Impact of Carbon Fees on Operating Costs for Major Domestic Industrial Energy Consumers

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Background and Scope

Under the compliance requirements of the *Climate Change Response Act* and the *Energy Administration Act*, the imposition of carbon fees is expected to have a significant impact on Taiwan's major carbon emitters and energy consumers. To understand the effect of these fees on corporate operating costs and net profit after tax, this research focused on industrial energy users with a contract capacity exceeding 800 kW and publicly listed companies. The researchers then targeted 151 representative enterprises to analyze the specific impacts of carbon fees on their financial stability and adaptive capacity.

Research Findings and Industry Disparities

The results show significant variations in the impact of carbon fees on operating costs, depending on the industry's emissions volume and carbon fee burden. The non-metallic mineral product manufacturing industry faces the highest proportion of carbon fees relative to operating costs, at 3.93%. Additionally, for the paper & printing, basic metals, and chemical & plastics industries, carbon fees represent a substantial portion of their net profit after

tax. Particularly under a general rate of NT$300 per metric ton of CO_{2e}, corporate earnings could be severely diminished. For example, even if China Steel Corporation qualifies for the lowest preferential rate of NT$50 per metric ton of CO_{2e}, its carbon fee costs would still amount to 53.57% of its net profit after tax. This indicates that without a preferential rate, the carbon fee would entirely “evaporate” the company’s net profit, causing a major financial shock.

In contrast, while the electronics and electrical machinery industry has higher carbon emissions and fee costs, its larger scale and higher profitability mean the impact on its operational financial metrics is relatively limited. Taking TSMC as an example, its estimated carbon fee cost for 2023 was only 0.31% of its operating costs and 0.38% of its net profit after tax. If TSMC implements voluntary reduction plans and meets industry-specific reduction targets, its carbon fee burden will be further reduced. This demonstrates that the impact of the carbon fee system varies greatly across industries, with carbon emission intensity and corporate value-added being key indicators for adaptation.

Policy Recommendations and System Optimization Directions

To mitigate the impact of carbon fees on high-emission industries and users while promoting a green industrial transition, the government can optimize the carbon fee system design and implementation strategies in the following five areas:

1. **Prioritize guidance for high-emission, high-impact enterprises**: Provide priority guidance to support companies in achieving energy efficiency improvements, fuel substitution, process optimization, and the adoption of a circular economy. The efforts will create a “big-leads-small” demonstration and spillover effect, driving a green transition across the entire industrial chain.

2. **Strengthen low-carbon technology R&D and promotion**: A dynamic database of low-carbon technologies should be established to inventory

and introduce the latest international energy-saving and carbon-reduction technologies. R&D subsidies, investment incentives, and demonstration sites can help reduce the financial and technical risks for businesses during their transition.

3. **Optimize differentiated fee rate design**: In addition to using carbon leakage risk as a calculation factor, indicators such as industrial carbon emission intensity and value-added rates should be considered to implement a more detailed, tiered pricing structure. This would balance industrial financial capacity and enhance the system's fairness and flexibility.

4. **Establish a carbon fee rate roadmap**: A clear roadmap for carbon fee rate adjustments should be established using a "pre-announced, gradual, and periodically adjusted" model. This would provide enterprises with a basis for planning their medium- and long-term capital allocation and emissions strategies, thereby strengthening the system's predictability and economic adaptability.

5. **Build a robust voluntary reduction review and performance management system**: Scientific, transparent, and measurable review standards and performance tracking mechanisms must be established. This includes standards for setting reduction targets, methodological justifications, and third-party verification to enhance the policy's credibility and incentive effects.