

## **6. Effects of Climate Change Tax and positive and negative impact on the economy**

***Petroleum and other sources of energy are required purchases. How will raising their tax burden affect the economy?***

Up until now, we have discussed the adoption of Climate Change Tax. How would such measures impact the economy and employment? In the 1970s, Japan experienced two oil crises, commonly known as “oil shocks.” These crises caused large rises in the price of petroleum and other products, but the subsequent recessions were only temporary (when prices rise due to an oil crisis, more of the additional money paid for the petroleum goes outside the country than in the case of a tax. For this reason, the negative impact on the economy is stronger.). Meanwhile, it is well known that these crises spurred Japanese society as a whole to become much more energy efficient.

As discussed in **2. Nature and requirements of a tax** and **4. Thinking on uses for tax revenues**, the expected effects and impacts of Climate Change Tax will be studied based on the assessment and review of the Programme in 2004, and the actual tax rate will depend on study based on the results of this assessment/review. Here we calculated the effects and impacts of the Climate Change Tax in order to get a general image, using a model developed by the National Institute for Environmental Studies and Kyoto University.

These calculations indicated that, for example, if a tax of about 45,000 yen per metric ton of carbon (i.e. about 30 yen per liter of gasoline or kerosene, about 29 yen per kg of coal, and about 25 yen per m<sup>3</sup> of natural gas) were put into effect, and no other measures taken, then the GDP of around 2010 would be about 15.2% larger than in 2000, which means that growth would be held to about 15.0% over this period.

Meanwhile, if a tax of about 3,400 yen per metric ton of coal (i.e. about 2 yen per liter of gasoline or kerosene, kg of coal, and m<sup>3</sup> of natural gas) were put into effect, and the revenues from the tax used to subsidize measures to combat climate change, then the GDP of around 2010 would be about 15.1% larger than in 2000. In other words, the economy would be only about 0.06% smaller in 2010 than if no additional measures were taken<sup>1</sup> (in terms of economic growth, this would be a reduction of about 0.01% in annual growth).

Each of the two cases above is expected to have the same effectiveness at reducing CO<sub>2</sub> emissions. In other words, both are expected to reduce emissions of energy-derived CO<sub>2</sub> to 2% below 1990 levels by 2010 (this would be 10% lower than if neither of these cases were implemented). When this is combined with the amount of CO<sub>2</sub> absorbed by forests, uses of the Kyoto Mechanism to be studied in the future, and the like, then it will be possible to meet the target of the Programme, and achieve the committed 6% reduction.

With the current economic situation, there are no guarantees that the impact on the economy will be small. However, we can be sure that the impact will not be extremely large. In other words, unlike the oil crises, in which the country experienced negative economic growth, in the case of a tax, the additional cost of the oil would stay inside the country, and the effective domestic use of these funds would avoid a major impact on the macro-economy. Additionally, unlike the time of

the oil crises, there is a wealth of energy-conservation technologies today. For this reason, it will be possible to increase investment in energy-efficient equipment and the like, without the need to save on energy costs to the point of shrinking the economy. This is especially true if the tax revenues are used for ACC measures. Additionally, these investments would have the effect of expanding the economy. And in fact, the model calculation predicts that production would increase in industries related to energy efficiency, such as the electronic machinery and services sectors.

While on the one hand the model assumes that the tax revenues will be allocated in the most efficient way possible, on the other hand it does not predict any dynamic changes, such as the development of a new energy-conservation technology that motivates a commitment to halting climate change. If this occurs, the actual impact on the economy could turn out to be even smaller.

In terms of employment, the calculation predicts that while a tax of about 45,000 yen per metric ton of carbon would have a negative effect on (reduce) employment, a tax of about 3,500 yen per metric ton of carbon, combined with utilization of the revenues from the tax on measures to combat climate change, would have a positive effect on (increase) employment. In either case, the range of change is within about 0.1%.

While it is true that a number of taxes are already levied on fossil fuels, Japan's energy taxes are about average among the OECD countries. A policy direction of valuing energy more, and promoting the reduction of CO<sub>2</sub> emissions, leaves room for further use of taxes.

Looking at the overall picture, since Japan lacks domestic fossil fuel resources, the only way for its economy to grow is to conserve energy, and use the work and knowledge of humans instead. There is a self-evident international trend toward further limiting the use of fossil fuels. Building an economy with little dependence on fossil fuels will benefit the planet. Japan should focus on the conditions for its own economic growth, and be the first to change course to the new direction for the economy of the human race, providing an example for how the economy of the human race as a whole should be.

This would also benefit Japan. In other words, enhancing measures to prevent climate change will create a dynamic process, increasing demand for products and equipment using technologies that will prevent climate change, which in turn will bring about the creation of innovative new technologies. It is expected that in the future, there will be large worldwide demand for technologies to prevent climate change, and this process will spur Japanese enterprises to develop innovative technologies ahead of their counterparts in other countries, thus giving them the profits accrued to the first in the market. This is vital in terms of Japan's economic growth strategy, and there is a very good chance for Japan to dominate this field.

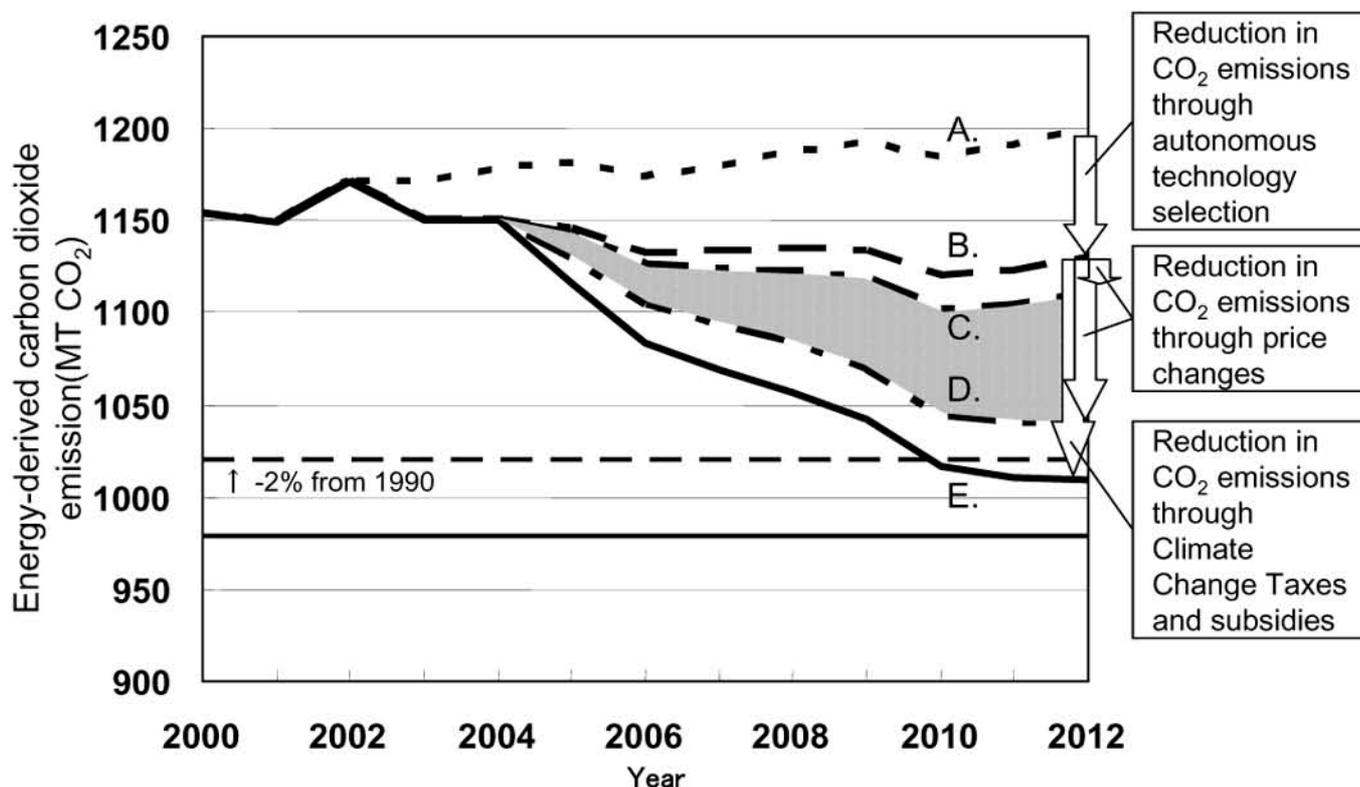
As discussed in this report, it is the opinion of the Expert Committee that the advantages of Climate Change Tax should be harnessed as part of a series of aggressive policies aimed at reforming the socio-economic structure through this change of direction.

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<sup>1</sup> The required reduction of CO<sub>2</sub> emissions will not be achieved in the case where no additional measures are taken, which the model used for comparison purposes. Consequently, the calculations above use the case where no additional ACC measures are taken as a basis for comparison. It must be taken into account that the comparison is not with cases in which other additional measures to combat climate change were taken.

Note that unlike an oil crisis, changing the state of taxes levied on fossil fuels signifies a conscious decision to take the lead in creating a new type of society that uses fossil fuels with greater care and appreciation. Although interest in the economic impact of the various measures, including Climate Change Tax, are high, because measures for combating climate change will by their nature create a new type of economy, it could be overly pessimistic to calculate the economic impact by comparing with the case in which no measures were taken.

## Reference 6: Overview of calculations using technology selection model (AIM end-use model)



Case Settings	2010 emissions using 1990 emissions as 100	Details
No new technologies are adopted	A: 113.7	This case assumes that the proportion of efficient energy technologies used will not change in the future. In other words, even when changing to new equipment, items with the same level of technology will be chosen.
Cases in which people make purchasing decisions based on desire to minimize cost	No policies implemented	B: 107.6
	Climate Change Tax is adopted	C (3,000 yen/tC): 105.7 D (30,000 yen/tC): 100.2
	Climate Change Tax (approx. 3,400 yen/tC) + subsidies using revenues adopted	E: 97.6

Note: Although not indicated in the reduction in the figure above, includes CO<sub>2</sub> sink measures using revenues from approx. 3,400 yen/tC tax.

## Reference: Economic model of impact (AIM top-down model)

Size of GDP around 2010 if no measures are taken

- Case E, above (Carbon tax (approx. 3,400 yen/tC) + subsidies using revenues adopted): -0.06%
- Climate Change Tax having same reduction effect as case E (about 45,000 yen/tC): -0.16%

**Note:** The AIM model was designed to evaluate the impact of ACC measures, with a focus on the Asia/Pacific region. The contents of the AIM end-user model above have been published in their entirety, and anyone can conduct additional tests or repeat the simulations of these policy proposals. Note that the future GDP and CO<sub>2</sub> reduction effect are in the final instance only estimates, used as a tool for proposal of measures.