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TABLE RONDE NATIONALE SUR L'ENVIRONNEMENT ET L'ÉCONOMIE

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ADDENDUM

EXTENDED DESCRIPTION OF OPTION 11:

DOMESTIC CAP AND ALLOWANCE TRADING (including control of transportation-related emissions through the participation of petroleum refiners)

Prepared for:

Multistakeholder Expert Group on Domestic Emissions Trading

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December, 1998

EXTENDED DESCRIPTION OF OPTION 11:
DOMESTIC CAP AND ALLOWANCE TRADING
(including control of transportation-related emissions through the participation of petroleum refiners)

INTRODUCTION

A July 1998 National Round Table on the Environment and the Economy (NRTEE) paper on *Possible Designs for a Domestic Emissions Trading Program for Greenhouse Gases* identified fourteen possible designs for a domestic emissions trading program for greenhouse gases. Six of those designs were selected for further analysis and were subsequently discussed at a meeting of the NRTEE's Multistakeholder Expert Group in September 1998. At that meeting, it was agreed that four of the six options should be elaborated in greater detail and that one of the NRTEE options that had not been considered should be assessed further. Table 1 provides an overview of all of the options that have been considered in the NRTEE process.

TABLE 1 – POTENTIAL DESIGNS CONSIDERED BY THE NRTEE

Option	Extended Description	Description of Measure
Prospect of a Future Commitment to Limit GHG Emissions		
1	X	Voluntary credit trading
2		Voluntary cap and trade system
No Specific Prospect of a Commitment to limit GHG Emissions		
3		Voluntary Credit Trading
A Commitment to Limit GHG Emissions Exists		
4	X	Cap and trade on carbon content of fossil fuels produced and imported
5		Cap on carbon content of fossil fuels crossing provincial and international borders, with trading by the owners of the fuels
6		Cap on the carbon content of fossil fuels implemented at the narrowest point in the distribution chain, with trading by owners of the fuels
7		Voluntary credit trading
8	X	Voluntary credit trading with mandatory performance standards
9		Mandatory credit trading
10		Voluntary cap and trade system
11	X	Domestic cap and allowance trading (including transportation), with domestic credit trading
12	X	Downstream cap and allowance trading (excluding transportation), with domestic credit trading
13		Domestic cap and allowance trading (including transportation)
14		Domestic cap and allowance trading – trading by large fuel users and municipalities (transportation and commercial /residential buildings), with domestic credit trading

This paper provides an extended description of NRTEE Option 11: Domestic Cap and Allowance Trading (including control of transportation-related emissions through the participation of petroleum refiners). It draws on an earlier paper prepared for the NRTEE (Description of Different Potential Allowance Trading Programs for Canada)[30] as well as comments on that paper made by members of the NRTEE Multistakeholder Expert Group.

This paper should be read in conjunction with the Extended Description of NRTEE Option 12: Downstream Cap and Allowance Greenhouse Gas Emissions Trading (excluding transportation). The domestic emissions trading system described in this paper differs from NRTEE Option 12 only in that it brings transportation-related greenhouse gas emissions into the system by making petroleum refiners and importers of transportation fuels responsible for these emissions. Rather than repeat much of the discussion found in NRTEE Option 12, this paper instead focuses on the key differences between NRTEE Option 11 and NRTEE Option 12.

This paper covers the following issues:

- a description of the trading program;
- descriptions of similar existing programs;
- the sources and emissions covered by the trading program;
- the number of participants in the program and the share of total emissions covered by participants;
- how the trading program would be administered;
- how emissions would be measured;
- possible complementary policies, and;
- evaluation of the option against a number of key criteria

DESCRIPTION OF THE TRADING PROGRAM

NRTEE Option 11 is a mandatory cap and allowance trading system. As with NRTEE Option 12, it is assumed that NRTEE Option 11 is implemented in response to Canada adopting a national commitment, such as the Kyoto Protocol, and then taking action to implement it.

Unlike NRTEE Option 12, NRTEE Option 11 is not exclusively applied "downstream", at the level where greenhouse gas emissions actually occur. This is because NRTEE Option 11 attempts to bring transportation-related greenhouse gas emissions into the system. Such an effort is clearly valuable, as transportation accounted for 27% of Canada's greenhouse gas emissions in 1995.[31]

[30] This paper was prepared in September 1998 by Barbara Campbell and Robert Hornung of the Pembina Institute and Erik Haites of Margaree Consultants.

[31] Jaques, A.P. et.al., Trends in Canada's Greenhouse Gas Emissions (1990-1995), (Ottawa, 1997).

As a result, NRTEE Option 11 is a hybrid system. A cap is established on total emissions and the regulator issues allowances that provide a right to emit a portion of the cap. Most participants in the system are required to hold allowances equivalent to their actual emission levels, but petroleum refiners and importers of transportation fuels are also required to hold allowances equivalent to the carbon content of the transportation fuels they sell in Canada. Petroleum refiners would receive credits for the carbon content of transportation fuels that are exported. Once again, participants with surplus allowances can sell these allowances to sources whose emissions exceed their allowance holdings.

The incorporation of transportation-related emissions through the addition of upstream carbon content trading can dramatically increase the coverage of the emissions trading system outlined in NRTEE Option 12. Instead of covering only 44% of Canada's greenhouse gas emissions, NRTEE Option 11 would cover 67% of Canada's emissions. Moreover, this increased coverage can be achieved with less than 50 new participants (importers of transportation fuels) entering the system.

Nonetheless, some members of the NRTEE multistakeholder expert group expressed strong reservations about addressing the transportation sector in this way. This concern was based in the fact that petroleum refiners and importers of transportation fuels can, on their own, do little to reduce greenhouse gas emissions from the transportation sector. In fact, these companies can primarily reduce these emissions by increasing the price of transportation fuels to consumers. Consumers then have a much broader range of strategies available to reduce greenhouse gas emissions from transportation.[34]

Two key questions were raised in the NRTEE multistakeholder expert group about this outcome:

- Does it make more sense to send this price signal through emissions trading or to directly implement a price change through the levy of a tax?
- Is a price signal the most effective way to reduce greenhouse gas emissions in the transportation sector or are other policies required?

With regard to the first question, if the level of the price signal is the same in both cases, there should be no difference in the economic efficiency between use of a tax and use of an upstream carbon content trading program. More work is needed, however, to assess the relative administrative burdens and political feasibility of each option. In reality though, it would be difficult to determine the level at which a tax should be established to match that which would have been generated through incorporation in the emissions trading system. As a result, it is less likely that the marginal cost of emission reductions would be equal across sectors – decreasing economic efficiency within society as a whole.

[34] Consumers can have a direct impact on emissions through their transportation mode and fuel choices. In many important areas, however, even the impact of consumers is indirect. For example, it will only be through their influence on the market and decision-makers that consumers can help increase the production of fuel-efficient vehicles and encourage changes in land use planning to favour public transportation.

With regard to the second question, there is a great deal of debate about the extent to which consumers will respond to changes in the price of transportation fuels. If demand for these fuels is highly inelastic, huge increases in price will be required to decrease demand for these fuels. Under these circumstances, it may be more cost-effective to use complementary policies (e.g., fuel efficiency standards for auto manufacturers) to bring about emission reductions in this sector. The NRTEE multistakeholder expert group concluded that a range of policies would likely be required to reduce emissions from transportation, whether or not transportation-related greenhouse gas emissions were included in an emissions trading system.

DESCRIPTIONS OF SIMILAR EXISTING PROGRAMS

NRTEE Option 11 is a hybrid domestic cap and allowance trading system that incorporates both "upstream" and "downstream" elements. There are no examples of such hybrid systems currently in existence.

The fact that no such system currently exists should not be taken as an indication that such systems are not viable. Rather, it is more a reflection of the breadth of the climate change issue. When emissions trading has been used to address other issues, the polluters have not been as diverse and plentiful as is the case with climate change. As a result, it is has been possible to address these polluters through either an upstream or downstream trading system alone.

Examples of existing downstream trading programs are discussed in detail in the extended description of NRTEE Option 12: Downstream Cap and Allowance Greenhouse Gas Emissions Trading (excluding transportation). Existing upstream trading programs are discussed in the extended description of NRTEE Option 4: Cap on Carbon Content of Fossil Fuels Produced and Imported. These examples will not be repeated here.

THE SOURCES AND EMISSIONS COVERED BY THE TRADING PROGRAM

NRTEE Option 11 builds on NRTEE Option 12 by incorporating transportation-related greenhouse gas emissions into the trading system. Specifically, NRTEE Option 11 addresses greenhouse gas emissions associated with the combustion of transportation fuels in automobiles, light and heavy-duty trucks, and railways. Greenhouse gas emissions from airlines have already been addressed in NRTEE Option 12.[35]

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[35] More research is required to determine if greenhouse gas emissions from shipping can be included in the system. Greenhouse gas emissions from the combustion of transportation fuels in international shipping, like emissions from international air transport, are not part of Canada's Kyoto commitment. The simplest solution would be to make shippers responsible for their own emissions for transport within Canada, similar to the situation airlines face in NRTEE Option 12.

Addressing these emissions through petroleum refiners would impose price increases on shippers (as refiners increase prices in response to the limits they face), even though the emissions generated by shippers in international transport are not reflected in Canada's commitment. Under such a scenario, it may make sense to follow the example set by the treatment of fossil fuel feedstocks in NRTEE Option 4 and

THE NUMBER OF PARTICIPANTS IN THE PROGRAM AND THE SHARE OF TOTAL EMISSIONS COVERED BY PARTICIPANTS

It was estimated that NRTEE Option 12 would involve 1,116 participants. NRTEE Option 11 adds virtually no new participants to the program. The thirteen companies that own petroleum refineries in Canada already participated in NRTEE Option 12, where they were held responsible for their own emissions of greenhouse gases from the combustion of fossil fuels on-site.

Indeed, the only new participants in the program would be importers of refined petroleum products (transportation fuels) that distributed these fuels for use in Canada. According to the extended description of NRTEE Option 4, there are only 15 to 50 companies in Canada that import coal, natural gas or petroleum products that are not domestic fossil fuel producers. As a result, the addition of an upstream carbon content trading program for transportation fuels does not significantly increase the number of participants beyond what was envisioned in NRTEE Option 12.

There is, however, a much more important difference between NRTEE Options 11 and 12. Specifically, NRTEE Option 11 covers significantly more of Canada's greenhouse gas emissions than NRTEE Option 12. While the latter addressed only 44% of Canada's greenhouse gas emissions, the addition of an upstream carbon content trading program for transportation fuels allows cap and allowance trading to address 67% of Canada's greenhouse gas emissions.[36] [37] This should increase the economic efficiency of the emissions trading system, lowering costs for all participants.

HOW THE TRADING PROGRAM WOULD BE ADMINISTERED

The extended description of NRTEE Option 12 discusses in some detail key administrative issues associated with a cap and allowance emissions trading system. Many of these administrative issues would not need to be handled any differently with the addition of an upstream carbon content trading program for transportation fuels. This is not, however, universally true.

For example, it is not clear that the *gratis* distribution of allowances described in NRTEE Option 12 would be appropriate for petroleum refiners and importers of transportation

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allow shippers to create emission reduction credits equivalent to the emissions associated with international transport that could then be sold to the petroleum refiners.

[36] Canada produced 165 Mt of greenhouse gas emissions from transportation in 1995. The contribution from airlines (10.8 Mt) is already included in NRTEE Option 12. Greenhouse gas emissions from the marine (5.6 Mt) and other (2.4 Mt) have been excluded. As a result, NRTEE Option 11 adds 146.2 Mt to the trading system relative to NRTEE Option 12. No effort has been made to subtract alternative transportation fuels like natural gas from these emission totals, but these alternative fuels represent only a miniscule portion of Canada's total transportation fuel use.

[37] As noted earlier, it would also be possible to address heating fuels for residential and commercial buildings that are produced by petroleum refineries under such a system. Doing so would increase coverage further.

fuels that are required to hold allowances for the carbon content of transportation fuels they sell in Canada. This is because these firms have few options available to reduce transportation-related greenhouse gas emissions aside from increasing the price of these fuels to their customers. Under a system where allowances are distributed *gratis*, this could result in windfall profits for petroleum refiners and importers of transportation fuels who would be able to profit from the increased price of their product without facing any additional costs. It would probably be necessary for government to tax these windfall profits back.

Instead, it is proposed that the initial distribution of allowances to petroleum refiners and importers of transportation fuels who are required to hold allowances to cover the carbon content of transportation fuels they sell in Canada should be through an auction. Under this scenario, increased revenues associated with an increase in the price of their petroleum products would help to offset the cost of allowance purchases, but provide no windfall profits.[38] It should be noted that these firms would also be able to obtain equivalent allowances or credits from other participants in the program as well as participants in Canada's voluntary credit trading system and participants in the Kyoto Protocol's flexibility mechanisms.

While there are examples of emissions trading systems where the vast majority of allowances are distributed *gratis* and a small percentage are subsequently auctioned, there is no system where both allocation systems account for a substantial portion of the total allowances distributed. In 1995, however, petroleum refiners would have needed 35% of the allowances distributed to cover potential emissions from the carbon content of the transportation fuels they sold in Canada. Can such a hybrid system be made to work?

The answer is probably yes. An initial set of allowances would be distributed *gratis* to all emitters participating in the program. A subsequent auction of the remaining allowances, restricted to petroleum refiners and importers of refined petroleum products (transportation fuels), would be held. More work is required to consider the mechanics of such an auction and what would be done with the revenues raised.

HOW EMISSIONS WOULD BE MEASURED

It is essential to be able to accurately measure actual emission levels in a cap and allowance trading program. The inclusion of upstream carbon content trading in the transportation sector should not pose a significant challenge.

Under such a system, petroleum refineries and importers of transportation fuels would need to provide documented records of the sale of their products. These quantities could

[38] It is not likely that petroleum refiners would be able to cover the full cost of their allowances through increases in the price of their products, although they should be able to cover a significant portion of their cost. This is because they may not be able to pass on the full price increase and also because consumers of these products may not respond to the price signals to the degree necessary for cost-recovery to take place. More study is needed on the ability to pass on cost increases through higher prices as well as the probability that consumers will respond to this.

then be multiplied by emission factors to provide a fairly accurate estimate of total emissions.

Import records and sales records (domestic and export) are not difficult to produce and can be verified by the regulator. Moreover, transportation fuels are made to specifications that should leave little doubt about their carbon content and, as a result, it should be relatively straightforward for a regulator to develop an emission factor. The regulator should also retain the ability to test the carbon content of transportation fuels sold.

POSSIBLE COMPLEMENTARY POLICIES

An emissions trading program is one of several measures to address greenhouse gas emissions. Complementary policies will often be required to: create a demand for allowances and credits, ensure the integrity of the trading system, remove barriers to the implementation of greenhouse gas emission reduction measures, and to ensure that sources outside the program also take steps to reduce greenhouse gas emissions.

As noted earlier, the NRTEE's multistakeholder expert group discussed the potential role emissions trading could play in reducing emissions from the transportation sector. In that discussion, there was some concern voiced about the ability of an upstream carbon content trading system to reduce greenhouse gas emissions in this sector. This concern arises out of a belief that the demand for transportation fuels is highly price-inelastic meaning that huge increases in price will be required to generate reduced emissions, whether that price increase is generated through emissions trading or taxes. Under such a scenario, other policies (e.g., fuel efficiency standards for vehicles) might be more cost-effective for society.

There is no consensus on the price elasticity of gasoline.[39] In the end, it seems clear that a mix of policies (i.e., regulatory, fiscal, information) will be required to reduce greenhouse gas emissions from the transportation sector.

Of course, as in NRTEE Option 12, a range of complementary policies will also be required to address emission sources not covered under the cap and allowance trading program.

EVALUATION OF THE OPTION AGAINST A NUMBER OF KEY CRITERIA

This section will evaluate how NRTEE Option 11 compares with NRTEE Option 12 when evaluated against a set of criteria that the NRTEE is using to assess all of the emissions trading systems it is examining.[40]

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[39] There is a brief discussion of this issue in US Carbon Emissions Trading: Some Options That Include Downstream Sources (Center for Clean Air Policy, 1998).

[40] These criteria were drawn from *Analysis of the Potential for a Greenhouse Gas Trading System for North America,* Commission for Environmental Cooperation, 1997, Chapter 3, pp. 32-42.

Economic Efficiency

This section on economic efficiency focuses on emission reduction costs, by looking at cost-effectiveness, transaction costs, and comprehensiveness.

Cost-effectiveness

Cost-effectiveness involves implementing the least expensive (to participants and society as a whole) measures to achieve a given level of net greenhouse gas emissions reductions. It requires that each source find the lowest cost options to reduce its greenhouse gas emissions and that the marginal cost of reducing greenhouse gas emissions be equalized across all sources. It also means that the costs of greenhouse gas emissions should be reflected in product prices so that the mix of goods and services consumed adjusts to "economize" greenhouse gas emissions to an appropriate degree.

NRTEE Option 11 is likely to be more cost-effective that NRTEE Option 12 because its greater comprehensiveness of coverage means that the marginal cost of reducing greenhouse gas emissions will be equalized across a larger percentage of emissions and sources. Cost-effectiveness may be somewhat compromised if the demand for transportation fuels is highly inelastic (such that regulatory policies might make more sense) or if petroleum refiners and importers of transportation fuels are unable to fully pass on increased costs to consumers.

Transaction costs

Transaction costs include the costs of obtaining needed information, identifying potential traders, effecting trades, and the administrative costs of managing and participating in the program. The criterion of minimizing these costs, all else being equal, covers both the program administrators as well as participants. NRTEE Option 11 is unlikely to be significantly different from NRTEE Option 12 in this regard.

Comprehensiveness

The comprehensiveness of a program involves maximizing the portion of total emissions covered, the range of greenhouse gas emission sources and sinks, and the various sectors of the economy that are included. NRTEE Option 11 is clearly more comprehensive than NRTEE Option 12.

Equity

Equity can be defined at various levels (e.g. equity among individuals, firms, regions, or nations) and in different ways (e.g. based on relative shares of emissions, ability to pay, or vulnerability to impacts). The equity criteria applied here focus on equity between nations, people of varying income levels, and industrial sectors.

International equity

The objective with respect to international equity is to minimize the cost burden borne by developing countries as a result of the program. NRTEE Option 11 is no different from NRTEE Option 12 in this area.

Domestic equity

Domestic equity seeks to minimize the incremental burden on low-income groups and to ensure an equitable distribution of impacts on income groups and regions. The revenue raised through the auctioning of some allowances under NRTEE Option 11 provides another potential tool that can be used to address any equity concerns.

Industrial equity

The criterion of industrial equity constitutes a fair distribution of the cost of emissions containment and reduction across industrial sectors. Another aspect of industrial equity has to do with new versus existing sources. As a result of its greater comprehensiveness, NRTEE Option 11 should equalize the marginal cost of emissions reduction across a broader range of emitters than NRTEE Option 12. The addition of an auction for allowances distributed to petroleum refiners and importers of fossil fuels lowers the barrier to the entrance of new firms in these sectors.

Technical feasibility

Technical feasibility covers key aspects that contribute to the reliability of achieving greenhouse gas reductions by the agreed amounts. Included in this set of criteria are flexibility of potential reduction options, timing of reduction measures, and leakage of emissions to outside the program.

Technical flexibility

Technical flexibility includes flexibility in the amount, location and technology of reduction measures that can be implemented. The greater the flexibility, the more choices participants have with respect to the level of emission reduction they implement in-house versus purchasing credits, the geographic location of reduction projects, and the types of existing or new technologies they apply. Greater flexibility provides more options for emissions reduction, perhaps at lower cost due to the broad range of options. There is no difference between NRTEE Options 11 and 12 in this regard.

Timing

The objective with regard to timing is to provide flexibility in the timing of reductions and incentives for early action. Once again, there is no difference between NRTEE Options 11 and 12.

Leakage

In terms of leakage, it is desirable that the program minimize the likelihood that greenhouse gas reductions in one place would lead to counterbalancing increases elsewhere. The fear of leakage should be decreased in NRTEE Option 11 relative to NRTEE Option 11, but complementary policies will still be required to address sectors not covered by the trading program.

Political feasibility

Any trading or other program must be compatible with several dimensions of the present and future political context, including: energy, environmental, fiscal and other policies; international agreements and commitments; and issues of national sovereignty.

Domestic political compatibility

Domestic political compatibility entails minimizing potential conflicts with existing and future domestic policies. Although future policy is not known, this assessment is based on recent trends in policy-making. A cap and allowance emissions trading program is in keeping with a move toward market-based mechanisms, deregulation, and utilities market restructuring. A mandatory cap is in keeping with emissions limits on other pollutants.

It is likely, however, that petroleum refiners and importers of transportation fuels will not be keen to take on responsibility for the emissions associated with the use of their products – threatening the political feasibility of NRTEE Option 11. Indeed, these firms may find policy options that directly target the consumers of these fuels to be preferable.

International compatibility

International compatibility involves minimizing potential conflicts with existing and future international regimes, including of course the Framework Convention on Climate Change (FCCC), and trade agreements such as NAFTA, GATT and the possible MAI.

NRTEE Options 11 and 12 are consistent with the FCCC and the Kyoto Protocol. Generally, an emissions cap and trading program is in keeping with the direction a number of other countries are taking with respect to the control of air emissions through the use of market mechanisms.

Sovereignty

Sovereignty is the ability of countries and their citizens to act according to national policies and self-interest with a minimum of international interference and pressure. Neither of NRTEE Option 11 or 12 threaten Canada's sovereignty or impinge on other countries' sovereignty.

Administrative feasibility

In order to function, any program must be able to be feasibly carried out by the participants and the government agencies. Three key aspects of administrative feasibility are measurement, verification and enforcement of emissions and reductions.

Measurability

The criterion of measurability seeks to minimize the uncertainty and complexity of measuring emissions levels and reductions. Adding an upstream carbon content trading program in NRTEE Option 11 is unlikely to make measurability any more difficult.

Verifiability

In order for the program to be viable and effective, the measurement of emissions and reductions needs to be verifiable in an objective manner by a third party. This ensures the reliability of information on which the program is based, and increases the confidence of participants and administrators in the actual performance of emission reductions.

Verifiability in a pure cap and allowance trading program is high when actual emission levels can be determined with a high degree of confidence, as is generally the case in NRTEE Options 11 and 12.

Enforceability

With regard to enforceability of a program, the objective is to maximize the compliance with allocated emission levels and complementary reductions. For participants to take the program seriously, the capacity and threat of enforcement action must be there. There is no difference between NRTEE Options 11 and 12 with respect to this criterion.