

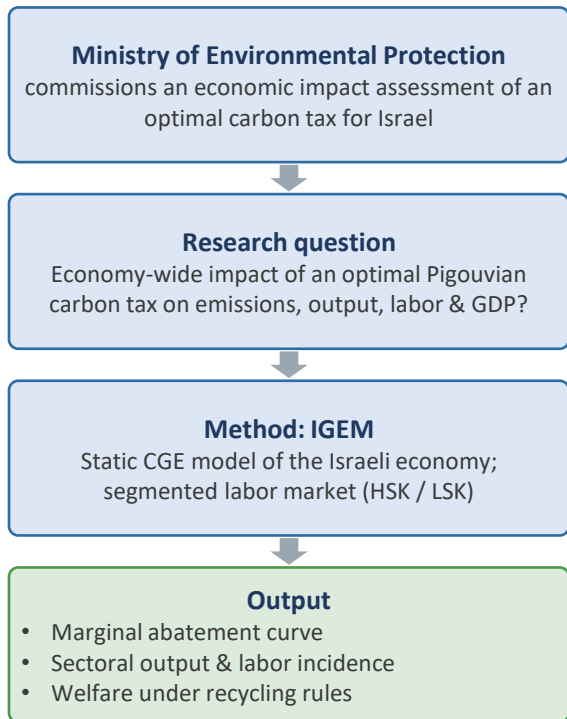
Optimal versus Politically Feasible Carbon Pricing

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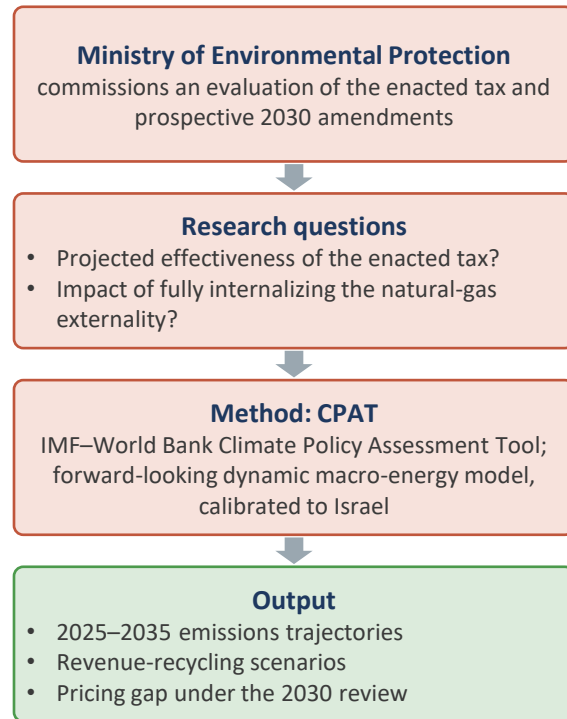
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Introduction: Two-Stage Research Design

STAGE 1 · Ex ante (pre-implementation)



STAGE 2 · Ex post (post-implementation)



Carbon Tax in Israel - Design & Coverage Gaps

Internalization by 2030

Fuel	2030 Internalization
Coal	100% ✓
Petcoke	100% ✓
Fuel oil	100% ✓
LPG	100% ✓
Natural gas	~30% ✗
Diesel / Gasoline	Not Included

** Existing excise exceeds carbon damage but is not labelled carbon pricing.*

Introduction: The Forces That Made Carbon Tax Politically Feasible

NDC obligations

Israel committed to -27% GHG by 2030 and -85% by 2050 (vs. 2015 baseline). The Ministry of Environmental Protection is finalising the updated NDC for government approval.

Fiscal pressure

The geopolitical crisis of 2023–2024 widened Israel's fiscal deficit to 8.3% of GDP (Aug 2024) — creating an urgent revenue need that made a carbon tax attractive.

EU CBAM effect

The EU Carbon Border Adjustment Mechanism (operative 2026) applies to Israeli exports. The industrial lobby shifted from opposition to conditional support.

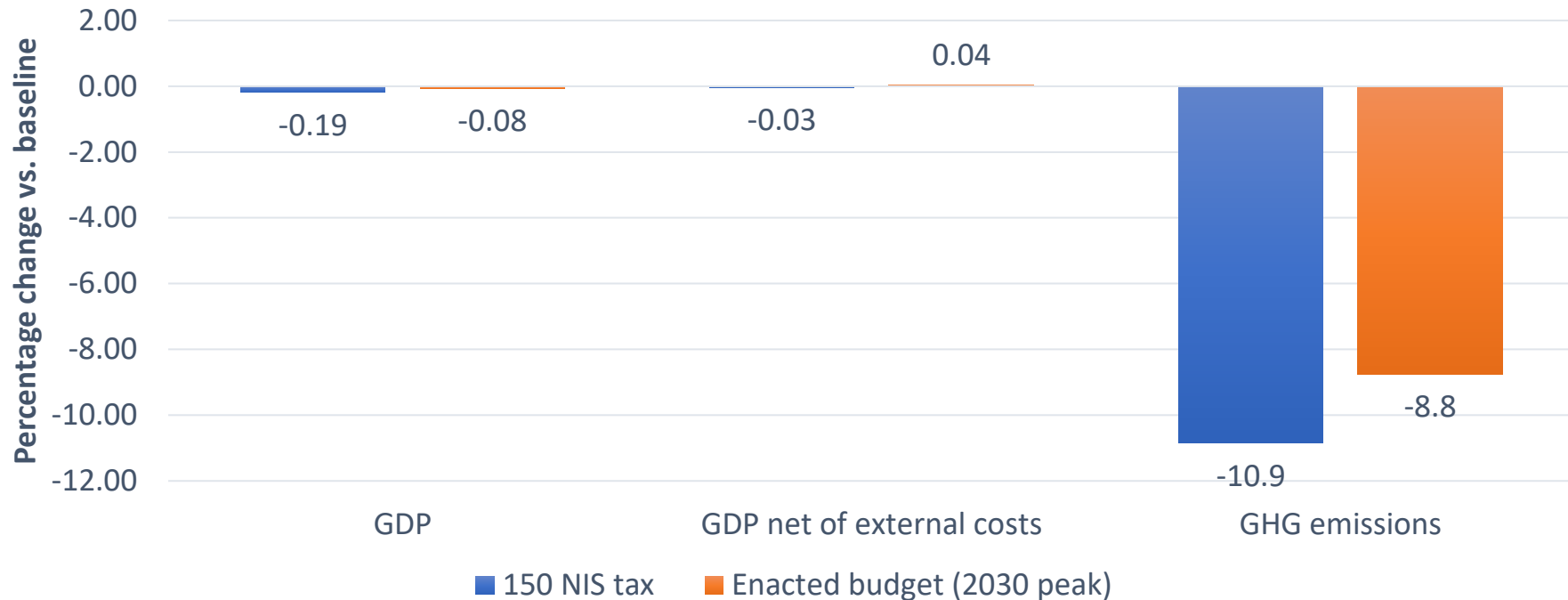
Stage 1

what is the impact of optimal Pigouvian carbon tax on emissions, labor and GDP?

Israeli General Equilibrium Model (IGEM)

- Static, multi-sector, open-economy Computable General Equilibrium (CGE) model Palatnik & Shechter (2010)
- Updated to 2014 Social Accounting Matrix (CBS input–output tables)
- 28 sectors · 10 energy intensive sectors
- Three revenue-recycling scenarios: lump-sum transfers · income-tax cut · indirect-tax cut

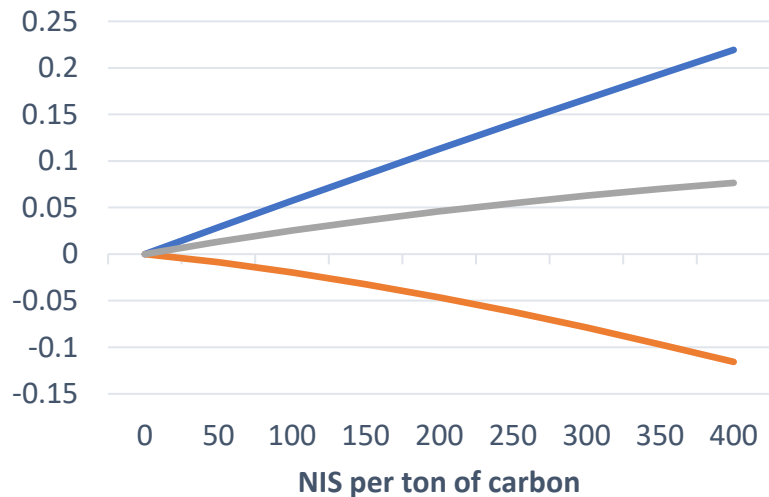
IGEM: Optimal Pigouvian Tax vs. Enacted Budget at 2030 Peak



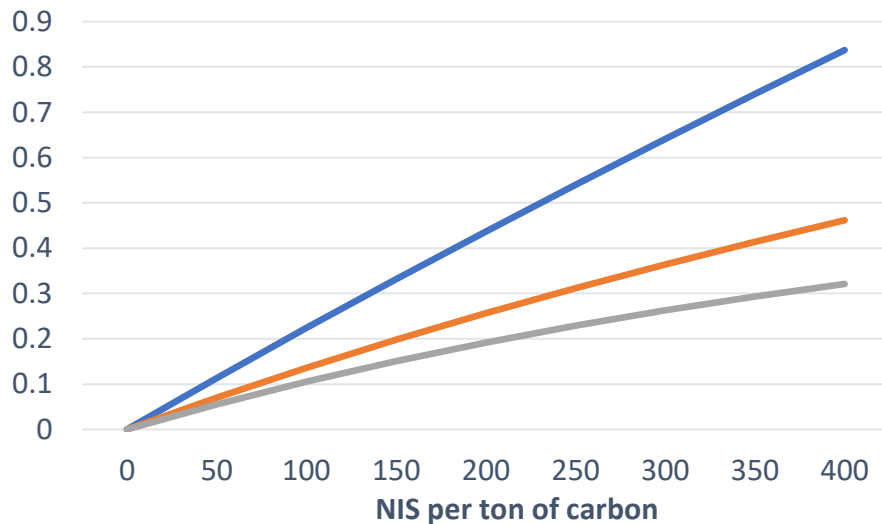
Political constraints cost ~2pp of emissions reduction (–10.9% 150 nis transfer scenario vs. –8.8% enacted) at near-zero extra GDP cost.

IGEM Results: Unemployment Effects by Skill Group

(a) High-Skilled workers



(b) Low-Skilled workers



— Lump-sum transfers — Income-tax cut — Indirect-tax cut

LSK unemployment rises under all schemes (binding minimum wage). HSK falls slightly under income-tax recycling — employment double dividend confirmed.

Stage 2

What are the projected impacts of the enacted carbon tax and the full internalization of natural gas externalities?

Climate Policy Assessment Tool (CPAT)

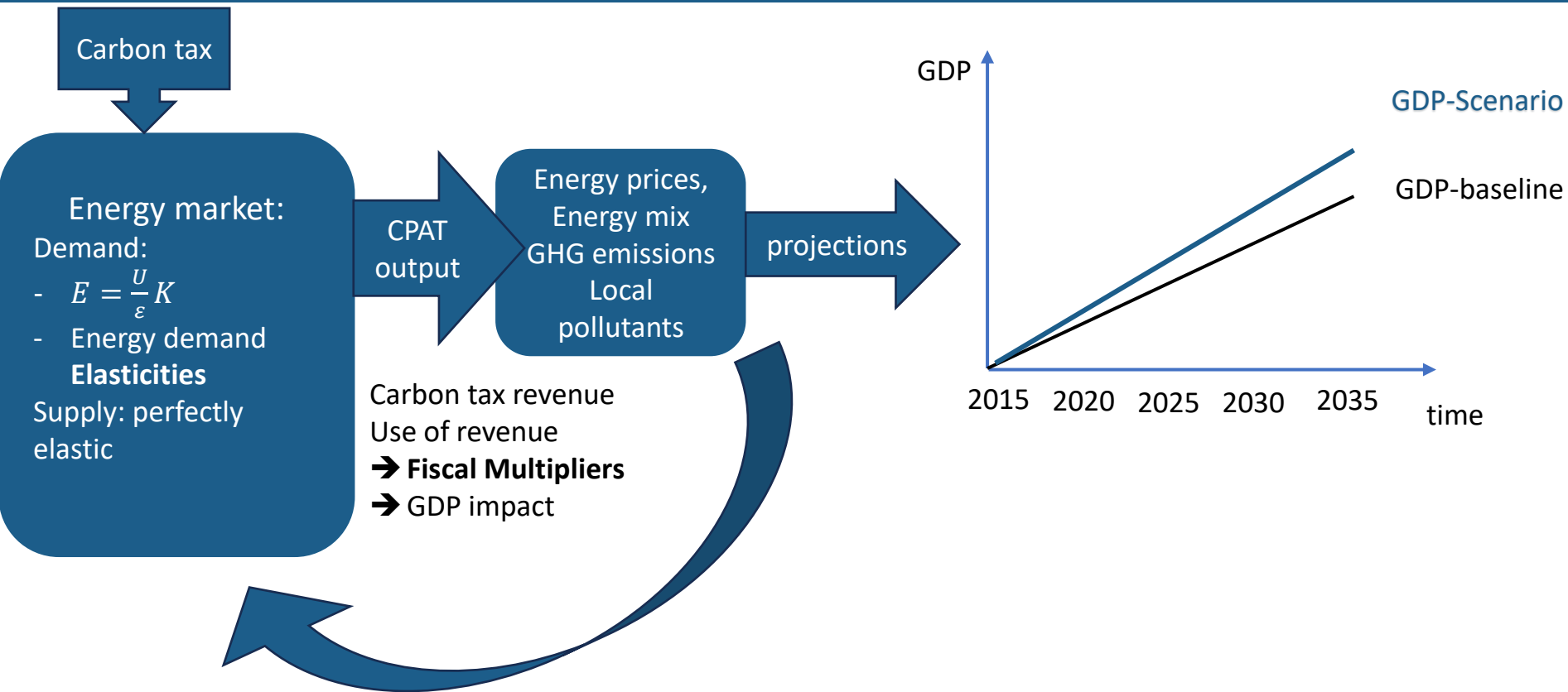
What is CPAT?

- Dynamic reduced-form macro-energy model · IMF & World Bank
- Used in IMF country work: Germany, Finland, Belgium, Cyprus, Mexico, France and many more
- Modules: mitigation, distributional incidence, transport, air quality

Israeli Calibration

- Full data reassessment vs. CBS, Bank of Israel, Tax Authority, Ministry of Finance, Ministry of Transport and Road Safety, Ministry of Energy and Infrastructures
- Elasticities: IMF meta-analysis
- Fiscal multipliers: blend of IMF values
- Key parameters: green energy 30% by 2030, coal phase-out 2026, VAT 18%, population growth 1.8%

CPAT: structure



CPAT: General equation for energy demand

Sector-specific demand for energy source E = change in usage of energy-consuming products in that sector x change in energy consumption rate in that sector x previous sectoral demand for energy

$$E_t = \left(\frac{u_t}{u_{t-1}} \cdot \frac{h_t}{h_{t-1}} \right) \cdot E_{t-1};$$

$$\frac{u_t}{u_{t-1}} = \left(\frac{GDP_t}{GDP_{t-1}} \right)^{v_t} \cdot \left(\frac{h_t \cdot p_t}{h_{t-1} \cdot p_{t-1}} \right)^{\eta^u}$$

change in usage of energy-consuming products = exogenous change in usage due to GDP growth x endogenous change in usage due to change in energy prices

$$\frac{h_t}{h_{t-1}} = (1 + \alpha)^{-1} \cdot \left(\frac{p_t}{p_{t-1}} \right)^{\eta^h}$$

change in energy consumption rate = exogenous energy efficiency improvements x endogenous efficiency improvements (price-induced)

h_t^E = energy consumption rate (inverse of energy efficiency)

p_t^E = price of energy

v^E = (constant) income elasticity of demand for energy-using product (e.g. assume .5 for coal)

$\eta^{UE} < 0$ = constant price elasticity of demand for use of energy-consuming products wrt. unit energy costs (assume -.3)

$\alpha^E \geq 0$ = exogenous energy efficiency improvements (assume 1%)

η^{hE} = elasticity of consumption rate wrt. energy prices (assume -.3)

CPAT Energy Demand Equation

$$E_t = E_{t-1}^{Ei} \left(\frac{GDP_t}{GDP_{t-1}} \right)^{v_t} \cdot \left(\frac{1}{(1 + \alpha)} \right)^{1 + \eta^u} \cdot \left(\frac{p_t}{p_{t-1}} \right)^{\eta^h + \eta^u + \eta^h \eta^u}$$

sectoral
demand
for energy
 E in sector
year t

=

previous
year's
demand

x

growth effect

x

exogenous technical
change effect
(less rebound)

price effect
own price elasticity, endogenous efficiency,
x and rebound (increased efficiency increases
energy demand); e.g. ~0.51 given below
assumptions)

Where:

α^i = exogenous energy efficiency improvements (e.g. assume 1% improvement per year)

η^u = constant price elasticity of demand for energy-consuming products (intensive margin) wrt. unit energy costs (assume -.3)

v^t = (constant) income elasticity of demand for energy-using product (e.g. assume .5)

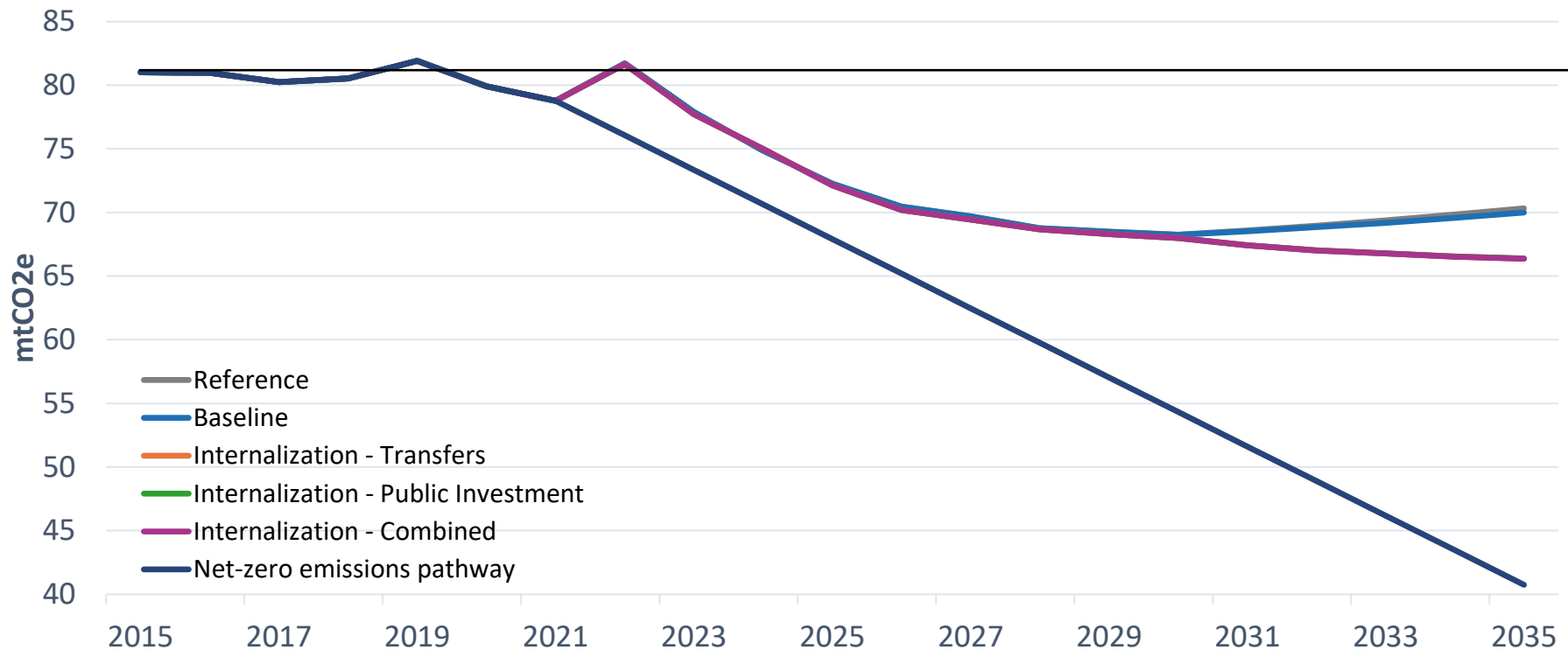
p_t = price of energy

η^h = elasticity of consumption rate (inverse of energy efficiency; extensive and fuel economy margin) wrt. energy prices (assume -.3)

CPAT: 5 Scenarios

Policy Dimension	Baseline	Reference scenario	Transfer scenario	Growth-oriented scenario	Combined scenario
Main policy targets	renewable energy target out of electricity generation of 30% by 2030 and 35% by 2035.				
Carbon Policy	2025-2030: The current taxation policy 2030-2035 The current taxation policy adds real annual growth of 1.9% to the tax	2025-2030: The current taxation policy 2030-2035 The current taxation policy	2025-2030: The current taxation policy 2030-2035 The current taxation policy adds real annual growth of 1.9% to the tax of fuels, -The tax on natural gas increases progressively until it reaches a level equivalent to 100% by 2035.		
Use of Tax revenue	25% to transfers 75% to the current government spending			Until 2030: 25% to transfers 75% to the current government spending From 2031: 30% to public investment 70% the current government spending	Until 2030: 25% to transfers 75% to the current government spending From 2031: 25% to public investment. 25% to transfers 32.4% labor tax reductions 17.6% corporate taxes reductions

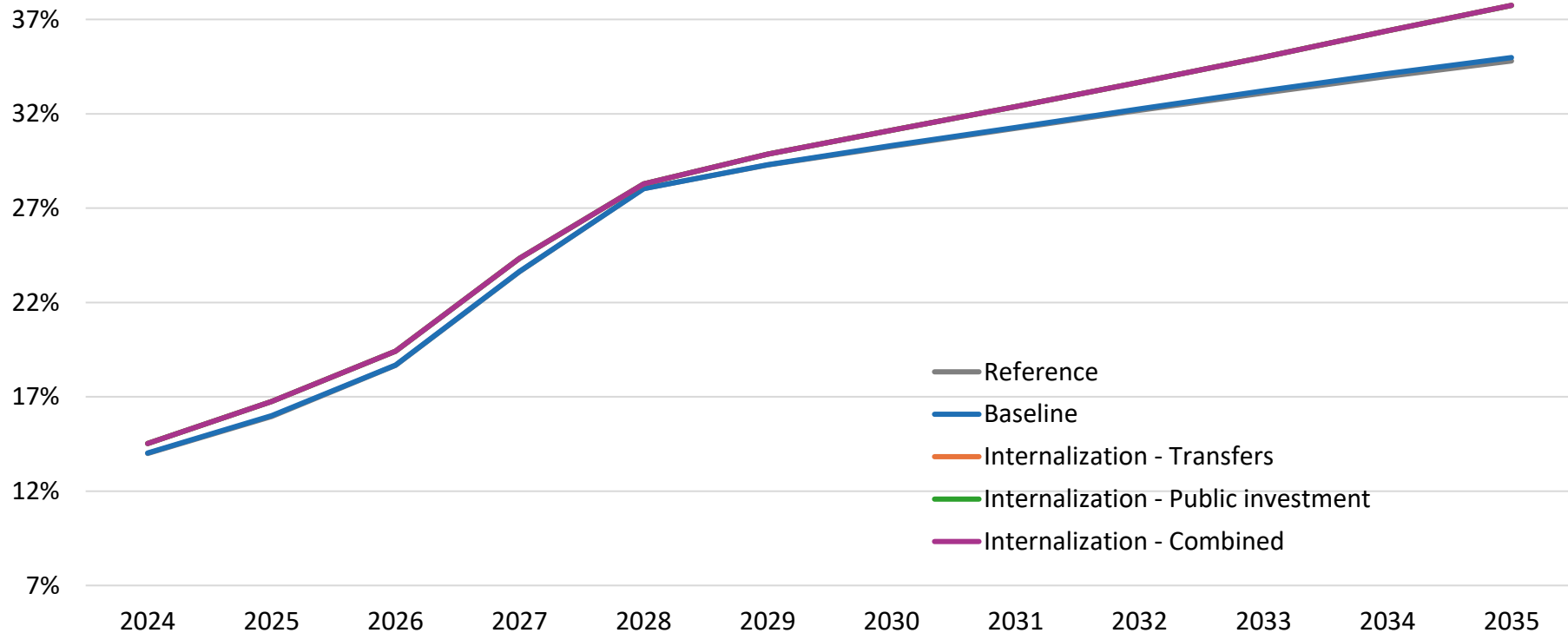
CPAT Results: GHG Emissions Trajectories 2024–2035



Reference rebounds after 2030. Full gas internalization → sustained –18% by 2035 (vs. –13% reference).

Different recycling barely affects emissions.

CPAT Results: Renewable Share in Electricity



Current policy supports 30% target by 2030. Full gas internalization adds ~3pp more, reaching ~38% by 2035.

CPAT approach (World Bank)

- **Sources:** World Bank model (MFMOD) + tax–GDP studies (Schoder 2022).
- Per 1 pp-of-GDP change in a tax or spending item; 100+ countries.
- Aggregated by income group; lagged one year.

Israel Treasury (DSGE)

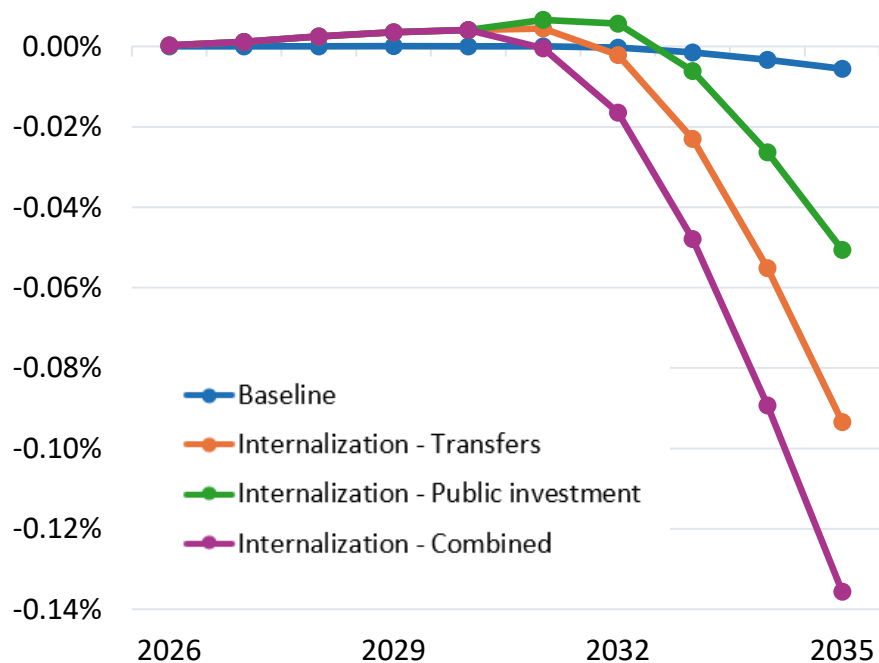
- Treasury ran its own DSGE analysis.
- **Indirect tax multiplier: -0.30**
- **Direct tax multiplier: -0.54**

Which income group? Israel was first classed high-income. But the lower a country's group, the higher its long-run investment multiplier — and with much public infrastructure (e.g. transport) less developed, we averaged high-income with upper-middle-income, a better fit for Israel.

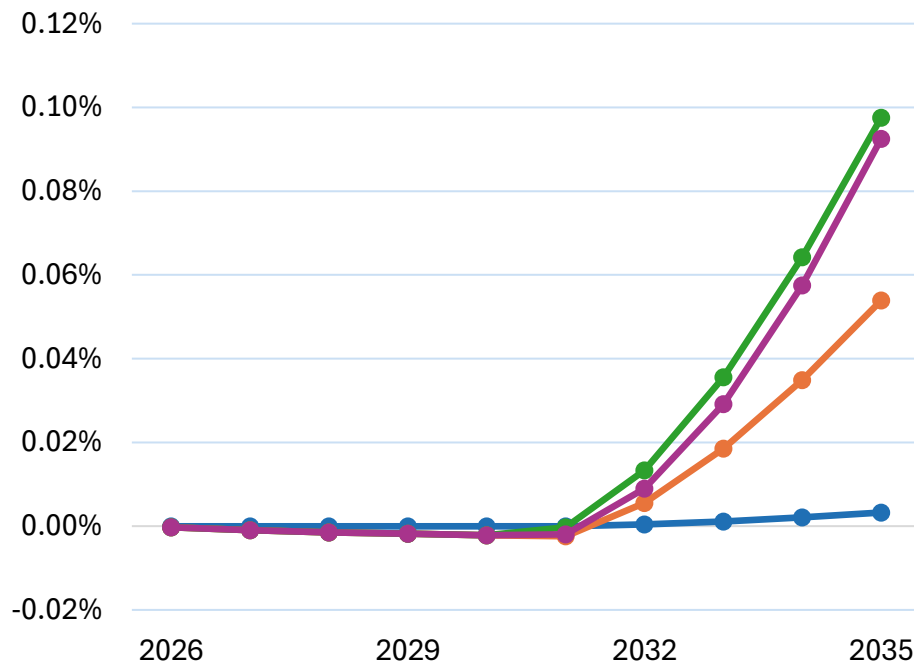
Impact on results: The Treasury's multipliers raised overall GDP. Otherwise, results were largely unchanged.

CPAT Results: GDP Impact Relative to Reference

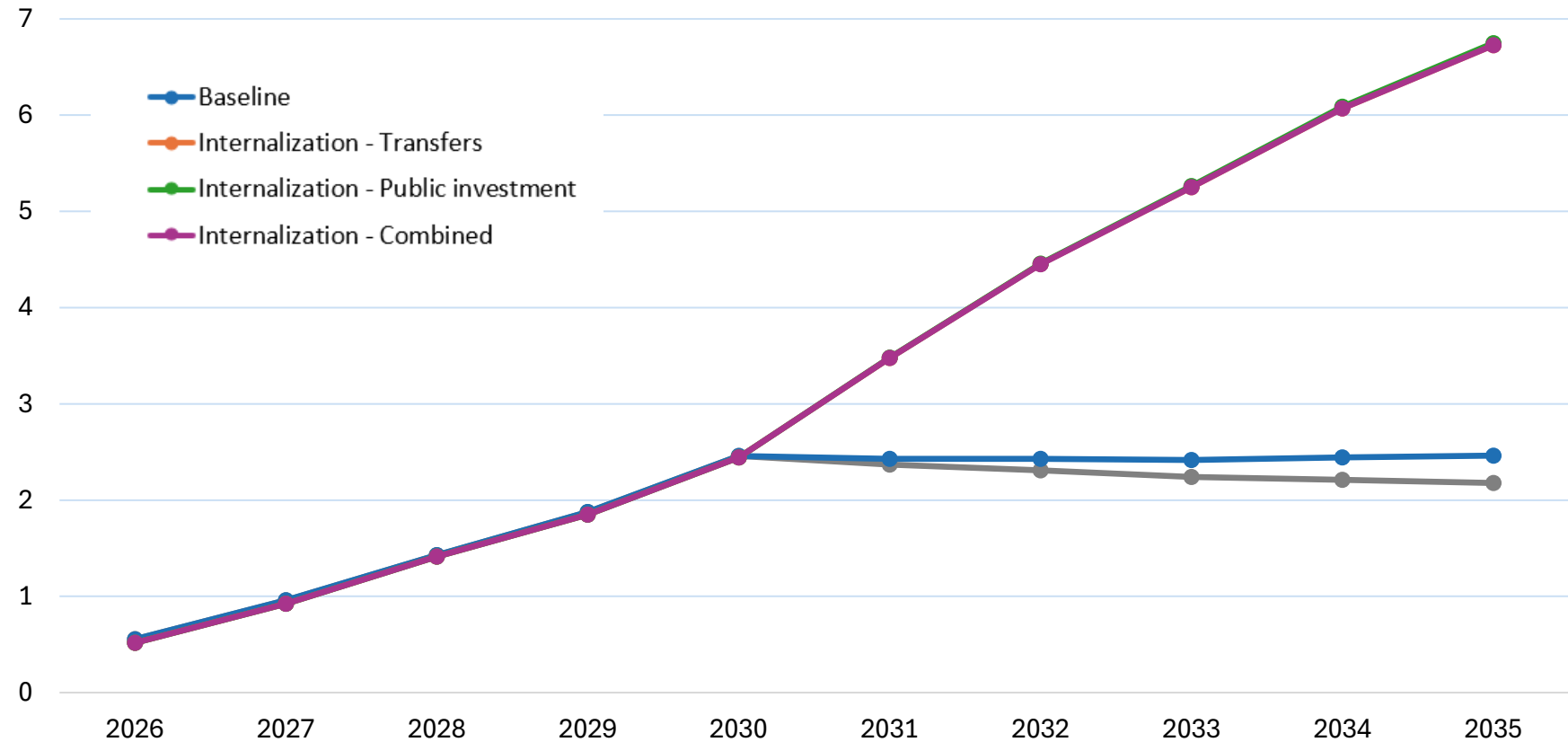
Original Model Multipliers



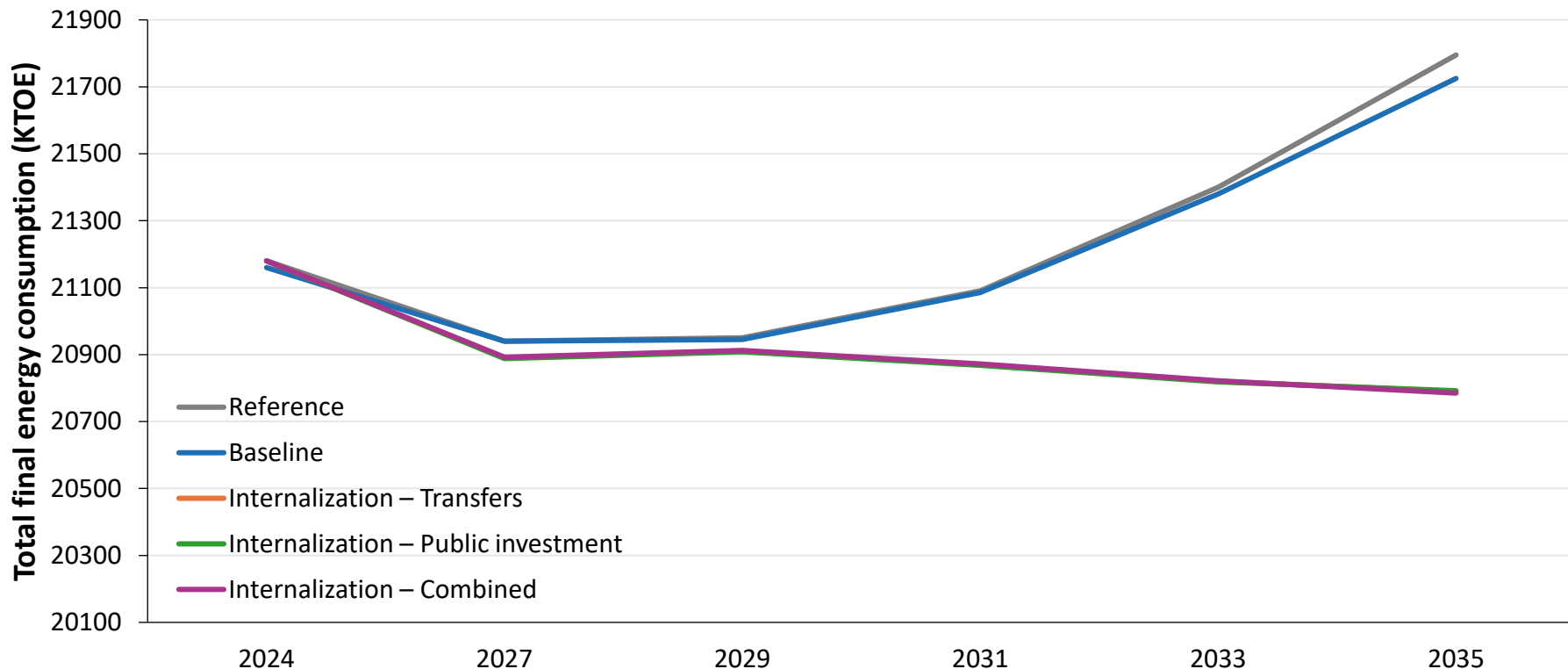
Treasury Multipliers



CPAT Results: Revenues

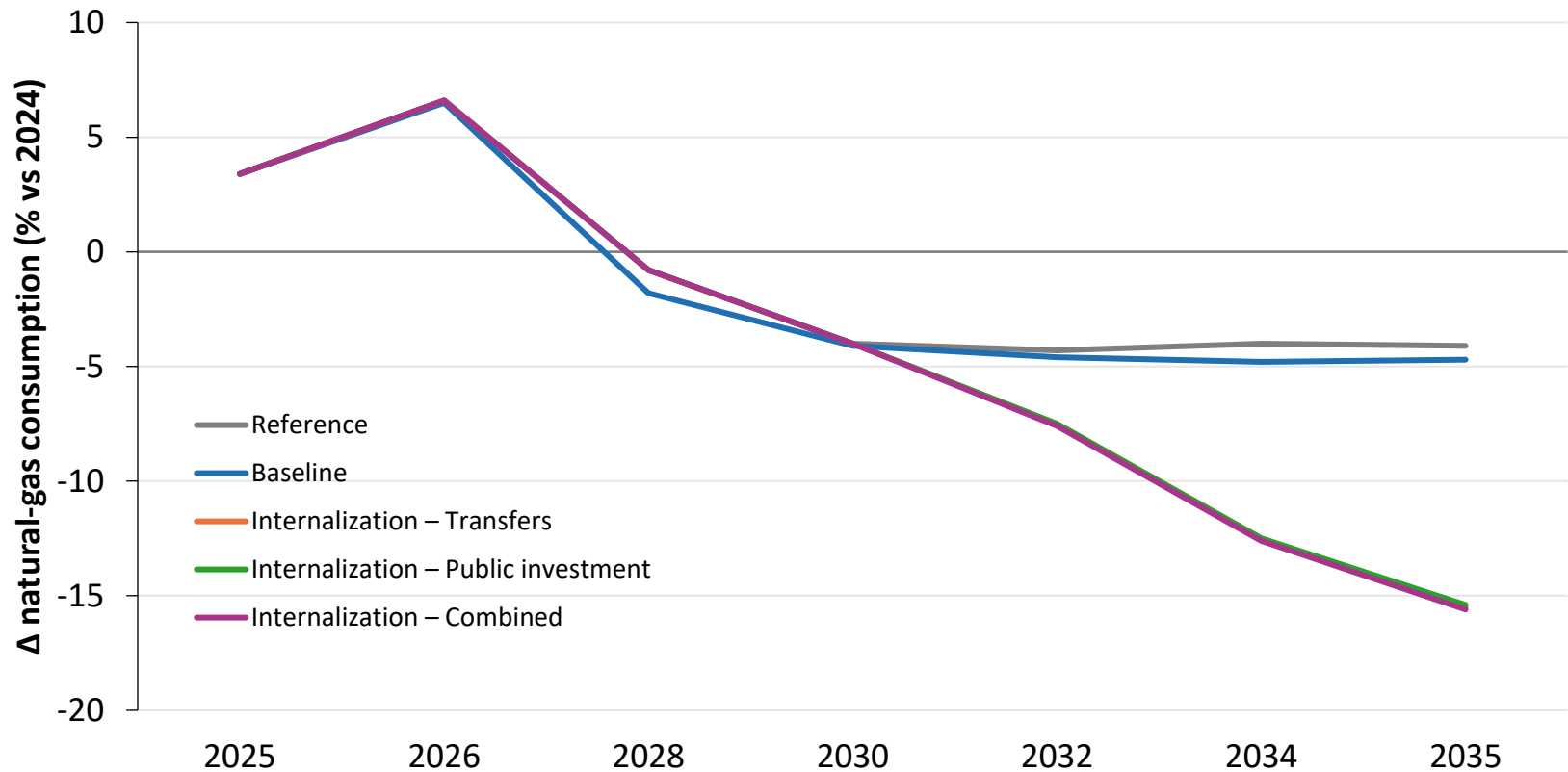


CPAT Results: Total Energy Consumption



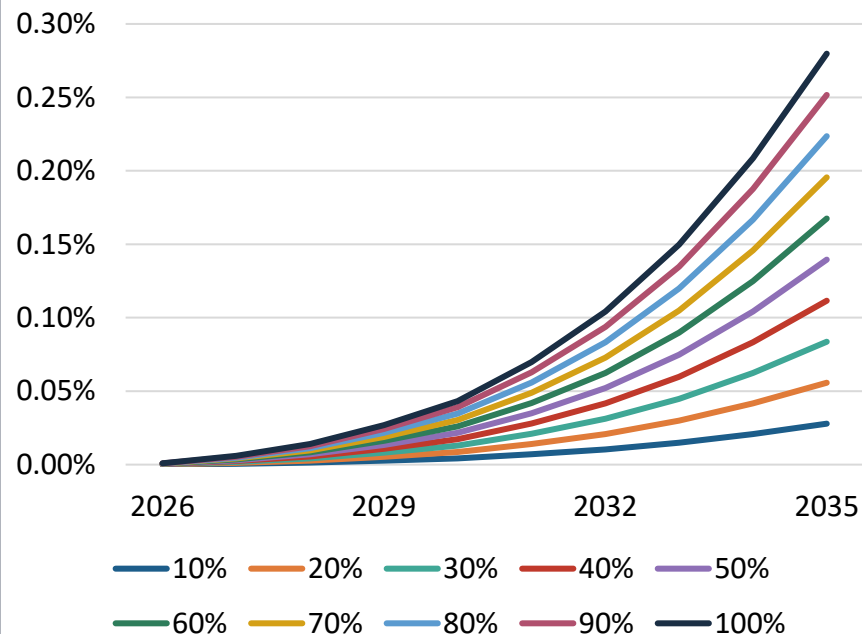
~925 KTOE cut (4.2%) by 2035 under full internalization — mainly less natural-gas use.

CPAT Results: Change in Natural-Gas Use Relative to 2024

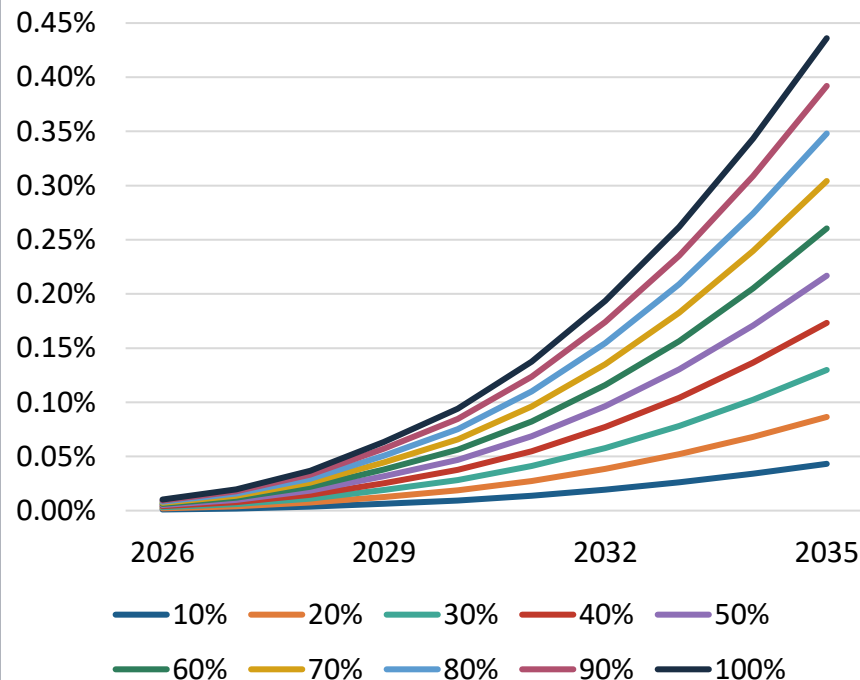


Sensitivity Analysis: Revenue-Use Impact on GDP

Investment VS current government spendings



Investment VS Transfers



Public investment generates strongest GDP gains. Revenue recycling choice matters more over time.

Cross-model convergence

Both models yield relatively close projections for GHG emissions and GDP.

Emissions & climate

Full internalization of natural gas externalities is projected to increase emissions reduction to ~18% by 2035 and raise the share of renewable energy by an additional ~3 percentage points.

GDP & revenues

The tax has no significant adverse macro impact. Revenues increase enabling growth-supporting investment.

Revenue recycling

Tax revenue recycling has limited effects on emissions but significant effects on macroeconomic variables, making it an important tool for economic support.

Tax Effectiveness

After 2030, holding the tax constant reduces its effectiveness, indicating the need for continued real tax increases and full internalization of natural gas externalities.

Thank You

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Questions & Discussion
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Further Research Pathways for CPAT

Local Pollutants Module

Quantify health co-benefits (PM_{2.5}, NO_x, SO₂) — direct external benefit channel not yet fully monetised in the analysis.

Household Distribution

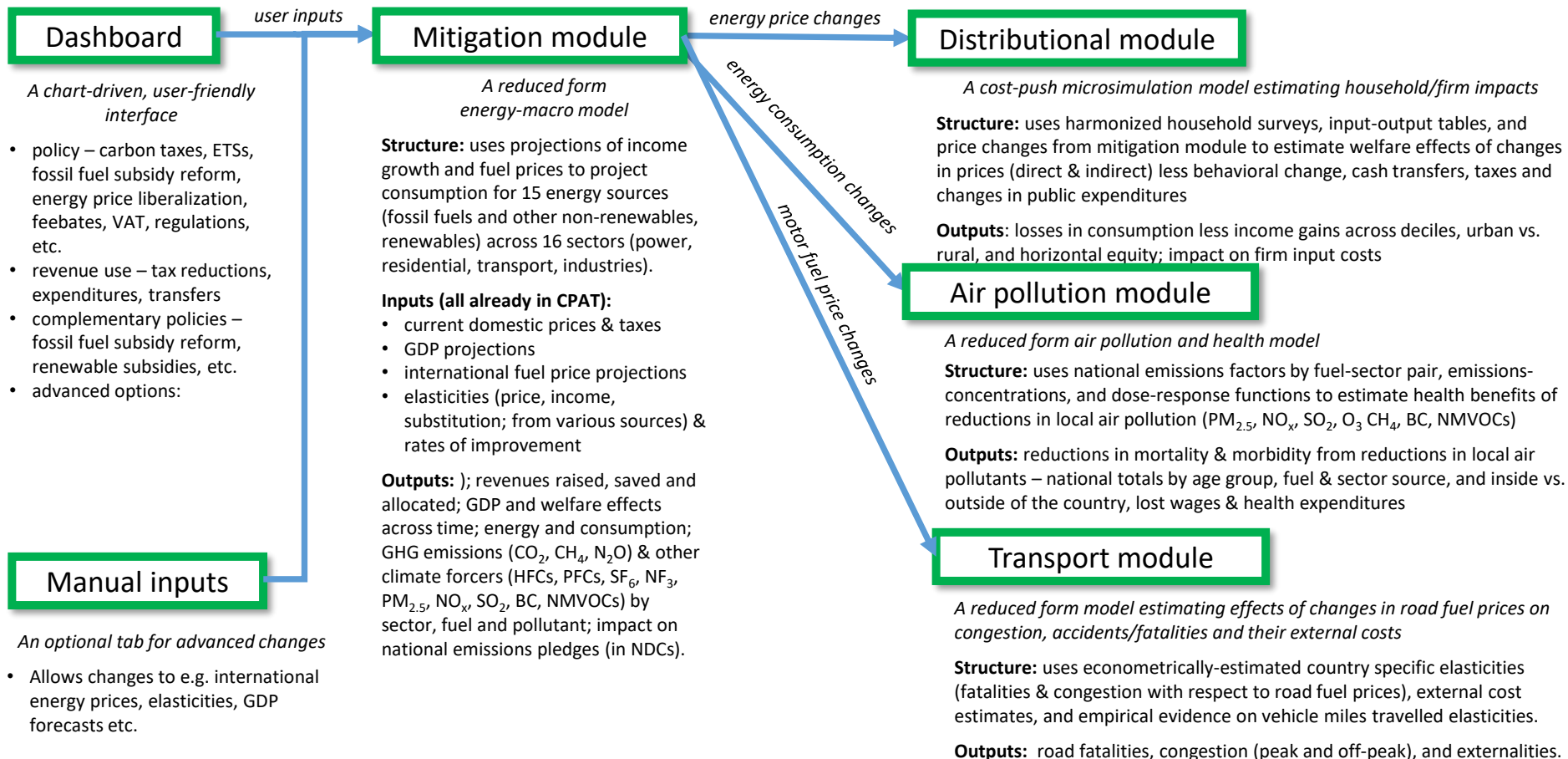
Distributional incidence across income deciles: who gains and who loses from the tax and each recycling rule.

Transport Module

Impact on transport modes, road-fuel demand, congestion and road-safety externalities.

Revenue-Use Extensions

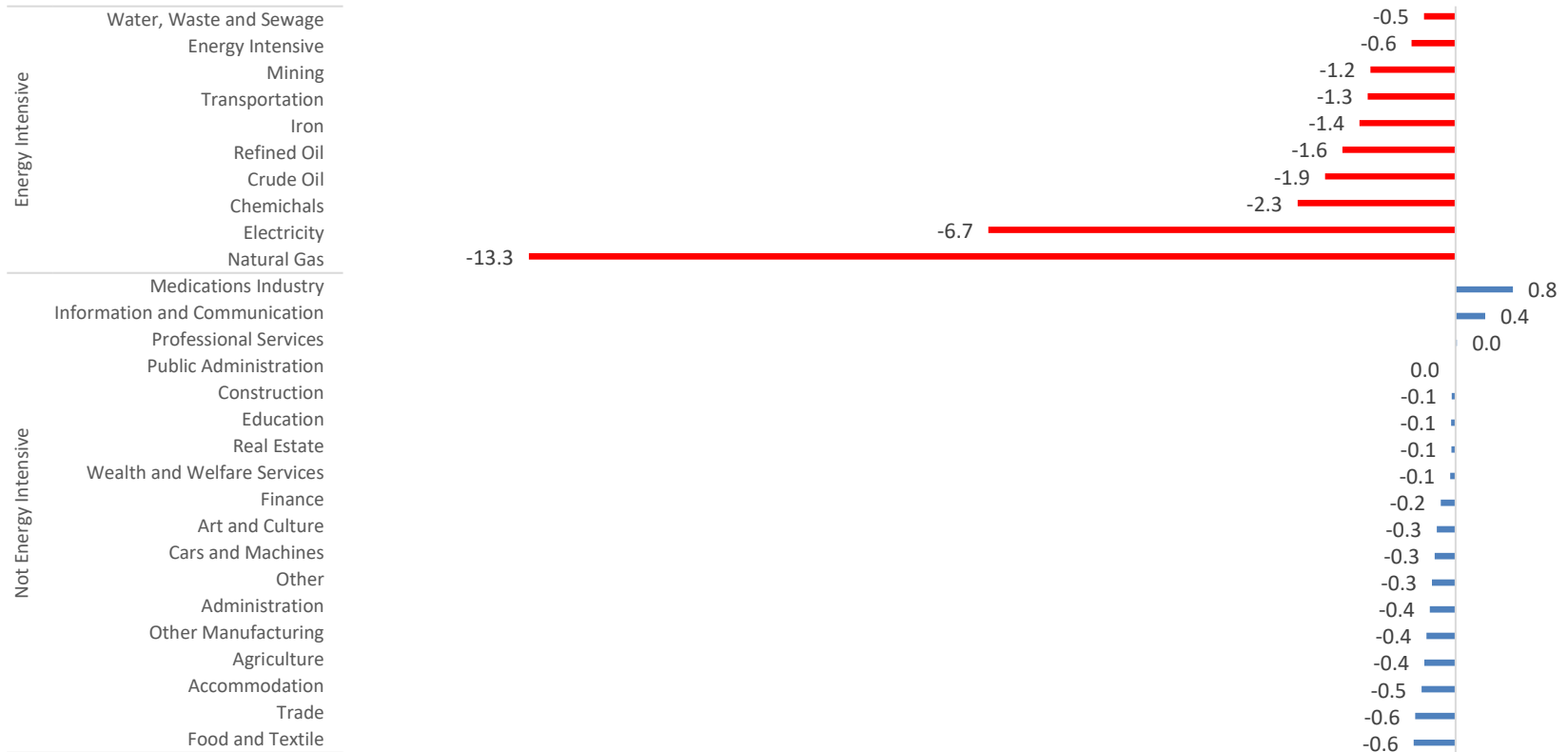
Broader recycling alternatives: targeted green investment subsidies, social security contribution cuts, and hybrid designs.



CPAT Calibration

Name	Value
Solar share in the energy mix in 2030	28%
Solar share in the energy mix in 2035	33%
Wind share in the energy mix in 2030	2%
Coal Use from 2026	0
VAT from 2025	18%
Population Growth	1.8%
GDP	CPAT model - close to data from CBS
Capacity factor of solar	19.7%
Fuels and solar prices	The Ministry of Energy and Infrastructure
Emissions	CBS
Energy mix	CBS

IGEM Results: Sectoral Output at NIS 150/tCO₂



Natural gas (–13%) and electricity (–6.7%) most affected. Info & comms and pharma expand slightly.