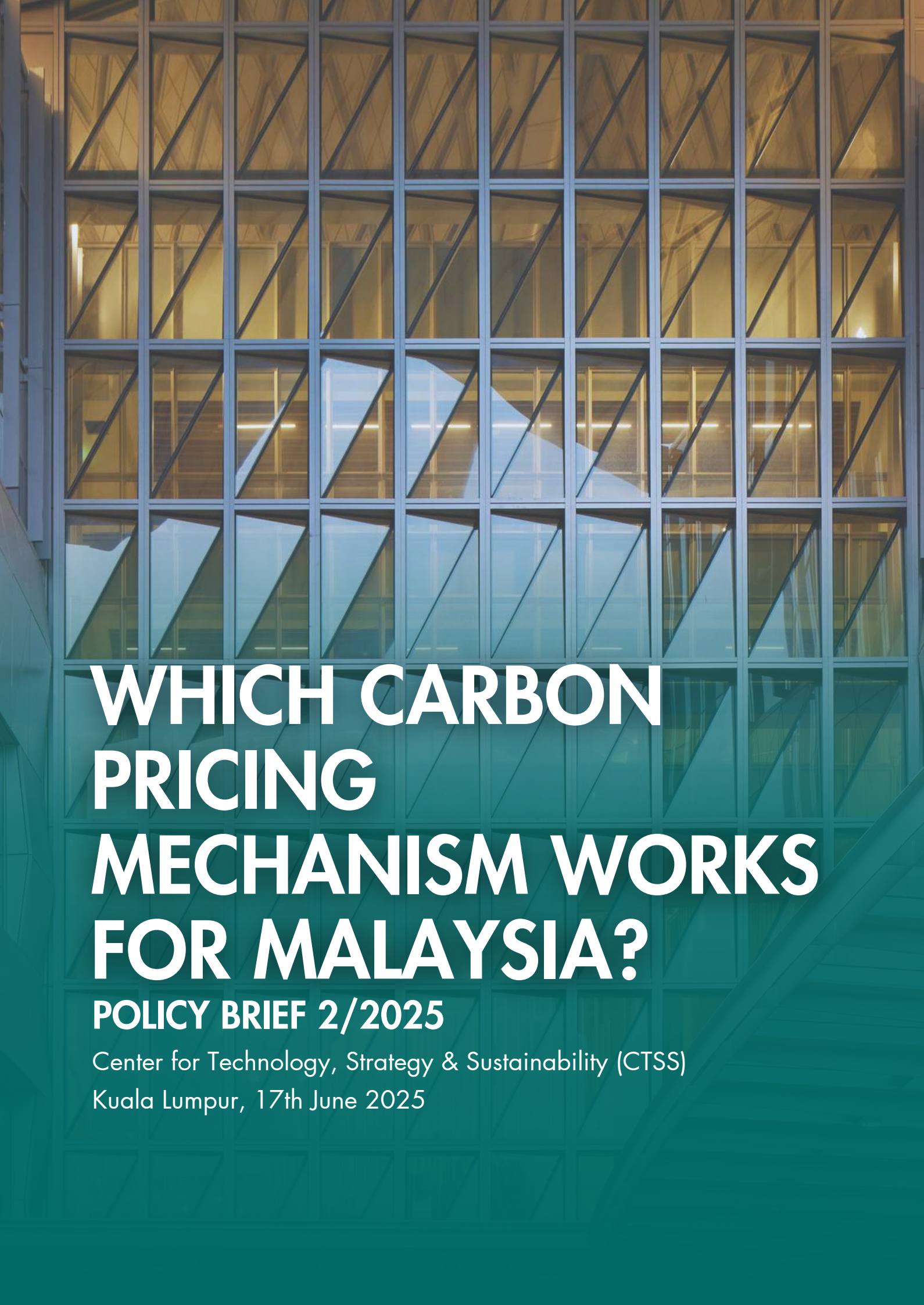

WHICH CARBON PRICING MECHANISM WORKS FOR MALAYSIA?

POLICY BRIEF 2/2025

Center for Technology, Strategy & Sustainability (CTSS)

Kuala Lumpur, 17th June 2025

ABOUT THE SERIES

This policy brief is a series of research documents summarizing the knowledge of area contextualized to Southeast Asia and Malaysia, in particular from ongoing research work by the Center for Technology, Strategy & Sustainability (CTSS) at the Asia School of Business. The author of this issue is **Emir Izat bin Abdul Rashid, ASB CTSS Senior Research Associate**.

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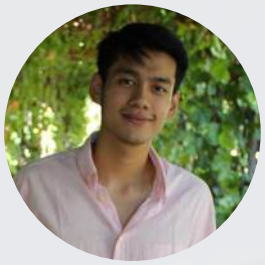

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Executive Summary

The two primary policies to reduce greenhouse gas (GHG) emissions are carbon tax and cap-and-trade. By incurring a cost to emit carbon dioxide emissions, these two policies will induce firms to emit less. As Malaysia pledges to meet emissions targets in achieving net zero, which carbon pricing policy works best at achieving sustainability goals while at the same time minimizing the cost to Malaysians? This brief aims to present the economic theory that underpins the logic of carbon pricing – how these mechanisms reduce carbon emissions in the firm's production process and the expected outcomes for the firm's profitability as well as social welfare. Further, by analyzing different expectations of carbon demands in Malaysia, this brief hopes to clarify the positive and negative implications of adopting one carbon pricing mechanism over the other through considering several distinct constraints that exist in Malaysia.

Why Carbon Pricing?

In 2024, 24% of global GHG emissions (12.8 GtCO2e) are covered under carbon pricing with 19% of them covered under the cap-and-trade system while the rest around 6% of emission are covered under carbon taxation[1]. The motivation of carbon pricing comes from the economics of negative market externalities.

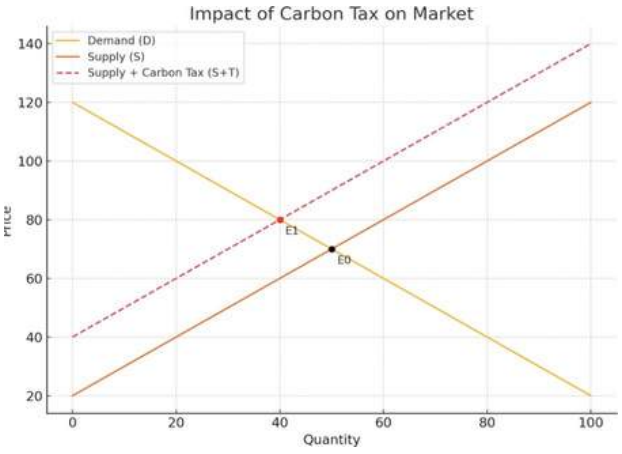
Negative market externalities are costs imposed to one party as a result of actions from another separate party. In the context of GHG emissions, firms produce goods through the use of fossil fuel energy which emits carbon dioxide that impose a social cost (adverse environmental effects such as natural disasters) on individuals although they did not choose to produce these goods: hence not directly responsible for the carbon emissions. Firms produce goods based on their private calculations of profit and cost without necessarily accounting for the social cost of carbon they produce. As a result, firms may overproduce beyond the socially optimal point for the environment.

Carbon pricing comes to the picture by imposing a tangible cost that firms have to pay in order for them to emit GHG; as a result, firms are incentivized to either produce goods at a lower carbon footprint or to reduce their production levels — both of which reduces the total GHG emissions to the environment. The difficult task ahead is to decide the price of carbon.

[1] World Bank, "GHG Emissions Coverage."

Carbon Tax

One way where carbon can be priced is through government taxation. The idea here is that the government is a suitable adjudicator because they represent the interests of the public hence they should have the right information regarding the social cost of carbon suitable within the context of their polity. By attaching a tax on carbon, firms have to pay a fee for each unit of carbon and GHG produced which would increase the cost of production using carbon. To see the effects of a carbon tax on firm production level and carbon emissions, I attach below two graphs to show the theoretical effects of carbon tax on the quantity of goods produced by firms and carbon emissions.



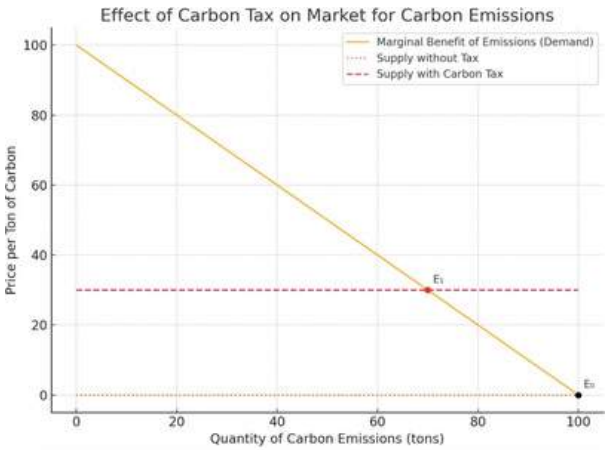


Diagram 1: Effect of Carbon Tax on Market and Carbon Emissions

What do we see from the graphical demonstration above? First, a carbon tax would increase the cost of a firm's production which would push up the supply curve of the firm. Initially, the firm produces at point E0 at around 50 quantities at price 70. After the introduction of carbon tax, the firm produces at point E1 at 40 quantities at price 80. A carbon tax would increase the prices of goods produced; the rate of increase would depend on how much the firm depends on carbon for its production processes. An oil and gas firm would have a steeper supply curve which means that it would be highly sensitive to any changes in price of carbon.

Although prices of goods increased as a result of carbon tax, the second graph demonstrates the carbon tax effect on the quantity of carbon emissions. Initially, firms emit at the level of 100 tons of carbon at virtually zero cost at point E0. After pricing carbon, the quantity of carbon will be reduced to 70 tons at a price of 30. How is the price set? The government will be the one who sets the price similar to how they set any type of excise tax such as tobacco and alcohol. Ideally, the carbon tax should be set at the social cost of carbon which is the additional damage in monetary terms that one ton of carbon emitted incurs on the environment. As of 2020, European countries such as Sweden and Switzerland have set the tax rate at more than $100 per ton of CO2e[2]. Our neighboring country Singapore has set its tax rate initially at $4, but has moved to $20 per ton of CO2e last year potentially reaching as high as $60 by 2030[3].

The current policy challenge for Malaysia prior to implementing a carbon tax policy is setting the carbon tax rate. As the tax rate is set by the government and the most efficient tax rate represents the social cost of carbon, the debate will be on what constitutes the social cost. Social costs are typically calculated from models that accounts of damage produced by carbon dioxide to life expectancy, property prices, and agricultural production[4].

To date, Malaysia does not have an official social cost of carbon or established methodologies to compute them. Thus, developing this measure is vital to the ideal carbon tax rate.

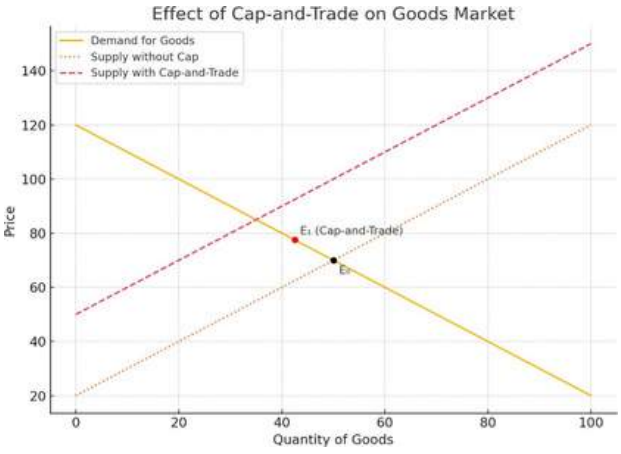
Another aspect to consider is the long-run adaptation of firms towards a carbon tax. Carbon-intensive firms that expect a long-run increase in costs will be motivated to set up operations elsewhere where the cost to pollute is cheaper. However, if firms do not have an alternative to move, they are incentivized to invest in reducing their carbon dependence through pollution abatement technologies. As a result, carbon tax may have a long-run positive effect on green innovation[5].

In addition, the revenue generated from the carbon tax may also be used to offset the losses incurred by the increase in prices of goods. The government can transfer the tax revenue through lowering taxes of other goods or direct transfer to the population. Alternatively, the government can use revenue generated to incentivize firms to invest in green technologies. The main challenge for policymakers after implementing carbon tax is the distribution of revenues whether firms or individuals be the primary recipient of carbon transfers.

[2] Timilsina, “Carbon Taxes.”
[3] National Climate Change Secretariat Singapore, “Carbon Tax.”
[4] “What Is the Social Cost of Carbon?”
[5] Ahmadi, Yamazaki, and Kabore, “How Do Carbon Taxes Affect Emissions?”

Cap and Trade

Another policy strand that has become more popular than the carbon tax is cap and trade — the two most popular being the European Union and Chinese emissions trading schemes. The cap and trade system is basically a government setting a limit on GHG emissions. Governments introduce a maximum limit – or a cap – of carbon dioxide emissions in a given year depending on their emissions target. Then, they will allocate a permit equivalent to one unit of carbon dioxide equivalent (1CO2e) to entities such as firms[6]. The allocation of permits can be calculated based on past emissions or alternatively through an auction or the combination of both. Firms, especially in hard to abate sectors, will reduce their carbon emissions based on how these permits are allocated.



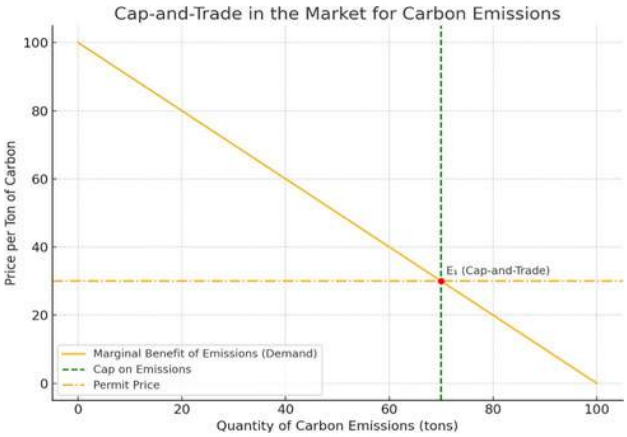


Diagram 2: Effect of Cap-and-Trade on Market and Carbon Emissions

As shown graphically in the graph above, the effect of cap-and-trade is similar to the carbon tax. The difference is in the emissions graph, the dotted green line represents the cap imposed by the government. As with the carbon tax, the cap-and-trade policy imposes a cost on the firms to purchase the permit which pushes up their supply curve which leads to higher prices and lower quantity produced. The carbon emissions will also be reduced now that the carbon is priced. The price of the carbon will be decided by the permit prices set by market players as opposed to the government – the only parameter set by the government is the total emissions budget allocated for the year.

[6] International Carbon Action Partnership, “What Is Emissions Trading?”

If the effect of carbon tax and cap-and-trade are qualitatively similar all else equal, then what is different? The major difference is the revenue generated from emissions. In a carbon tax system, 100% of the revenue generated from carbon emissions is collected by the government. In a competitive auction cap-and-trade system, the government will collect the revenue upon selling the permit but any revenue generated from the increased permit prices will be made by the entity that purchased the permit. If the government decides to allocate permits based on past emissions for free, the government will not generate any revenue at all. In fact, firms that receive a bulk share of the permits can sell them at a profit which can make up for the losses from reduced production capacity due to carbon pricing. This is the primary reason why the cap-and-trade system is favored more by the corporate sector than the public. Whereas the carbon tax system delegates climate redistribution to the government, the cap-and-trade system leaves the market to decide.

In Malaysia, the cap-and-trade system has not been implemented but the market infrastructure is available in the form of a voluntary carbon market. In 2021, Bursa Malaysia introduced the Bursa Carbon Exchange (BCX) where firms can purchase carbon credits to offset the emissions[7]. Credits are similar to permits where one unit of carbon is the same as one ton of carbon dioxide equivalent (CO2e). But, credits are voluntary for firms who want to advance their own sustainability initiative. Permits are mandated emissions reduction instruments. The government can take advantage of the available infrastructure provided by BCX to implement cap-and-trade. The next steps for the Malaysian government is to establish clear guidelines and methodologies of what constitutes one unit of carbon, a regulatory body to monitor and set the rules of the carbon market, and a transparent permit allocation process. These steps are crucial towards building an effective cap-and-trade scheme where carbon emission reductions are maximized at a minimum cost to consumers.

A clear constraint that can pose an obstacle to smooth cap-and-trade implementation is the capacity for firms to track carbon emissions. Based on the World Bank Entrepreneurship Survey in 2024, out of the 979 manufacturing firms surveyed in Malaysia, only 31 firms monitor its carbon emissions[8]. The industry most represented among the 31 firms is the chemicals industry and the average number of employees of these firms is 275 i.e., large firms. As the cap-and-trade system works most effectively when firms perform emissions monitoring on their own and thus able to participate in a carbon market, there is a need for greater inclusion for firms – especially SMEs and non-exporters – to perform their own emissions monitoring.

[7]Bursa Malaysia and Malaysian Green Technology and Climate Change, Comprehensive Project Development Toolkit."
[8] World Bank, "World Bank Entrepreneurship Survey."

Carbon Pricing in Varying Carbon Demand

In addition to revenue distribution, both carbon pricing systems differ in their response to varying carbon demand.

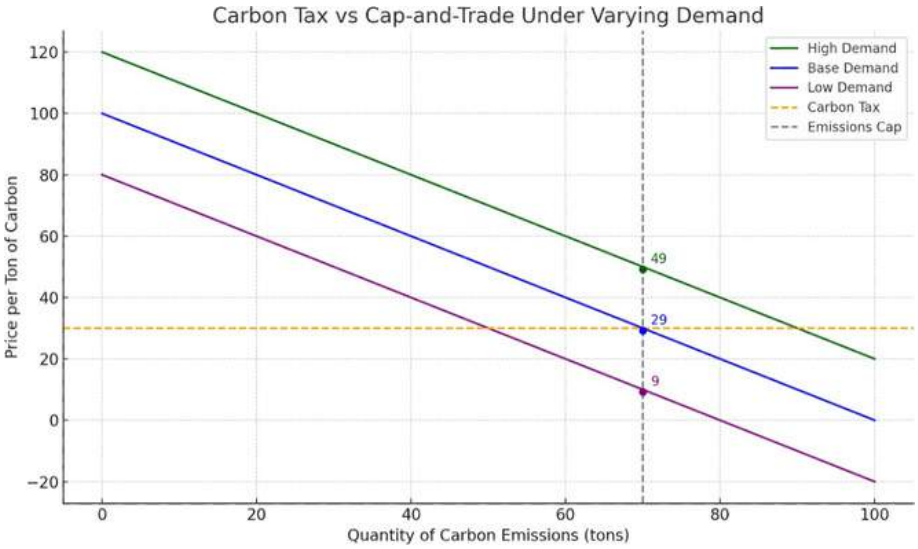


Diagram 3: Carbon Pricing Effects Under Varying Demand

Suppose in one year, the country experiences a positive productivity shock where the demand of production increases rapidly. When this happens, carbon demand will increase as firms want to produce more to take advantage of this sudden productivity increase. Increase in carbon demand will push the demand curve upwards shown in green. Under a carbon tax regime, firms are more willing to produce more if demand is higher – the quantity of emissions produced is at 90 tons as opposed to 70 tons capped by the cap-and-trade system. Under a cap-and-trade system, the price will increase above the carbon tax set at 29 to 49.

The same can be said if there is a negative shock to carbon demand. A carbon tax regime will see the quantity of carbon emissions reduced but a cap-and-trade will see the price of carbon fall. The difference between both systems reflect the different types of volatility induced; a carbon tax will see stable prices but volatile emissions but a cap-and-trade will see stable quantity but volatile prices.

One can clearly see the benefit of combining both systems to manage carbon emissions effectively. During times of low carbon demand, firms can reduce their carbon emissions willingly to stock up on their carbon permits since the price of carbon on the market is low. During times of high carbon demand, firms can use their carbon permit savings and sell them at a higher price instead of producing emissions. In both scenarios, we will see a reduction in carbon dioxide emissions. As we approach socially optimal sustainability targets, the government can gradually loosen the cap and reduce their carbon tax.

Conclusion

Carbon pricing represents the most promising avenue for a country to pursue emissions targets beyond net-zero. Carbon pricing includes the carbon tax system or the cap-and-trade. As discussed in prior sections, both carbon tax and cap-and-trade will theoretically reduce carbon dioxide emissions. However, both systems differ in how the revenues of emission abatement is distributed. For carbon tax, 100% of the revenue from carbon tax collection will be managed by the government; for cap-and trade, the revenue from carbon permits will depend on how these permits are allocated.

In terms of implementing a carbon tax in Malaysia, the two main policy challenges will be setting the tax rate according to the social cost of carbon and how the revenue will be distributed upon collecting the tax. Rigorous and scientifically sound calculation of the social cost is vital to ensure that the tax is efficient. In addition, the revenue collected can offset the economic losses from taxation.

As for the cap-and-trade system, Malaysia already has a market infrastructure to implement a functioning carbon market. However, the allocation of permits to firms whether through an auction or through historical emissions is crucial to minimize the negative economic effects of pollution abatement to consumers. Another major challenge to the cap-and-trade system is the level of pollution monitoring among firms in Malaysia. As the system relies on a wide participation of players across different industries, increasing the capacity of firms – beyond large and exporting firms – to monitor their own emissions is vital for the carbon market to function well.

An encouraging path to a consistent carbon reduction scheme might be to combine both carbon tax and cap-and-trade. As highlighted in the previous section, implementing both systems might allow firms to adjust their carbon consumption depending on the carbon demand. During periods of high carbon demand, the cap-and-trade mechanism will kick in to limit carbon emissions. During periods of low carbon demand, the carbon tax can serve as a floor to limit emissions.

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