# The Macro-Fiscal-Energy Scenario Tool

## Financing and efficiency, not the size of the program, decide what climate investment does to growth and debt

One open workbook for 186 countries runs the investment need, feasible carbon pricing, growth and the debt test in one pass. Financing and efficiency matter more than the program's size; for Kenya, carbon pricing on a clean grid pays for about 5 percent of the need.

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# Ministries get four numbers on climate investment from four teams, and they rarely add up

**4**

separate estimates: budget need, carbon revenue, growth, debt risk

**45–50%**

of GDP: debt added by 2050 if net zero relies mostly on spending (IMF, representative large emitter)

**10–15%**

of GDP with a mix that includes carbon pricing (IMF, indicative advanced-economy case)

Each estimate needs the others: growth needs the financing, debt needs growth, carbon revenue depends on the emissions the investment avoids.

Source: IMF, Fiscal Monitor, October 2023 (Climate Crossroads).

# One workbook chains four models on one set of public data for 186 countries

**Investment model:** what a net zero path needs to 2050, split by who pays (budget, utility, contract, viability gap, private).

**Pricing screen:** most emission cuts from a power-sector tax, feebate or mix within three political limits.

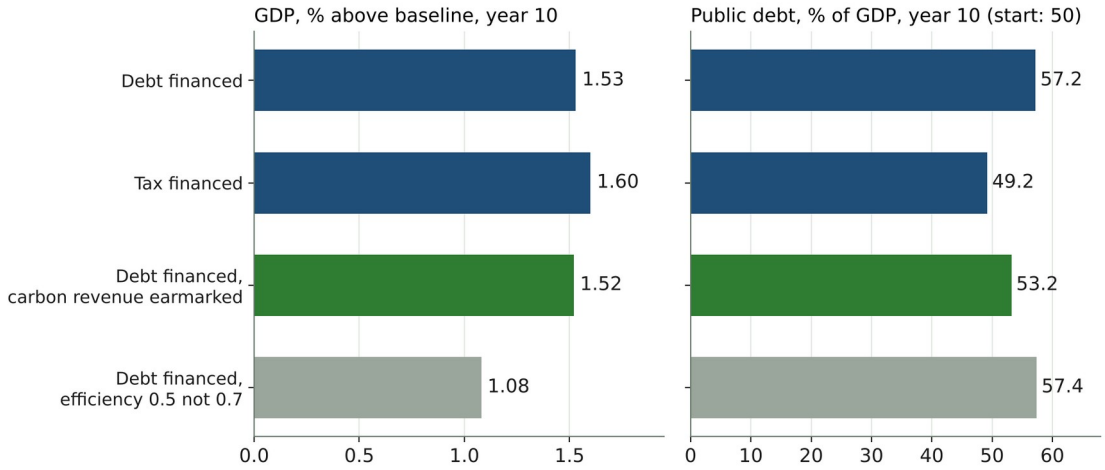
**Lite macro models:** open simplified versions of the IMF's GIMF and the DIG/DIGNAD/DIGNAR models turn the financed program into GDP and debt paths.

**Debt test:** a simplified Bank-Fund LIC-DSF rates the risk of debt distress before and with the program.

**Every assumption is a visible cell;** results are differences from a reference that holds the 2024 fiscal position fixed.

Source: Working paper 6.5, The tool; Kumhof et al. (2010); Marto, Papageorgiou and Klyuev (2018); IMF and World Bank (2018).

# Earmarked carbon revenue lowers the debt path; low efficiency lowers the growth path




**Earmarking 0.5% of GDP:** debt peak 53% not 57%, same growth.

**Efficiency 0.5 not 0.7:** GDP gain 30–40% lower, same debt.

**Tax financing:** debt flat, GDP slightly higher.

GIMF-lite, 1% of GDP a year of public investment for ten years; year 10.

Source: Working paper 6.5, Table 3 (default illustrative calibration).

# For low-income borrowers, concessional finance changes the debt path, not the growth path

| DIGNAD-lite, stylized program | GDP yr 10 | GDP yr 20 | Debt yr 10 | Debt peak (yr 20) |
|---|---|---|---|---|
| **30% grants, 30% concessional, 40% commercial** | 1.02% | 1.36% | 55.3% | 56.0% |
| **All commercial** | 1.04% | 1.36% | 57.6% | 58.4% |
| **Difference** | −0.02 | 0.00 | −2.3 | −2.4 |

GDP: % above baseline; debt: % of GDP, from 50 at the start (30 concessional, 20 commercial). Half of households hand-to-mouth; efficiency 0.6. The growth case rests on efficiency and the return on public capital.

Source: Working paper 6.5, Table 3.

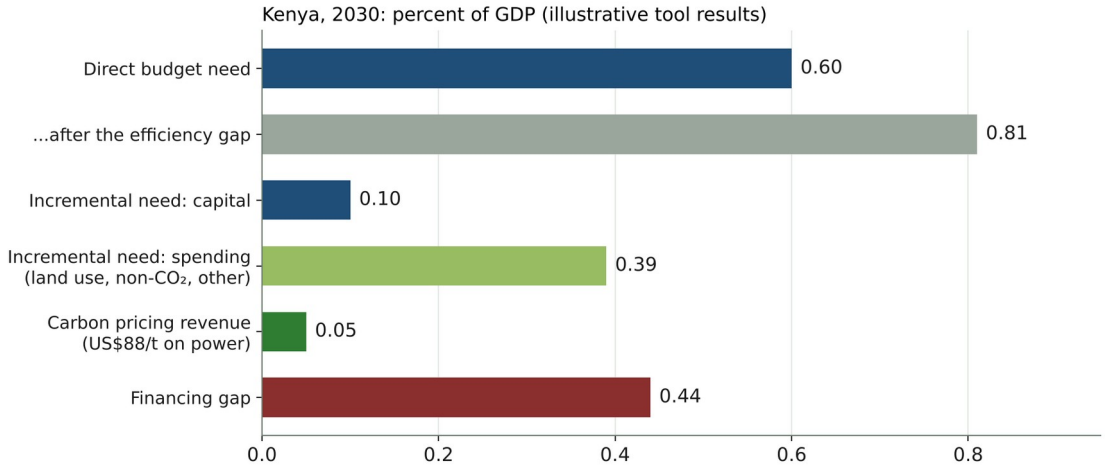
# When generators' losses bind, a tax and a feebate cut emissions equally, but only the tax raises revenue

| Instrument (default limits) | Tax (US$/t) | Feebate (US$/t) | Abatement | Binding limit |
|---|---|---|---|---|
| **Tax only** | 35 | 0 | 25.3% | Generators' loss |
| **Feebate only** | 0 | 38 | 24.5% | Generators' loss |
| **Best mix** | 30 | 6 | 25.4% | Generators' loss |
| **Tax only, tariff rise capped at 2%** | 25 | 0 | 20.1% | Visible tariff |

Rebating to households would not raise the feasible price; compensating or retiring high-emitting plants would. If generators recover less of the carbon cost, the feasible tax falls to US$22.

Source: Working paper 6.5, Table 4; stylized power sector (2.Source/pricing_screen.py).

# Kenya's net zero program needs 0.5% of GDP a year, mostly land use and non-$CO_2$, and pricing pays for little




Kenya, 2030, % of GDP; illustrative tool results, not official estimates.

**Grid over 90% renewable:** oil power emitted 0.74 $MtCO_2$ in 2024 (Ember).

**Tax of US$88/t** raises 0.05% of GDP: about 5% of the need to 2050.

**Weak delivery** adds a third to the bill (0.81 vs 0.60).

Source: Macro-Fiscal-Energy Scenario Tool, Kenya run (2026); Ember (2026); working paper 6.5, Table 5.

# The program adds 7 points of GDP to Kenya's debt by 2050, and the published DSA confirms the high risk it starts from

| Kenya | Tool (illustrative) | Public figure |
|---|---|---|
| **GDP effect, 2050** | +0.26% (+4.6% cross-check) | |
| **Debt added by 2050** | +7.2 pts vs debt held at 67.3% (2024) | IMF: 71–74% in 2025–30 |
| **Debt-carrying capacity** | Medium (2.73) | Medium (3.01) |
| **Risk of debt distress** | High, before and with | High |

The tool lacks trade data (hence 2.73) and a real exchange rate: depreciation in 2023–24 drove the DSA's latest upward revision.

Source: Tool, Kenya run; IMF WEO database (2026); IMF Country Report 24/13 (joint DSA, Dec 2023).

# The tool compares packages for one country; it does not forecast or replace a debt sustainability analysis

**Lite models are not their parents:** one country, one good, fixed real exchange rate; checked against theory, not yet against GIMF or DIG.

**Defaults stand in for data:** return on public capital, hand-to-mouth share, grants, trade.

**The model families disagree** where it matters: energy savings and private investment. Treat the gap as a finding.

**The debt test has no judgment** and no depreciation stress; start from the published DSA.

Source: Working paper 6.5, Limits and use.

# What to do

## What the tool shows

**Financing and efficiency** move debt and growth more than size.

**The binding limit** decides whether pricing raises revenue.

**Kenya:** small need, mostly not energy; pricing covers ~5%.

**Debt risk** is set by the starting position.

## Actions

**Ministries:** compare financing packages, not program sizes.

**Start from the DSA,** add the depreciation stress.

**Fix efficiency** before scaling up.

**Price around the binding limit;** fund land use with grants and concessional loans.