How Can the Japanese Government Effectively Reduce CO2 Emissions Without Forcing Iron and Steel industry to Diminish Their Businesses

Introduction

Japan is the fifth most significant contributor to carbon dioxide emissions, and the need for climate action is urgent (Our World in Data, 2020). Struggling to play a leading role in global warming countermeasures in the international community, the Japanese government announced its ambitious target to implement carbon neutrality by 2050 (Nomura Research Institute, 2021). However, the target remains unattainable without a significant reformation in the iron and steel industry. The iron and steel industry has lagged in implementing global warming countermeasures. With the melting point for iron and steel being extremely high, iron and steel production requires extremely high-temperature, usually generated by fossil fuel consumption. Thus, even if CO2-free electricity becomes ubiquitous in the future, emissions of CO2 in the iron and steel industry may not be preventable (The Government of Japan, 2019). This paper critically assesses the current policy and explains why coercive taxation on CO2 emissions is problematic. Based on the precedent policy in foreign countries, this paper argues that the exemption of carbon taxation in exchange for a voluntary approach, the increase in the carbon tax ratio, and the introduction of an Emission Trading System

(ETS) are the key to encouraging the iron and steel industry to reduce CO2 emissions without forcing them to diminish their businesses.

Status quo of carbon dioxide emissions in Japanese iron and steel industries

Multiple data sets suggest that the Japanese iron and steel industry is the biggest impediment to reducing carbon dioxide emissions domestically. First, the iron and steel industry is the most responsible for indirect CO2 emissions, accounting for 43.7% of the whole industrial sector's emissions (Ministry of the Environment, 2018). Since the industrial sector accounts for 93.8% of domestic CO2 emissions, this indicates that reforming the iron and steel industry is indispensable to effectively reduce CO2 emissions domestically (Ministry of the Environment, 2018). Second, in terms of advances in reducing CO2 emissions, the iron and steel industry is one of the most unsuccessful industries among all industrial sectors, second only to the food and beverage manufacturing (Ministry of the Environment, 2018). While the chemical industry, the second largest contributor accounting for 21.5% of the whole industrial sector's emissions, had reduced its emissions by 14.4% between 2005 and 2016, the decline in the iron and steel industry stalled at 3.1% in the same period (Ministry of the Environment, 2018). These statistics indicate that without the enforcement of effective

preventive measures, the iron and steel industry will remain the most considerable burden to reduce domestic CO2 emissions.

The deficiency of the current policy

The Japanese government has stated two ambitious targets: reducing 46% of the greenhouse gas emissions between 2013 and 2030 and implementing a carbon-neutral society by 2050 (Ministry of Foreign Affairs of Japan, 2021). However, since Japan's current carbon tax rate is not stringent enough, and the absence of Japan in the international carbon trading framework is problematic, the current policy may not correspond with such a progressive target.

According to The World Bank Group, an organization that supports implementing carbon pricing policy through funding and technical assistance, it is clear that “the potential of carbon pricing is still largely untapped" (The World Bank Group, 2021). Experts claim that the government needs to impose a tax of 40 to 80 United States (US) dollars per ton of CO2 emissions to meet the goal stated by the Paris Agreement, which aims to keep global warming below 2 degrees compared to pre-industrial levels (The World Bank Group, 2021). In contrast, the carbon tax rate set by the Japanese government is far below experts' recommendations since only two US dollars is imposed per ton of CO2 emissions. Mizuho Information & Research Institute

(2017) estimates that the current policy will contribute to reducing energy-originated CO2 emissions by 4.4% between 2013 and 2030, but it is too far from the goal the Japanese government set initially.

The other problematic aspect of the current policy is the absence of ETS adoption. The basic concept of the ETS, also known as the "cap and trade system", is to diminish CO2 emissions within the ETS framework by limiting the maximum number of emissions for each company. If the company's emission exceeds its limits, it must buy "permits" from other companies or the government (EU Climate Action, 2014). Thus, companies can choose whether to enhance their reduction effort while earning money by selling "permits" or to diminish their reduction efforts while losing money by buying "permits". Since global warming is an international issue and Japan's annual share of global CO2 emissions is limited to 3% (Our World in Data, n.d.), putting taxes only domestically may not be effective. The absence of an international carbon trading framework can impede Japan's global contribution.

Coercive taxation is not fair

Although uniform taxation for the whole industry seems to be fair in general, enforcing carbon dioxide taxation requires flexibility. Coercive taxation on the iron and steel industry can devastate its financial situation and hinder its competitiveness

(Nippon Steel, 2003). Akio Mimura, the former CEO of Japan Steel, explains that the Japanese iron and steel Industry spent 10 billion US dollars on voluntary measures between 1990 and 2001, attaining the highest level of energy efficiency in the world in 2003 (Nippon Steel, 2003). Thus, the careful evaluation of voluntary approaches at the industry level is required to avoid irrational taxation. Therefore, the exemption should be granted in exchange for "abatement commitments" (Thalmann, 2006).

Possible solution: How to reduce CO2 emissions effectively while avoiding coercive or unrealistic policy

This segment argues that the exemption of carbon taxation, the increase in the carbon tax rate, and the introduction of the Emissions Trading System can be possible solutions to reduce domestic carbon emissions. The benefit of these solutions is that the Japanese government can effectively reduce CO2 emissions in the iron and steel industry without forcing them to diminish their business. Since these possible solutions derive heavily from the multiple policies already implemented in foreign countries, the potential adverse effects are amended to make the most suitable in Japan.

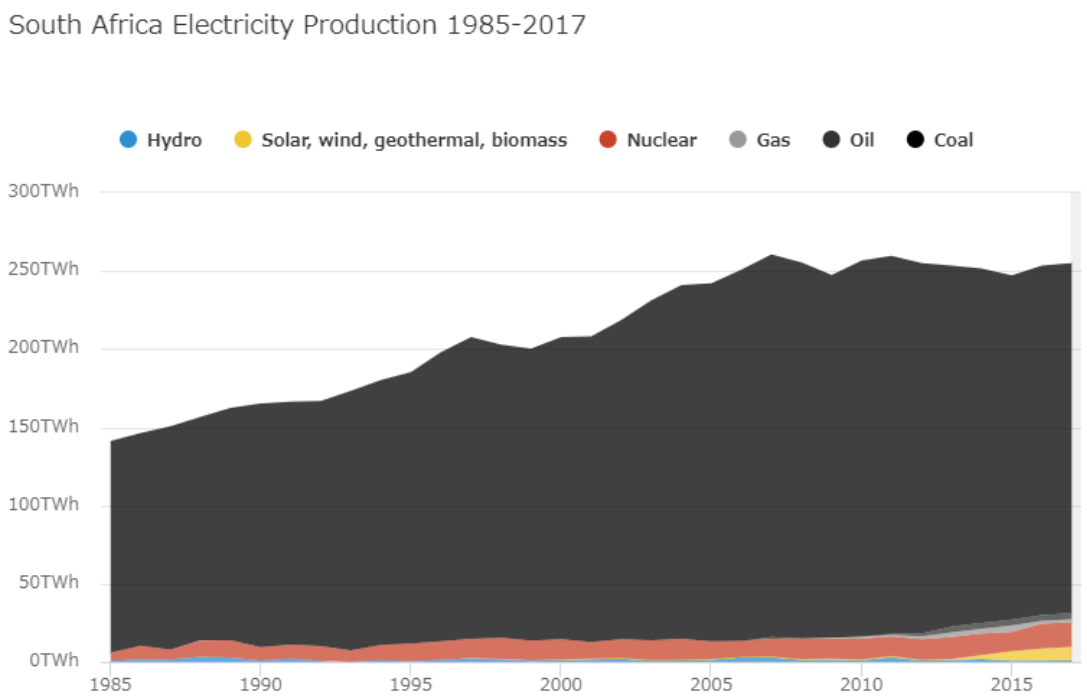
<u>The exemption of the carbon taxation</u>

The efficacy of the exemption policy with a high carbon tax rate is strongly supported by the recent achievements of the United Kingdom. According to the World Bank Group (2021), the carbon tax rate in the UK is 25 US dollars per tonne, which is more than ten times higher than that in Japan. Correspondingly, to protect energy-intensive industries, the British government proposed a lower tax rate for such industries in exchange for voluntary contributions (Thalmann, 2006). As a result, the UK accomplished reducing 45% of annual CO2 emissions and 68% growth in Gross Domestic Product from 1990 to 2020 (Office for National Statistics, 2022).

However, the negative aspect of exemption cannot be ignored. The National Treasury of Republic of South Africa (2010) asserts that "the exemption should be awarded only for a short transition period.". The National Treasury of Republic of South Africa's passive attitude towards the exemption comes from its extreme reliance on coal for electricity production. As can be seen from graph 1, their significant dependence on coal has not been resolved since 1985. Thus, electricity production emits a considerable amount of CO2 to burn coal, accounting for 80% of domestic emissions (Carbon Brief, 2018). Given such an unusual situation, the National Treasury of Republic of South Africa suggests that to offset the deficiency of the carbon taxation caused by the exemption, the government needs to increase the tax rate on non-exempt sectors

concurrently (2010). In other words, the exemption of carbon taxation on the electricity production sector will most likely make the policy ineffective.

Given its distinct characteristic in energy consumption and dependence on fossil fuels, the acceptance of the exemption varies between countries. However, as a developed country that is not dependent on coal consumption, it is reasonable to assume that an exemption policy might be appropriate in Japan. Still, the Japanese government needs to implement the proper criteria to measure companies' voluntary approach.



graph 1 (CarbonBrief, 2018)

The increase in the carbon tax rate

As mentioned before, the carbon tax rate in Japan is far below the recommendation made by the World Bank Group. Even worse, given the recent acceleration of tax rates in multiple countries such as Canada, Germany, and Ireland, it is apparent that Japan has been a laggard in enforcing CO2 reduction policy in the international community (The World Bank Group, 2021).

Although the comparison with foreign countries suggests increasing carbon taxes, the Japanese government may need to avoid unrealistically stringent amplification of carbon taxes. A Switzerland-like approach can be a solution to maximize taxation at a realistic level. Switzerland is known for its high level of direct democracy, and the electorate has the right to reject the enforcement of too stringent laws (Thalmann, 2006). For example, in June 2021, they refused a new CO2 bill in the national referendum (Ener data, 2021). Despite the electorates' right to reject the bill, Switzerland's current carbon tax rate is 101 US dollars per ton, the second highest in the world (The World Bank Group, 2021). This indicates the significant acceptance among the nation of strict environmental regulations. Another remarkable aspect of Switzerland's CO2 restriction is that the Federal Council is entitled to increase taxes if they find the need for more restrictive measures (Thalmann, 2006). Thus, the Federal

Council acts as the practitioner of the law in which the electorate participates in its making.

Unlike Switzerland, Japan's Gross Domestic Product is more dependent on secondary sectors, and maintaining the competitiveness of the secondary sector is prioritized in Japan. Thus, instead of electorates, the representatives of iron and steel companies and other energy-intensive companies should be given the right to reject the unrealistic amplification of the carbon tax rate.

The introduction of the Emissions Trading System

The Emissions Trading System has expanded its international coverage in global greenhouse gas emissions since 2021. The amount of CO2 emissions increased by 6.4% due to the launch of China's national ETS (The World Bank Group, 2021). The Government of China plans to use ETS as a tool to accelerate the reduction of carbon and implement carbon neutrality by 2060. As a country that aims to implement carbon neutrality by 2050, the absence of Japan in the ETS framework is illogical.

Since the Japanese iron and steel industry obtains its energy efficiency amongst the highest internationally (Nippon Steel, 2003), establishing an international ETS is more appropriate than a national one. For example, measured by the energy consumption rate, the Japanese iron and steel industry is 10% more efficient than

China's and 16% more efficient than India's (Research Institute of Innovative Technology for Earth, 2019). Thus, it is reasonable to assume that importing technologies that Japanese iron and steel industries hold makes it possible to reduce carbon dioxide emissions within the ETS framework.

Conclusion

This paper conducted a critical assessment of the current Japanese policy. It concluded that the inefficient carbon tax rate and the absence of the Emissions Trading System do not correspond with ambitious goals of Japan, such as implementing a carbon-neutral society by 2050. Then, it proposed the exemption of carbon taxation in exchange for a voluntary approach, the increase in carbon taxes, and the introduction of the Emissions Trading System as a possible solution. By adopting these solutions mentioned above, the Japanese government can effectively reduce CO2 emissions domestically without forcing the Japanese iron and steel industry to diminish their businesses.

The Japanese government still has a long way to go before getting over the legal development to implement the aforementioned solutions. For instance, setting the convincing criteria to measure the voluntary approach is arduous, and deciding the carbon tax rate through discussion with Japanese iron and steel companies will not be

quickly settled. Furthermore, publicizing the concept of ETS is a time-consuming process. To implement a carbon-neutral society by 2050, the Japanese government needs to amend current policies urgently.

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