`

CENTRAL BANK OF TRINIDAD & TOBAGO

WORKING PAPER SERIES

WP 01/2026
MARCH 2026

The Macroeconomic Effects of Introducing a Carbon Tax in Trinidad and Tobago

Janelle D. Spencer, Andell Nelson, Lauren Sonnylal and Christopher Wanliss

RESEARCH DEPARTMENT

ABSTRACT

Trinidad and Tobago ranked as the highest per capita emitter of carbon dioxide in Latin America and the Caribbean in 2023, with estimated emissions of approximately 22.8 metric tonnes of CO_2-equivalent per person. In support of the country's Nationally Determined Contributions (NDCs) and broader climate mitigation efforts, this paper assesses the macroeconomic and environmental implications of introducing a domestic carbon tax. Using the IMF–World Bank Carbon Policy Assessment Tool (CPAT), a set of calibrated policy scenarios are developed to evaluate how carbon pricing (combined with complementary fiscal measures) affects emissions, economic activity, and external balances. The results indicate that even a moderate carbon tax can meaningfully curb emissions, reducing total greenhouse gases by up to 24.8 per cent by 2035 and enabling Trinidad and Tobago to meet its conditional NDCs ahead of schedule. Carbon taxes generate substantial fiscal revenue and effectively targets high-emitting sectors, while the implementation of subsidy reform and strategic revenue recycling further supports economic activity and enhances distributional outcomes. All scenarios maintain a current account surplus, although revenue recycling produces a mild softening of the external balance in later years due to stronger domestic demand. Notwithstanding these benefits, the modelled carbon price path remains below levels typically associated with limiting global warming to 2°C, and methane and nitrous oxide emissions exhibit limited sensitivity to carbon pricing alone. Overall, the findings suggest that carbon taxation, when integrated within a broader policy framework, offers a viable pathway for Trinidad and Tobago to advance its climate commitments without compromising macroeconomic stability.

JEL Classification Numbers: H230; Q280
Keywords: Carbon Tax, Climate Change, Climate Policy Assessment Tool, Trinidad and Tobago

WORKING PAPER SERIES

Publisher:

Central Bank of Trinidad and Tobago

P.O. Box 1250, Eric Williams Plaza

Independence Square, Port of Spain

Phone: (868) 621-2288; (868) 235-2288

Email: info@central-bank.org.tt

URL: www.central-bank.org.tt

Disclaimer: The Working Papers Series includes papers that are primarily written by Central Bank of Trinidad and Tobago research economists in order to solicit comments from interested readers and to stimulate discussion. The views expressed are those of the authors and not necessarily those of the Central Bank. Comments can be sent to commentsWP@central-bank.org.tt.

THE MACROECONOMIC EFFECTS OF INTRODUCING A CARBON TAX IN TRINIDAD AND TOBAGO

Janelle D. Spencer, Andell Nelson, Lauren Sonnylal and Christopher Wanliss

Introduction

As countries advance in their net-zero carbon emissions ambitions, various climate mitigation and adaptation strategies have been adopted to support these agendas. Policymakers have at their disposal a wide array of instruments to aid in emissions reduction, such as emission pricing schemes, standards and regulations, tradable permits, voluntary agreements, and feebates[1], among others. Emission pricing schemes, in the form of carbon taxes, have emerged as one of the more popular instruments due to its cost-effectiveness and ability to generate revenue (OECD 2022) .

Carbon taxes are 'Pigouvian taxes', a type of environmental tax first introduced by Arthur Pigou in the 1920s that price individual environmentally harmful activities (Köppl and Schratzenstaller 2023). The tax is levied on activities that create negative externalities, such as pollution, thus internalising the cost of pollution and climate damage into market prices. This results in consumers paying more, leading to an incentivised reduction in carbon emissions and increased adoption of clean energy alternatives across economic sectors. The implementation of carbon taxes as a policy instrument originated in the 1990s in both Finland and Poland. As at April 2025, 95 jurisdictions have adopted carbon pricing compliance instruments (implemented, under development or under consideration) at the national (52) and subnational (43) levels. Of the 80 carbon pricing instruments implemented to date, 37 are emissions trading schemes (ETS) and 43 are carbon taxes **(Appendix 1)**. Together, these instruments cover approximately 28.0 per cent of global greenhouse gas (GHG) emissions, equivalent to about 14.7 gigatonnes of carbon dioxide equivalent ($GtCO_2e$). (World Bank Group 2025). Carbon tax rates vary widely, ranging from US$0.73 per tonne of CO_2 equivalent (CO_2e) in Ukraine to US$158.8 CO_2e in Uruguay. Similarly, the proportion of national GHG emissions covered by carbon taxation varies, from 2.9 per cent in Spain to 98.0 per cent in Norway (World Bank Group 2025).

As part of global efforts to reduce carbon dioxide (CO_2) emissions, Trinidad and Tobago has explored carbon pricing as a potential emissions-reduction instrument as part of its nationally determined contributions (NDCs). Within this context, a home-grown "Carbon Reduction Strategy" was developed which identifies key emitting sectors for intervention; the power generation, transportation and industrial sectors. Technical work by the Ministry of Planning, Economic Affairs and Development, in collaboration with the United Nations Framework Convention on Climate Change (UNFCCC) and consultants, have noted that two of the most feasible carbon pricing approaches for consideration in Trinidad and Tobago are an economy-wide carbon tax or a specific installation carbon tax (Ministry of Planning and Development 2022). As such, this paper undertakes a country-level assessment of the potential macroeconomic impact of introducing a carbon tax domestically.

To assess the implications of a carbon tax in Trinidad and Tobago, the International Monetary Fund-World Bank (IMF-WB) Climate Policy Assessment Tool (CPAT) was calibrated to the domestic context. CPAT is an analytical framework designed to simulate the economic, emissions, and distributional impacts of climate policies, including carbon taxation, across multiple countries. Accordingly, it can support policymakers in the design and implementation of effective, efficient and equitable climate policy measures. In this vein, three carbon tax scenarios were developed,

[1] A feebate is a revenue-neutral environmental policy mechanism that levies a charge on purchasers of high-emission products, while redistributing those revenues as rebates to buyers of low-emission products.

each incorporating additional layers of complementary policies and reforms to evaluate the potential macroeconomic effects of a carbon tax.

The rest of the paper is structured as follows: **Section 2** reviews the theoretical and empirical literature on carbon taxes and their impacts. **Section 3** provides stylised facts on Trinidad and Tobago's emissions, climate vulnerabilities and progress toward decarbonisation. **Section 4** outlines the CPAT framework used to assess the macroeconomic impact of a carbon tax on the domestic economy under three key scenarios. **Section 5** discusses the results and **Section 6** concludes with some recommendations and a way forward.

2. Literature Review

Widespread use of fossil fuels, among other factors, has contributed significantly to GHG emissions, leading to accelerated climate change and its adverse impacts. In line with the goals of the Paris Agreement, to limit global average temperature increases to well below 2ºC above pre-industrial levels, substantial reductions in emissions are required across all sectors. However, firms and individuals have historically failed to internalise the environmental costs of their activities, resulting in a misalignment between private incentives and societal well-being. This gap between private and social costs represents a classic case of market failure, where pollution is not appropriately priced into economic behaviour (Metcalf 2021). According to Metcalf (2021), this divergence equals the marginal damage from pollution and underscores the need for corrective policy tools. One such approach is pollution liability, which refers to taxes and pricing mechanisms designed to influence the behaviour of producers and consumers by accounting for environmental externalities (Eurostat 2010).

Applying environmental taxes to internalise externalities was first introduced by Arthur C. Pigou[2] in 1920 and is based on the 'polluter pays' principle. This principle suggests that the costs of pollution should be borne by those who cause it, and it typically takes the form of a fiscal tax collected by the government. Theoretically, environmental taxes are intended to control pollution by introducing a charge 'per unit of emissions' (per tonne of CO_2 equivalent), which leads emitters to cut emissions - as long as it is less costly than paying the environmental tax (IMF et al., 2024). Furthermore, it creates a price signal for final consumers and other firms to lower their consumption of carbon-intensive products. This market-based measure creates a source of revenue to aid in the green transition process, with its main aim being to stimulate the adoption of cleaner technology while reducing dependence on fossil fuels.

Governments and environmental experts are increasingly recognising the role of carbon pricing in transitioning to a decarbonised economy by capturing external costs of GHG emissions, such as crop damage, healthcare costs, and property loss. Carbon pricing connects emissions to their sources through a monetary value, typically in the form of a price on carbon dioxide emitted (World Bank Group 2025). This is often paired with an Emissions Trading System (ETS) that allows emitters to trade units of emissions to meet their targets. In an ETS market, large emitters can purchase allowances from low emitters. Both approaches provide a strong incentive for emitters to invest in reducing their emissions to either lower their tax payments or to lower the cost of buying GHG allowances (IMF et al. 2024)

Evolving from Pigou's idea of environmental taxes, carbon taxes have become one of the more effective metrics used to account for negative externalities related to GHG emissions, while also reducing environmental degradation (Manta et al. 2023). It can be implemented in various forms, such as imposing a tax on fossil fuels based on CO_2 emissions during consumption. This penalises fuels with higher carbon content, such as coal and petroleum coke, more than

[2] Arthur Cecil Pigou, "The Economics of Welfare," *Macmillan: London*, 4th edition (1932).

those with lower carbon content, such as natural gas. Alternatively, a carbon tax can be imposed on goods or services based on CO_2 emissions during production (Timilsinas 2018). One of the main advantages of implementing a carbon tax is that, by its nature, it can impact various parts of an economy including electricity production, manufacturing, and transportation, inter alia. This instrument also presents a lower degree of administrative complexity in contrast to other carbon pricing mechanisms. Most jurisdictions have robust tax collection systems; therefore, adjusting the system to account for collections from fossil fuels can be easily executed (Metcalf 2021).

Nevertheless, policymakers have historically been hesitant to implement carbon taxes, with voter attitudes and misconceptions playing a major role. According to Carattini, Carvalho, and Fankhauser (2017), voters often underestimate environmental taxes' benefits and costs, overlooking indirect subsidies funded by higher income taxes or electricity rates. Opposition often stems from suspicions about government intentions to increase revenue rather than reduce GHG emissions. Therefore, determining how revenues from a carbon tax should be spent becomes an integral component of its design. This is referred to as revenue recycling. Three of the most popular revenue recycling strategies are to publicly earmark proceeds for a specific agenda like public transport improvements; compensating low-income households via lump-sum transfers to offset distortionary household income effects; or using tax proceeds to proportionately reduce the fiscal distortions of other taxes on labour, profits or consumption, all to secure full or partial revenue neutrality.

Studies on carbon tax implementation are either ex-ante or ex-post and cover individual countries and/or a panel of countries, focusing on economy-wide effects, impacts on industrial firms, or at the sectoral level (households, industries and firms). Ex-ante studies evaluate the hypothetical consequences of energy and/or emissions taxes before its implementation. Ex-post evaluations, which began in the early 2000s, review the actual effect of implementing a carbon tax and are widely thought to be more reliable. Notwithstanding, Rafaty, Dolphin and Pretis (2020) highlight the limitation of ex-post evaluations, explaining that these methods face difficulty in isolating the pure causal effect of a carbon tax, separate from other determinants, such as complementary policy measures implemented alongside carbon taxes.

The methodological approaches adopted in the carbon tax literature can be divided into three groups: theoretical, empirical (numerical), and review or qualitative techniques. Multiple empirical models have been used to analyse carbon tax issues, such as general equilibrium models, input-output models, partial equilibrium models, optimisation models and econometric models. The general equilibrium approach, particularly the computable general equilibrium model (CGE), was found to be the most common analytical tool to analyse all major issues related to carbon tax (Köppl and Schratzenstaller 2023). Meanwhile, ex-ante econometric approaches are used for two main reasons: first, as a means of observing the effects of carbon taxes on fuel or CO_2 emissions in countries or regions where carbon taxes have been in place for many years; and second, to analyse stakeholders' or public opinion on carbon tax policies (Timilsinas 2018).

Meng et al. (2012) assessed (ex-ante) the economic impacts of a carbon tax implemented in Australia in July 2012 using a static CGE model. The study discovered that a US$14.27 per tonne of CO_2 tax, with exemptions for agriculture, road transport, and household sectors, would result in a 0.6 per cent loss of GDP if the government utilised the tax revenue on public consumption. When the tax revenue is recycled to households as a lump-sum rebate to partially compensate for the negative effects of the carbon tax, the GDP loss is slightly lower (0.5 per cent).

Jaafar (2020) assessed the macroeconomic impact of introducing a carbon tax and phasing out fossil fuel subsidies in Tunisia using the Multi-sector Macroeconomic Model for the Evaluation of Environmental and Energy Policy

(ThreeME) Tunisia model[3]. The macroeconomic impacts of subsidy reform combined with a carbon tax were examined under two assumptions: one involving revenue redistribution and saved expenditure from reduced fossil fuel subsidies, and the other without redistribution. With redistribution, GDP was marginally higher by 0.31 per cent compared to the baseline scenario, while CO_2 emissions declined by 22.0 per cent, similar to the scenario without redistribution (24.0 per cent). This indicates that the rebound effect generated by the extra revenue redistribution was small compared to the substitution effects generated by a higher fossil fuel price. Without redistribution, GDP would fall by 2.5 per cent in 2030, primarily due to declines in household spending and investment. This scenario led to a 24.0 per cent reduction in CO_2 emissions by 2030, but at a large economic cost.

A popular ex-ante tool used to examine the potential impacts of climate mitigation strategies on various countries is the IMF-WB's Climate Policy Analysis Tool (CPAT). The CPAT is an Excel 'spread-sheet based' climate mitigation tool which provides a country-by-country level analysis for 200 countries. It can be used to examine climate mitigation strategies, including carbon taxes, on a range of macroeconomic and social variables. These include the effects on energy demand and prices, CO_2 and other GHG emissions, fiscal revenues, GDP, welfare and other impacts on households and industries (Black, Parry, et al. 2023).

Utilising the CPAT, the IMF conducted an extensive quantitative analysis of options for closing ambition and policy gaps related to climate change for 170 jurisdictions ranging from high-, middle- and low-income country groups (Black, Chateau, et al. 2022). One of the options presented includes the implementation of an international carbon price floor, to facilitate an equitable scaling up of global mitigation action through coordination of a minimum price floor that will be differentiated according to a country's income level. In this instance, all high-, middle- and low-income countries implement a minimum carbon price of US$75, US$50 and US$25 per tonne of CO_2 emissions in 2030, respectively. Results indicate that through the international carbon price floor, cuts in carbon intensity have similar allocations across income groups, but varying allocations for individual countries due to differences in responsiveness to carbon pricing (Black, Chateau, et al. 2022). Overall, the appropriate mitigation mix depends on country-specific exigencies.

Literature on the Caribbean has primarily evaluated carbon taxes from an ex-ante perspective. Also utilising the IMF-WB's CPAT, Cevik (2022) examined different options to increase climate change mitigation and adaptation in Small Island Developing States (SIDs) including the Caribbean. According to the author, fiscal measures, including a carbon tax on fossil fuels, are the most efficient tools to aid in climate change mitigation. Notably, the implementation of a modest carbon tax can encourage investment in renewable energy and greater energy efficiency, therefore leading to a reduction in CO_2 emissions (Cevik 2022). The results indicate that assuming a carbon tax of US$50 per tonne of CO_2 emissions, Dominica, Haiti, St Lucia, and Trinidad and Tobago can achieve or come very close to meeting mitigation targets by 2030. On a macroeconomic country-level, while Trinidad and Tobago will benefit from sizeable revenue gains, given its reliance on the energy sector, some marginal deterioration in economic growth is expected. Notwithstanding, the author notes that there will be greater positive impacts on the environment.

Yarna (2024) analysed carbon taxation in the context of Trinidad and Tobago, focusing on three existing mechanisms that can be used to incorporate carbon pricing. The author found that Trinidad and Tobago could benefit by converting or structuring along the lines of existing environmental tax policies, such as the 'engine size customs charge', value added tax (VAT) (via a carbon-CVAT), and removal of fuel subsidies. During this process, the jurisdiction would also

[3] It is a macroeconomic model developed by the French Environment and Energy Management Agency (ADEME), the French Economic Observatory (OFCE), and the Netherlands Economic Observatory (NEO). ThreeME is a hybrid CGEM (Computable General Equilibrium Model) that combines the top-down approach of CGEMs with the bottom-up approach of energy models.

have to examine equity considerations, as well as the unavoidable implications for compliance and public perception. It is hoped that as industrialised countries build and perfect their carbon regimes, the area will begin to adapt them locally.

UN Jamaica (2021) examined the findings of an Economic and Social 2021 survey administered to the Jamaican Economy Panel (JEP). According to the research, 44.0 per cent of respondents preferred carbon taxes over emissions trading (33.0 per cent), while others were unsure or insisted on further research to determine whether either was impactful. It also considered arguments against implementing a carbon pricing regime with respondents indicating potential risks such as administrative expenses and economic implications. The potential for carbon leakage and inflation, particularly for the poorest, as producers may shift costs onto consumers, potentially causing economic activity to move away from the region was also highlighted. Panellists, when asked how carbon pricing could be more effective and palatable to the public, strongly favoured revenue redistribution through tax credits or lower taxes. Lastly, the report identified that respondents preferred the introduction of a carbon-pricing regime in a broader international framework that extended beyond the Caribbean.

While there is an abundance of ex-ante literature on carbon taxes, there are limited global studies examining this concept from an ex-post perspective. Lin and Li (2011) provided an early assessment of carbon taxation schemes in a number of European countries through standard differences-in-differences techniques. Results indicated that the mitigation effect of established carbon taxes varied among the countries, with Finland being the only country where a significant effect was obtained. Differences in the estimated effects stemmed from differences in the design of policy schemes and revenue recycling.

In one of the more recent ex-post reviews of the macroeconomic effect of carbon taxation, Köppl and Schratzenstaller (2023) reported that the most researched jurisdiction in the world is British Columbia, Canada. Carbon taxes have also been evaluated extensively among Nordic countries such as Denmark, Finland, and Sweden. Across the literature, ex-post studies found no significant impact of carbon taxes on economic growth (Murray and Rivers 2015; and Metcalf 2019). The other main area of interest related to the effects of carbon taxation on macroeconomic performance is its effect on aggregate employment. Azevedo et al. (2018) found no impact on aggregate employment, while Bernard et al. (2018) report a 4.5 per cent increase in overall employment between 2008 and 2016.

There are varying degrees of coverage and outcomes in energy-exporting nations that have established carbon-pricing regimes. Canada implemented its national federal carbon pricing scheme in 2019, combining a consumer fuel charge (consumer carbon tax)[4] with an industrial pricing mechanism (an output-based pricing system), which is credited with successfully reducing the country's GHG emissions by 8.0 per cent since its inception (Institute for Climate Economics 2025). However, in April 2025, facing significant political opposition, and being viewed as a *"cost-of-living burden*," Canada's federal consumer fuel charge was repealed (Govt. of Canada 2025)[5]. In the case of Norway, despite being a pioneer in the sphere of carbon pricing, and having one of the world's highest carbon taxes, the country still faces challenges in meeting its 2030 targets (Chau 2024). Norway's GHG emissions have fallen 21.0 per cent since 1990, with current policies projected to achieve a 26.3 per cent reduction by 2030, far below the 55.0 per cent target (Norwegian Ministry of Climate and Environment 2023).

[4] Titled the 'Pan Canadian Approach to Pricing Carbon Pollution' (Govt. of Canada 2025).

[5] Contrary to common perceptions, Canada's Institute for Research on Public Policy discovered that the effects of emissions pricing have had a minimal impact on consumer prices, accounting for just over 0.5 per cent of the overall (more than 19.0 per cent) increase in consumer prices (inflation) since 2019 (Govt. of Canada 2025).

Australia's experience with carbon taxes was brief (2012-2014), credited with lowering GHG emissions by 2.4 per cent annually, while economic activity climbed unimpeded. However, it was repealed due to political opposition and industry lobbying over rising domestic energy and electricity costs (household electricity rates reportedly increased by 14.9 per cent), despite no evidence that it had negative economic impacts[6]. Ultimately, the tax was replaced with a subsidy-based system, the Emissions Reduction Fund (Smart Prosperity Institute 2012). France suspended a planned carbon tax increase in 2018 after '*Yellow Vest'* protests over fuel price hikes. Taiwan (2023-2024) delayed implementation of its carbon tax due to industry pushback and Sweden partially rolled back its carbon tax in the 2010s, through expanded industry exemptions, as the country attempted to balance climate ambitions with economic competitiveness (Jonsson, Ydstedt and Asen 2020).

3. Stylised Facts

Trinidad and Tobago is the most industrialised economy in the English-speaking Caribbean due to its role as a leading producer of oil and gas, and a major hub for petrochemicals. With over 100 years of experience in the oil and gas industry, the energy sector is the country's largest economic sector, accounting for 31.5 per cent of GDP and 81.4 per cent of exports in 2023. The country also has a vibrant manufacturing sector (mainly food, beverage and cement production) which accounted for 16.1 per cent of GDP in 2023. Consequently, the twin-island nation is a significant producer of GHG emissions relative to other Caribbean countries.

As at 2023, annual GHG emissions[7]including land-use, land-use change and forestry (LULUCF) amounted to 48.6 million tonnes of carbon dioxide equivalents ($MtCO_2e$). This compares with annual GHG emissions of: 1.4 $MtCO_2e$ for Barbados, whose main economic activity is tourism; 6.3 $MtCO_2e$ for Suriname, whose main economic activity is mining and quarrying; 8.3 $MtCO_2e$ produced by Jamaica, a tourism and services-based economy; and 11.4 $MtCO_2e$ produced by Guyana, another energy-based economy (**Figure 1**). Domestically, in 2023, CO_2 accounted for 71.0 per cent of total emissions. The relatively large share of CO_2 emissions highlights Trinidad and Tobago's position as the highest CO_2 emitter per capita in Latin America and the Caribbean[8]. CO_2 emissions from fossil fuel operations (38.5 per cent), manufacturing (37.6 per cent), power generation (12.2 per cent) and transport (10.6 per cent) account for the largest shares of emissions.

As a Small Island Developing State (SID), Trinidad and Tobago is vulnerable to temperature increases, changes in precipitation and rising sea levels. Other vulnerabilities include increased flooding, increased frequency and intensity of hurricanes, hillside erosion and loss of coastal habitats. Domestic climatic changes[9] have also been noted, as evidenced by a shift in the daily temperature and rainfall cycle over the last four decades. **Figure 2** illustrates that over the period 1989 to 2023, there has been a steady rise in annual surface temperature, which has translated into an increase in the number of hot days and a corresponding decrease in the number of wet days[10]. Nelson and Melville (2025) show that over the decennial period, 2011 to 2020, there have been 347 wet days and 674 hot days. This compares with a total of 407 wet days and 207 hot days over the period 1981 to 1990 **(Figure 3)**.

[6] According to Sydney University research, the carbon tax accounts for only nine percentage points of that rise, with the remainder attributed to increasing power transmission and distribution expenses (Smart Prosperity Institute 2012).

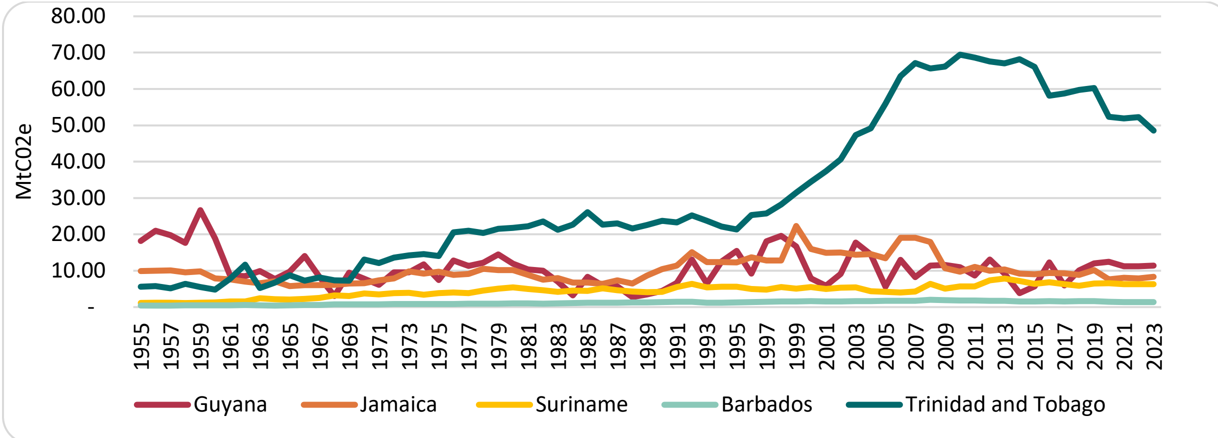
[7] Greenhouse gas emissions include carbon dioxide, methane and nitrous oxide from all sources, including land-use change. It is measured in tonnes of carbon dioxide-equivalents over a 100-year timescale.

[8] Despite low absolute CO_2 emissions, Trinidad and Tobago has high per capita and GDP-adjusted emissions. (World Resource Institute 2005).

[9] Over the last three decades, there has been an upward trend in temperatures. Mc Sweeney, using a Global Climate Model (GCM), found several increases in the mean annual temperature in Trinidad and Tobago, with an increase of around 0.6ºC since 1960. The Trinidad and Tobago Meteorological Service (TTMS) also found that the annual mean air temperature has warmed over the period 1981-2010 by 0.8 and 0.5ºC relative to 1961-1990 and 1971-1990, for Trinidad and Tobago, respectively.

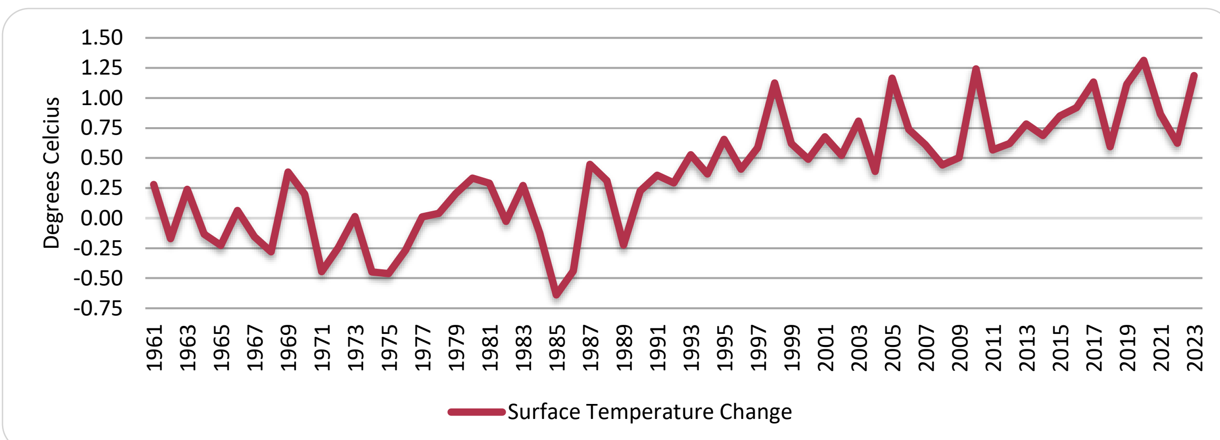
[10] Wet days refer to a day with precipitation above 1 mm while hot days refer to a day with temperatures above 37 Degrees Celsius. This is based on a study undertaken for Trinidad and Tobago by Carvalho and Wanderley (2022).

Figure 1: Annual GHG Emissions (Selected CARICOM Countries)



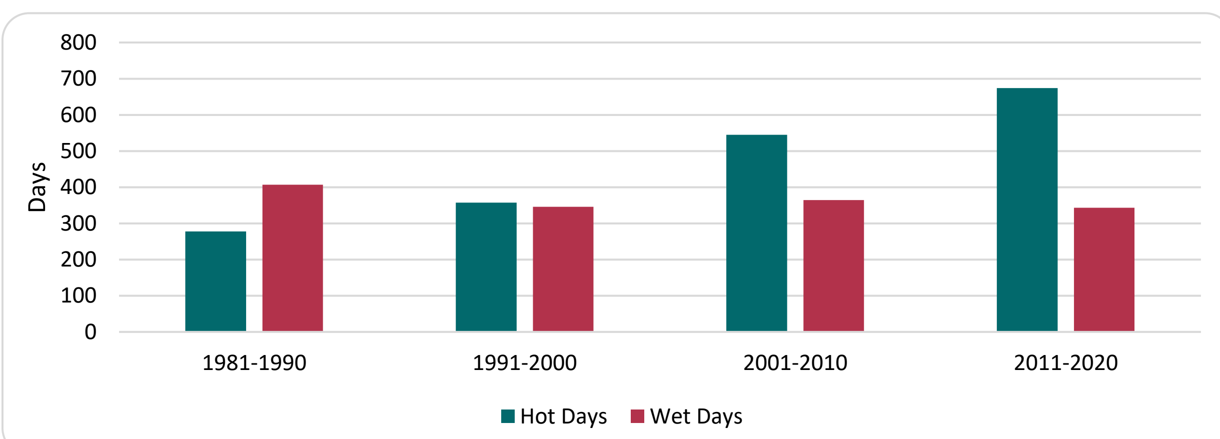
Source: Our World in Data and Jones et al. (2024)

Figure 2: Annual Surface Temperature Change



Source: IMF Climate Change Dashboard

Figure 3: Hot Days and Wet Days

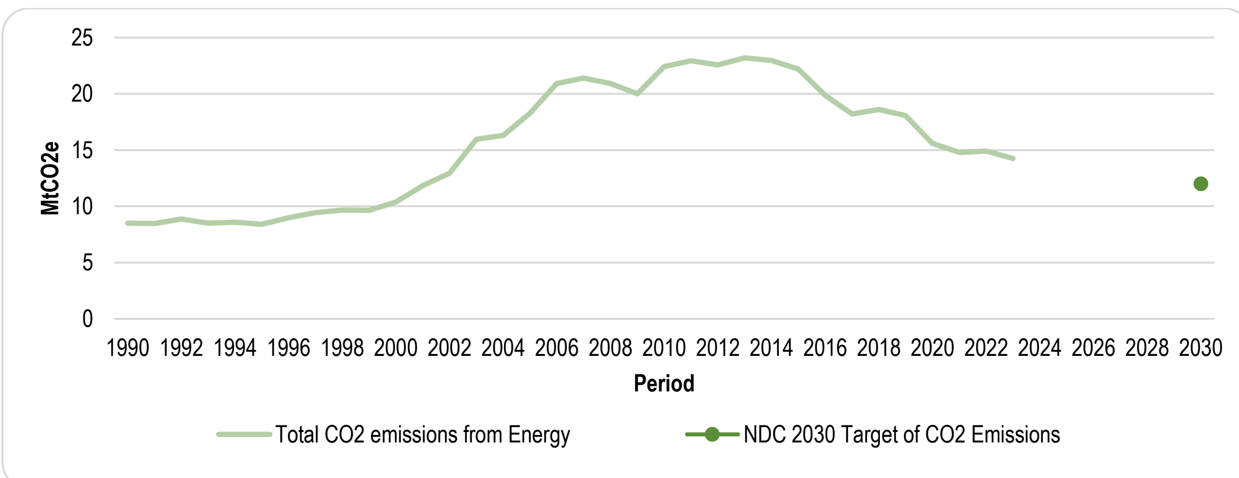


Source: TTMS, IMF Climate Change Dashboard, Nelson and Melville (2025), and FAO
Note: Hot (wet) days occur when maximum temperature (total rainfall) reach or exceed the 95th percentile. (Carvalho and Wanderley 2022, TTMS 2022).

Trinidad and Tobago has begun taking action to reduce its environmental impacts. Domestically, a strategy was outlined for reducing GHG emissions[11] in the largest carbon-emitting sectors: power generation, industry and transport. Through Nationally Determined Contributions (NDCs), the goal is to reduce cumulative emissions from the power generation, transport and industry sectors by 15.0 per cent or 15.5 $MtCO_2e$ by 2030, from business as usual (BAU), conditional on international financing. Further, a national commitment was made to unconditionally, through domestic financing, reduce domestic public transportation cumulative emissions by 30.0 per cent or 1.7 $MtCO_2e$ by 2030. The total cost of implementing the NDC is estimated at US$2.0 billion. These commitments over the medium to long term can assist with mitigating global warming.

Figure 4 shows Trinidad and Tobago's reported CO_2 emissions, against its NDC. The plot shows that the country has made considerable progress in reducing its CO_2 emissions. However, to achieve the conditional 2030 target, the country has to cut its emissions by 2.25 million tonnes. Nevertheless, within the last 12 years Trinidad and Tobago reduced its annual GHG emissions by more than 8.0 million tonnes.

Figure 4: Reported CO_2 Emissions versus Nationally Determined Contributions



Source: UNFCCC; EDGAR; FAO and the IMF Climate Change Dashboard

To support NDC ambitions, the Ministry of Planning, Economic Affairs and Development collaborated with the UNFCCC to explore the feasibility of carbon pricing approaches in Trinidad and Tobago. The Ministry also identified carbon pricing as a viable option for Trinidad and Tobago to leverage finance and address climate change[12]. Additional policy measures have been implemented to ensure the country's compliance with its international obligations and national climate change agenda. These include:

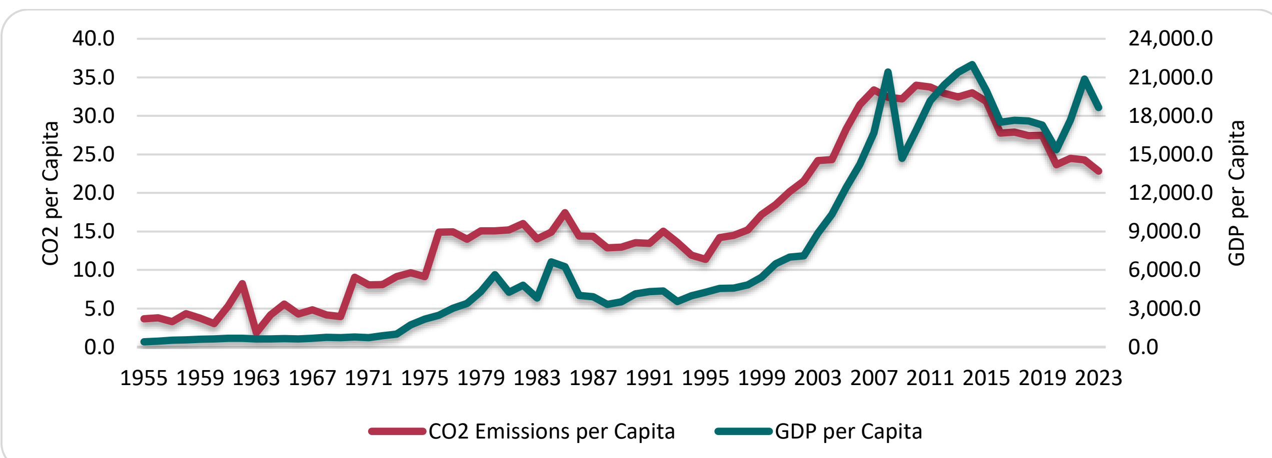
- The establishment of a Cabinet-appointed Ministerial NDC Implementation Committee.
- The establishment of Waste Management Rules, 2021, and the Waste Management (Fees) Regulations 2021 which were made operational in 2022.
- The development of a National Climate Change Policy.

[11] Trinidad and Tobago has outlined a Carbon Reduction Strategy to reduce GHG emissions in the power generation, industry and transport sectors. This policy was developed by the Carbon Reduction Strategy Task Force (CRSTF), which was formed in April 2010.
[12] As part of the national climate agenda under the Ministry of Planning and Development's Strategy for Reduction of Carbon Emissions in Trinidad and Tobago to 2040.

Fuel subsidy reform was implemented by gradually increasing domestic fuel prices at the pump[13]. Between 2016 and 2022, domestic fuel prices increased six times, with 2022 recording two increases. In the latest 2022 increase, super and premium gasoline were increased by $1.00 per litre (15.0 per cent), and diesel was increased by 50 cents per litre (14.7 per cent). Several other measures were instituted across the transport, power generation and industrial sectors. In the transport sector, the Ministry of Planning, Economic Affairs and Development is promoting the uptake of electric vehicles through the operationalisation of an e-Mobility Policy[14]. The Government also provides concessions on electric vehicles with a Cost, Insurance, and Freight (CIF) value below a particular threshold[15] and incentivise the use of Compressed Natural Gas (CNG) as an alternative fuel[16].

Trinidad and Tobago introduced incentives to lower electricity consumption, promoted shifts towards low-carbon technologies, like solar and wind, as well as infused renewable energy sources into the domestic economy's energy mix. The Ministry of Energy and Energy Industries in collaboration with the Ministry of Planning, Economic Affairs and Development and a private consortium[17] have advanced the country's first utility-scale solar project to add 92.0 megawatts of solar energy to the national electricity grid in 2025. There are also plans to finalise a Feed-in Tariff Policy and develop an Implementation Plan to allow for small-scale grid-tied installations of renewable energy by residential and commercial entities. Trinidad and Tobago also commenced an onshore Wind Resource Assessment Programme (WRAP) by deploying two Light Detection and Ranging (LiDAR) devices to measure wind data.

Figure 5: Per Capita CO_2 Emissions and GDP per capita



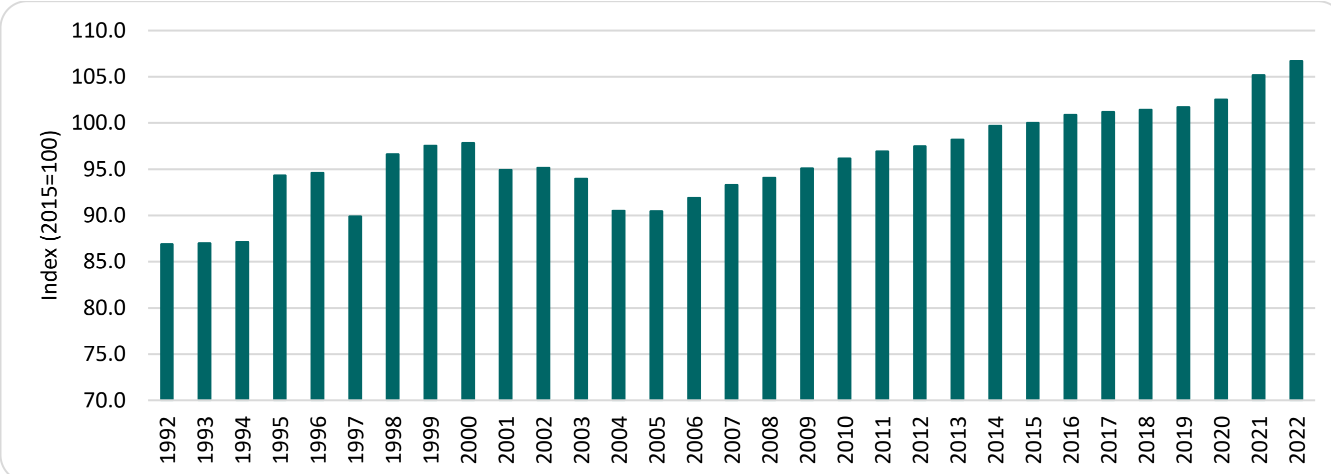
Source: Our World in Data, IMF Climate Change Dashboard and Central Bank of Trinidad and Tobago

Over the last three decades, Trinidad and Tobago, like many other countries, has been slowly decarbonising its economy. **Figure 5** shows per capita CO_2 emissions[18] and GDP per capita moving in opposite directions, particularly since 2007. During the period 2007 to 2023, per capita CO_2 emissions were on a steady downward trajectory while GDP per capita climbed upwards, though falling occasionally. Additionally, a major contributor to the country's carbon sink is its healthy stock of climate-altering land cover, which will be crucial in removing GHG emissions and aiding in

[13] The retail price of fuel is fixed at the pump. The fuel subsidy compensates for the difference between the wholesale price of fuel and the retail price. Baksh (2008) showed, based on historical fuel price adjustments in 2003 in Trinidad and Tobago, a one per cent change in fuel prices should lead to a 0.5 per cent increase in transport prices.
[14] Trinidad and Tobago's e-mobility policy is a set of incentives and regulations that aim to encourage the use of electric vehicles (EVs).
[15] In the FY2025/26 Budget; a customs duty of 10.0 per cent, VAT of 12.5 per cent, and a tiered motor vehicle tax based on electric motor size were implemented on electric vehicles with a Cost, Insurance, and Freight (CIF) value exceeding $400,000.00.
[16] See January 2023 Economic Bulletin, Box 1, Fiscal Measures in Support of Climate Change Mitigation: economic-bulletin-january-2023-20231302.pdf
[17] The operators of this project are a consortium of Light source bp, bp and Shell. It is the country's first major utility-scale solar project.
[18] Carbon dioxide (CO_2) emissions from fossil fuel combustion and industrial activity, including transport and electricity generation, but excluding land-use change.

the mitigation of global warming **(Figure 6)**. As such, land use planning also plays a significant role in the country's climate change mitigation strategy.

Figure 6: Climate Altering Land Cover Index



Source: IMF Climate Change Dashboard and FAO

4. Methodology and Data

The International Monetary Fund and World Bank's (IMF-WB) Climate Policy Assessment Tool (CPAT) is an interconnected spreadsheet-based Excel model. This CPAT 'model of models' covers over 200 countries which allows for a rapid diagnostic of the potential benefits of climate policy reforms across multiple dimensions. The model can be parametrised to the user's requirements without the need for external data[19] input. At the time of writing, the latest available version of the tool is 2023, making it quite suitable to assist policymakers in designing and implementing effective, efficient and equitable climate change-related policies.

The CPAT allows governments to assess the most appropriate policy mix based on the domestic resources and prevailing tax systems within each country's context. It aids in quantifying the impacts of several climate mitigation policies, including carbon pricing, fossil fuel subsidy reform, renewable subsidies, emissions, fiscal revenues, GDP, household and industry incidence, and many other key metrics. The model's parameters are streamlined to be broadly within the mid-range of ex-ante models, while taking into account the details of the ex-post empirical literature. It allows for quantitative comparisons through adjustments for sensitivity analyses.

The model's spreadsheets are structured according to four key modules: mitigation, distribution, air pollution and transport. The mitigation module is a reduced-form energy-macro model that utilises projections of income growth and fuel prices to project consumption for 15 energy sources[20] across 17 sectors[21]. The distributional module is a cost-push microsimulation model that estimates the impacts of climate mitigation policies on households and industries (across several sectors). The air pollution and transport modules are reduced-form models which capture the welfare spillovers from climate polices on health, congestion and road safety.

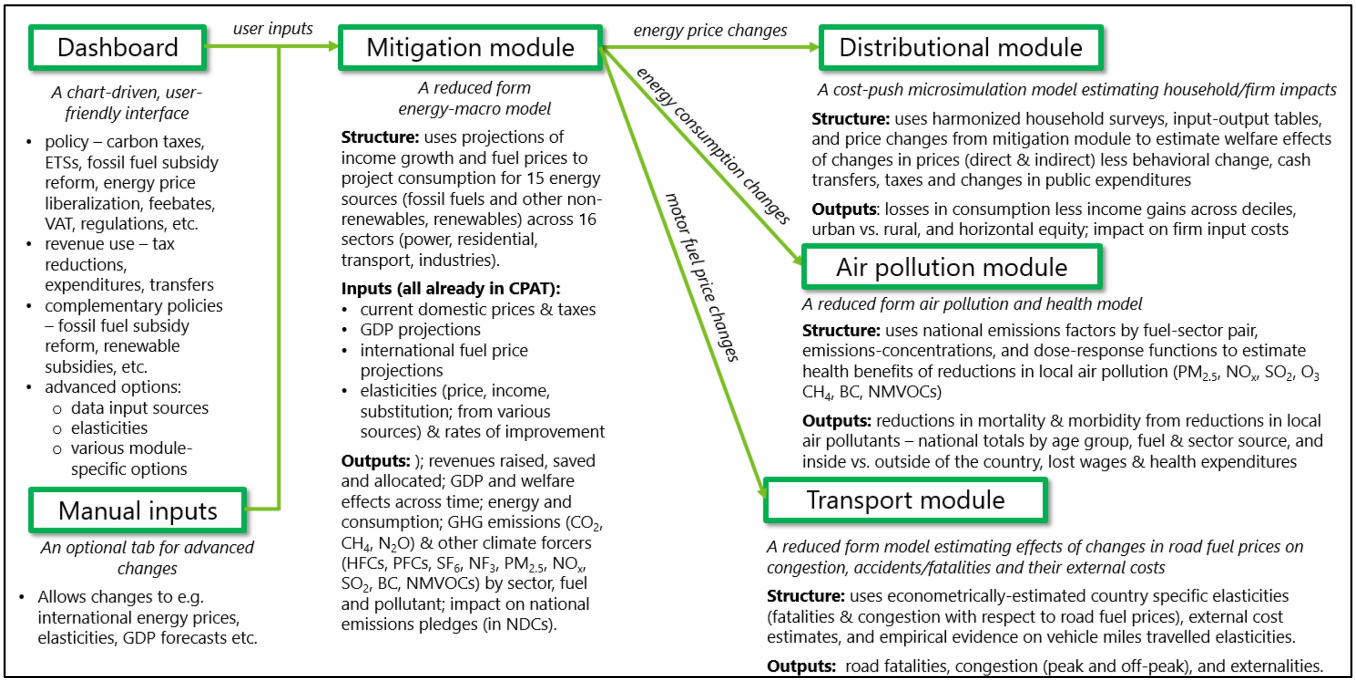
[19] Although the CPAT presents a comprehensive database, there is an option for users to manually incorporate their own data or parameter assumptions.

[20] Energy Sources – coal, natural gas, gasoline, diesel, kerosene, liquefied petroleum gas (LPG), jet fuel, other oil products, electricity, wind, solar, hydro, other renewables, nuclear and biomass.

[21] Sectors – consistent with UNFCCC, these include power generation, transport (road, rail, shipping, and aviation, including domestic and international), buildings (residential, food & forestry, public & private services), industries (mining & chemicals, iron & steel, other metals, machinery, cement, other manufacturing, construction, fuel transformation & transport), other energy use and non-energy use.

As illustrated in **Figure 7**, the mitigation module functions as a central component linking to the other modules through simulated changes to: 1) energy prices, in the case of the distribution module; 2) energy consumption for air pollution; and 3) motor fuel prices in relation to transportation.

Figure 7. Overview of CPAT Structure



Source: Black et al. 2023, the IMF-World Bank Climate Policy Assessment Tool

(i) Mitigation Module

The CPAT's mitigation module uses production-based emissions inventories, excluding emissions from imported goods. It identifies five main energy-consuming sectors: power, industry, transportation, buildings, and other. The overall module is a reduced-form macro-energy model for estimating the impacts of climate mitigation policies on energy consumption, prices, GHGs, local air pollutants, revenues, GDP, and welfare. Underlying the mitigation module are three (3) econometric models constructed to simulate energy demand, supply, and market equilibrium within a specified country (**Appendix 2**). Impacts can be estimated either under a BAU scenario (model's default settings based on a country's confirmed NDCs), or for various 'user-defined' mitigation policies.

(ii) Distribution Module

This distribution module examines issues of income equality and poverty caused by climate change policies, specifically at the industry and household levels. Changes in energy prices caused by climate mitigation policies can have either a regressive or a progressive impact on households, depending on the country. The CPAT distribution module estimates the impact of climate mitigation policies on 59 non-energy economic sectors in 120 countries. It quantifies changes in firms' input and output prices and shows each sector's contribution to GDP, total output, household demand, and exports. This data can help policymakers estimate the effects on firms, particularly in energy-intensive, trade-exposed (EITE) industries, and inform countries considering protection policies. Econometrically, assessments are made in one of two scenarios, 'before' and 'after,' revenue recycling and responses, while 'direct' and 'indirect' impacts are estimated at both the industry and household levels.

(iii) Co-Benefits Modules: Air Pollution and Transport[22]

Aside from lowering carbon emissions, climate mitigation policies provide health and welfare benefits. CPAT includes two modules for estimating these co-benefits: health improvements from lower local air pollution and welfare benefits from decreased vehicle use due to higher fuel prices. These modules provide a comprehensive understanding of how climate policy affects human health and welfare.

Air pollution co-benefits:

CPAT measures the mortality, morbidity, and economic costs of local health damages caused by fossil fuel use in each country. The model estimates local air pollutant emissions using energy consumption by fuel, sector, and scenario. It calculates particulate matter with a diameter of 2.5 micrometres or less (PM2.5), ozone concentrations and population exposure using intake fractions and the TM5-FAst Scenario Screening Tool approach. Population exposure to PM2.5 and low-lying ozone is then mapped to health burdens using baseline mortality rates and exposure-response curves from a 2019 Global Burden of Disease (GBD) study[23]. The two approaches are averaged, and changes in mortality risk are quantified. While the monetisation of mortality risks is contentious, it is necessary to incorporate health risks into energy price estimates and make policy trade-offs.

Road transport co-benefits:

Climate mitigation efforts can reduce vehicle travel, thereby affecting congestion, accident rates, and road deterioration. Raising petrol prices can reduce vehicle miles travelled while encouraging public transportation and carpooling. This reduces travel demand while decreasing economic costs related to congestion, accidents, and road wear and tear. These expenses are typically borne by individuals. To estimate these effects, CPAT projects future congestion levels using past trends along with expected changes in GDP and population. It also considers how sensitive congestion is to fuel price increases. The model uses up-to-date congestion data from TomTom[24], focusing especially on urban and working-age populations who are most affected by traffic.

While this paper focuses on carbon taxation as a mitigation instrument, it is important to note that the CPAT framework is designed exclusively to evaluate the mitigation impacts of carbon pricing and does not incorporate climate adaptation dynamics. This limitation is particularly relevant for SIDS such as Trinidad and Tobago, where climate policy discussions have increasingly shifted toward adaptation initiatives, such as coastal protection, water resource management, and infrastructure resilience, given the country's high vulnerability to sea-level rise, extreme weather events, and temperature-related stresses. As a result, the model captures only one dimension of the national climate policy response. Integrating carbon pricing within a broader framework that simultaneously advances adaptation efforts remains essential for strengthening the country's long-term climate resilience and safeguarding economic stability.

Data

The CPAT model's base scenario is constructed from *"recently observed fuel and electricity consumption"* statistics by IMF staff (base year 2019 in version 1 of CPAT). Energy demand and production data are largely compiled from the International Energy Agency (IEA) and other sources. Real GDP projections are from the IMF World Economic

[22] Given data unavailability, this module of the CPAT was not calibrated for Trinidad and Tobago.

[23] GBD (2020). "A Systematic Analysis for the Global Burden of Disease Study 2019." The Lancet. Vol. 396. Elsevier. https://doi.org/10.1016/S0140-6736(20)30752-2.

[24] TomTom is a navigation and mapping company that provides real-time and historical traffic data using anonymized GPS information from millions of connected vehicles. Source: https://www.tomtom.com/newsroom/product-focus/tomtom-traffic-stats-explained/

Outlook (WEO) database, usually over a five-year horizon, and data on energy taxes, subsidies, and prices by energy product have been compiled from publicly available and IMF sources. International energy prices are projected using an average of WB and IMF projections for coal, oil, and natural gas prices, which are then used to project domestic prices using empirical estimates of pass-through by country. Elasticities are calibrated to empirical evidence through an extensive literature review and yield estimates that are broadly in line with the mid-range of BAU emissions and policy scenario responsiveness implied by other models.

Scenario Analysis

CPAT allows inputting user-defined scenarios to find the best combination of policy mixes to fit a country's unique circumstances. Some of the available tools include price-based policies and ETSs, fuel and electricity taxes, fossil fuel subsidy reform, and energy market reform. As such, three scenarios were developed to analyse the potential impacts of a carbon tax in the context of Trinidad and Tobago. Each scenario adds layers of policies and reforms to track the possible changes to the country's macroeconomic health.

The first iteration focuses on the installation of a carbon tax on fuels across various industries (**Scenario 1**). In **Scenario 2**, in addition to the broad-based introduction of a carbon tax, there is the gradual removal of the current fossil fuel subsidy, while also factoring the implementation of a feed-in tariff for renewable power generation to support the adoption of solar power. **Scenario 3** builds on Scenario 2 by evaluating the impact of the redistribution of fiscal revenues raised through implementing a carbon tax.

For all scenarios, implementation begins in 2026 with a five-year execution timeline. This allows all changes to be fully integrated by 2030 in alignment with the country's NDC targets. An initial carbon tax of US$10.00 (TT$67.92) per tonne of CO_2 emissions was selected to stay in line with the regional average[25]. The carbon tax gradually increases to a target policy price level of US$50.00[26] (TT$339.61) per tonne of CO_2 by 2030 (a five-year period). The chosen tax structure includes all fuel types (natural gas, gasoline, diesel, liquefied petroleum gas (LPG), kerosene, and other oil products) except for coal and covers all economic sectors (power generation, road transportation, domestic aviation, domestic shipping, residential, and other energy use) except rail transportation. Industries covered include food and forestry, services, mining and chemicals, iron and steel, other metals, machinery, cement, other manufacturing, construction, and fuel transformation and transportation.

In Scenario 1, which features the introduction of a carbon tax, there are no special provisions for either fuel or sectoral exemptions; neither producer nor consumer fossil fuel subsidies; fuel price controls; or any subsidy funding options or revenue recycling. Building from this, Scenario 2 features the gradual phasing out of all fossil fuel subsidies (for producers and consumers) starting in 2026 and spanning the five-year time horizon. The electricity sector, along with low-income households, were earmarked for exemptions; however, these exemptions will also be gradually phased out starting in 2028. Scenario 2 also features a renewables subsidy of US$0.20 (TT$1.36) per kilowatt-hour (kWh) for a period of 10 years. The rate was adopted based on Barbados' long-standing and recently updated Feed-In Tariff schedule[27]. Inclusive of the parameters in Scenario 2, Scenario 3 includes revenue recycling options (redistribution) at a rate of 40.0 per cent for public investment (such as public transport, information and communications technology

[25] Based on the World Bank's 2024 Climate Dashboard, the following Latin American and Caribbean jurisdictions impose carbon taxes: Uruguay, Queretaro, Yucatan, Zacatecas, Colombia, Durango, Chile, State of Mexico, Guanajuato and Argentina. To derive the initial carbon price, an average of these jurisdictions' existing carbon tax was estimated, excluding the main outliers; the highest (Uruguay) and lowest (Argentina) taxes. See **Appendix 1** for rates.

[26] Based on the assumptions by Cevik 2022, a carbon tax of US$50 per tonne of CO_2 emissions is the estimated amount identified for Caribbean countries (Dominica, Haiti, St Lucia and Trinidad and Tobago) to achieve or come very close to meeting the mitigation targets by 2030.

[27] Source: Barbados Light & Power Company Limited. Taken from: https://support.blpc.com.bb/support/solutions/articles/42000060966-billing-under-the-renewable-energy-rider.

(ICT), water, and sanitation infrastructure), 35.0 per cent for current spending (such as health, education, and social security), and 25.0 per cent on transfers. In this context, transfers refer to cash payments to vulnerable households who are disproportionately impacted by the introduction of the carbon tax through higher domestic prices, but have limited financial resources to adapt to the prices. These rates were calculated based on budgetary allocations in Trinidad and Tobago's 2024/2025 National Budget. **Table 1** outlines all Scenarios and their associated assumptions.

Table 1: Carbon Tax Policy Parameters for Each Scenario

Carbon Tax Parameters	Carbon Tax (Scenario 1)	Carbon Tax and Removal of Fuel Subsidy (Scenario 2)	Carbon Tax and Removal of Fuel Subsidy with Revenue Redistribution (Scenario 3)
Key Policy Assumptions			
Define Policy:			
Year to introduce new policy	2026	2026	2026
Starting carbon price (real USD per tonne CO_2)	10	10	10
Target level of carbon price	50	50	50
Year to reach target level	2030	2030	2030
Policy Coverage:			
Fuels[1]	Exclude Coal	Exclude Coal	Exclude Coal
Sectors[2]	Exclude Rail	Exclude Rail	Exclude Rail
Industries[3]	All	All	All
Exemptions (fuels/sectors)	NA	Phased out from 2028	Phased out from 2028
Fossil fuel subsidies (producer)	NA	Starting 2026, for 5 years	Starting 2026, for 5 years
Fossil fuel subsidies (consumer)	NA	Starting 2026, for 5 years	Starting 2026, for 5 years
Price controls (for fuels)	NA	Starting 2026, for 5 years	Starting 2026, for 5 years
Renewable subsidy[4]	NA	US$0.2, for 10 years	US$0.2, for 10 years
Subsidy funding options/ Revenue recycling[5]	NA	NA	Public Investment – 40% Current Spending – 35% Transfers – 25%
Additional Policy Options			
Additional mitigation effort in non-energy sectors?	No	Yes	Yes
Price pathway continues to rise after target year?	No	No	No
Policy pathway is in nominal or real terms?	Real	Real	Real
Power price: portion of cost change passed-on	0%	0%	0%
Power feebate: power revenues rebated per kwh	No	Yes	Yes
Harmonize VAT rates in residential and transport?	Yes	Yes	Yes
Include electricity in fuel subsidy phase-out?	No	Include	Include
Uncertainty Adjustments			
International energy prices adjustment	Base	Base	Base
GDP growth adjustment	Base	Base	Base
Price elasticities adjustment	Base	Base	Base
Income elasticities adjustment	Base	Base	Base
Adjust income elasticities for GDP levels?	Yes	Yes	Yes
Fiscal multipliers adjustment	Base	Base	Base
Max RE scale-up rate	User-Defined	User-Defined	User-Defined
Renewables cost decline rate	Medium	Medium	Medium
Miscellaneous			
Include endogenous GDP effects?	Yes	Yes	Yes
Residential LPG/kerosene always exempted	No	No	No
National social cost of carbon (SCC) source	Target	Target	Target
Congestion & road damage attributable to fuels	1%	1%	1%
Add non-climate Pigouvian tax on top?	No	No	No
Years to phase-in non-climate Pigouvian tax?	NA	NA	NA
Add additional excise tax?	No	No	No

Notes:
1) Fuels: coal, natural gas, gasoline, diesel, liquefied petroleum gas (LPG), kerosene, other oil products
2) Sectors: power, road, rail, domestic aviation, domestic shipping, residential, other energy use
3) Industries: food & forestry, services (private & public), mining & chemicals, iron & steel, other metals, machinery, cement, other manufacturing, construction, fuel transportation & transportation
4) A renewable subsidy of US$0.2 was selected based on Barbados' Feed-In Tariffs schedule https://support.blpc.com.bb/support/solutions/articles/42000060966
5) Percentages in Scenario 3 are based on the revenue allocations to the identified sectors in Trinidad and Tobago's 2024/25 National Budget.

Results and Analysis

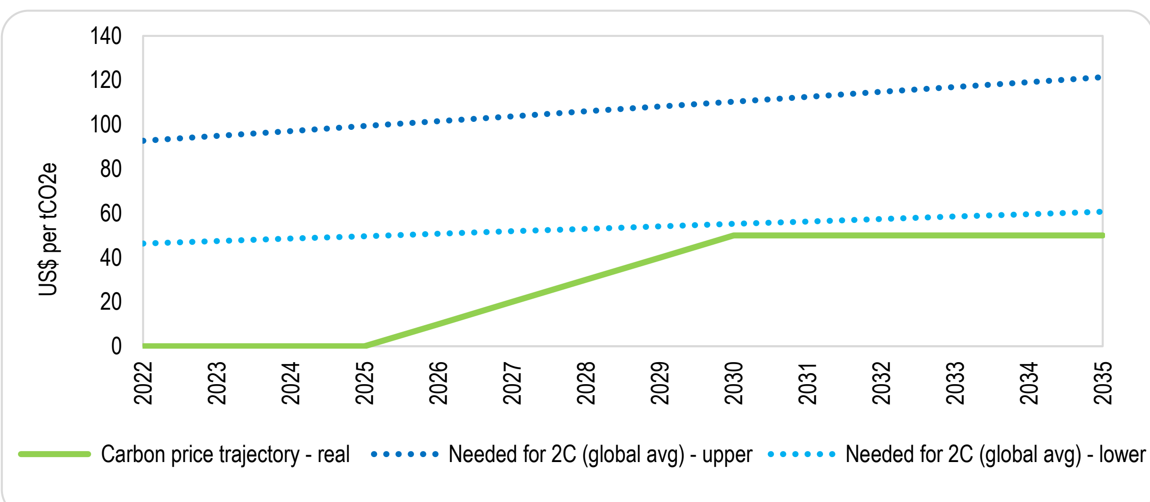
The CPAT simulation results offer compelling evidence that a phased carbon tax can effectively reduce emissions domestically. While the proposed carbon price path (US$10.00 - US$50.00 per tonne of CO_2) falls short of international benchmarks needed to meet the 2.0°C[28] global warming limit, it does deliver tangible progress toward the country's climate goals. **Figure 8** illustrates that while the policy trajectory stays below the lower band recommended for 2.0°C alignment, it demonstrates a steady and predictable ramp-up, providing policymakers with a feasible entry point into carbon pricing while minimising economic disruption.

Crucially, the proposed carbon tax successfully targets the most polluting sectors of the domestic economy. **Figure 9** illustrates that over a ten-year horizon, the tax captures 54.0 per cent of CO_2 emissions from industry, 27.3 per cent from the power sector and 14.5 per cent from the transport sector. Collectively, that represents 95.0 per cent of Trinidad and Tobago's carbon-intensive output. These are the sectors identified in the country's Carbon Reduction Strategy and NDCs as priority areas for intervention. This provides support for introducing a domestic carbon tax that is both strategic and well aligned with national priorities.

Figure 10 further reinforces the effectiveness of the carbon tax by depicting a sustained decline in emissions from 2026 onward. In 2026, the projected emissions curve intersects the country's conditional NDC target, with emissions stabilising below the threshold by 2030. In cumulative terms, the carbon tax achieves a 16.9 per cent reduction in emissions relative to the BAU scenario. This suggests that while the tax alone may not place the country on a net-zero path, it is still a powerful mechanism for meeting near-term goals and laying the foundation for more ambitious policy packages in the future.

The rest of this section analyses the macroeconomic impact of each scenario, comparing changes in emissions, economic and fiscal health as subsidy reform and redistributive practices are implemented.

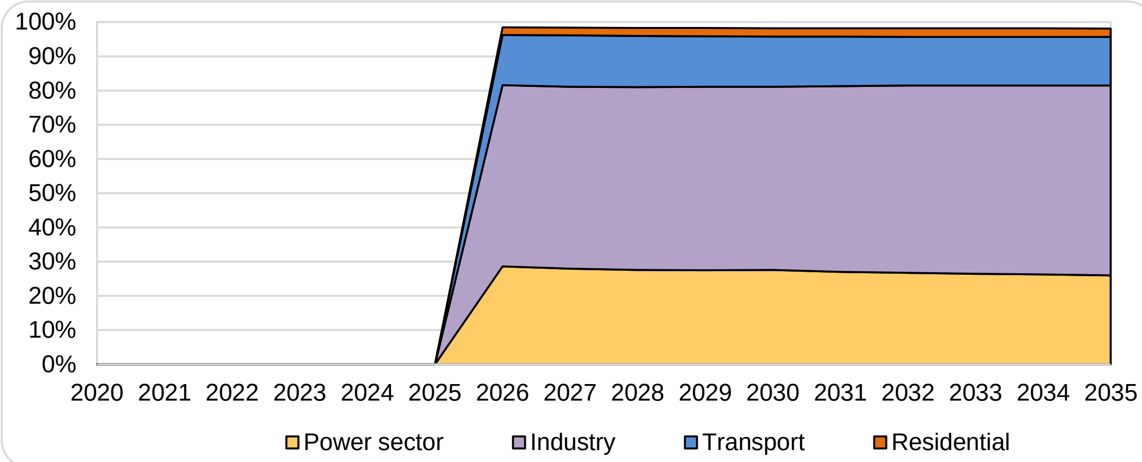
Figure 8: Carbon Price Trajectory (US$ per tCO_2e), 2020-2035



Source: IMF-World Bank CPAT

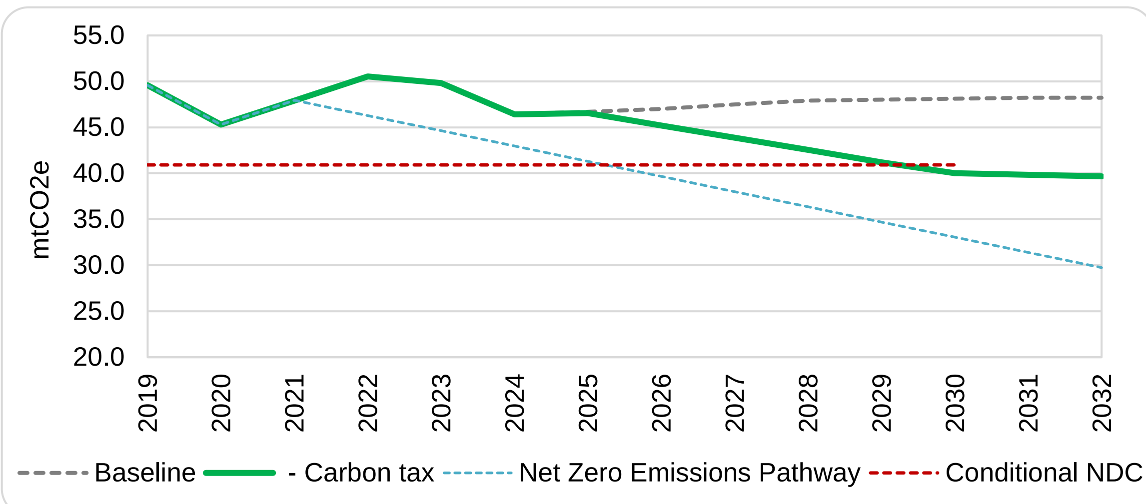
[28] The 2015 Paris Agreement aims to hold the increase in global average surface temperature to well below 2°C above pre-industrial levels. Exceeding this threshold is expected to cause more significant and potentially irreversible climate change impacts.

Figure 9: CO_2 Emissions Covered (per cent of national total)



Source: IMF-World Bank CPAT

Figure 10: GHG emissions vs. Paris pledge ('NDC'; mtCO_2e excl. LULUCF), Trinidad and Tobago



Source: IMF-World Bank CPAT

Scenario 1

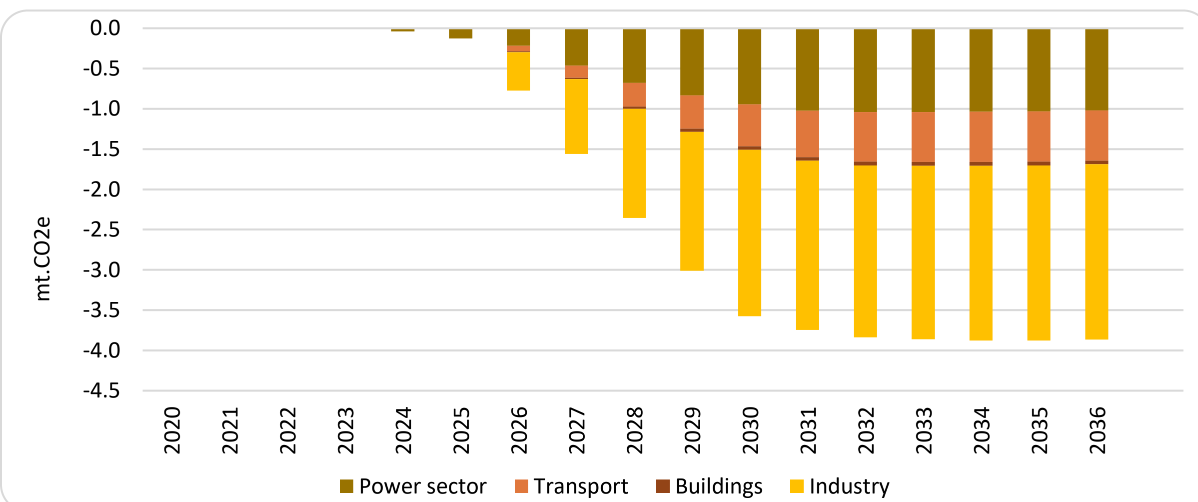
During the first year of implementation of the carbon tax (2026), projected GHG emissions[29] fall to 45.0 million tonnes of CO_2 equivalent (MtCO_2e), compared to the actual output of 50 MtCO_2e in 2023[30] (**Figure 10**). This represents a decline of 9.3 per cent. Notably, over the remaining years to reach the US$50.00 carbon tax target (2027 to 2030), a steady falloff of just under 3.0 per cent is recorded in the emissions gap, moving from 45.0 MtCO_2e in 2026 to 40.0 MtCO_2e in 2030. Interestingly, by 2030 with GHG emissions dropping to 40.0 MtCO_2e, this represents a decrease of 19.3 per cent when compared to 2023. Beyond the implementation period, by 2035, GHG emissions are expected to decline to 39.0 MtCO_2e, representing a 21.6 per cent fall from the outturn in 2023.

[29] The references to GHG emissions in this section exclude land use, land use change, and forestry (LULUCF).
[30] 2023 is chosen as the base year of comparison for GHG emissions as this is the latest year of actual data on emissions for Trinidad and Tobago.

More specifically, CO_2 emissions related to energy and non-energy activities are projected to dip by 12.7 per cent to reach 30.0 $MtCO_2$ in the first year (2026), from 35.0 $MtCO_2$ in 2023. By 2030, it is expected that CO_2 emissions will drop by roughly one quarter (26.5 per cent) of its 2023 outturn to register 26.0 $MtCO_2$ emissions. Further out, by 2035, CO_2 emissions are forecasted to decrease by 29.6 per cent to reach 25.0 $MtCO_2$ emissions from the recording in 2023. Based on these results, the gradual implementation of the carbon tax over the five-year period would successfully reduce GHG emissions, surpassing the stated NDC goal of a 15.0 per cent drop by 2030. This will occur as households and businesses shift to greener fuel sources.

Energy-related CO_2 emissions declined across all key sectors. In 2026, when the carbon tax is introduced, energy CO_2 emissions falls by 0.8 $MtCO_2$ to record 15.5 $MtCO_2$ when compared to projected emissions without the tax (**Figure 11**). Actual data for 2023 shows that Industry (56.9 per cent of the total), Power (26.4 per cent of the total), Transport (14.6 per cent of the total), and Buildings (2.1 per cent of the total) accounted for 17.1 $MtCO_2$. Once the tax is introduced in 2026, energy-related CO_2 emissions declined by 9.5 per cent or 1.6 $MtCO_2$ to record 15.5 $MtCO_2$, compared to 2023. The largest reduction of 1.5 $MtCO_2$ stemmed from the Industrial sector, and then 0.07 $MtCO_2$ from the Power sector. Subsequently, by 2030 energy-related CO_2 emissions from these four key sectors are projected to dip by 3.9 $MtCO_2$ or 22.8 per cent, when compared to 2023. The Industrial (decline of 2.9 $MtCO_2$), Power (reduction of 0.7 $MtCO_2$) and Transport (-0.2 $MtCO_2$) sectors are forecasted to drive this overall downward movement. Later into the forecast horizon, by 2035 energy-related CO_2 emissions are projected to total 12.5 $MtCO_2$, lower by 27.0 per cent when compared to 2023. The largest falloff will stem from the Industrial sector (3.1 $MtCO_2$), followed by the Power sector (decline of 1.1 $MtCO_2$), and the Transport sector (0.3 $MtCO_2$).

Figure 11: Change in Energy CO_2 Emissions by Key Sectors



Source: IMF-World Bank CPAT

Scenario 2

Domestically, following the implementation of the carbon tax, notable price increases are expected in energy commodities over the five-year period to 2030. Natural gas prices are projected to move from US$6.33 per gigajoule (GJ) in 2025 to US$6.86 per GJ in 2026, reflecting an increase of 8.42 per cent (**Table 2**). Over the period 2026 to

2030, the price of natural gas is anticipated to rise on average by 6.8 per cent each year. By 2030, a natural gas price of US$8.94 per GJ is forecasted, reflecting an uptick of 41.2 per cent when compared to the outturn in 2025. Crude oil prices are also expected to follow a similar trend. Initially, the price of oil is expected to increase by 4.2 per cent to US$70.45 per barrel (bbl) in 2026, higher than the previous year's recording of US$67.64 per bbl. Subsequently, the price of oil is expected to increase from US$70.45 per bbl in 2026 to US$86.10 per bbl in 2030. By 2035, a steady increase in the prices of gasoline, diesel, liquefied petroleum gas (LPG) and kerosene is projected. The gradual removal of the fuel subsidies over the period will closely align domestic energy prices with international prices.

Table 2: Domestic Energy Price Changes for US$50/t$CO_2$ in 2030 (weighted by consumption)

Fuel	Unit	Baseline (2025)	Baseline + - Carbon Tax (2030)	Per Cent Change
Natural Gas	US$ per gigajoule	6.33	8.94	41.2
Oil	US$ per barrel	67.64	86.10	27.3
Gasoline	US$ per litre	0.45	0.66	46.7
Diesel	US$ per litre	0.54	0.73	35.2
LPG	US$ per litre	0.61	0.68	11.5
Kerosene	US$ per litre	0.74	0.82	10.8

Source: IMF-World Bank CPAT

A significant amount of additional revenues could be raised from the implementation of the carbon tax, which could be used to finance the decarbonisation of the economy, support vulnerable households, and strengthen structural resilience (Cevik 2022). Over the ten-year period (2026 to 2035), additional fiscal revenues increased by US$5.34 billion. The largest increase came from natural gas (US$3.58 billion), followed by gasoline (US$1.3 billion), diesel (US$0.71 billion) and non-road oil (US$0.43 billion). In the first five years of implementation, total additional fiscal revenues net of subsidies gradually increased, moving from a projected deficit of US$0.13 billion[31] in 2025 to a surplus of US$0.52 billion in 2030 (**Figure 12**). In the first year (2026), fiscal revenues improved by US$0.06 billion, resulting in a smaller deficit (total additional fiscal revenues net of subsidies) of US$0.07 billion, largely owing to higher natural gas revenue which grew by US$0.11 billion to US$0.12 billion. Following the upward trend, between 2025 and 2030 fiscal revenues grew by a total of US$1.83 billion. This movement was driven by an increase in fiscal revenues related to natural gas (US$1.46 billion), gasoline (US$0.41 billion), diesel (US$0.25 billion) and non-road oil (US$0.17 billion).

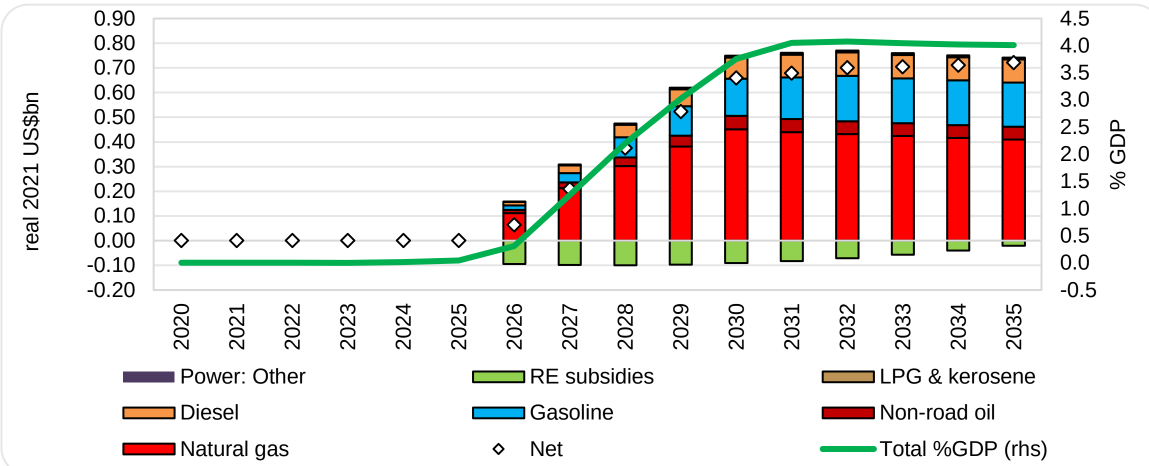
The model's assumption of implementing a renewable energy feed-in subsidy will result in government outlays on this provision. On average, over the initial five-year period 2026 to 2030, renewable energy subsidy payments are expected to be US$0.1 billion. Smaller outflows are noted during the second five-year period (2031 to 2035), averaging US$0.05 billion. Costs associated with renewable energy technology are expected to be higher in the first instance; therefore, subsidy payments during this period would be higher. However, as costs fall and demand settles, subsidy payments will also decline.

Another benefit of Scenario 2 is the accelerated decline in emissions. As discussed in Section 3.0, the power generation and transport sectors account for 12.2 per cent and 10.6 per cent of CO_2 emissions in Trinidad and Tobago, respectively. While not the largest polluting sectors, they are key emitters and a focus for the Government of Trinidad and Tobago. In Scenario 2 with the removal of the fuel subsidy, the Government is able to move faster

[31] Revenue is stated in real 2021 US$ billions.

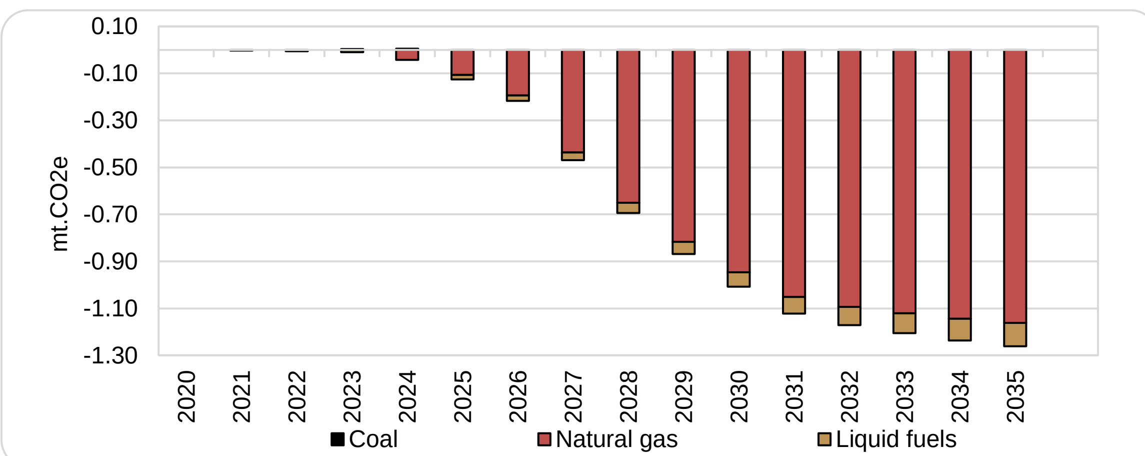
toward its mission reduction goals. **Figure 13** shows that in the first five years of the tax (2026 – 2030), alongside a gradual removal of the fuel subsidy, emissions from the power sector are reduced on average by 0.52 $mtCO_2e$ per annum. This rate increases to an average of 1.11 $mtCO_2e$ mitigated per annum between 2031 and 2035. The data reveals that of all liquid fuels, consumption of natural gas is impacted the most following the imposition of the tax. Larger declines are recorded after 2028 when the fuel subsidy is also removed. Gasoline is the second most affected fuel type.

Figure 12: Fiscal Revenues by Fuel-type



Source: IMF-World Bank CPAT

Figure 13: Change in Power Sector Emissions by Fuel*



Source: IMF-World Bank CPAT

*Average of elasticity and engineering models

Scenario 2 vs Scenario 3

This section compares the outcomes of Scenario 2, carbon tax implementation alongside subsidy reform, with Scenario 3, which builds on Scenario 2 by incorporating fiscal revenue redistribution. This comparison helps to isolate the additional macroeconomic and environmental impacts of a revenue recycling strategy, particularly on the external sector and the emissions profile by gas.

Following the introduction of the carbon tax, the current account balance (as a per cent of GDP) declined by 0.4 per cent in the first instance **(Figure 14)**. In Scenarios 2 and 3, over the first five years of the tax, the balance averages 6.8 per cent and 6.7 per cent of GDP, respectively, compared to 10.3 per cent of GDP over the five years prior. The balance reaches a low of 6.6 per cent of GDP in 2028, coinciding with the phasing out of exemptions in both scenarios.

This deterioration likely reflects the dual impact of reduced energy sector export earnings and increased spending on imports of renewable energy equipment, capital goods and other inputs needed for the energy transition. The combined effect of the carbon tax and the removal of fuel subsidies is expected to raise domestic energy production costs. For energy-intensive exports, such as LNG, petrochemicals and other manufactured goods, higher production costs can erode price competitiveness in international markets and lead to contractions in export volumes and revenues. However, the impact will depend on the size of elasticities for these products and the contractual supply arrangement. Nevertheless, based on the results, over time, investment in low-carbon technologies and economic diversification could help offset these losses, but these benefits are likely to materialise gradually.

Comparison of the current account performance across Scenarios 2 and 3 revealed that for Scenario 3, the current account as a share of GDP was slightly lower, possibly owing to a falloff in energy exports[32] and improvements in GDP[33]. Scenario 3 assumes 60.0 per cent of the carbon tax revenue is recycled into public investment. Public investment has the potential to stimulate aggregate demand, and increase imports of capital goods, altering the trade balance.

From 2031 onward, Scenario 2 shows a modest recovery in the current account surplus, while Scenario 3 remains relatively flat. This difference can be attributed to the redistributive fiscal strategy in Scenario 3, where a portion of carbon tax revenue is recycled into public investment. These investments can stimulate domestic demand, increasing imports of capital goods. In contrast, Scenario 2's more conservative fiscal stance helps stabilise and gradually strengthen the external position.

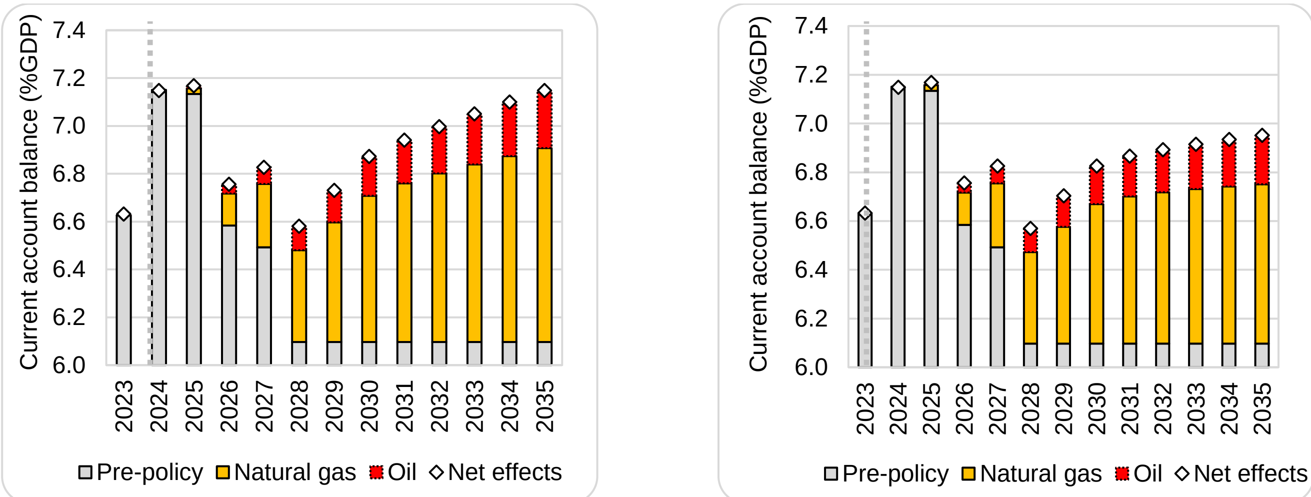
Overall, Scenario 2 preserves external balances more effectively, while Scenario 3 trades slower-growing surpluses for expanded domestic development. This trade-off underscores the importance of aligning fiscal policy with long-term development goals. Provided the current account remains in surplus and external buffers are strong, the slightly weaker trajectory of Scenario 3 may be acceptable, if it delivers gains in social outcomes, productivity and long-term resilience.

[32]. CPAT accounts for changes in fuel and electricity imports and exports and changes in trade are accounted for in GDP estimates but the coverage of traded products is limited. This prevents explicit analysis of border carbon adjustments (BCA) which is an emerging area gaining significant attention.

[33]. The implementation of the carbon tax affects GDP over time and is dependent on how revenues are recycled. Greater allocations to public investment, as assumed in Scenario 3, tend to be supportive of GDP than increasing transfers or current government expenditure.

Figure 14: First-order Impact on the Current Account Balance of Trinidad and Tobago (for US$50 - Carbon tax p/t$CO_2$e in 2018-2030)

Scenario 2 **Scenario 3**



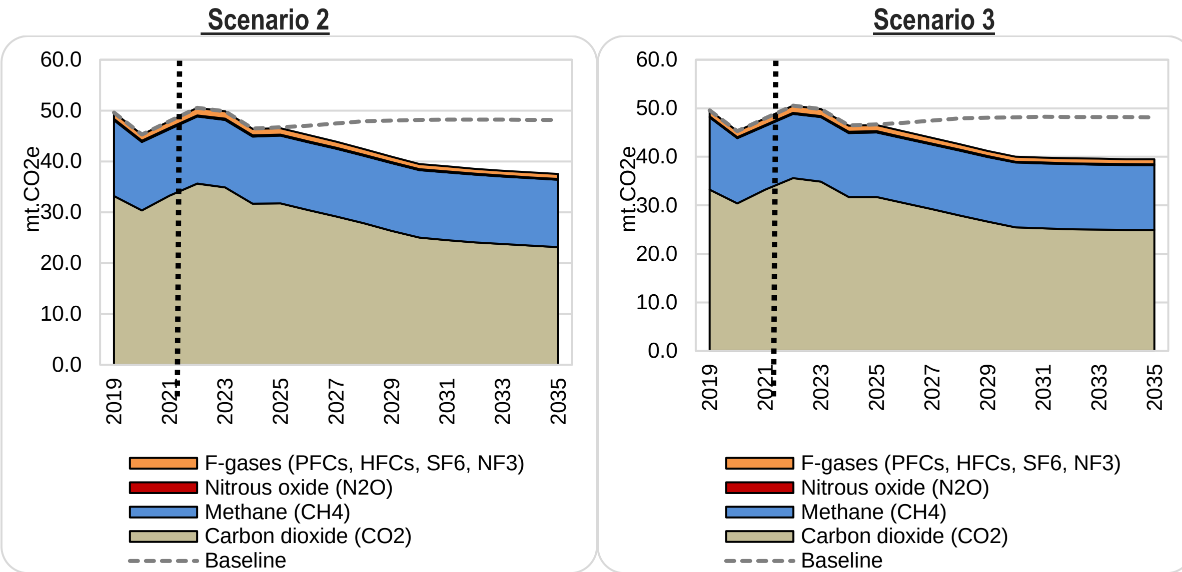
Note: Assumes current account balance is the same in years after and including 2026.

Figure 15 disaggregates total projected GHG emission by gas type excluding land use, land-use change and forestry (LULUCF). The gases shown include CO_2, methane (CH_4) and nitrous oxide (N_2O), which together form the bulk of Trinidad and Tobago's emissions profile.

Under both scenarios, there is a marked and sustained decline in CO_2 emissions over the projection horizon, consistent with the tax's focus on fossil fuel combustion. The fall in CO_2 is sharper in the early years (2026 – 2030), reflecting the immediate price signal of the carbon tax and reduced use of carbon-intensive fuels in power generation, industry and transport. In Scenario 2, emissions fell from 30.0 mtCO_2e in 2025 to 23.0 mtCO_2e in 2035. Scenario 3 shows a marginally greater reduction in CO_2 emissions compared to Scenario 2 by 2030, potentially due to stronger behavioural shifts and technology uptake.

In contrast, methane and nitrous oxide emissions display more inertia, with only gradual reductions observed across both scenarios. This can be expected, as these gases originate from sources that are less responsive to carbon pricing, such as industrial processes, landfills and agriculture. The lack of significant change in these emissions suggests that while a carbon tax is effective in curbing energy-related CO_2, it should be complemented by non-price interventions that target other sectors. These could include stringent emissions standards for industrial processes, incentives for methane capture, and reforms in waste management or agricultural practices.

Figure 15: Projected Total GHG Emissions by Gas (exc. LULUCF)

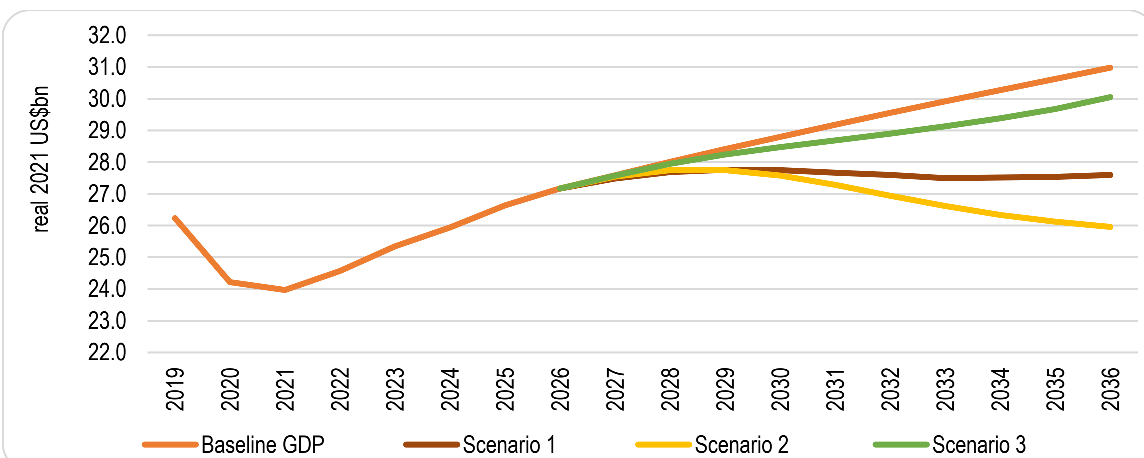


Source: IMF-World Bank CPAT

Scenario 1 vs Scenario 2 vs Scenario 3

Impact on GDP

Figure 16: GDP Levels in Trinidad and Tobago (for US $50 - Carbon tax p/t CO_2e by 2030)



Source: IMF-World Bank CPAT

One of the most significant findings of this study pertains to the projected evolution of Trinidad and Tobago's real GDP under the three carbon tax implementation scenarios. As illustrated in **Figure 16**, all scenarios exhibit a departure from the IMF's baseline growth path following the introduction of a carbon tax in 2026. However, the nature and severity of the deviations vary significantly depending on the policy environment.

In Scenario 1, the introduction of the tax causes forecasted real GDP to drop and stabilise just below US$28.0 billion in 2026. Annual real-GDP growth remains negative for from 2030 to 2033, averaging -0.23 per cent, before turning marginally positive for the years 2034 - 2035 (averaging 0.07 per cent annually). This outcome underscores the short-term adjustment costs associated with increased energy prices and reduced competitiveness in carbon-intensive sectors. The contraction is indicative of a drag on both supply and demand. Households face higher living costs, while firms encounter rising production expenses, dampening both investment and output.

When fossil fuel subsidies are removed in Scenario 2, more pronounced declines are noted in real GDP. The sharper contractions reflect compounded economic pressures. Higher energy costs, along with the withdrawal of subsidies, further erodes household purchasing power and firm profitability. Though the intended fiscal consolidation has merit from a public finance standpoint, it imposes a heavier burden on vulnerable groups, with no immediate options for compensation. This Scenario highlights the risks of aggressive policy stacking without adequate safeguards for economic resilience.

Only when carbon tax revenues are redistributed (Scenario 3) are the negative GDP impacts tempered. This highlights the potential for revenue redistribution to support household consumption and sustain demand. Scenario 3's GDP trajectory is closely aligning with the IMF baseline, averaging 1.3 per cent growth between 2026 and 2030 and 0.9 per cent thereafter. Notably, by 2036, the economy's growth rate surpasses the baseline forecast (1.25 per cent vs. 1.18 per cent), suggesting that a well-designed redistribution strategy can cushion the economy and stimulate inclusive growth.

Impact on Energy Prices

Table 3: Energy Price Changes for US$50/t CO_2 in 2030*

Fuel Types	Baseline	Scenario 1		Scenarios 2 & 3	
		Baseline + Carbon tax	% change	Baseline + Carbon tax	% change
Gasoline (US$ per litre)	0.41	0.54	31.6	0.66	62.6
Diesel (US$ per litre)	0.52	0.66	25.2	0.73	39.4
LPG (US$ per litre)	0.57	0.67	17.2	0.68	17.6
Kerosene (US$ per litre	0.69	0.82	18.6	0.82	19.0
Oil (US$ per barrel)	62.63	86.10	37.5	86.10	37.5
Natural gas (US$ per gigajoule (GJ))	6.14	8.93	45.5	8.94	45.5
Electricity (US$ per kwh)	0.05	0.05	0.0	0.05	0.1

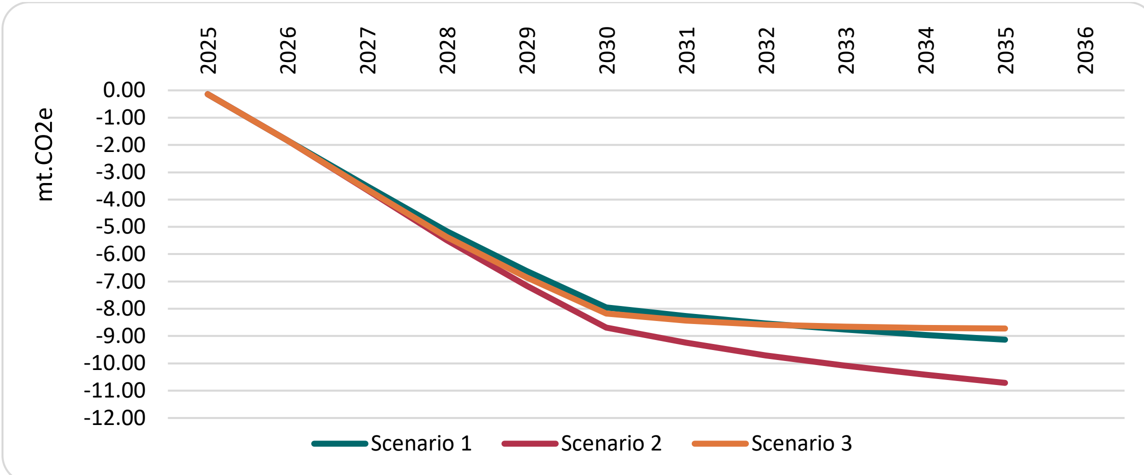
Source: IMF-World Bank CPAT

* Weighted by consumption

In Scenario 1, on average, domestic energy prices are expected to increase by 2.4 per cent in 2026, 8.9 per cent in 2027, and 15.3 per cent in 2028, before settling at 27.7 per cent above baseline prices in 2030. Natural gas, oil and gasoline were the fuel types most affected. **Table 3** shows that phasing out the fuel subsidy amplified negative pricing effects in Scenarios 2 and 3 (both of which have identical impacts). In Scenario 1, by 2030, when the US$50.00 per tonne of carbon dioxide tax is fully implemented, natural gas is expected to experience the steepest price increase at 45.5 per cent, rising from US$6.14 to US$8.93 per GJ. Oil and gasoline prices were also significantly impacted, rising by 37.5 per cent and 31.6 per cent, respectively. In Scenarios 2 and 3, the most significant increases were seen in gasoline (62.6 per cent), natural gas (45.5 per cent), diesel (39.4 per cent), and oil (37.5 per cent). Natural gas price increases are expected to filter through to the power sector, while the observed increase in transportation fuel is also expected to have a cascade of effects across the economy, from the cost of public transportation, food, clothing etc.

Impact on GHG Emissions Abatement

Figure 17: Abatement of GHGs (excluding LULULCF)



Source: IMF-World Bank CPAT

GHG abatement resulting directly from the carbon tax was nearly identical across all three scenarios **(Figure 17)**. Between 2026 and 2035, emissions reductions amounted to an average of 6.9 mtCO_2e in Scenario 1, 7.4 mtCO_2e in Scenario 2 and 6.6 mtCO_2e in Scenario 3. For Scenario 1, during the gradual phase-in of the carbon tax, average annual abatement was 5.0 mtCO_2e, compared to 8.7 mtCO_2e recorded in the subsequent five-year period (2031-2035). Meanwhile, in Scenarios 2 and 3, emission reduction climbed to an average of 5.4 mtCO_2e and 5.2 mtCO_2e respectively, between 2026 and 2030 and 10.0 mtCO_2e and 6.6 mtCO_2e between 2031 and 2035.

The falloff in CO_2 emissions was less pronounced in Scenario 1 when the fuel subsidy was still in force. Meanwhile, the greatest reduction occurred in Scenario 2, where there was no revenue redistribution and the fuel subsidy was removed. The lower abatement observed in Scenario 3 suggests a rebound effect, largely due to the recycling of revenue (income effect), which may have precipitated an increase in the consumption of goods and services. The slower decline in emissions suggest that households are benefiting from the revenue recycling strategy implemented, such that an increase in household income from redistributed revenues may encourage higher consumption and contribute to higher emissions.

The impact of a carbon tax on CO_2 emissions depends on its impact on prices and the responsiveness of the sector to the price changes. Industry, power and transportation sectors accounted for the majority of the GHG abatement across all three scenarios. Industry dominated, averaging 77.3 per cent of the total reductions. The power sector contributed the second largest share (15.1 per cent on average), while transportation accounted for most of the remainder, averaging 5.9 per cent. The industrial subsectors responsible for the larger declines in CO_2 emissions were fuel transformation, followed by mining and chemical, and iron and steel. In the transport sector, demand for fuel can be impacted as a result of shifts to more efficient and cleaner technologies, along with a direct reduction in fuel demand (reduced driving). Emissions emanating from road transport accounted for the larger share of the change in CO_2 emissions, followed by domestic aviation.

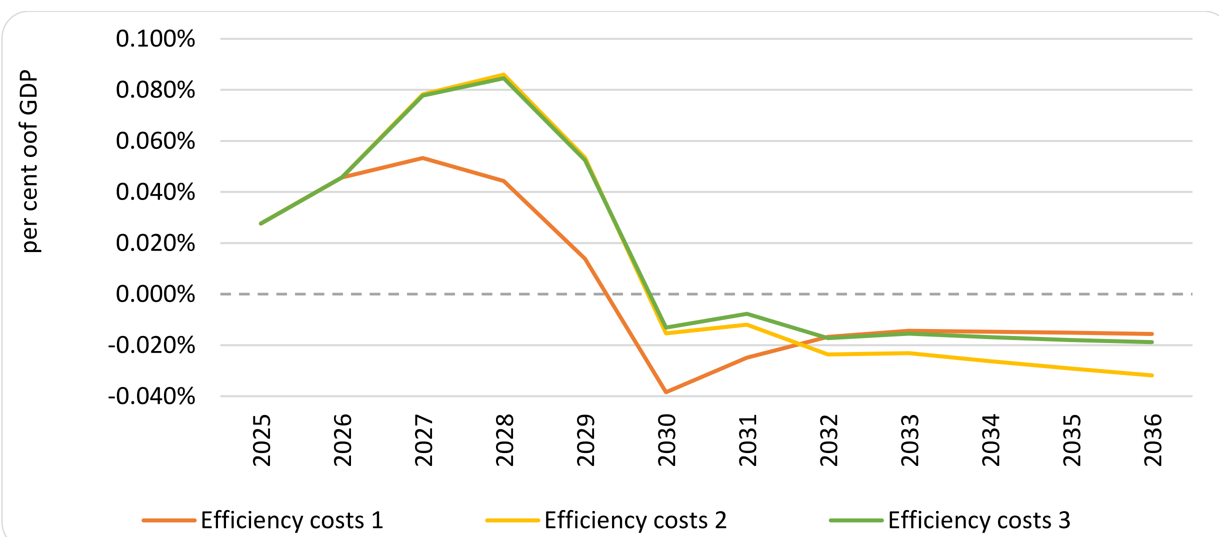
Impact on Welfare

The CPAT model allows for the estimation of welfare benefits accruing from the introduction of a carbon tax. The model considers averted damages from climate events, pollution, road accidents and the benefits derived from reduced traffic congestion and deadweight losses (efficiency cost[34]). Notwithstanding a lack of data for Trinidad and Tobago to assess the impact of the carbon tax on households, in all three scenarios resources are shifted from a market distorting environmentally harmful policy to a more efficient, equitable and productive one. Scenario 2, yielded the largest total average welfare gain (sum of both co-benefits and climate benefits) over the period 2026 – 2035, at approximately 2.3 per cent of GDP, while Scenarios 1 and 3 were smaller, at 2.0 per cent and 2.1 per cent, respectively. Welfare gain is highest in Scenario 2 as the removal of the fuel subsidies eliminates a significant fiscal burden and reduces the deadweight losses in the fuels market.

Scenario 3, which involves revenue recycling, delivers the second largest welfare gain by enabling targeted cash transfers that support equity and progressive redistribution. Fuel subsidies are widely regarded as regressive, as wealthier households own more vehicles, consume more energy and capture a larger share of the benefits. Accordingly, implementing a carbon tax while removing fuel subsidies generates a new revenue stream and frees fiscal resources. These additional resources can be redirected toward critical services such as healthcare, education, green infrastructure, and social safety nets. Results indicate that annual welfare gains averaged 4.2 per cent during the transition period (2026 - 2030), and nearly doubled in the post-transition period (2031 to 2035), averaging 7.9 per cent annually. Across all scenarios over 2026 - 2035, avoided transportation pollution yielded the largest average co-benefit (2.27 per cent of GDP), followed by air quality (2.25 per cent) and climate benefits (1.9 per cent). Overall, net benefits averaged 2.26 per cent of GDP.

Scenario 1 generates the least welfare benefit from the introduction of the carbon tax, as it reflects the scenario with the highest deadweight losses. The introduction of the carbon tax without the phasing out of the fuel subsidies can lead to further distortions especially if the cost of the tax outweighs the benefits of the fuel subsidies. **Figure 18** illustrates the gains from the reduction of deadweight losses (efficiency costs) accruing from the imposition of the carbon tax across all three scenarios. The imposition of the carbon tax in 2026 results in gains, which increases in Scenarios 2 and 3 when prices adjust and the market equilibrates during the transition phase.

Figure 18: Total Monetised Welfare Benefits for US$50 - Carbon tax p/t CO_2e by 2030



Source: IMF-World Bank CPAT

[34] Efficiency costs are defined as deadweight losses in fuel markets arising from changes in fuel prices, not accounting for revenue recycling benefits or tax interaction effects.

An Indicative Optimal Carbon Tax for Trinidad and Tobago

The CPAT simulations offer useful insights into the range of carbon prices that Trinidad and Tobago could feasibly adopt within the five-year implementation horizon outlined in the Data and Methodology Section. Under the modelled policy path, starting at US$10.00 per tonne in 2026 and rising linearly to US$50.00 by 2030, the economy implicitly experiences intermediate tax levels of US$20.00, US$30.00 and US$40.00. Accordingly, the emissions, fiscal, and macroeconomic impacts associated with these price points are embedded in the model outcomes, even though not examined as standalone scenarios.

The results indicate that Trinidad and Tobago's conditional NDCs can be achieved comfortably within this US$10.00 - $50.00 price corridor by 2030. While lower levels (US10.00 - $20.00) support early emissions reductions, they generate limited fiscal revenue and therefore constrain the country's ability to fund essential complementary measures; such as targeted household compensation, just transition programmes, and investments in renewable energy and resilience. These lower prices also produce weaker behavioural incentives and may not provide sufficient policy space for adapting energy markets in a hydrocarbon-dependent economy.

By contrast, higher prices consistent with global 2°C pathways (exceeding US$50.00 per tonne) would achieve stronger mitigation outcomes, but entail sharper domestic energy price adjustments and more significant short-term macroeconomic impacts. These levels are neither necessary for meeting Trinidad and Tobago's existing NDC commitments nor well-suited to the country's structural characteristics. As a small, energy-exporting economy with longstanding energy subsidies and a production structure closely tied to natural gas, such aggressive price trajectories may be difficult to absorb over the short to medium-term. Trinidad and Tobago also faces a different set of transition dynamics than many regional peers that do not export hydrocarbons. Although, the country may require a moderately stronger price signal than the current regional average to meaningfully influence domestic consumption and production patterns, while still maintaining economic stability.

Within this context, an indicative optimal carbon tax range for Trinidad and Tobago lies between US$30.00 and US$50.00 per tonne by 2030. This range represents a pragmatic balance between mitigation ambition and economic practicality. It is sufficiently high to maintain progress toward the NDC, produces meaningful fiscal revenue, and supports complementary transition and resilience initiatives, yet moderate enough to reduce the risk of abrupt domestic price adjustments relative to more aggressive global benchmark trajectories. Importantly, because both US$30 and US$50 arise within the modelled five-year trajectory, the impacts associated with this range are already captured within the CPAT results.

This range should not be interpreted as a mathematically optimised carbon price. Rather, it reflects an indicative policy-relevant band informed by (i) the simulated emissions pathway, (ii) revenue generation possibilities, (iii) the structure of Trinidad and Tobago's energy market, and (iv) the need for a smooth and socially acceptable transition. Lower prices would likely underfund complementary measures and deliver weaker incentives, while substantially higher prices are more aligned with global mitigation objectives than with the country's immediate transition priorities. This range balances environmental effectiveness with macroeconomic stability, moderates negative pass-through effects, and provides households and firms, particularly those in energy-intensive sectors, sufficient time to adjust to rising energy costs.

Conclusion and Recommendations

This study finds that the introduction of a carbon tax in Trinidad and Tobago can significantly reduce GHG emissions while generating meaningful fiscal revenue to support national development priorities. CPAT simulations suggest that a moderate carbon price trajectory, beginning at US$10.00 per tonne of CO_2 and rising to US$50 by 2030, would significantly contribute to achieving the country's 2030 NDC targets. These findings support the viability of carbon taxation as an effective policy instrument within Trinidad and Tobago's climate change mitigation framework.

However, this trajectory remains insufficient to align with global 2°C pathways, which require carbon prices in the order of US$50.80 – US$101.50 per tonne in 2026, rising to US$57.40 – US$114.80 by 2032. At the same time, potential socio-economic challenges, including increased fuel costs, inflationary pressures, and stakeholder resistance, highlight the need for a phased and equitable implementation strategy.

From a macroeconomic perspective, the findings are cautiously optimistic. Although higher energy prices initially dampen activity, the effects are temporary, with real GDP and the current account balance recovering in the medium term across all scenarios. Importantly, projected energy price increases are moderate and partially offset by fiscal inflows estimated at US$5.3 billion between 2026 and 2035.

Scenario comparisons underscore that policy design is critical. A carbon tax without supportive measures risks triggering contraction and stagnation. By contrast, when complemented by revenue recycling and redistribution mechanisms, carbon pricing can achieve both environmental effectiveness and economic viability. The findings further suggest that carbon taxation should not be implemented in isolation from broader fiscal and energy policy measures. Recent policy actions (such as the reduction in retail prices for super gasoline, the introduction of the electricity surcharge of TT$0.05 per kilowatt-hour (kWh), and the announced reforms to domestic gas pricing) carry important price and welfare implications that interact with carbon pricing outcomes.

Taken together, the results suggest that a moderate carbon price path, settling within an indicative range of US$30.00 – $50.00 per tonne by 2030, represents a balanced and practical approach for Trinidad and Tobago. This range is sufficiently strong to maintain progress toward the NDCs while generating the fiscal space needed to support compensation mechanisms, just transition initiatives, and investments in renewable energy and resilience. At the same time, it avoids the sharper adjustment pressures associated with higher global benchmark prices. Lower prices at the beginning of the range (US$10.00 – $20.00) provide useful early signals but produce limited behavioural change and insufficient revenue to meaningfully support complementary policies. Conversely, as a net-energy-exporting economy, Trinidad and Tobago requires a somewhat stronger price signal than many regional peers that are not hydrocarbon producers, both to influence domestic consumption patterns and to align incentives within its energy-intensive production structure. The US$30.00 – $50.00 range therefore reflects a pragmatic midpoint; one that is already implicitly captured within the modelled pathway, consistent with the country's NDC, and aligned with a stable and socially acceptable transition pace.

It is also important to acknowledge that the CPAT framework models mitigation outcomes only and does not incorporate adaptation effects. This represents a notable limitation for Trinidad and Tobago, where climate strategy increasingly prioritises adaptation measures such as resilient infrastructure, coastal protection, and climate-smart agriculture. As a result, this study captures only one dimension of the broader climate policy response. Integrating carbon pricing into a wider resilience-building and adaptation framework remains essential for safeguarding long-term development.

To ensure that a carbon tax advances both environmental and developmental goals, the following policy recommendations are proposed:

1. Strengthen Institutional and Legal Frameworks: Enact enabling carbon pricing legislation, with clear provisions for enforcement, monitoring, and revenue use transparency. Systems for monitoring reporting and verification have already been implemented, therefore integrating this system with the European Union's Carbon Border Adjustment Mechanism (CBAM) can provide accurate, verifiable emissions data for exports that help preserve market access and competitiveness.

2. Phase Out Fossil Fuel Subsidies Transparently: Accelerate subsidy reform with the aim of aligning domestic fuel prices with international market prices while maintaining exemptions for essential services like public transport during the transition. This should be done through a transparent and clear communication strategy explaining the economic and environmental rationale, alongside targeted support for vulnerable groups.

3. Expand Clean Energy Infrastructure: Complementary policies such as building clean energy infrastructure (electric vehicle charging stations, small-scale solar in schools, ministries and community centres), expanding compressed natural gas (CNG) service stations and upgrading public transportation with CNG fuel can provide affordable and accessible alternatives to fossil fuels.

4. Implement a Just Transition Strategy: Earmark a portion of carbon revenues to protect low-income households and workers in carbon-intensive sectors. Social safety-net mechanisms including, direct cash transfers and utility subsidies would be effective in redistributing carbon revenues. Support retraining and reskilling initiatives for workers in energy-intensive industries to transition toward greener jobs in renewables, energy efficiency, and sustainable agriculture.

5. Reinvest Carbon Revenues for Climate-Resilient Development: Use carbon tax revenues to fund green infrastructure, climate-smart agriculture, renewable energy projects, public transport upgrades, and adaptation initiatives. Establish a Green Transformation Fund to pool carbon revenues, climate finance, and private investment for strategic low-carbon development projects.

6. Engage Stakeholders and the Public: Conduct regular consultations with industry, civil society, and citizens to build public trust, identity implementation bottlenecks, and create just solutions. Launch a national awareness campaign on carbon pricing, climate risks, and how revenues will be reinvested in public goods.

7. Implement a Structured Review Process: Integrate dynamic pricing reviews every three to five years to assess if adjustments are needed based on updated emissions, economic performance, and global trends.

Trinidad and Tobago stands at a pivotal crossroad. As an energy-exporting nation vulnerable to climate change, the country must balance economic interests with the urgency of decarbonisation. When embedded within a coordinated policy mix (including subsidy reform, revenue recycling, and investment in clean energy and resilience) a moderate carbon tax can become a powerful tool for shaping a lower-carbon, competitive, and more inclusive economy.

Looking ahead, future work could integrate adaptation-financing models, explore distributional effects using household-level data, and assess how carbon pricing can be aligned with broader economic diversification strategies. Ultimately, a well-calibrated carbon tax can serve not just as a tool for emissions reduction, but also as a catalyst for transforming Trinidad and Tobago into a more resilient, inclusive, and future-ready economy.

References

Andersen, Mikael Skou, Terry Barker, Edward Christie, Paul Ekins, John F. Gerald, Jitka Jilkova, Sarbajit Junankar, Michael Landesmann, Hector Pollitt, and Robert Salmons. Competitiveness Effects of Environmental Tax Reform (COMETER). Final Report to the European Commission. Aarhus, DK: National Environmental Research Institute, University of Aarhus, 2007. Accessed 2024. https://pure.au.dk/ws/portalfiles/portal/128999763/COMETR_Summaryreport.pdf.

Azevedo, David, Hendrik Wolff, and Akio Yamazaki. "Do Carbon Taxes Kill Jobs? Firm-Level Evidence from British Columbia." Climate Change Economics 2022. Accessed 2025. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4242152.

Bernard, Jean-Thomas, Maral Kichian, and Misbahul Islam. "Effects of B.C.'s Carbon Tax on GDP." USAEE Research Paper Series, 2018. Accessed 2025. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3283220.

Black, Simon, Ian Parry, Victor Mylonas, Nate Vernon, and Karlygash Zhunussova. "The IMF–World Bank Climate Policy Assessment Tool (CPAT): A Model to Help Countries Mitigate Climate Change." Working Paper 23/128. Washington, DC: International Monetary Fund, 2023.

Black, Simon, Jean Chateau, Florence Jaumotte, Ian Parry, Gregor Schwerhoff, Sneha Thube, and Karlygash Zhunussova. "Getting on Track to Net Zero: Accelerating a Global Just Transition in This Decade." IMF Staff Climate Note 2022/010. Washington, DC: International Monetary Fund, 2022.

Carattini, Stefano, Maria Carvalho, and Sam Fankhauser. "How to Make Carbon Taxes More Acceptable." Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science, 2017. Accessed 2025. https://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2017/12/How-to-make-carbon-taxes-more-acceptable.pdf.

Carvalho, Leticia Vicente, and Henderson Silva Wanderley. "Risk Identification of Precipitation Extremes due to Climate Change in the Southern Region of the State of Rio de Janeiro." Revista Brasileira de Geografia Física 15, no. 4 (2022): 2073–2085. Accessed 2025. https://periodicos.ufpe.br/revistas/rbgfe/article/view/253680/41446.

Cevik, Serhan. "Waiting for Godot? The Case for Climate Change Adaptation and Mitigation in Small Island States." IMF Working Papers. Washington, DC: International Monetary Fund, 2022. Accessed 2025. https://www.imf.org/en/Publications/WP/Issues/2022/09/09/Waiting-for-Godot-The-Case-for-Climate-Change-Adaptation-and-Mitigation-in-Small-Island-523277.

Chau, Symphoney. "Norway Has One of the World's Highest Carbon Tax Rates (1991–ongoing)." New York University Center on International Cooperation, 2024. Accessed May 2025. https://www.sdg16.plus/policies/carbon-tax-norway/.

Eurostat. Environmental Statistics and Accounts in Europe. Luxembourg: Publications Office of the European Union, 2010. Accessed December 2024. https://ec.europa.eu/eurostat/web/products-statistical-books/-/KS-32-10-283.

Government of Canada. "Fuel Charge Rates: Removal of Fuel Charge." Canada Revenue Agency, April 1, 2025. Accessed June 2025. https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/fcrates/fuel-charge-rates.html.

Institute for Climate Economics. "In the Absence of a Carbon Tax in Canada, Measures to Fill the Gap Are Essential." March 2025. Accessed May 2025. https://www.i4ce.org/en/absence-carbon-tax-canada-measures-fill-gap-essential-climate/.

International Monetary Fund, Organization for Economic Co-operation and Development, United Nations Conference on Trade and Development, World Bank, and World Trade Organization. Working Together for Better Climate Action. 2024.

Jaafar, Afef. “Macroeconomic Impacts of Carbon Pricing: Case of Energy Subsidies Phase-Out and the Introduction of a Carbon Price in Tunisia.” energynow 16 (2020). Accessed January 2025. https://energynow.tt/blog/macroeconomic-impacts-of-carbon-pricing-case-of-energy-subsidies-phase-out-and-the-introduction-of-a-carbon-price-in-tunisia.

Jonsson, Samuel, Anders Ydstedt, and Elke Asen. “Looking Back on 30 Years of Carbon Taxes in Sweden.” Tax Foundation Europe, 2020. Accessed 2025. https://files.taxfoundation.org/20200929121706/Looking-Back-on-30-Years-of-Carbon-Taxes-in-Sweden-re.pdf.

Köppl, Angela, and Margit Schratzenstaller. “Carbon Taxation: A Review of the Empirical Literature.” Journal of Economic Surveys 37 (2023): 1353–1388. Accessed January 13, 2025. https://onlinelibrary.wiley.com/doi/full/10.1111/joes.12531.

Lin, Boqiang, and Xuehui Li. “The Effect of Carbon Tax on Per Capita CO_2 Emissions.” Energy Policy 39, no. 9 (2011): 5137–5146.

Manta, Alina Georgiana, Nicoleta Mihaela Doran, Roxana Maria Badircea, Gabriela Badareu, and Alexandra Madalina Taran. “Does the Implementation of a Pigouvian Tax Be Considered an Effective Approach to Address Climate Mitigation?” Economic Analysis and Policy 80 (2023): 1719–1731.

Meng, Sam, Mahinda Siriwardana, and Judith McNeill. “The Environmental and Economic Impact of the Carbon Tax in Australia.” Environmental and Resource Economics 54 (2012): 313–332. https://link.springer.com/article/10.1007/s10640-012-9600-4.

Metcalf, Gilbert E. “Carbon Taxes in Theory and Practice.” Annual Review of Resource Economics 13 (2021): 245–265.

Metcalf, Gilbert E. “On the Economics of a Carbon Tax for the United States.” Brookings Papers on Economic Activity (2019): 405–458. Accessed 2025. https://www.brookings.edu/wp-content/uploads/2019/03/Metcalf_web.pdf.

Ministry of Planning and Development. “Leveraging the Industry’s Strengths for the Energy Transition.” Keynote Address by The Hon. Pennelope Beckles at the Energy Chamber’s Trinidad and Tobago Energy Conference 2022. Accessed 2025. https://www.planning.gov.tt/content/hon-pennelope-beckles-keynote-address-energy-chamber%E2%80%99s-trinidad-and-tobago-energy-conference.

Murray, Brian, and Nicholas Rivers. “British Columbia’s Revenue-Neutral Carbon Tax: A Review of the Latest ‘Grand Experiment’ in Environmental Policy.” Energy Policy (2015): 674–683. Accessed 2025. https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_15-04_full.pdf.

Nelson, Andell, and Yannick Melville. “Climate Change and Inflation: The Role of Climate Variables in Inflation Modelling.” CBTT Working Paper Series. Central Bank of Trinidad and Tobago, 2025. Accessed 2025. https://www.central-bank.org.tt/wp-content/uploads/2025/05/WPS-001_2025.pdf.

Norwegian Ministry of Climate and Environment. Norway’s Eighth National Communication: Under the Framework Convention on Climate Change. 2023. Accessed May 2025. https://www.regjeringen.no/contentassets/a69c7662e3ed4b1fa2f946f8e966343a/en-gb/pdfs/t-1582-e-norways-eighth-national-communication.pdf.

OECD. “A Framework to Decarbonize the Economy.” Economic Policy Paper No. 31, February 2022. https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/02/a-framework-to-decarbonise-the-economy_642a6827/4e4d973d-en.pdf.

Rafaty, Ryan, Geoffroy Dolphin, and Felix Pretis. “Carbon Pricing and the Elasticity of CO_2 Emissions.” Institute for New Economic Thinking Working Papers, 2020. Accessed January 2025. https://www.ineteconomics.org/uploads/papers/WP_140-Rafaty-Dolphin-and-Pretis-final-2.pdf.

Smart Prosperity Institute. "The Rise and Fall of the Australian Carbon Tax." 2012. Accessed 2025. https://institute.smartprosperity.ca/content/rise-and-fall-australian-carbon-tax.

Timilsinas, Govinda R. "Where Is the Carbon Tax after Thirty Years of Research?" World Bank Group Policy Research Working Paper. World Bank Group, 2018. Accessed December 2024. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/209041530236682559/where-is-the-carbon-tax-after-thirty-years-of-research.

Trinidad and Tobago Meteorological Service (TTMS). "Climate." 2022. Accessed 2025. https://www.metoffice.gov.tt/Climate.

UN Jamaica. "Carbon Pricing in the Caribbean." Jamaican Economy Panel Discussions. United Nations Jamaica, 2021. Accessed January 2025. https://jamaica.un.org/sites/default/files/2021-09/JEP%20Discussion%205_0.pdf.

UNTCAD. "Working Together for Better Climate Action: Carbon Pricing, Policy Spillovers, and Global Climate Goals." 2024. Accessed 2025. https://www.wto.org/english/res_e/booksp_e/climate_action_e.pdf.

World Bank Group. "Carbon Pricing Dashboard." 2025. Accessed January 2025. https://carbonpricingdashboard.worldbank.org/compliance/coverage.

Yarna, River. "Carbon Taxation in Trinidad and Tobago: Our Current Mooring." The UWI St. Augustine Law Journal 2, no. 1 (2024): 53–61. Accessed January 2015 (likely typo in original access date). https://journals.sta.uwi.edu/ojs/index.php/stalj/article/view/9143.

Appendices

Appendix 1: Regional Carbon Taxes

Carbon Tax	Price (US$/tCO2e)	Start date	Country income group	Scope
East Asia & Pacific (3)				
Singapore carbon tax	18.6	2019	High income	National
Taiwan, China carbon fee	9.1	2024	High income	Subnational
Japan carbon tax	1.9	2012	High income	National
Europe & Central Asia (22)				
Sweden carbon tax	144.6	1991	High income	National
Liechtenstein carbon tax	136.0	2008	High income	National
Switzerland carbon tax	136.0	2008	High income	National
Norway carbon tax	133.9	1991	High income	National
Denmark carbon tax	108.4	1992	High income	National
Netherlands carbon tax	94.8	2021	High income	National
Portugal carbon tax	72.7	2015	High income	National
Ireland carbon tax	68.5	2010	High income	National
Finland carbon tax	66.9	1990	High income	National
Iceland carbon tax	60.1	2010	High income	National
Luxembourg carbon tax	58.5	2021	High income	National
France carbon tax	48.1	2014	High income	National
Hungary carbon tax	38.8	2023	High income	National
Slovenia carbon tax	33.3	1996	High income	National
Andorra carbon tax	32.4	2022	High income	National
Estonia carbon tax	27.0	2000	High income	National
UK Carbon Price Support	23.2	2013	High income	National
Latvia carbon Tax	16.2	2004	High income	National
Spain carbon tax	16.2	2014	High income	National
Albania carbon tax	13.7	2008	Upper middle income	National
Ukraine carbon tax	0.7	2011	Upper middle income	National
Poland carbon tax	0.0	1990	High income	National
Latin America & Caribbean (16)				
Uruguay CO2 tax	158.8	2022	High income	National
Queretaro carbon tax	32.8	2022	Upper middle income	Subnational
Colima carbon tax	27.8	2025	Upper middle income	Subnational
San Luis Potosí carbon tax	16.7	2025	Upper middle income	Subnational
Tamaulipas carbon tax	16.7	2022	Upper middle income	Subnational
Yucatan carbon tax	15.0	2022	Upper middle income	Subnational
Morelos carbon tax	12.3	2025	Upper middle income	Subnational
Zacatecas carbon tax	12.3	2017	Upper middle income	Subnational
Colombia carbon tax	6.5	2017	Upper middle income	National
Argentina carbon tax	5.3	2018	Upper middle income	National
Chile carbon tax	5.0	2017	High income	National
Durango carbon tax	4.9	2024	Upper middle income	Subnational
Guanajuato carbon tax	4.9	2023	Upper middle income	Subnational
Mexico carbon tax	3.9	2014	Upper middle income	National
Mexico City carbon tax	2.8	2025	Upper middle income	Subnational
State of Mexico carbon tax	2.8	2022	Upper middle income	Subnational
Middle East & North Africa (1)				
Israel carbon tax	1.5	2025	High income	National
Sub-Saharan Africa (1)				
South Africa carbon tax	12.8	2019	Upper middle income	National
Abolished Carbon Taxes (Canada - 8)				
Alberta carbon tax	North America	2017	High income	Subnational
Baja California carbon tax	Latin America & Caribbean	2020	Upper middle income	Subnational
BC carbon tax	North America	2008	High income	Subnational
Canada federal fuel charge	North America	2019	High income	National
New Brunswick carbon tax	North America	2020	High income	Subnational
Newfoundland and Labrador carbon tax	North America	2019	High income	Subnational
Northwest Territories carbon tax	North America	2019	High income	Subnational
Prince Edward Island carbon tax	North America	2019	High income	Subnational

Source: Taken from (World Bank Group 2025)

Appendix 2: Energy Demand Model

In the general equation used for all energy demand in CPAT, the final demand for a particular energy source in a period t is determined by:

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

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

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

where:

- Et is demand at time t for a specific energy good in a particular sector
- ut is usage of energy-consuming capital goods
- ht is the energy consumption rate of capital goods, the inverse of energy efficiency
- vt is the income elasticity for the energy good which may change over time (see below)
- pt is the price for energy in the sector
- η^u is the price elasticity of demand for the usage of energy-consuming capital goods
- $\eta^h < 1$ is the price elasticity of the energy consumption rate
- $0 < \alpha < 1$ is the autonomous rate of efficiency improvements for energy-consuming capital goods (e.g., reflecting the gradual replacement of older, less efficient capital with newer, more efficient capital).

Appendix 3: Energy Supply Model

The supply curves for fossil fuels and countries are assumed to be perfectly elastic across the range of climate mitigation policies, implying fixed unit production costs within a given time period. This is a reasonable approximation for oil products where international markets are well integrated and most countries pay a fixed price for importing or exporting the fuel. Coal supply curves are elastic over time due to large reserves available for extraction, whereas coal importers face a fixed regional price. Natural gas markets are more fragmented than oil markets due to the high costs of liquefying and re-gasifying the fuel. One caveat is that when large energy-consuming countries act together to reduce fuel consumption, this can put downward pressure on global fuel prices. This possibility is not explicitly modelled in CPAT, but its effect would be to (slightly) reduce the price responsiveness of domestic fuel use, which is easily adjustable in CPAT for such scenarios.

The power sector supply curves for electricity production are elastic, but unit production costs vary according to climate mitigation policies. To address the power system's complexity and importance for decarbonisation, CPAT employs two models: an elasticity-based supply model and a techno-economic hybrid ('engineering') model. The elasticity-based model is a simplified static approach that allows for broad approximations of changes in electricity generation as a function of changes in relative generation prices. It is easily parameterised using econometric evidence on coal and fuel price elasticities, and the consequences of different assumptions are clear. The engineering model takes into account power system complexities at the national level, such as system reliability through storage, variations in generation asset turnover rates, and nonlinearities in generation responses. Both models serve as checks on each other to identify key factors limiting decarbonisation in power systems.

The elasticity-based electricity supply model calculates the industry-level unit cost, denoted as c, by calculating the share-weighted average of generation costs for various fuels.

$$c = \sum_i \theta^i \cdot g^i \text{ ... (4)}$$

where θ^i is the share of fuel *i* in total generation and g^i is the full cost of producing and delivering a unit of electricity using fuel *i,* with fuels potentially including coal, natural gas, oil, wind, solar, nuclear, hydro, biomass, and other renewables.

Generation shares are determined as follows:

$$\theta^i = \theta_0^i \cdot \left\{ \left(\hat{g}^i\right)^{\varepsilon^i} + \frac{\sum_{j \neq i} \theta_0^j \left[1 - \left(\hat{g}^j\right)^{\varepsilon^j}\right]}{\left(1 - \theta_0^j\right)} \right\} \text{ ... (5)}$$

Where*: i, j* index fuels, subscript 0 indicates a generation share in the BAU (prior to mitigation policy), and ˆ indicates a proportionate change in unit costs relative to the BAU (e.g., caused by a carbon tax). Expression (5) summarizes the impact on the generation share for fuel *i* in response to policy-induced changes in its own generation cost, and in the generation cost of other fuels. Specifically, $\varepsilon^{i} < 0$ is the 'conditional' own-price elasticity of generation for fuel *i,* that is, the percent reduction in fuel *i* due to switching from that fuel to other fuels, per a one-percent increase in fuel *i*'s generation cost, conditional on a fixed level of electricity generation.