# *THE IMPACT OF CARBON PRICING ON THE COAL-TO-GAS SWITCHING IN THE ASIA-PACIFIC REGION*

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## Overview

Coal and natural gas are key sources of global power generation, but coal's high emissions make transitioning to natural gas essential for reducing greenhouse gases and improving air quality. This shift is critical for achieving near-term emission reduction goals. In regions with both coal and gas power plants, market forces—particularly the prices of coal, natural gas, and carbon—play a crucial role in driving this transition. This study explores the optimal carbon price range needed to incentivise the shift from coal to gas in the Asia-Pacific region. Sensitivity analyses assess how various carbon price levels affect natural gas consumption, providing insights into strategies for cleaner energy adoption.

## Methods

We first determined the appropriate range of carbon prices for the region by designing a system of equations that captures the relationships among coal, natural gas, and carbon prices based on the marginal cost of power generation and fuel efficiency. This method helped us analyse how various pricing factors impact power generation. Using an energy system model, we then projected the long-term outlook for natural gas and coal consumption in the Asia-Pacific region up to 2050. These projections allowed us to identify the carbon price range that would incentivise coal-to-gas switching.

Next, we conducted a sensitivity analysis to estimate how natural gas consumption across the region would change if this carbon price range were applied.

## Results

Preliminary findings suggest that coal prices in the Asia-Pacific region could reach around USD 80/ton by 2050, while long-term natural gas prices would stabilise at approximately USD 10/mmbtu. Given these conditions, carbon pricing between USD 50 and USD 80/ tonCO2 could provide the incentive for power generators to favour natural gas over coal, expediting decarbonisation efforts in the region.

Future analysis indicates that a carbon price of USD 60/ton CO2 would maximize natural gas consumption, resulting in a cumulative increase of 2,588 billion cubic meters of natural gas and avoiding 12,561 million tons of coal equivalent between 2024 and 2050. However, the impact varies across countries, with gas consumption rising in China and OECD (Organisation for Economic Co-operation and Development) countries but declining in non-OECD countries.

## Conclusions

Switching from coal to gas is a vital strategy for reducing emissions and improving air quality. While renewables are key to reducing GHG intensity, their development is not happening fast enough to meet the Paris Agreement's temperature targets within the necessary timeframe. The Asia-Pacific region lacks robust carbon pricing mechanisms, which limits the economic incentives required for coal-to-gas switching. A carbon price between USD 50 and USD 75/ton $CO_2$ could greatly enhance this transition. Without such mechanisms, power generators in the Asia-Pacific region may not have sufficient incentives to invest in cleaner gas technologies over coal.