# Feebates: The Full Carbon Price at the Margin, Without the Carbon Bill

## Decarbonizing coal-heavy power and trade-exposed industry

A revenue-neutral feebate runs and builds power plants exactly as a carbon tax would, at no cost to the treasury. Under a single buyer it barely moves tariffs; in a wholesale market it raises prices by much less than a tax. The benchmark decides whether it works.

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Climate Fiscal Policy Brief No. 1.2 · October 2026

# A carbon tax stalls in coal-heavy power because it charges for every tonne still emitted

**+189%**

price of coal at $2.50/GJ once a $50/tCO₂ tax is added

**$70bn**

a year: what a $50 tax would collect from India's power sector (2024 output)

**$0**

net payment by the average producer under a revenue-neutral feebate

The tax's relative-price signal cuts emissions; its charge on remaining emissions is a transfer, and that is what governments exempt or hold down.

Source: IPCC (2006) emission factors; illustrative fuel price; Ember 2024 generation data. Working paper 1.2, Table 2.

# A feebate keeps the incentive and drops most of the bill

**Above the benchmark, pay; below it, receive.** Each producer pays the carbon price on the gap between its emissions per unit of output and the sector average.

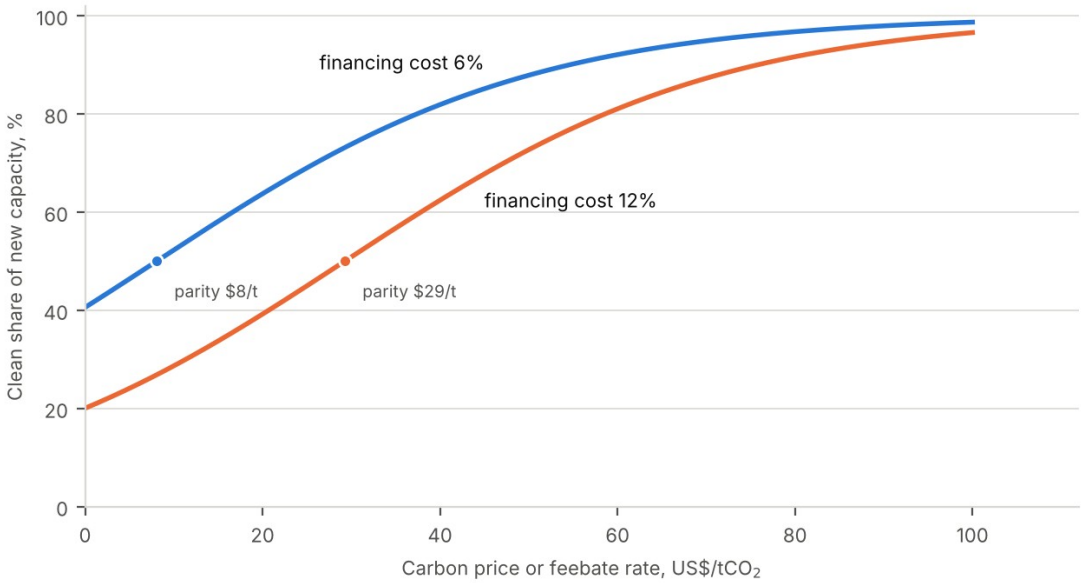
**Fees fund rebates.** With the benchmark at the average, the treasury neither gains nor loses.

**Every tonne cut is worth the full rate,** as under a tax. Output-based rebating of a tax is the same instrument.

**The cost is a weaker signal to use less.** Feebate-and-regulation packages achieve 50–70% of a tax's emission cuts (IMF).

Source: Fischer (2001); IMF Fiscal Monitor (October 2019).

# Power plants are run and built exactly as under a tax at the same rate




Clean share of new capacity against the carbon price; tax and feebate curves coincide (illustrative costs).

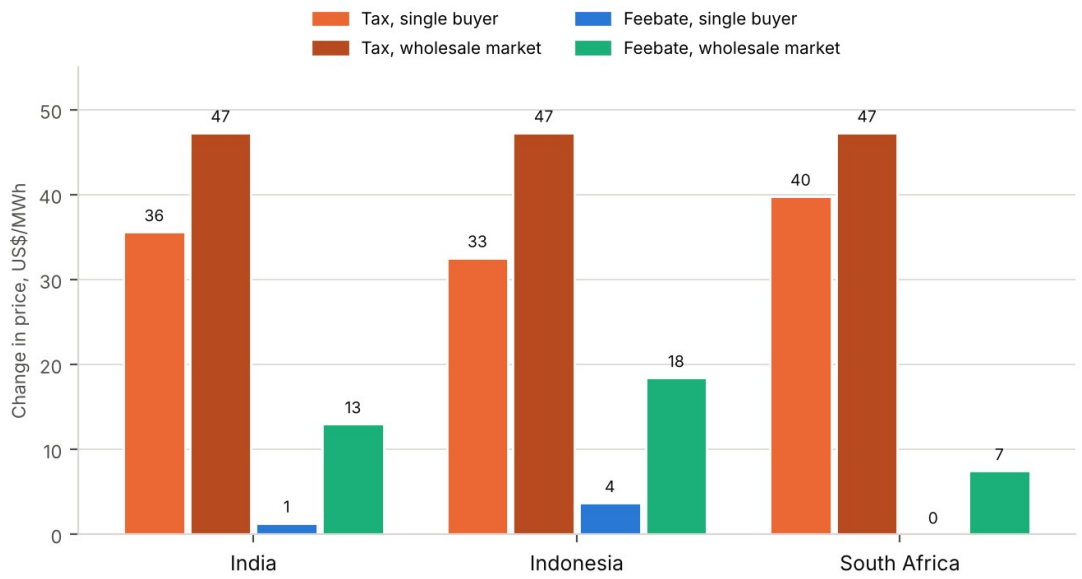
Source: Working paper 1.2, Propositions 1 and 4, Figure 1.

**Same merit order:** the benchmark shifts every plant's cost equally, so coal switches to gas at the same price.

**Same investment choice:** the benchmark cancels between clean and coal capacity.

**Finance matters more:** a 6% to 12% cost of capital moves the clean–coal break-even from \$8 to \$29/$tCO_2$.

# What consumers pay depends on how power is sold




Change in electricity price at $50/tCO$_2$, 2024 generation mixes (costs illustrative).

Source: Ember (2024 data); IPCC (2006). Working paper 1.2, Propositions 2 and 3, Figure 3.

**Single buyer, fees netted:** tariffs rise $0–4/MWh, against $33–40 for a tax.

**Wholesale market, coal at the margin:** $7.5–18/MWh, against $47. There a feebate is a tax refunded to consumers per MWh.

**Netting matters:** if coal passes fees through while clean plants keep rebates, $6–13/MWh.

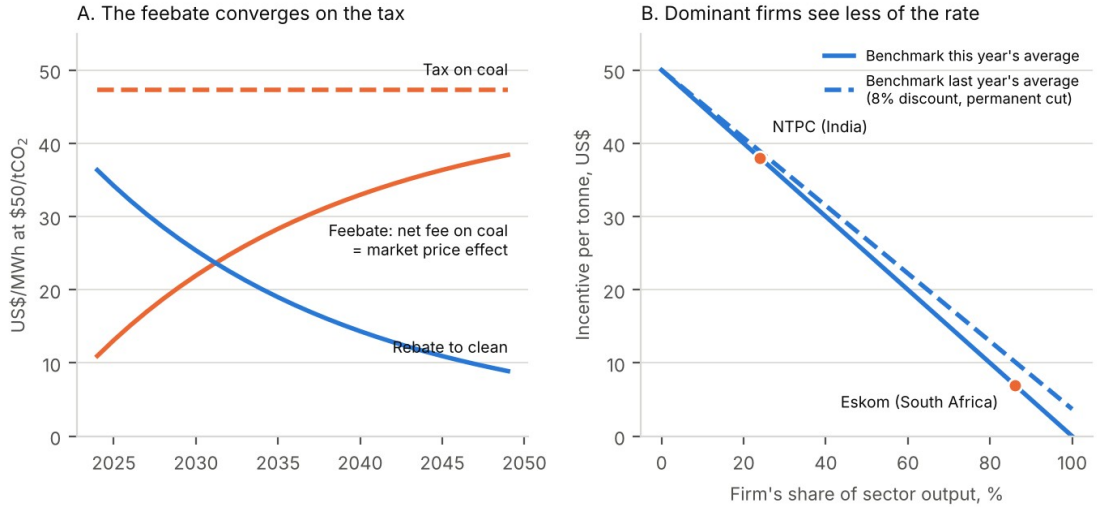
# In three coal-heavy grids, a feebate keeps regulated tariffs almost flat

| At $50/tCO$_2$, 2024 mix | India | Indonesia | South Africa |
|---|---|---|---|
| **Coal share of generation** | 74.5% | 61.5% | 83.6% |
| **Single buyer: tax ($/MWh)** | +35.6 | +32.6 | +39.8 |
| **Single buyer: feebate ($/MWh)** | +1.3 | +3.7 | 0.0 |
| **Market, coal marginal: tax ($/MWh)** | +47.3 | +47.3 | +47.3 |
| **Market, coal marginal: feebate ($/MWh)** | +13.0 | +18.4 | +7.5 |
| **Tax revenue forgone ($bn a year)** | 69.8 | 10.7 | 9.9 |

Most power in all three is sold through state buyers at regulated tariffs today; South Africa legislated for a wholesale market in 2024.

Source: Ember yearly electricity data (2024); IPCC (2006); costs illustrative. Working paper 1.2, Table 2.

# The benchmark must fall as the grid cleans and must not let a dominant utility pay itself




**A falling average tightens the feebate by itself:** coal's net fee rises from $11 to $38/MWh over 25 years at $50.

**Eskom (86% of supply) faces about $7 of a $50 rate.** Measure large firms against everyone else's average; dispatch on cost plus the full rate.

**One benchmark across fuels;** three benchmarks raise China's cost per tonne by 18%. Keep new plants out of the benchmark for their first years.

Source: Working paper 1.2, Propositions 5–6, Figure 2; Goulder et al. (2022); Eskom; NTPC.

# In industry a feebate protects exporters, and working systems already use benchmarks

**Steel at $80/tCO$_2$:** a tax raises producer prices 21–43%, a feebate 7–14% (Brief 1.1).

**Canada's output-based pricing** charges above a standard per unit of output and credits below it; its 2030 price was cut from C$170 to C$115 in May 2026.

**EU free allocation** pays allowances at a best-10% benchmark times output; it is being phased out for CBAM sectors from 2026.

**CBAM credits only a price paid, net of rebates,** so a feebate earns nothing at the border. Credit its carbon-price equivalent (Briefs 1.4, 6.1).

Source: Working paper 1.1; Canada OBPS Regulations; ICAP (2026); European Commission; Regulation (EU) 2025/2083.

# Feebates in use confirm both the incentive and the benchmark warnings

**Sweden, NOx, 1992–:** charge refunded per unit of energy; mean emission rates fell about 40% by 1998, at a rate a tax could not have reached politically.

**France, cars, 2008–:** a fixed benchmark cost about €285m in 2008, and higher sales made the net emissions effect negative.

**UK, generators, 2013–17:** a carbon price cut power emissions 20.5–26% a year; a feebate keeps that relative-price signal.

Source: Sterner and Höglund (2000); D'Haultfœuille et al. (2014); Leroutier (2022).

# What to do

## What the analysis shows

**Same dispatch and investment** as a tax at the same rate.

**Single buyer:** tariffs rise $0–4/MWh, not $33–40.

**Market:** $7.5–18/MWh, not $47.

**Benchmark design** decides whether dominant utilities feel the rate.

## Actions

**Coal-heavy countries:** legislate a power feebate at the rate wanted for a tax; buyer nets fees and rebates; benchmark by formula each year.

**Large firms:** leave-one-out benchmark; closure payments, not coal benchmarks.

**All adopters:** keep the consumption charge on electricity low while the grid is coal-heavy (Briefs 1.1, 1.3).

**Importers:** credit feebates at their carbon-price equivalent.