOP or Administrative Body for Emissions Trading issues the international permits.

In order to keep the GHGs emissions cap within Kyoto commitments, the criteria of the buyer's or seller's liability issue should be the market to be effectively workable and functioning. To accomplish this, the principle ***simpler is better*** should be applied to the buyer's or seller's liability issue at least for the initial stage. With this recognition, it is possible to judge that "**seller's liability only**" is better.

Incentive setting for compliance, *etc*., or the issue of non-attainment of the Annex B cap in case of non-compliance can be compensated by other procedures, especially by non-compliance procedures.

We conclude that if the buyer's liability is attributed to the permit, the participants of the market must take the related risk into account for the retroactive contract clause. It can be said that it is not preferable from the viewpoint that it may reduce the potential market development. It is risky to set the discounting by the market because the market may not work properly in the initial stage. So, the method subtracting from the following commitment period with some interest is more practical. In this case, it should be consistent with the non-compliance procedures. It is desirable that the *ranking* function is newly established as a function within the framework of the Protocol and is incorporated in the review process, since it is an attractive option.

Developing trading regime through the Exchanges as early as possible is desirable for the standardization of the commodities like derivatives. The authority (COP/MOP and/or each Government) does not need to develop such commodities except for *Advance* contract; ordinary rules for commercial deal are sufficient.

Unit of the permit is ton-C(eq) for the assigned amounts, on the other hand, kg-C(eq)

or smaller can be developed domestically related to the allocated entities.

Proposal for trading regime

Here we discuss ideas for concrete image of trading regime based on seller's liability.[23]

Preconditions

- Permits and emissions should implement annual settlement.
- The fiscal year of permits should be consistent in whole Annex I Parties.
- Banking is possible through more than one commitment periods. Borrowing (from the self) is possible during the same commitment period. It is prohibited in principle to extend to the following periods, however, special treatment mentioned in the non-compliance procedure is excluded.

SPOT

- Bonds (permits) which could be settled/valid in the concerned year and the year after should be SPOT.
- SPOT is distributed in the beginning of each fiscal year for the annual permitted amount (*e.g.*, 1/5 of the assigned amounts of the whole commitment period minus Advance distribution) by COP/MOP or Administrative Body for Emissions Trading.
- Credits created by CDM should be valued 100% as actual emission reductions certified. The permit converted from CDM credit should be regarded as SPOT in the market.
- In principle, self-borrowing which extends to the next period would not be permitted, however, it is free to borrow permits from other countries or firms including the REPO market.[24] In this case, if borrowers do not have credibility, lenders collect the mortgage with high interests.[25] The risk of the lenders would be compensated with daily calculation and payments. The

[23] The original idea is from Mr. Hamaoka (IGES 2nd Brainstorming Forum on Emissions Trading, August 1998).

[24] It has various uses such as to supply for the shortage of permits temporarily at the time of settlement of possession amount of permits and emission record at the end of fiscal year or commitment period, or to use it for short selling for profit margin.

[25] Some mortgage interests are higher than 100%.

borrowing and lending of permits of the same year would not change the total amount of the tradeable permits.

Derivatives

- The contract stating that the trade is based on OTC and SPOT shall be delivered on expiration date, would be called FORWARD. It is possible to choose the date of expiration freely.[26]
- The contract stating that the trade is conducted at Exchanges and SPOT shall be delivered on expiration day, would be called FUTURES.[27] The expiration date shall be standardized.
- The stock which is traded at Exchanges or with OTC-base and which become valid in the future as SPOT would be called ADVANCE. Vintage year which becomes valid as SPOT is set up for ADVANCE.[28]

[26] By making the settlement in kind on expiration date a simultaneous settlement of *permits-money*, it is possible to prevent buy-and-run or sell-and-run from occurring. By collecting mortgage depending on credibility, settlement default at the time of settlement in kind can be avoided.

[27] By making the settlement in kind on expiration day a simultaneous settlement of *permits-money*, it is possible to prevent buy-and-run or sell-and-run from occurring. As for default of settlement at the time of settlement in kind, it is not possible to realize differentiation depending on credibility by using mortgage interest since the interest rate is fixed. The introduction of bargain limitation depending on credibility is possible, however, it does not mean perfect prevention of settlement default. If the credibility is extremely low, some measures should be taken such as brokers do not permit trading at the stage of ordering.

[28] ADVANCE is not derivative commodity but a kind of SPOT. Therefore, COP/MOP or Administrative Body for Emissions Trading issues them. Total of ADVANCE of vintage of a certain year and SPOT issued in the same year should be identical with that year's tradable assigned amounts.

III. Issues for International Regime Design

III.1 Role of the Administrative Body

Awareness of the Issue

Central Administrative Body for Emissions Trading will have a key role for the workable emissions market. Whether the system succeeds or not depends on the designing the function of this Body.

Points and Proposals

Administrative Body, which is responsible for maintenance/operation of the regime, will be established under the COP/MOP to the Protocol. The functions of the Body are expected to be as follows:

Relation to the COP/MOP;

Whether newly established or utilizing existing facility, only the COP/MOP (supreme Body to the Protocol) is the authority to determine what kinds of functions shall be assigned to the Administrative Body. It is possible to establish Executive Board under the COP/MOP that controls the Body.

Issuing Function;

The Body issues the permits identical to tradeable assigned amounts with serial numbers to each Annex B Party based on its quantified commitment, however, the Body is not the decision-making authority related to the commitments.

Emissions Monitoring/Recording Function;

Monitoring of the GHGs emissions/removals in each Party is necessary. However, it is realistic that each Party (Government) is responsible for the monitoring and the Administrative Body is responsible only for recording.

Tradeable Permits Tracking Function;

This can be linked to the tracking system of each country electrically. Data from

seller and buyer Parties can be used for double-checking the information.

Judgement Function of Compliance;

Judgement of the compliance can be possible by matching the allocation, emissions monitoring data and permits tracking information.

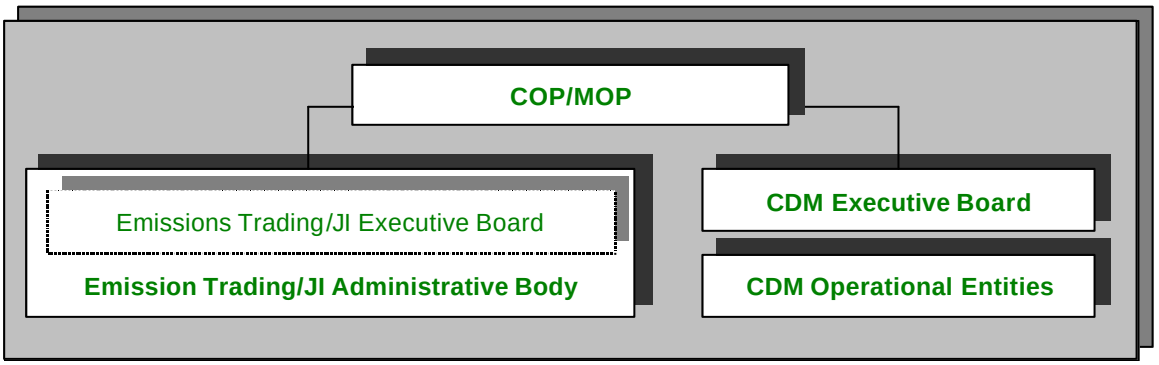
Compliance Enforcement Function;

In case that some Party does not comply with its quantified commitment, the Body takes appropriate measures based on the non-compliance procedures in the Amendments of the Protocol. This can be delegated by another organization if we judge not to assign such big competence to the Body.

Others;

The Body should not have huge administration and immoderate bureaucracy. Electrification and transferring the rights and roles to each Party and to the Exchanges are important. Cooperation with the expert in-depth review function of the Protocol is indispensable.

It should *not* intervene in the market as well; it should have respect for the autonomous nature of the market. In case of some critical phase like lack of permits in the market, the COP/MOP or Executive Board directed by the COP/MOP will decide the countermeasures instead of the Body. Linking with the CDM Executive Board, converting the CDM credits to SPOT permits and issuing serial numbers, and management of converting JI credits (a part of assigned amounts) are also conducted by them.



III.2 Non-Compliance Provisions

Awareness of the Issue

Non-compliance procedures (Article 18) for the Kyoto Protocol shall be determined at the COP/MOP 1. It should be balanced between centripetal and centrifugal forces. It means that (without the world government) the enforcement should be as much as to prevent withdrawal, though it is supported by the strictness of business deal and moral in Protocol compliance. It should be realistic and also stringent.

Points and Proposals

Measures like financial penalty (fine) are unrealistic for a non-compliance procedure for a global *environmental* treaty. The graded procedure can be set according to, *e.g.*, the economic level of the Party. Moreover, a set of procedures can be applicable according to the level and kind of non-compliance as in the case of Montreal Protocol (assuming developing country).

However, the biggest difference between Kyoto Protocol and other (regulated) protocols is the fact that ***some Party's non-compliance means such Party cannot purchase enough amount of (available) permits from the market***.[29] In other words, if market works properly and has enough permits in it, such Party can comply with its commitment by purchasing the permits equivalent to excess part of its emissions.[30] This implies that some market-based approach might be suitable for the non-compliance procedures as well.

Here a set of procedures as an example utilizing market is proposed. It should be noted that CO_2 emissions from fossil fuels are regarded as tradeable and others are supposed as tradeable as long as it is a kind of gas with high monitoring accuracy and if the emissions could be determined within one year.

1. First Step;

The Party will report the compliance possibility and outlook based on

[29] This means a situation in which market is not working properly. That is, there are not enough permits providers in spite of price rise. If the gap between supply and demand is large (more demand than supply by far), some effects such as energy saving could be expected for mid to long term, however, for short period, it can only be tackled by reducing energy consumption by curtailing production. However, since energy is indispensable for living, this measure has limitation in its nature.

[30] Here the issue of supplementarity is not especially considered. Also, a case in which the Party *intentionally* do not purchase permits (for instance because it is expensive) is not supposed.

self-judgement to COP/MOP *annually*. At the same time, estimation committee of the Administrative Body for Emissions Trading verifies/examines this based on a certain method.[31] However, the compliance of the Party will be decided after the commitment period of five years is over (it is free to conduct the borrowing during this period).

2. Second Step;

The Party must report within six months after the end of each commitment period the total emissions and the serial numbers of the permits which is offset regarding CO_2 emissions of fossil fuels. As for other gases, JI and CDM credits, the same kind of report is obliged within one year after the end of commitment period. There is no grace period to compensate for the unfulfilled part (purchase the permits for shortage). This is because it is possible to estimate the emissions of other gas than CO_2 from fossil fuel, the major emissions, when they are settled and supply the shortage of the permits. As for CO_2 of fossil fuels, the Party is recommended to adopt the way to grasp the emissions without time-lag by corresponding each fossil fuel sales to the permits.

3. Third Step;

As for the given permits and emissions which could not be offset, the Party is permitted to borrow from its following commitment period with certain limit like ceiling of 10% of assigned amounts as an exemption and special treatment. Some interest is set and the added amount will be subtracted from the assigned amounts in the following commitment period.

4. Fourth Step;

The amount which cannot be borrowed because of the limitation mentioned above must be compensated by purchasing (not by paying penalty of) high fixed rate (*e.g.*, $500/t-C(eq)) non-tradeable permits from the Administrative Body. This procedure enables the Party to comply with the Protocol.[32]

It is possible to supply for this payment by using CDM credits, *etc*., with the same tonnage after the certification.

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[31] This committee will conduct the same kind of estimation as private *ranking institution* in case of buyer' liability.

[32] There are several ideas for setting the price of this special permits. Here the image of the standard is a double of the highest marginal cost in emission reductions in Annex I.

It is also possible to use the revenue for CDM funds as in the CDF (Clean Development Fund) discussed through the negotiation process of the Kyoto Protocol.

This procedure has a merit *not* to "punish" a sovereign nation, although equivalent to the penalty procedure. The country concerned can comply with the Protocol by purchasing the permits with high interest.[33] Moreover, we do not have to waste time owing to its automatic nature avoiding the room for troublesome negotiations.

It can be said that the whole emissions in Annex B will be a little bit larger than its original cap. This can be compensated by the procedure like pooling some amount separately by the Administrative Body as a buffer and/or the Body covers the shortage by purchasing the permits in the following period from the market using such revenue.

5. Fifth Step;

In case that a Party neglects to purchase such high fixed rate permits, some other procedures are needed. At this stage, the author has no idea to meet both conditions: the Party wishes to stay in the framework of Kyoto Protocol (no withdrawal) and also stringent enough but acceptable.

III.3 Participation of Developing Country Parties

Awareness of the Issue

It is clear that the future participation of the non-Annex I developing countries is necessary for the entry into force of the Protocol, global GHGs emissions abatement, development of future supplier of the permits, *etc*. The problem is how to design a scheme that has *incentives* for the developing countries to participate in the regime.

Points and Proposals

There are two forms for the developing countries' participation:

[33] Here the seller's liability is supposed, however, if this system is adopted in the buyer's liability, it differs completely from "penalty" in the meaning of compliance.

Evolution or Graduation;

This is based on the idea that high income developing countries should be categorized in the Annex I and be responsible for the GHGs abatement as it can. The condition can be set by a certain per capita economic level and/or by the OECD participation. This matter should be discussed naïvely in the FCCC framework of reconsideration of Annex I category and/or (second) review of the adequacy of commitments of all Parties. It is scheduled to be negotiated at the COP 4, however, it seems difficult to get some resolution because no concrete proposals are not on the table.

In the near future, we expect some *automatic* graduation scheme, which does not need negotiations, to be introduced.[34]

Opt-In (Voluntary Participation);

A non-Annex B Party can join the regime of quantified commitments (and emissions trading) voluntarily as an Annex B (or Annex C) Party. The former Article 10 of the Chairman's text deleted in the negotiation process at the COP 3 had this opt-in clause. Some non-Annex B Parties expressed themselves in favor of this participation recognizing the merits of emissions trading; this opt-in might be promising scheme incorporating the incentives. However, amendment of the Protocol is needed.

Formula for the initial allocation—assigned amount or quantified commitment—might be key for this opt-in participation. For example, absolute level like emissions per capita or some *growth target*, which is based on the *difference* between some baseline, can be possible. Other options like *partial* participation of limited regions, sectors or companies in a developing country can also be possible.

Here we propose a *selection* formula which enables a non-Annex B Party to choose voluntarily one from plural commitments like

- per capita emissions *level* (*e.g.*, 0.7 t-C(eq) per capita per annum),
- decreasing *rate* of GHGs emissions intensity against GDP (*e.g.*, 0.5% per annum).

It is better to set different types of commitments of the *absolute level* and

[34] Some ideas are envisaged like exceeding some level of per capita GDP or three years after being the member of OECD.

decreasing *rate of change* in order to reflect each country's characteristics.

The design, which enables the developing countries to opt-in as early as possible and as many as possible, is needed. We expect that looser targets might be better for longer-term environmental benefits.[35]

III.4 Timing Issue

Awareness of the Issue

The entry into force of the Protocol was very much dependent on the ratification issue of the US, which calls for some new commitments of key developing countries. As it may take time for key developing countries' participation, it is unclear whether the Protocol will be able to entry into force by the 1st commitment period at this stage.

Although the situation seems pessimistic, here we envisage an optimistic scenario: the US will ratify the Protocol with the approval by the Senate through a lot of developing countries' opt-in to the regime. In this case, what kinds of metamorphosis are desirable?

Hopeful Scenario

Here we discuss the period divided into two: before 2008 and after 2008.

Before 1st Commitment Period;

We need to have concrete rules related to the details of the emissions trading regime prior to the 2008 (*e.g.*, in 2006) for the smooth take-off of the market. In fact, we can settle the modalities and so on at the COP (not COP/MOP) before entry into force of the Protocol. So, we can expect it possible if the negotiations at COPs and SBIs will be successful. We should keep in mind that the room for *try-and-error* is essential. It is no use (almost impossible) to settle the perfect rules from the beginning. We should select the realistic learning-by-doing method.

[35] Examples of longer term merits are follows: opt-in might be linked to the timing of entry into force of the Protocol, early establishment of monitoring system in the developing countries, setting a *cap* including the developing countries, incorporating early reduction incentives for developing countries, reducing the risk of market manipulation by some big EIT countries and realizing the fluid emissions market by inviting much more suppliers. We can also expect the effect of correction of South-North gap through the income transfer.

It is useful for any Annex B Party to consider some kind of domestic early reduction crediting system discussed in the US, *etc*. In this case, the idea with amending the Protocol is problematic; we can design the scheme without amending the Protocol. International trading is also possible between the entities in these countries by OTC-basis. We must recognize the risk of future uncertainty, on the other hand, we can get the merits of accumulation of experiences and know-how.

At least, we can expect that the market will run autonomously (before 2008) by the stakeholders once the details of the system (after 2008) is settled.[36] This means that it is desirable for all Parties to decide the details of the international trading rules in the early days, around 2002, and better that the Protocol take into force thereafter. It is therefore anticipated that the arrangement of domestic system will be spurred by the establishment of international rules. If the domestic system (after 2008) is decided relatively early, it is expected that the market will grow actively and autonomously without the need for introduction of an early reduction credit system.

In the 1st Commitment Period and Beyond;

Prior to 2008, the market gets activated through the development of derivatives and so on. The key points in the 1st commitment period are the setting the level of the quantified commitments in the 2nd period and the movement (timing and amount) of the new developing countries' participation. These can influence the market price very much.

The next big issue is how to deal with the non-compliant Parties (in the 1st period) after 2012. It is OK to deal with this sensitive issue using the non-compliance procedures determined at the COP/MOP 1. On the other hand, failure to manage this issue can make some impact not only on the credibility of the market but also on that of the framework of Kyoto Protocol itself.

[36] Before the details are fixed, pioneers are expected to run the gray market with OTC basis. Once the details are determined, the market is expected to grow up through the establishment of the secondary market.

III.5 View Points from the Market

Awareness of the Issue

It is indispensable to have the workable and functioning GHGs emissions market not only for utilizing low cost options internationally but also for keeping international framework of the UNFCCC/Kyoto Protocol.[37] The emissions market must be transparent, autonomous, liquid, and stable (with some appropriate fluctuations) in order to keep the conditions. Here we consider the related points to this matter.

Points and Proposals

Following points should be recognized for the effective market design:

International Exchange;

At this stage, Chicago Board of Trade (CBOT), International Petroleum Exchange (IPE) and Sydney Futures Exchange (SFE) expressed their intentions to be the commodity exchanges of the GHGs permits. The secondary market utilizing these exchanges offers more transparent and anonymous market and enables the exchange for efficient tracking of the permits.[38] Development of standardized derivatives can offer the much more liquidity to the market. World-wide 24 hours market with plural Exchanges is preferable.

Sales by speculation may be questionable in ethical sense, however speculators are necessary because they function as risk-takers and enable the energy consuming companies to hedge their risks.

Dealing with Defaults;

Defaults should be dealt as in the case of ordinary business contracts. Special treatments are not necessary.

Information Supply and Its Method;

Information like market price of the permits, GHGs emissions/energy consumption trends, *etc*. may be supplied by the Exchange and/or brokers as in

[37] Without workable market, the permits will not be supplied sufficiently in spite of the high price. This may cause non-compliance of many Parties; the credibility of the Protocol itself will be reduced and developing countries may distrust industrialized countries.

[38] Large scale dealings by private sectors will be mainly by OTC-basis referencing the price information of the Exchanges.

the case of other commodities mainly through the Internet. The Administrative Body will play the role of authority.

If buyer's liability is installed, (private) ranking companies may play an very important role for information supply.

Trade between Governments and Bubble/Umbrella Formation;

It is envisaged that the trades between Governments will be based on negotiations including factors other than pure market mechanism. This may cause some distortions to the market except for small deal. Consignment deal by some enterprises might resolve this problem.

Formation of "bubble" as the case of EU has no problem once agreed in it. However, trade barrier between inside and outside the bubble or umbrella impedes sound market formation and might conflict with the WTO rules. These should be recognized as a reorganization of the initial allocations (assigned amounts).

Integration with CDM/JI markets;

The credits which got through the CDM or JI projects should be equally valued with the permits in principle (a ton is a ton).[39] In general, transaction costs of the project-based CDM and JI are much higher than those of emissions trading. In other words, only the projects whose marginal implementation costs are lower than permit price will be realized. The assigned amounts traded as the permits are expected to be much larger than the amount of credits transferred as a total by the CDM/JI projects.

On the other hand, project-based CDM/JI regimes may send price signals as the *real* marginal abatement costs to reduce GHGs emissions to the tradeable permits market. Especially, the CDM can start prior to the 1st commitment period (from 2000 as in the clause of the Protocol[40]), the results of CDM projects provides useful information to roughly estimate the permit price before the market starts.

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[39] We must recognize that the emission reduction units (ERUs; JI credits) have the attribute of some buyer's liability. This may cause some operational difference between certified emission reductions (CERs; CDM credits) and/or tradable permits of emissions trading (discussed later). Even if the buyer's liability is instaklled, certified CDM credits are rational to be converted to the permit with 100% validity.

[40] It is unclear that the credits generated before the entry into force of the Protocol and/or before the details of the scheme settled can be effective. Although, some retroactive treatment may be possible based on Article 12. If it is difficult to arrive at such consensus internationally, each Government can have the related resolutions *domestically* (without changing its quantified commitment).

Measures by the Private Sectors;

In the case of domestic allocation, each enterprise is expected to situate the trade of permits as one of the options of the strategic management policy, not only minimizing costs but also maximizing benefits including other factors than climate change mitigation through the experience accumulations.[41]

III.6 Issue of Supplementarity

Awareness of the Issue

In the Protocol, emissions trading shall be supplemental to domestic actions without describing its quantitative definition. The application of this clause may cause some distortions to the market; however, we must care for the ethical aspects especially reliable relation between South and North.

Points and Proposals

Here we propose to consider what kind of guidelines is sufficient to meet this supplemental clause focusing on "domestic policies and measures" instead to set some ceiling for tradeable amounts.[42]

Here we propose as a concrete idea to develop some standards and announcement of many *physical performance indicators* (intensities like electricity generating efficiency, fuel economy, *etc*.) in each Party. The COP/MOP will have some recommendations to the Party according to the achievement of such standards (but *not* mandatory). The Administrative Body shall make the matrix table of such indicators, evaluate them country by country and make them open to the public. Each Party can recognize concretely its weak region/sector of energy-saving performances through this process; some Yard-stick type competition across the country can be expected. The idea of common indicators was mentioned in the original proposal of the Protocol.

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[41] Permits trade can be used as an option of risk management. Brokers and/or consultants can offer useful information as experts in this field.

[42] Some idea to set ceiling to the (net) GHGs emissions trading by the EU and others, no concrete and in-depth analyses are provided with its level, method, *etc*. For example, we can envisage the situation that the early (private) deals was valid, while later are invalid when the permits are truly needed. We can consider some concrete ideas to correct these issues, however, they are rather arbitrary.

III.7 **Russia and Ukraine**

Awareness of the Issue

Parties in economic transition have some problems related to domestic trading system like emissions monitoring and tracking of permit transfer.[43] One may be afraid of the market manipulation because the trades will be through the Government initially, at least. These problems are essential for the emissions market to work well with sufficient suppliers if these countries cannot establish the basis for trading.

We must care for ethical issue of *hot-air* trading as well.

Points and Proposals

Transitional countries to the market economy can join the trading regime smoothly by establishing/preparation of domestic systems through the support from OECD countries:

Development of Monitoring and Tracking System;

Targeting 2008 or some year before, supporting programs should be organized to develop/establish systematic monitoring system in EIT Annex B countries. This program might be essential and should be in parallel to the supporting programs of menu development of emissions mitigation.[44]

Fear for Market Manipulation;

As far as the market functions properly, it may difficult to manipulate the market. However, it is envisaged that the market has some frictions in the early stage. There may be some room for big suppliers to manipulate the market. Increasing the market participants through the domestic market development with the supporting programs mentioned above, clear market signal of the abatement costs through the active CDM/JI projects[45] and developing countries' opt-in may soften

[43] These countries can influence the whole system much as a big supplier of permits and also low quality data for emissions inventory.

[44] OECD countries should organize the same kinds of programs for Opt-In developing countries as well.

[45] We can read the text of the Protocol that the projects between Annex I can be approved under CDM if the non-Annex I Parties will benefit from project activities, although hardly to accept this interpretation. If possible, we expect that it is difficult for these big suppliers in Annex I to manipulate market owing to promotion of early reductions in Annex I and exposure of explicit abatement cost in these countries.

this issue.[46]

Issue of Hot Air Trading;

In the Protocol, assigned amounts are defined clearly; no concept of *hot-air* are introduced. Indeed, it is difficult to define hot-air politically and technically.[47] This means that it is *dangerous* to get too deeply involved in this matter *spending limited time and resources for negotiations*. We should estimate the demerits of delay in introducing the trading regime.

On the contrary, it is probable that without hot-air, the market will not work properly owing to lack of supplied amounts. So I regret to say that we should regard the hot-air as a stimulating measure to start the emissions trading regime smoothly and as a tool to support eastern bloc.

Moreover, promoting JI projects which explicitly reduce the GHGs emissions (although problematic for baseline setting) can reduce the share of hot-air trading as the JI credits are a portion of the assigned amounts to be traded. So, we should come up with various ideas to expand the JI projects like weakening the buyer's liability (discussed below).

III.8 Conditionality Issue of Host Country's Compliance for JI

Awareness of the Issue

In the case of JI in Article 6, the Protocol mentions as follows:

> *"It does not acquire any emission reduction units if it is not in compliance with its obligations under Article 5* (monitoring article) *and 7* (inventory/national communication article)*"* (Article 6 para.1 (c));

and

[46] As in the case of OPEC, it might be unnecessary to be afraid of this situation. It might be possible to cope with this situation after it occurs (try-and-error). However, the points mentioned in this section are not only for risk management but also necessary for the sound development of the market.

[47] For Example, CO_2 emissions reduction in Germany has been mainly due to the reunification of its eastern bloc. UK has decreased its emissions as a side effect of the electricity sector deregulation through switching from coal to gas. These might be difficult to be regarded as the hot-air. It may be time-consuming and troublesome to settle the definition of the hot air politically and technically.

"If a question of implementation by a Party included in Annex I of the requirements referred to in this paragraph is identified in accordance with the relevant provisions of Article 8 (expert review article)*, transfers and acquisitions of emission reduction units may continue to be made after the question has been identified, provided that any such units may not be used by a Party to meet its commitments under Article 3 until any issue of compliance is resolved".* (Article 6 para.4).

In these paragraphs, first of all, suggestions are given that there are *several kinds of compliance* with the Protocol and, for example, there is the possibility that the obligation to report is complied with but not the obligation to meet quantified commitment. However, it is not clarified whether the credit disappears if the obligation to report is late or if it is acceptable as long as it is offered within a delayed time limit.

It is also doubtful whether this clause works. If we apply this improperly, only a few projects by private sector are implemented because of their high risk.

Points and Proposals

Here we examine the interpretation of this clause and consider its proper applicability:

Handling of the Clause;

First of all, proper (logical) interpretation of the issue of compliance is that of host country and not that of investor country.[48]

The monitoring system and reporting obligation (records of emission amounts and tracking of permit transfer) would be provided as a necessary condition which guarantees the emission unit dealings, although some discrimination by accuracy might be set. In this case, the problem after the fact is only the existence of appropriate reporting. Regarding this matter, annual reporting could become the guarantee instead of after the commitment term ends. It is desirable to apply that only the reported emissions with some accuracy over the commitment period is valid for trade, at least.

If there is some time lag between reporting-related compliance and national level final settlement of accounts of emissions trading, and the result of this matter

[48] Investor country is going to comply with its quantified commitment by using JI credits.

influences the judgement of quantified target-related compliance of investor Party, it might also influences other Party's quantified target-related compliance afterwards. This time lag needs some kind of limitation because, for example, it is impossible to determine the details retroactively if a summary report is offered ten years later.

Here we focus on the issue how much of the ERUs will be invalid. If all of them will be invalid, it is probable to encounter the situation mentioned above. This risk will reduce the incentives for investors very much.

ERU itself have the same origin of tradeable emissions permit as a portion of assigned amounts. Therefore, it might be better to set the same attributes to both of them to keep the system simple. In this paper, seller's liability nature is proposed in the 1st commitment period, at least. If it is deemed that the condition of compliance in Article 6 is a possible dealing condition, that is to say, it is the initial *sieve*, this does not particularly conflict with the seller's liability system. Regarding the reporting obligation, it is possible to respond by putting the institution by which necessary items are automatically reported into the mechanism of the *sieve*.

IV. Issues for Domestic Regime Design

IV.1 Introduction of Early Reduction Credit System

Awareness of the Issue

As mentioned in the "timing issue" section, some countries, such as the US, are considering the introduction pilot domestic emissions trading before the 1st commitment period. This is a promising trial both in promoting early action and in gaining experiences in the introduction of GHGs emission trading regime. International trading can be done among the enterprises of the countries that have introduced the system.

Points and Proposals

The point is what kind of system is useful in promoting early action and in gaining experiences. Here we consider some elements related to this issue. It is noted that the role of government as *buffer* is important.[49]

Open Market System;

A full-scale cap-and-trade system is desirable after 2008 for activating the market, however, at the pilot phase, it is easier to introduce the baseline-and-credit system in which *reductions* from baseline are traded, rather than introducing the cap-and-trade system based on the emission allocations. This system works well as the *open market* system (open for participants) like the JI case.[50]

Voluntary Nature;

Enterprises can voluntarily participate in this system.

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[49] For example, smooth continuation of the permit price before and after the first commitment period needs some loose domestic baseline setting, therefore needs some governmental fund to purchase lack of permits after 2000 if baseline (quantified limits) setting rule is the same.

[50] The US is well experienced in the *open market* trading system to tackle the regional air pollution problems.

Non-Compliance/Enforcement Procedures;

In connection with the voluntariness, it is not desirable to set a penalty or some enforcement regulations. In case of non-compliance, it is better to use softer procedures like releasing the names of the enterprises in this pilot phase.

Baseline Setting;

It is difficult how to set baselines for voluntary-participating enterprises. It would either by setting the same formula for all the enterprises, or by admitting each enterprise to set independent baselines to some extent. It is up to each Party. It does not have to be linked to the cap-and-trade domestic allocation system after 2008. It should be recognized that the role of this voluntary-based pilot system introduction as the transitional measure is because of the difficulty of allocation in early stage.

Incentive Setting and Consistency with Kyoto Protocol;

Incentive for the enterprises is that they can use the acquired credits in the 1st commitment period when the full-scaled domestic cap-and-trade system is implemented. However, it is not desirable if it changes the assigned amounts of the Party based on the Kyoto Protocol in the 1st commitment period, because it requires amendment to the Protocol. Therefore, the early credits will be borne by the nation as a whole including the sectors not participating in the early credit system.[51]

Relation to On-Going Voluntary Actions;

Enterprises with emission target based on voluntary agreement or voluntary action plan can choose (or relate) it to the baseline with qualification of the government. This system offers another additional and strong options of emission reductions for the enterprises. The increase in the number of participating firms is expected since there are almost no negative impact through the participation in the system.

International Action;

There is no problem in utilizing the CDM credits, which is supposed to become effective in 2000.

[51] Compared with the national emissions amount, the total amount of the early reduction credits will not be so big, therefore its impact to increase the burden of the non-participating enterprises can be disregarded.

Regarding the international trading with the foreign enterprises with a similar system or JI projects, the consistency of the Protocol can be maintained by linking it in the articles of the sales contract with the shift of the *proper* Spot emission permits *after* 2008. Experiences in international trading can also be gained. Enterprises not under this early credit system can also trade with the firms under this system by coming up with the contents of the contract.

Expansion to the Domestic Trading System in the 1st Commitment Period;

As mentioned above, it is neither necessary nor realistic to link the early reduction system to the system in the 1st commitment period. The modalities of domestic trading system after 2008 needs to be discussed by policy-makers and stakeholders based on the experiences in the early credit system.

Continuity of the Market to 2008 and Beyond;

Suppose that the market for all of Annex I becomes a reality after 2008. If participating countries are only those with high marginal costs (*e.g.*, a few JUUSCANNZ countries), it is anticipated that the price of permit will be dicrete before and after 2008, *i.e.*, become low after 2008. In this case, the incentive for participation will be reduced. If the baseline is set relatively loose for early pilot system, the market will not lose continuity and incentive for early participation will be created.

Necessity of the Pilot Trading System;

As mentioned above, establishment of the early credit system is quite desirable. However, it is hard to deny the difficulty of introducing this system in many ways. The essence of introduction of this system is as a transit measure, when the rules for full-scale cap-and-trade system after 2008 becomes difficult to establish in early stage, because of the difficulty of domestic allocation and uncertain elements of the international system. In other words, if these barriers are overcome and the (rules for) domestic cap-and-trade system after 2008 is established in the early period, it is anticipated that the market will proceed autonomously as did the SO_2 allowance trading system in the US.[52]

[52] In this case, it does not matter whether the implementation of the trading system has to be after 2008 or before. If Spot permit which will be effective for a certain period after 2008, are applied, like Advance, marketing of the official permits (Spot and Advance) will start. Even if the Advance is not established, the market will hopefully start in the form of Forward and Futures as long as the rules and system are established.

IV.2 Trades by the Government

Awareness of the Issue

It is desirable from the aspect of market activation and efficiency that the private sector will be the core of the trading since a government is not an entity to conduct a business-based trading. However, in case that not all the emission sources are covered in trading, it is possible that the government will conduct the trading instead of these sources. It is assumed in certain country that the government will be the only trader.

Points and Proposals

Here we consider the points where the government or the central bank trades:

Government as a Sole Trader Case;

It is possible in a certain Party that the government will be the sole trader due to the size of the country and to the lack in the will of the private sectors for trading, and to the difficulty of the initial allocation. However, it is still desirable to have the participation of the private sectors by devising the methodology.[53]

Coverage of Non-Allocated Sectors/Sources;

In general, the domestic emissions trading system can ensure the national compliance with the Protocol by covering all of domestic emission sources. This can be compensated in the case that only the government purchases the increased emission amount (shortfall) or in the case that the permits are allocated to the up-stream companies of the energy supply. However, when it is allocated to the down-stream level, the compliance cannot be ensured unless some measures are taken for the sectors/sources without allocations. For such sectors, governments may conduct the trading instead and collect the revenue from the sectors as tax, *etc*.[54]

Revenue;

In the case when governments conduct the trading instead, the question is how to

[53] Firms can participate in the trading without being allocated.

[54] Such sectors are assumed as household/business, transport, and industrial sectors with small energy consumption. The up-stream of energy supply can also conduct the trading instead of the government through price shift.

seek a new source of revenue. Establishment of a new tax such as carbon tax, diversion of existing (specified) revenue, or utilizing the general revenue is possible. In any case, there are many barriers to be overcome such as the consistency with the tax range and the fact that it is quite unusual for taxation to purchase emission permits from abroad.

Trading Forms;

When a government trades with another government on negotiation basis, it is envisaged that factors other than market might come in. When they participate in the private market through Exchanges, *etc*, they might distort the market mechanism through its inflexibility like deadline setting, *etc*.[55]

Entrusting several third institutions instead of government or central bank can decrease the impact on efficiency or interference by the aspect other than the market mechanism.

IV.3 Domestic Allocations and Auctions

Awareness of the Issue

The domestic allocation method is the crucial and sensitive issue in designing the domestic emission trading system. It is also what the private firms are worried about most. However, nowadays it tends to be discussed whether the system is proper or not, without having a clear and common image. Actually there are various possible ways and each country can adopt their own system. Therefore, it is worth talking over one system but it is dangerous to talk about the properness of the domestic emission trading system as a whole.

[Note] A domestic system is discussed here but the trading is supposed to be international.

Points and Proposals

Here we summarize the points related to this issue and have some more concrete images for domestic allocations:

[55] For instance, if the governments' dealing date is fixed (*e.g.*, the next day of the GHGs emission statistics release), the price of emission permits might soar at the time.

Auctions;

All or a portion of the domestic allocations to private firms could be in the form of auction. Currently it is unrealistic to put all amounts to auction, however it is said that it avoids the unfairness of the simple allocation and it is more efficient. It is more likely to save a small amount for the auction and ensure the market price signal and the route for the non-allocated sectors such as new participants to access the market.

It is also important to think how to use the income of the auction.[56]

The auction can be done not only by government but also by economic organizations or Exchanges.

It is also important to decide who can participate in the auction. It could be limited to the energy supplier (up-stream) or it could be opened for all the private sectors including individuals. In the case of whole amount auction, it might be limited to the domestic firms that are obliged to submit emission trading records to the government (regulated entities) although inefficient, since there is a danger of buying up by foreign enterprises.[57] If a small amount were to be auctioned, it would not have to have any limits.

The point to be recognized in this chapter is distribution of auction income. In ordinary allocation rules, allocation is directly linked with problems of income distribution. There are also the problems of this kind of distribution for auction as well to decide the expenditure.[58] The selection of the method of utilizing the expenditure is the key point for auction design and a design with various incentives could be selected.

Allocator;

Allocation could be done directly by the governments to private firms, on the other hands, it is also possible that government allocates to the industrial organizations and they will allocate again to each firm. This layered allocation

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[56] In case of the auction for all amounts, the system is similar to the carbon taxation. The same kind of a task as the recycling of carbon tax revenue will arise to the auction income circulation system and unfairness in allocation will be pointed out. Or it could be positively utilized in green tax reform. If the whole income is to be paid back to everyone who bids, there is a danger of buying all the permits up by millionaires.

[57] On the other hand, this might be important to supply a lot of permits into the market, especially for the initial stage of trading when the market does not function well for permit supply. However, some international coordination might be necessary.

[58] This distribution issue occurs in any of the policies and measures. Different from other policy institutions, emission trading is able to correct this problem through dealing.

system enables each industry sector to adopt independent allocation system. Monitoring and tracking could also be reported from the lower to the upper layer or directly to the government under the responsibility of each layer.[59]

Criteria for Allocated Amounts;

The criteria of allocated amount are the important issue for enterprises. As long as referring to the existing emission trading systems, they are mainly based on past record (grandfathering rule).[60]

This grandfathering does not have to stand on the past record of *emissions amount* but on some related indices. For example, "common intensity standard (emissions per fuel consumption) *times* fuel consumption record" method can make more incentives for energy conservation and fuel switching and soften the tendency of protecting vested rights.[61]

We can apply different criteria sector by sector. For example, we can set some tougher target for residential/commercial/transportation sectors which have large room for energy-saving potential,[62] instead, looser target for industry sector with good performance for the down-stream allocation case.

Moreover, it is important to reserve additional allocations for *e.g.*, early action, and/or renewable energy use. There is much to be devised in this issue.

It is not necessary that the reference year as 1990 as mentioned in the Protocol. The following standards are also possible: average or maximum value of multiple years, nearest year of effectuation, or 1973 which was the first oil crisis.

There are many countries in which industries have voluntary action plans and/or goals. It is possible to classify this actions by the existence of agreements between government and each enterprise or organization. It is possible to make this voluntary plan/targets with proper correction related to initial allocation.[63]

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[59] This layered system is more realistic in a country with strong independent industrial structure. For the case of no domestic trading system established by the government, even if industries conduct independent allocation (based on their voluntary targets) without consultation by the government, if its centripetal power is strong, it could be an incentive for each enterprise to participate in emissions trading.

[60] It is important for any kind of policies and measures to respect some past record (*i.e.*, present condition), not only in the issue of emissions trading allocations.

[61] It is almost impossible to establish performance indicators while ignoring category of business. However, in the case of common sector, it will be more practical.

[62] For these sectors, up-stream sector (or the government) trades instead through price (or tax) shift.

[63] Existing voluntary plans and the emissions trading system need to clarify the relationship no matter how the classification is done.

Meanwhile, there is also the problem of how to manage companies and organizations with no such plans.

It is necessary to give consideration to availability of data of past records for examination of these criteria.

Total Domestic Allocation Amount;

Basically, the assigned amounts of the Kyoto Protocol or less should be allocated to the domestic entities. On the other hand, it is possible to allocate more (*e.g.*, based on 1998 level), in general. In this case, it is conditionally that the Government purchases the shortfall from abroad, but it is fairly realistic and acceptable domestic allocation amount as a whole. On the other hand, the efforts for reduction (including emissions trading) by private sectors might be weaker.

Up-Stream or Down-Stream;

It is more feasible that allocation unit is by enterprises and not by details such as emission points or factories.[64]

Allocation level is often discussed with regards to the allocation to up-stream energy provider (import and production industries level) or to the down-stream (energy consumption level).[65]

When allocating to the up-stream level, the compliance of the country will be automatically ensured, however, when allocated to the down-stream level, it is difficult unless some related (compensation) measures are taken. The other merit of the regulation at the up-stream level is that there are fewer firms involved and it is easy to manage. On the other hand, the down-stream has the information of the (abatement marginal) cost to reduce its emissions, so allocation to the down-stream characterizes the original concept of the emissions trading.

If emission certificate or coupon system is to be introduced, it is possible that the regulated level, where Government checks the consistency of permits consumed and emission monitored, and the allocated level are separated; the certificate will work as a mediation for these two levels.

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[64] Transboundary allocation will not be done among multilateral enterprises. However, it is up to the enterprises to do inside (international) trading (it should be reported).

[65] There are various ways to define the up-stream and the down-stream. For instance, both electricity end-users and fossil fuel burners (power plants) could be defined as down-stream. Each government can choose its own system.

For instance, it is possible to allocate to the down-stream and establish a regulation to the up-stream in parallel. In this case, energy consumers (*i.e.* down-stream level) need to pay for the energy with certificates when purchasing fossil fuels. Industries of up-stream must report the consistency (of offset) of the fossil fuel sales record and the emission certificate collected go against the sales stream to the government every year.

The characteristic of this system is that it is beneficial for both allocating for down-stream, which knows its marginal cost, ranging from individuals to high energy consuming firms and managing by the small number of up-stream, though the method should be discussed a lot.[66]

The certificate/coupon could have smaller units than international emission permits (*e.g.*, 100 g-C(eq)). A form like electronic money or pre-paid card would be more appropriate than bill. Of course, it needs to have the same value and character as the international emission permits (*e.g.*, seller's liability).

In case of up-stream allocation, the problems of rent, which follow the assignment of valuables with no charge, could become obvious. When an upper stream enterprise sells a little more energy than the assigned amount, quite a lot of rent comes to the upper enterprise because in naïve, absolutely competitive markets, price increase for products is regulated by limitation expenses rather than average ones.

Allocation Frequency and System Modification;

In the Protocol text, amount of 5 years is assigned to each Party at once. On the other hand, in the case of domestic system, it is desirable to have allocation every year or more frequently, taking the issue of consistency with domestic tax system into account. Flexibility of time can be maintained through the mechanism like borrowing from the government for 5 years (without interest?) and/or by using various tools in the market. Domestic systems such as allocation scheme should not be changed for the 5 years of a commitment period. The information of the next period should also become open as early as possible to let the enterprises choose the optimal option.

[66] In case of allocating energy consumption of household and/or transport sectors at individual level, "energy-saving mind" might arouse in those sectors that are weak in the consumption saving effect just by pricing. If CO_2 emission of all energy consumption is allocated at individual level, LCA (Life Cycle Assessment) information on CO_2 emission will be released.

Decision Making Process for the Allocation Formula;

It is desirable that the above mentioned system will be discussed with a transparent decision making process as much as possible. For example, the successful RECLAIM emissions trading system in the US (targeting SO_X and NO_X around Los Angels regions) listened to broad opinions from the stakeholders and adopted the one which obtained the largest consensus from more than 20 allocation proposals.

How to Deal with Uncertain Gases by Source/Sink;

It is possible that each country makes own decision not to admit the GHGs trading from emission/absorption sources with high uncertainty. As mentioned in the first sections of this report, it is more favorable in the view of market liability. It is better to have international cooperation in this issue, however, not inevitable. It is also possible to adopt the reduction (credit)-type trading system (after the reduction amount is certified, it can be saved as credits) instead of emission allocation for these uncertain sources/sinks.

IV.4 Monitoring and Tracking Method

Awareness of the Issue

Governments should be responsible for monitoring and tracking of domestic emissions and reductions. This system requires establishment of some international standards, however, each Party would be able to have original system and methods in the detail beyond the standards.

For the time being, it is better to restrict the targeted GHGs with the cap-and-trade system to industrial gases (emissions from fossil fuel and N_2O, PFCs, HFCs and SF_6 from industrial processes). Others could be included afterwards if the system begins to function properly and monitoring system has more preciseness. Baseline-and-credit system (reduction type) can be applied to CH_4 concerning forestry and fossil fuel production/transportation).

Points and Proposals

Monitoring and tracking systems depend highly on where to set the above allocation

and tracking level.

Generally, linking it to the fossil fuel production/sales/purchasing records can treat monitoring of the CO_2 emitted by fossil fuel combustion.

Electronized tracking of emissions permits could be more precise and real-time in the certificate/coupon system. It is possible to do unified transaction by elictoronizing.

IV.5 Non-Compliance and Enforcement

Awareness of the Issue

Different from the international case, domestic non-compliance regulation could be severe under jurisdictions of each sovereign country law.

Points and Proposals

There are two kinds of compliance. One is on that of commercial deal and it is regulated by existing commercial mercantile law/regulations.

Another is on the consistency of emissions monitoring and tracking. Strong legal measures for enforcement including penalty can be applied in case of non-compliance. Governments should take some measures to avoid non-compliance of one enterprise to become international non-compliance of the country with the Protocol by purchasing the amount from foreign firms/countries by the Government, for example.

IV.6 Relation to Other Policy/Measures

Awareness of the Issue

Governments should clarify the relation to other domestic policies and measures not only on global warming but also on other political targets like deregulation when introducing domestic emission trading system.

Points and Proposals

The domestic emissions trading system is thought as a framework to ensure each country's compliance with the Protocol. On the other hand, each country is free to introduce other policies and measures in order to realize other political goals. For example, even if the residential/commercial and transport sectors are covered by emissions trading system, it is not likely to reduce their emissions through the rising price. It could also be justified to introduce additional policies and measures to these sectors since the emissions trading should be supplemental to the domestic action.

This can be interpreted that the political priority is recognizing the importance of the aspects other than cost effectiveness. The emissions trading cannot be the solution to everything.

Governments should respect the independence of the market and refrain from participating in or interfering with the market as much as possible. We need to provide with ideas for the system designing to cover up.

IV.7 Relation to Technology Development

Awareness of the Issue

Emissions trading, as the framework to adopt least cost options, is an extremely attractive option. On the other hand, there is the possibility that incentives for technological innovation will become lower than when under direct regulation. This may not give positive influences on the development of innovative technologies which should become a pillar of long-term countermeasures against global warming.

Points and Proposals

Followings are points related to technology and emissions trading:

(1) possibility of future *low cost* of countermeasure options;

(2) possibility of development of *innovative* technology;

(3) influence on *diffusion*/*penetration* of technology;

(4) anxiety about economic measures.

Regarding SO_2 allowance trading in the US as an example, it is generally known that the cost using scrubber became lower than previously due to the price signal of the allowance, however, SO_2 and the GHGs related issue are different. Regarding the options for GHGs countermeasures, it is doubtful whether the cost will go down smoothly and there may be some potential barrier related to technological problems.

Considering influences against technological innovation, anxiety remains, as previously mentioned, that emissions trading without limitation might interfere with technological innovation.

On the other hand, emissions trading does not have much positive effect on technological innovation. It could be effective largely due to the spread of efficient technology at low cost. Regarding this point, at least in the short/middle term and probably in the long term, the spread of low cost efficient technology should work more effectively for GHGs emission control.

In the meantime, it is anticipated that measures other than trade, such as subsidies, can complement technological innovation which draws the most attention in the long term. If the system, as a part of the expense burden, is reduced by the introduction of emissions trading as a criteria, more power for technological innovation development could be procured than regulation.

The extent of trust of economic instruments regarding how well they can handle these matters depends on people. Their individual differences of opinion regarding issues such as the importance of structuring the economic instruments and concrete methods such as development of technological policies, is more significant than economic instruments.

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