The Use of Green Tax Incentives for Renewable Energy Deployment in Emerging and Developing Countries

IISD REPORT

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International Institute for Sustainable Development

September 2025

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Acknowledgements

The author gratefully acknowledges help in the preparation of this report from Tara Laan, David Manley, Alexandra Readhead, Paloma García Córdoba, and Josefina del Rosario Lago, Elisangela Rita, Thomas Lassourd and Nathalie Jones for their research and writing support.

The author also thanks Massimo Meloni and Mathilde Closset (UN Trade and Development), Agustin Redonda (Centre for Economic Policies), Giovanni Occhiali (International Centre for Tax and Development), Diala Hawila, Faran Rana, and Hannah Sofia Guinto (International Renewable Energy Agency) for their valuable inputs and feedback.

Finally, the author wishes to thank representatives of the governments of the Philippines, Namibia, South Africa, Lao PDR, and Chile for sharing their insights.

Any remaining errors or omissions are our own.

Executive Summary

The transition to renewable energy is essential for meeting global climate goals and building resilient, low-carbon economies. However, investment in clean energy remains deeply uneven. While developed countries and major emerging markets like China and India attract most of the capital, many developing countries face challenges in attracting the financing needed to expand renewable energy.

This report explores how countries in emerging and developing markets use tax incentives to support renewable energy investment, i.e., "green" tax incentives. These incentives include income tax holidays, accelerated depreciation, and import duty relief. Based on an original data set covering 35 countries, the report looks at how governments design these incentives, what problems they aim to solve, and how effective they are as an investment promotion tool in different national contexts.

Key Findings

- **Green tax incentives are common but not equally used across regions.** In Asia and Latin America, they account for more than 70% of the renewable energy incentives identified. In Africa, where many governments rely more on donor support and concessional finance, the figure is only 24%.
- **Profit-based incentives are the most frequently used**, but they often fail to support early-stage projects in riskier markets where companies are not yet profitable. Cost-based incentives, including targeted tax credits, tend to lower risks more directly and help unlock investment.
- **Many countries apply incentives too broadly**, without focusing on technologies that most need support. This approach can waste resources and reduce impact, especially in countries that face tight budget constraints.
- **Tax incentives work best when governments combine them with other supportive policies.** These include national energy plans, power purchase agreements, local content requirements, and affordable financing through public or development banks. Without this broader policy support, tax incentives may fail to deliver results.
- **Experiences from China and India offer valuable lessons.** In the early years, both countries used tax incentives together with public investment, strong institutions, and coordinated industrial policies to lower project costs and build domestic supply chains. As their markets grew, they shifted toward auctions and performance-linked payments that rewarded cost reductions and efficiency.

Tax incentives are familiar tools that appeal to both governments and investors, but they are not a solution on their own. When governments design them poorly or apply them without clear goals, they can reduce revenue without attracting meaningful investment. To use tax incentives well, policy-makers must define their purpose, measure the costs, and ensure that incentives fit within a broader strategy for clean energy and inclusive growth.

Table of Contents

List of Figures

List of Tables

List of Boxes

Abbreviations and Acronyms

ASCM	Agreement on Subsidies and Countervailing Measures
CREATE	Corporate Recovery and Green Tax Incentives for Enterprises Act
EMDE	emerging market and developing economy
FIRB	Fiscal Incentives Review Board
FIT	feed-in tariff
IEA	International Energy Agency
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IRENA	International Renewable Energy Agency
LAO PDR	People's Democratic Republic of Lao
OECD	Organisation for Economic Co-operation and Development
PPA	power purchase agreement
R&D	research and development
UNCTAD	United Nations Conference on Trade and Development
VAT	value-added tax
VRE	Variable renewable energy
WTO	World Trade Organization

Glossary

This glossary provides definitions of technical terms used throughout the report. It aims to support readers by offering clear explanations of fiscal policy and renewable energy-related concepts relevant to the discussion of green tax incentives in emerging and developing countries.

Accelerated depreciation	A tax incentive allowing investors to deduct a larger portion of asset costs in the early years of a project's life to improve early cash flows.
Cost-based incentives	Tax incentives that defer tax payments or allow deductions based on specific project costs, like capital expenditures.
Corporate income tax	A direct tax imposed on the net income or profit of corporations.
Emerging markets and developing economies	Countries classified by the World Bank as having low, lower-middle, or upper-middle incomes, typically with growing but less mature markets.
Effective tax rate	The actual rate at which a corporation's income is taxed after deductions, credits, and exemptions are considered.
Feed-in tariffs	Policy mechanisms that offer long-term contracts and guaranteed pricing to renewable energy producers.
Fiscal incentives	Financial measures (tax incentives. such as tax reductions or exemptions) used to encourage investment in specific sectors.
Global Anti-Base Erosion Rules	Organisation for Economic Co-operation and Development rules ensuring large multinational companies pay at least a 15% effective tax rate globally.
Green tax incentives	Tax incentives aimed at promoting environmentally beneficial activities, particularly renewable energy projects.
Import duty exemptions	Tax relief measures that waive customs duties on imported goods, typically renewable energy equipment.
Investment tax credit	A tax credit based on a percentage of eligible investment costs to incentivize capital investments.
Levelized cost of electricity	The average cost per unit of electricity generated, accounting for the total costs of building and operating a power plant over its lifetime.

Least developed countries	Countries classified by the United Nations as having the lowest indicators of socio-economic development.
Multinational enterprise	A corporation that operates and owns assets in multiple countries.
Profit-based incentives	Tax incentives that reduce taxes payable on business profits, often through income tax holidays or reduced corporate tax rates.
Renewable energy certificates	Tradable, non-tangible energy commodities certifying that electricity was generated from a renewable energy resource.
Substance requirements	Tax rules requiring that companies conduct genuine economic activities (e.g., hiring staff, operating facilities) in a jurisdiction to qualify for tax benefits.
Supply-side incentives	Policies that promote the generation of goods and services, such as production tax credits and investment support.
Tax holiday	A temporary reduction or elimination of corporate income tax to incentivize investment.
Value-added tax relief	Exemptions or reductions in value-added tax obligations to reduce costs for businesses investing in specific sectors like renewable energy.
Variable renewable energy	Renewable energy sources like wind and solar whose output fluctuates based on natural conditions.

1.0 Introduction

The accelerating climate and energy crises have made it more urgent than ever to shift to sustainable energy and green infrastructure. Countries must now expand renewable energy and improve energy efficiency to reduce environmental harm, strengthen energy security, and build economic resilience. For many developing countries, energy security is not only about transitioning away from fossil fuels but also about expanding access to affordable and reliable energy for underserved populations. This dual imperative makes the energy transition both a developmental and a climate priority. To meet the Paris Agreement's 1.5°C target, countries must triple renewable energy capacity and double gains in energy efficiency by 2030 (International Renewable Energy Agency [IRENA], 2022; United Nations Framework Convention on Climate Change, 2023).

Yet despite this urgency, renewable energy investment remains deeply uneven, particularly in developing countries (International Energy Agency [IEA], 2025b). Although private capital now covers three-quarters of global renewable energy finance, most of it flows to low-risk, mature markets (IEA, 2023). Many developing economies struggle to attract both public and private investors due to limited fiscal space, high debt burdens, weak financial systems, and policy uncertainty. In response, governments have increasingly offered tax incentives such as tax credits, accelerated depreciation, and customs duty exemptions to draw in investment.

The term "green tax incentives" has been coined to refer to targeted tax relief used by governments to attract private investment in environmentally sustainable sectors or projects, including renewable energy projects. These incentives are aimed at shifting capital flows toward climate-aligned developments by improving the financial viability and return on investment of green activities.

However, tax incentives are not without trade-offs. When poorly designed or implemented in isolation, tax incentives can lead to substantial revenue losses without generating the intended investment (International Monetary Fund [IMF] et al., 2015; Organisation for Economic Co-operation and Development [OECD], 2022). These costs are particularly important in developing contexts, where public funds intended to serve the broader population are redirected to benefit private investors who are often already better positioned to access capital. This raises concerns about equity and redistribution, especially when incentives reinforce regressive systems that exclude low-income populations from the benefits of clean energy transitions (United Nations Development Programme, 2022). In some cases, tax incentives may also favour imported technologies or foreign-owned firms, creating an uneven playing field that undermines the competitiveness of local industries (UN Trade and Development [UNCTAD], 2023). At the same time, overly narrow or restrictive incentives may fail to attract meaningful investment or innovation.

Maximizing the impact of green tax incentives, therefore, requires embedding them within a coherent policy framework that not only addresses investment barriers but also promotes social equity, supports domestic market development, maintains fiscal responsibility, and phases out subsidies and other forms of public financial support for fossil fuels. Ultimately,

governments must weigh these trade-offs based on their policy priorities, development goals, and institutional capacity.

This report explores the evolving use of green tax incentives across emerging markets and developing economies (EMDEs). It analyzes trends in incentive design, examines the barriers these incentives aim to address, and identifies opportunities to enhance their efficiency and effectiveness when tailored to the specific context and objectives of each country. Based on a review of 35 countries, this report addresses the following questions:

- What types of green tax incentives are governments using?
- How can these incentives better respond to the barriers to investment?
- How are green tax incentives designed, monitored, and administered?
- How could governments improve their efficiency while minimizing revenue loss?

What Gap Is This Report Filling?

Over the past 2 years, we have worked with several developing countries, including People's Democratic Republic of Lao (Lao PDR) and Lesotho, that are exploring ways to increase investment in the renewable energy sector through the potential use of tax incentives, but remain uncertain about the long-term sustainability of this approach. This report seeks to address this uncertainty by examining the effectiveness, risks, and design considerations of green tax incentives in emerging and developing economies, with the aim of informing more sustainable and context-appropriate policy choices. This research seeks to gain a greater contextual understanding of the findings from an UNCTAD (2023) report that identified incentives and disincentives to renewable energy investment. In particular, the report found that developing countries broadly make use of generic green tax incentives that are not aimed at removing investment barriers. This report builds on these findings and gives specific examples of where and how governments have used incentives.

The International Institute for Sustainable Development (IISD) brings deep expertise on public financial support and fiscal policy reform, particularly within the energy and extractive sectors. Since 2007, the IISD Energy Program and Global Subsidies Initiative have led in-depth analysis and engagement on the reform of energy subsidies, including tax expenditures for clean energy in EMDEs. Since 2018, IISD's Economic Law and Policy Program has led research on the use and effectiveness of tax incentives in developing countries, including the creation of a dedicated database examining how such incentives are applied in the mining sector. Drawing on this experience, IISD recognizes both the parallels and the important distinctions between fiscal approaches for mining and renewable energy investments. Through the work of its Energy, Investment Law and Policy, and Tax and Investment programs, IISD has spent several years analyzing investor behaviour, evaluating tax expenditures, and supporting governments in the design of sustainable, efficient incentive regimes in emerging and developing economies.

Who Is This Report For?

This report is written for tax and investment policy practitioners in the renewable energy sector. It is intended for policy-makers in developing countries that use or wish to use green tax incentives to attract renewable energy investment, as well as government officials in charge of accelerating investment in renewable energy with limited experience in tax policy. The report aims to support informed, well-grounded decision making regarding the use, design, and implementation of green tax incentives, highlighting the following: a) how green tax incentives can play a role in removing investment barriers, b) at which stage of a country's renewable energy sector these incentives can be most appropriate, and c) how they can be designed and monitored. Additionally, it guides tax administrators to improve their oversight of these incentives. Lastly, the report aims to serve as a complementary tool for international organizations and civil society groups that advise on the design and implementation of green tax incentives, as well as enhancing the transparency and accountability of renewable energy tax policies.

2.0 Methodology and Definitions

This report draws on a survey of 35 EMDEs, examining the fiscal and non-fiscal incentives used to attract investment for renewable energy. The database captures key attributes for each incentive, including policy start and end dates, durations, eligibility criteria, administering agencies, status (active or inactive), and whether measures were introduced as part of broader policy packages or as stand-alone initiatives. It also records information on monitoring mechanisms, implementation challenges, and perceived impacts. This inventory and the accompanying policy advice focus specifically on renewable energy deployment, that is, the generation, distribution, and use of renewable electricity within domestic markets rather than on renewable energy manufacturing or export-oriented production. This distinction is important, as the policy tools, investment drivers, and institutional challenges differ significantly between deployment and manufacturing contexts.

The surveyed countries span a diverse range of income levels, classified according to the World Bank's 2024 income groupings: three low-income economies, 16 lower-middle-income economies, 13 upper-middle-income economies, two high-income economies, and one unclassified economy.

We selected countries based on their relatively high share of renewable energy in the electricity mix, as reported in IRENA's 2023 data. On average, these countries have a renewable energy share of approximately 43.8%, which is significantly higher than the global average of 30.3% (REN21, 2023). We also prioritized countries where we have existing institutional relationships or prior engagements, and where reliable, up-to-date information is available in English.

Notably, China, India, and Brazil were excluded from the survey because their renewable energy sectors are significantly larger and more advanced than those of most other emerging and developing countries (IEA, 2022). These countries benefit from large-scale infrastructure, relatively sophisticated policy frameworks, and more mature domestic industries, making their experiences less comparable to those of countries with more limited fiscal space and institutional capacity. While China and India have increasingly developed export-oriented renewable energy manufacturing strategies, particularly in solar photovoltaic and wind turbines, Brazil's approach has remained more domestically focused, with strong emphasis on hydropower, bioenergy, and local content requirements to meet internal energy demand (IRENA & ILO, 2024; World Bank, 2021). As a result, their policy priorities and market structures differ substantially from those of smaller or less industrialized economies.

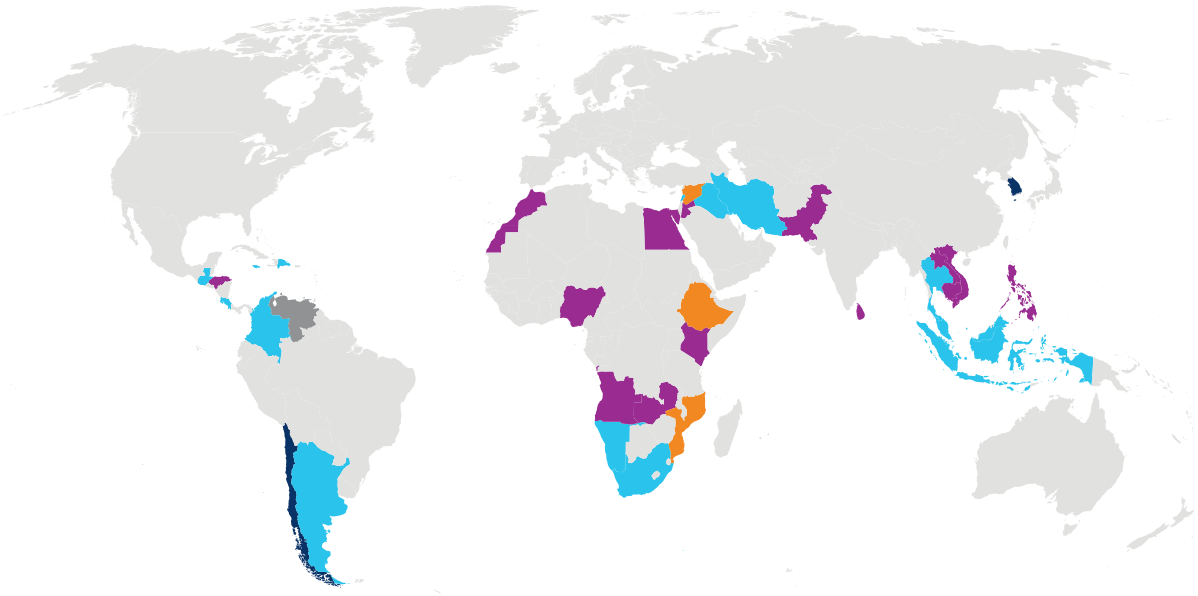
Renewable energy incentives, including tax expenditures, for China, India, and Brazil are, however, documented in IISD's database of public financial support for renewable power generation in G20 countries, with the most recent results published in 2024 (Laan et al., 2023). IISD maintains this database to identify and, where possible, quantify support measures for renewable generation, integration, and storage in G20 countries using publicly available data, with a strong preference for government sources. The database covers measures up to 2023 and is updated annually as new data becomes available. Building on this resource, IISD has broadened its country focus beyond the G20 to include EMDEs of

particular interest. A decade of data on India's renewable energy subsidies, including tax exemptions, is available in IISD's *Mapping India's Energy Policy 2023* report and data set (Raizada et al., 2023).

Practical considerations, such as the accessibility of legal documents and language barriers, also informed the selection process. This approach allowed us to focus on a diverse set of countries where comparative analysis would be more meaningful and actionable.

While the survey highlights regional and sectoral trends, the sample is not statistically representative of all developing countries. Findings are illustrative rather than comprehensive, providing insight into standard practices rather than defining strict global benchmarks.

Figure 1. Map with countries selected for database highlighted



Low-income economies	Lower-middle-income economies	Upper-middle-income economies	High-income economies	Unclassified
Ethiopia	Egypt	South Africa	Korea Rep	Venezuela
Mozambique	Angola	Namibia	Chile	
Syria	Morocco	Indonesia		
	Zambia	Thailand		
	Nigeria	Malaysia		
	Kenya	Iran		
	Vietnam	Iraq		
	Pakistan	Lebanon		
	Lao	Argentina		
	Philippines	Colombia		
	Sri Lanka	Costa Rica		
	Cambodia	Guatemala		
	Jordan	Dominican Republic		
	Honduras	Jamaica		

Source: World Bank, n.d.

This research builds on various other research projects within IISD, including an inventory of public financial support for renewable energy generation and integration (grids and storage) by G20 governments. The report *Unlocking Clean Power for All: How Tipping Points Theory Can Guide Effective Use of Public Funds* (Urazova & Laan, 2024) provided an overview of investment barriers in renewable energy in EMDEs, which this research builds on.

Definitions

IISD applies the definition of subsidies as agreed upon by World Trade Organization (WTO) members in the Agreement on Subsidies and Countervailing Measures (ASCM), which defines a subsidy as "a financial contribution by a government that provides a benefit to a recipient" (WTO ASCM, 1994, Article 1). Under this definition, subsidies include direct budgetary transfers (e.g., grants), indirect transfers through price and regulatory support (e.g., administered pricing), and government revenue foregone (e.g., tax exemptions, accelerated depreciation, or other tax incentives). Therefore, green tax incentives are classified as subsidies within this framework. While terms such as "support" or "incentives" are sometimes used in broader contexts, this study uses the term "subsidies" in line with the WTO ASCM and the IISD Global Subsidies Initiatives' cross-programmatic approach to ensure consistency in the identification and reporting of fiscal support measures.

Governments use tax incentives to promote specific economic activities by lowering the tax burden on investors (Holland & Vann, 1998). Unlike other forms of investment incentives, green tax incentives offer a direct and quantifiable monetary benefit to the investor. These incentives fall into two main categories: profit-based and cost-based. Profit-based incentives reduce the amount of tax the investor owes on business profits, while cost-based incentives defer tax payments or allow the investor to deduct qualifying expenses, thereby lowering overall tax liability.

This report focuses on tax incentives, such as tax holidays, accelerated depreciation, and investment allowances because they are among the most widely used tools to attract renewable energy investment in developing countries (IMF et al., 2015; OECD, 2022). Compared to other types of incentives (Table 1), tax incentives tend to have a more direct impact on government revenue and are more closely tied to international tax and investment policy frameworks, including the OECD/G20 global minimum tax rules (OECD, 2022). While non-tax incentives, including grants and concessional financing, also play an important role, the emphasis on tax measures is reflective of their widespread use and relevance in the countries covered by this study (World Bank, 2021).

At the same time, many governments are focusing on supply-side interventions, including the development of large-scale renewable energy projects and transmission infrastructure, as a first step in expanding generation capacity (IEA, 2023; IRENA, 2024). Demand-side or consumption incentives such as feed-in tariffs (FITs), net metering, and targeted subsidies such as grants or rebates for specific technologies, tariff discounts, and other forms of direct financial support, also play a role in shaping investment environments, particularly in low-income countries where financial costs and access gaps are more pronounced (Sustainable

Energy for All, 2021). However, these were beyond the scope of this paper, which focuses specifically on supply-side fiscal incentives.

The concepts of effectiveness and efficiency should be the cornerstone of every decision about tax incentive policy (IMF et al., 2015). Incentives are effective when they achieve clear goals like attracting specific types of investment or supporting key sectors. Efficiency, in contrast, means targeting incentives so that governments avoid spending on investments that would have happened despite the incentive. An efficient tax incentive system delivers measurable results with minimal cost and provides long-term value to both the economy and society.

Table 1 summarizes the types of incentives governments use to attract renewable energy investment. This report focuses specifically on tax investment incentives, which—according to UNCTAD's 2023 analysis—are among the most prominent tools employed by emerging and developing countries to stimulate private investment in renewable energy (UNCTAD, 2023). The categorization follows the typology developed in UNCTAD (2023).

Table 1. Summary of main types of incentives used within the context of the energy transition

Type of incentive	Operation of incentive	Example of incentive
Tax incentives		
Profit-based	Reduce tax liability in relation to income or profits.	Tax holiday or reduced corporate income tax rate.
Cost-based	Incentive reduces or defers tax liability with respect to cost of investment.	Accelerated depreciation, investment and reinvestment allowances, research and development credits.
Indirect tax relief	Provide relief on taxes levied on goods and services.	Value-added tax (VAT) relief.
Financial incentives		
Grants and other budget transfers	Provide non-repayable grants to help cover high upfront capital costs, including expenses related to research, installation, and early-stage development of renewable energy projects.	
Loans	Provide concessional finance through below market-rate loans, extended credit lines, and longer-term debt to lower project costs and attract private investment.	

Type of incentive	Operation of incentive	Example of incentive
Other instruments		
Auctions	Invite bids to develop a set amount of renewable energy capacity, with contracts often being long-term power purchase agreements (PPAs) that guarantee sales and prices are awarded to the most competitive bidders.	
FITs	Promote renewable energy by offering producers long-term contracts at guaranteed often above-market prices, thereby providing certainty of revenue and encouraging investment.	
Contract for difference	Promote investment in renewable energy by providing revenue certainty to project developers. A government or designated authority guarantees a fixed "strike price" for electricity over a defined period. If the market price falls below this strike price, the developer receives a top-up payment; if the market price exceeds it, the developer pays back the difference. This mechanism reduces market risk, encourages private investment, and supports the deployment of low-carbon technologies.	
Feed-in premiums	Producers sell electricity directly into the market and receive an additional payment—the premium—on top of the market price. Unlike FITs, which offer a fixed price, feed-in premiums expose producers to market signals while still providing a stable revenue stream.	

Source: Authors, based on UNCTAD, 2023.

It is important to note that while many of these instruments serve similar purposes, such as improving profitability, lowering upfront costs, or reducing investment risk, they differ significantly in form and administration. For example, FITs and profit-based tax incentives can both enhance project returns, but they operate through distinct channels. A profit-based incentive reduces the government's claim on company profits through the tax system, whereas an FIT guarantees revenue via energy market regulation, often through long-term PPAs offering above-market electricity prices.

These differences matter for both policy design and implementation. Fiscal incentives require coordination with tax authorities and must align with the broader tax policy and revenue strategies. Instruments like FITs or auctions, on the other hand, demand regulatory capacity,

credible off-takers, and functioning electricity markets. Each tool also carries trade-offs in transparency, targeting, fiscal cost, and institutional complexity.

Ultimately, green tax incentives can play a vital role in attracting renewable energy investment in the near term, but governments must balance them with long-term fiscal sustainability. As countries scale up deployment, the right mix of instruments will depend not just on technical design, but on how well they fit within national legal, fiscal, and institutional contexts ensuring the energy transition remains equitable, financially feasible, and fiscally sound.

3.0 Barriers to Investment in Renewable Energy in Developing Countries

Clean energy investment in EMDEs still falls short of what is needed to meet climate and development goals. While tools like green tax incentives can catalyze renewable energy projects, their effectiveness depends on broader systemic factors. Most barriers do not exist in isolation; instead, they form self-reinforcing loops that sustain fossil fuel dependence, weaken investor confidence, and prevent market transformation. For this reason, it is important for countries to put in place coherent policy frameworks that address proven barriers to investment rather than depending on incentives in isolation.

This section uses IISD's Tipping Point Framework to explore how fossil fuel subsidies, infrastructure gaps, incumbent energy interests, and high capital costs interact and reinforce each other. It also identifies the conditions under which green tax incentives can break these loops while acknowledging that deeper structural reforms must accompany them (Urazova et al., 2024).

Structural Barriers Undermining the Impact of Green Tax Incentives on EMDEs

Distorted Market Signals: The role of subsidies

In many EMDEs, governments subsidize electricity to make it more affordable for retail consumers, particularly low-income households. These subsidies most often take the form of regulated tariffs set below cost-recovery levels for consumers. While the immediate effect is on retail prices, the consequence is that utilities receive less revenue from electricity sales. This can squeeze the margins of electricity generators, especially when wholesale prices are also kept low, reducing the capacity and willingness of utilities to invest in renewable energy generation or grid integration (IEA, 2024a; OECD, 2025).

Not all subsidies operate in this way. Some involve direct payments to utilities or the provision of tax incentives, which do not necessarily reduce utility revenues but still distort relative prices between fossil fuels and renewable energy. By keeping fossil fuel-based electricity artificially cheap for consumers, these subsidies dampen incentives to switch to renewable sources. The absence of taxes that reflect the environmental and health costs of fossil fuels is itself a form of subsidy, as it leaves their true societal cost unpriced (OECD, 2025; Sánchez et al., 2020).

Where fossil fuel subsidies persist, governments sometimes seek to offset the imbalance by subsidizing renewables, for example through green tax incentives or other forms of support. While this can help improve renewable energy project economics, it is fiscally costly and often inefficient if fossil fuel subsidies remain in place. IISD's Tipping Points framework emphasizes that such measures may only unlock transformative investment if underlying market distortions are addressed, including fossil fuel subsidies that undermine price signals (Urazova & Laan, 2024). A more effective approach is to reform or remove fossil fuel subsidies, and/

or apply taxes on fossil fuels, thereby shifting relative prices in favour of clean energy. Targeted renewable energy incentives can then build on this corrected price signal to mobilize investment at scale (Urazova & Laan, 2024; UNCTAD, 2023).

Infrastructure Incompatibility and the Challenge of Integrating Variable Renewables

Most power systems in EMDEs were built around centralized fossil fuel generation and lack the flexibility to integrate variable renewable energy (VRE) sources like wind and solar. At low levels, VRE integration requires minimal adjustments. However, higher penetration levels demand grid upgrades, improved forecasting, and substantial investment in storage and modernization (IEA, 2024b).

Without these upgrades, VRE projects may face curtailment, transmission bottlenecks, and delayed revenues, each of which raises investment risk and financing costs. In some countries, state ownership of grid infrastructure limits the application of tax incentives. In others, where unbundling or privatization has taken place, well-targeted incentives can lower capital costs and attract private investment in grid upgrades.

Green tax incentives can help address infrastructure gaps in several ways (UNCTAD, 2023):

- **accelerated depreciation** for storage and grid assets improves short-term cash flow
- **import duty relief** for components and materials used in grid expansion reduces costs
- **research and development (R&D) tax credits** support innovation in smart grid and storage technologies

In publicly owned systems, tax incentives may be less effective. However, governments can incorporate them into public–private partnerships or innovation schemes. For large-scale upgrades, concessional finance, grants, or budgetary allocations may offer more suitable support (Merrill et al., 2024).

Fossil Fuel Incumbency and System Inertia

Fossil fuels continue to dominate EMDEs' energy systems because of deeply embedded infrastructure, financial flows, and political support. Governments reinforce this dominance through subsidies, public financing, and policy influence from fossil fuel interests. These conditions create systemic inertia that complicates efforts to shift toward renewables (Urazova & Laan, 2024).

In 2023, governments worldwide allocated at least USD 1.5 trillion to fossil fuel support—including subsidies, state-owned enterprise investments, and international financing. Of this, USD 447 billion went to new fossil fuel production (Laan et al., 2024). In such settings, renewable energy developers face an uneven playing field. Fossil fuel interests often lobby against reform and delay policy change (Oil Change International, 2023; Polzin et al., 2017).

Governments can use green tax incentives to push against this inertia:

- **Investment tax credits** reduce upfront costs for renewable projects.
- **Production tax credits** improve revenue certainty and reward clean energy generation.
- **Accelerated depreciation** boosts early project cash flow by front-loading returns.

While advanced economies often rely on these tools, EMDEs tend to favour tax holidays and broad exemptions, which are costlier and less targeted (UNCTAD, 2023). By designing incentives with clear performance metrics or domestic content requirements, governments can make these tools more efficient. Over time, these incentives can help cultivate new constituencies in support of clean energy and shift political momentum toward reform.

High Capital Costs and Perceived Risk

High capital costs remain one of the most serious obstacles to renewable energy investment in EMDEs. Renewable energy projects require large upfront spending, making them particularly sensitive to financing conditions. In many EMDEs, the cost of capital for solar photovoltaic is more than twice as high as in advanced economies (IEA, 2024b).

This cost gap stems from real and perceived risks, including policy uncertainty, currency volatility, and concerns about the financial health of utilities (off-takers). These risks increase the cost of capital for both equity and debt providers, leading project developers to demand higher returns and lenders to charge higher interest rates or limit loan tenors. These impacts, in turn, will delay project closure and make it harder for developers to access affordable finance (IEA, 2024b).

Green tax incentives can ease these pressures by improving project economics:

- **Accelerated depreciation** allows early cost recovery and higher deductions.
- **Tax credits** lower upfront equity requirements.

While these tools cannot eliminate macroeconomic risks, they can reduce exposure by strengthening the financial profile of projects. When paired with reforms to subsidies, grid infrastructure, and financial systems, green tax incentives become more effective.

Green tax incentives have the potential to improve project viability, for example, by ensuring that investors preserve their cash flows and reduce upfront capital costs. However, incentives do not operate in a vacuum but rather within distorted policy environments. The tipping points approach highlights that the challenges faced by EMDEs in incentivizing investment in renewable energy are not isolated: they are part of interlinked systems that resist change. Recognizing these tipping points and feedback loops is important for policy-makers in enabling the design of more targeted, efficient, and impactful incentive regimes (Urazova & Laan, 2024).

For these reasons, green tax incentives will possibly be most effective where they form part of coherent, cross-sectoral strategies that address the underlying distortions related to energy pricing, infrastructure, and the broader political economy of the energy sector. Where this is not done, countries risk using incentives in a fiscally inefficient manner that also fails to drive systemic change.

4.0 The Design and Use of Green Incentives in Developing Countries: Insights from the IISD database

This section draws on data from IISD's internal Green Incentives Database, which catalogues the design and use of renewable energy-related tax and non-tax incentives across 30 developing and emerging economies. The information on the design and administration of green tax incentives was collected through a combination of desktop research and targeted interviews with government officials, allowing for a deeper understanding of institutional roles, implementation practices, and administrative challenges. The database provides a comparative overview of the types of incentives adopted, the sectors and technologies they target, and their evolution over time. While the database does not capture the relative fiscal weight or economic magnitude of individual incentives, it offers valuable insights into the policy intent and structural emphasis of governments with respect to green investment promotion. This data has been used to analyze how developing countries design and implement green tax incentives, highlighting regional differences and alignment with best practices.

Table 2. Summary of IISD database highlights

Region	Number of countries surveyed	% of green incentives that are tax-based	Most common instrument	Targeting (tech-specific)	Typical incentive duration
Latin America	**10**	75%	Fiscal incentives – Income tax exemptions, accelerated depreciation	Limited	5–10 years
Asia	**10**	70%	Fiscal incentives – Income tax holidays	Limited	7–21 years
Africa	**10**	45%	FITs and fiscal incentives – FITs, VAT exemptions	Rare	3–10 years
Middle East	**5**	40%	Fiscal incentives - VAT/import duty exemptions	Very limited	3–5 years

Source: IISD Database on the use of Green Incentives in Emerging and Developing Countries.

This table presents a regional snapshot of green investment incentives based on a review of national laws, policy documents, and public databases across the 30 EMDEs reviewed. The percentage reflects the proportion of renewable energy incentives that are tax-based, as opposed to other kinds of subsidies, such as grants or regulatory measures. Where possible, we quantify the typical incentive duration and specify the number of countries reviewed in

each region. The "Targeting" column refers to whether the incentive is designed for specific technologies (e.g., wind, solar, geothermal) or applied more broadly. Categories such as "Limited" or "Rare" indicate the prevalence of technology-specific design in the countries reviewed. In cases where a precise figure was not available, qualitative labels were used based on frequency and scope.

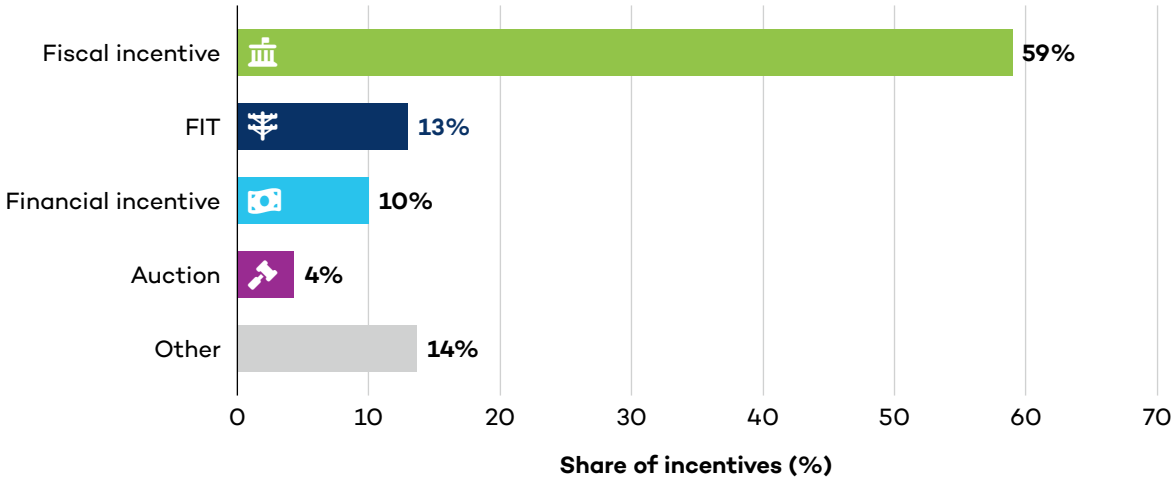
Reliance on Green Tax Incentives

Surveyed countries in Latin America and Asia rely heavily on green tax incentives in comparison to other measures.

As highlighted in Table 2, the database considered the use of green tax incentives, which can be understood as legal provisions that a) reduce the quantum of tax payable by an investor (profit-based incentives), b) defer the payment of taxes due in time or create opportunity for selected business activities to reduce the quantum of tax (cost-based incentives), or c) relate to exemptions or deferrals of taxes levied on goods and services.

Our database supports UNCTAD's findings on the widespread use of tax incentives as a key tool for promoting investment in EMDEs. Green tax incentives constitute at least 58% of identified measures.

Figure 2. Distribution of identified incentives across all countries



Source: IISD Database on the use of Green Incentives in Emerging and Developing Countries.

Latin American and Asian countries rely more on green tax incentives, with these representing 81% and 70% of identified tools, respectively. For surveyed African countries, green tax incentives represented only 24% of identified instruments.

Types of Incentives

Income tax exemptions and reduced rates are the most commonly used form of tax incentive.

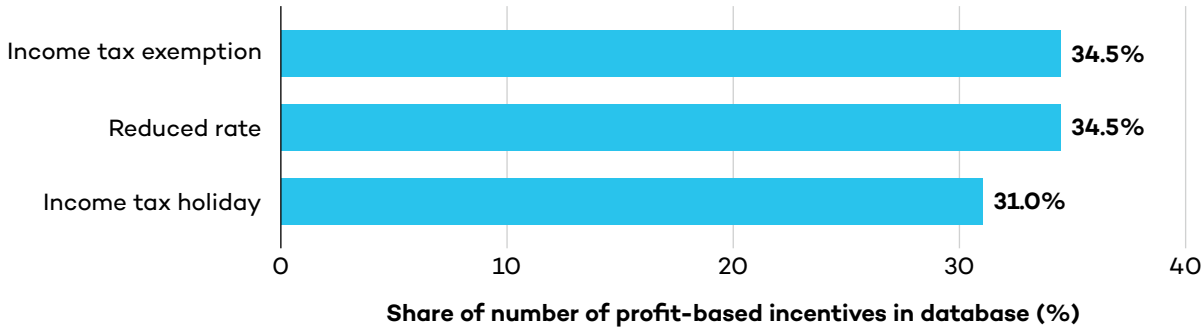
Amongst surveyed countries, income tax holidays and reduced rates were the most common form of tax incentives, each accounting for about 34.5% of all identified fiscal measures. Income tax holidays were slightly less prevalent, representing 31% of identified measures across all regions.

Profit-based green tax incentives, such as income tax exemptions, are widely used to enhance the financial attractiveness of renewable energy projects by increasing post-tax returns. Although this study does not assess the impacts of tax incentives directly, existing research suggests that in many developing countries, such incentives often have limited effectiveness because they do not address the fundamental risks or market conditions that influence investment decisions (IEA, 2021; UNCTAD, 2023). Profit-based incentives, in particular, tend to benefit projects only once they are generating income, providing little to no support during the early stages of development when financing needs are greatest and risks are highest. In markets where renewable energy developers face high upfront capital costs, protracted permitting processes, unreliable grid infrastructure, and elevated costs of capital, these incentives offer minimal risk mitigation or financial relief (IRENA, 2021; World Bank, 2020). Consequently, their ability to attract sustainable investment remains constrained in the absence of broader policy and institutional reforms.

Moreover, in many EMDEs, while private renewable energy projects are typically underpinned by long-term PPAs that ensure profitability over time, challenges such as low electricity tariffs, demand uncertainty, or grid curtailment can still affect project bankability and delay returns on investment. These risks are particularly acute for public or state-owned projects, where investments may be made without guaranteed off-take agreements and where financial viability depends on recovering high upfront costs over time. In such contexts, even with PPAs, developers and utilities may face delays in achieving profitability due to broader market and infrastructure constraints (IRENA, 2021; World Bank, 2020). As a result, the promised tax benefits may be delayed or never fully realized, reducing their effectiveness as an investment driver. In contrast, instruments such as investment tax credits, accelerated depreciation, or concessional finance offer more immediate and targeted support that aligns better with the sector's risk–return profile.

Finally, profit-based incentives often carry a high fiscal cost relative to their impact, especially when granted indiscriminately. Without safeguards or performance-based conditions, they can erode the tax base without delivering substantial new investment, making them a less efficient policy tool in many contexts.

Figure 3. Prevalence of profit-based incentives



Source: IISD database on the use of Green Incentives in Emerging and Developing Countries.

There are, however, regional differences in the extent to which green tax incentives are relied on, as opposed to other measures.[1]

The reliance on green tax incentives varies significantly across regions, reflecting different policy objectives, market structures, and levels of industrial development. In Latin America and Asia, green tax incentives account for 81% and 70% of identified instruments, respectively. In these regions, governments have used tax tools to support industrial development and reduce capital costs for domestic and foreign investors. For example, several Southeast Asian countries have actively pursued policies to localize renewable energy supply chains, using incentives such as tax holidays and import duty exemptions to attract manufacturing and stimulate upstream investment.

In contrast, African countries rely far more heavily on imported equipment, expertise, and finance. As a result, tax incentives represent only 24% of identified instruments in the region, with greater emphasis placed on grants, concessional finance, and public procurement to address affordability and infrastructure gaps. These differences reflect broader regional contexts: while some countries aim to build domestic green industries, others prioritize energy access and affordability through externally supported delivery models.[2]

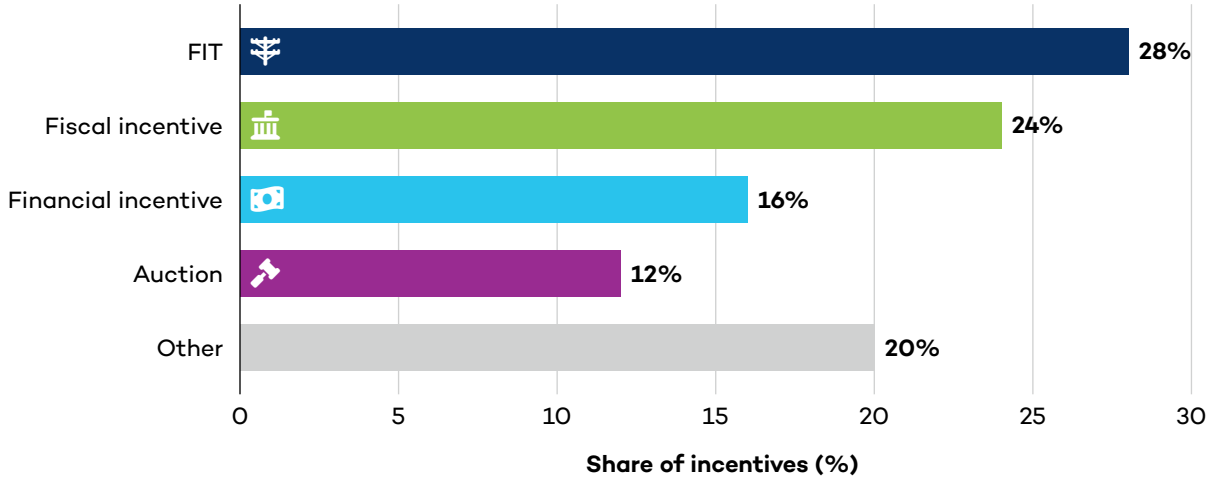
[1] These other measures include
- FITs, which guarantee renewable energy producers a fixed price for the electricity they generate;
- net metering, which allows small producers to offset their electricity bills by feeding surplus power back into the grid; and
- auctions, which allow developers bid to supply renewable energy at the lowest possible price, helping governments allocate support more efficiently.

[2] Externally supported delivery models refer to renewable energy deployment approaches that rely heavily on foreign investment, donor funding, or international development finance. These models often focus on scaling up energy access through utility-scale or off-grid solutions without necessarily developing local manufacturing capacity or domestic value chains.

Use of Investment Incentives per Region

Africa

Figure 4. Investment incentives in Africa

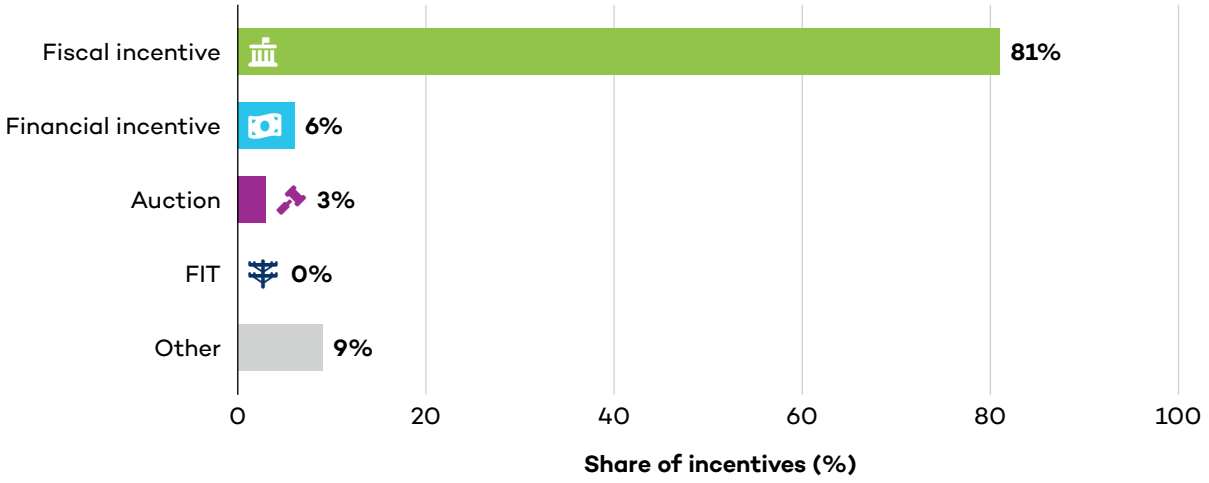


Source: IISD Database on the use of Green Incentives in Emerging and Developing Countries.

Surveyed African countries displayed a balanced mix of investment incentives, with FITs presenting the most commonly used instrument on the continent. With regard to the use of fiscal measures, at present, countries mainly apply cost-based incentives, providing special accelerated depreciation rules for the sector, tax deductions for the cost of installing solar panels for business, and VAT exemptions on various solar and energy equipment.

Latin America

Figure 5. Investment incentives in Latin America



Source: IISD Database on the use of Green Incentives in Emerging and Developing Countries.

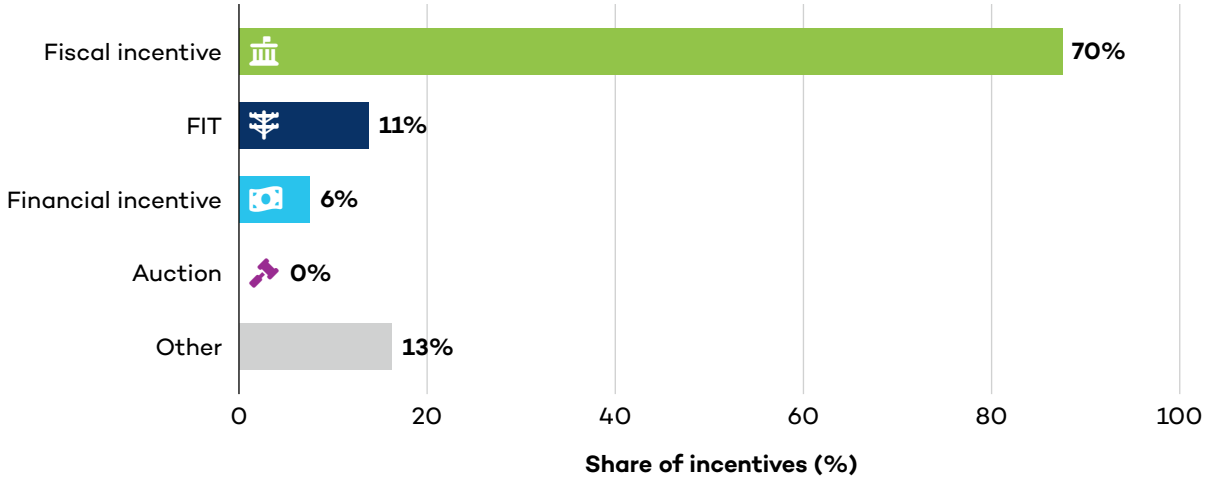
Within the Latin America and the Caribbean region,3 fiscal measures are the most commonly used type of investment incentives. Of the surveyed countries, 80% make use of at least one fiscal incentive. Countries in the region use a mix of measures, with income tax exemptions (identified in 4 of 10 surveyed countries) and reduced income tax rates being the most used profit-based incentives. Accelerated depreciation is also common within the Latin America and the Caribbean region. The region also makes use of a number of cost-based incentives that have not been identified in other surveyed countries, including

- tax reductions on interest on foreign financing of renewable energy projects,
- single tax credits of up to 75% (depending upon the energy technology) on the cost of capital equipment used in renewable energy projects.

These incentives are interesting because they respond directly to the barriers to investment faced in the sector. By reducing the tax burden on interest, tax reductions on foreign financing can be impactful because they help lower the overall financing costs, making renewable energy projects more financially viable. Renewable energy technologies, such as solar panels, wind turbines, and geothermal systems, involve significant capital expenditures for equipment. Tax credits on capital equipment directly lower these costs, making renewable energy projects more affordable for developers.

Asia

Figure 6. Investment incentives in Asia



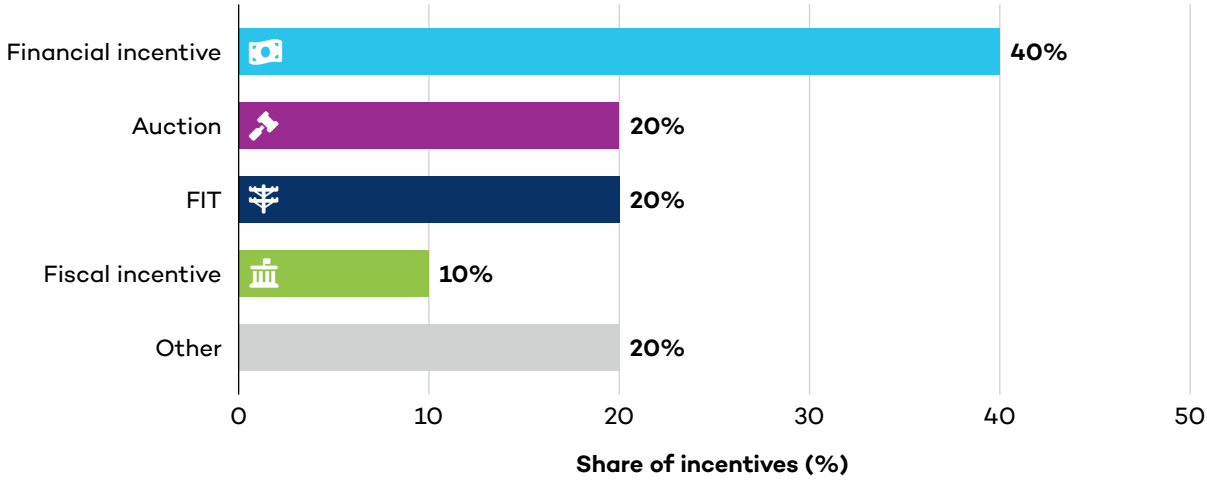
Source: IISD Database on the use of Green Incentives in Emerging and Developing Countries.

Surveyed Asian countries are strongly reliant on fiscal measures. Countries in East and Southeast Asia depend relatively more on these types of instruments compared to the rest of the region, which is in line with the findings of a 2019 OECD report on the use of incentives more broadly in the region (OECD, 2019). Profit-based incentives are widely used as an investment incentive, with 50% of studied countries making use of income tax holidays. The most generous income tax holiday identified in the region is granted for up to 21 years under the Renewable Energy Act in the Philippines; however, other countries, such as Lao PDR and

Cambodia, determine the duration of the incentive based on the development zone in which the project is located, with projects in more rural zones benefiting from longer incentives. Net metering is the most common "other" form of incentive used in the region.

Middle East

Figure 7. Investment incentives in the Middle East



Source: IISD Database on the use of Green Incentives in Emerging and Developing Countries.

Surveyed Middle Eastern countries show the least reliance on green tax incentives. Where these countries make use of green tax incentives, they typically include tax exemptions and deductions for qualifying expenses by renewable energy developers. Import duty relief also features prominently within the region.

Targeting of Incentives

Green tax incentives are used in a largely untargeted manner, applying to a wide range of renewable energy technologies, which could impact their effectiveness.

Green tax incentives in the surveyed countries are predominantly untargeted, with most applying broadly to the deployment of renewable energy technologies, rather than being tailored to specific technologies or investment stages. Only 17% of countries offered technology-specific incentives, primarily directed at wind and solar energy.

While broad-based incentives promote neutrality and allow market forces to guide technology selection, this approach carries significant risks, particularly in more mature renewable energy markets. Untargeted incentives tend to over-subsidize mature, low-risk technologies, such as utility-scale solar, that may already be commercially viable without public support. In contrast, emerging or strategically important technologies like geothermal, offshore wind, and

grid storage often receive insufficient attention. This lack of differentiation weakens the ability of green tax incentives to catalyze a diversified, resilient energy mix that can support long-term energy security.

However, in countries where renewable energy sectors are still broadly underdeveloped, untargeted incentives may be an appropriate first step. In such contexts, stimulating any form of investment can be critical to kickstarting market development. Nonetheless, as markets mature, the continued use of broad incentives can become fiscally inefficient and less effective at addressing evolving investment barriers.

Technology-neutral incentives also risk fiscal inefficiency in markets where different technologies face vastly different cost structures, financing challenges, or grid integration needs. Fixed tax holidays, blanket exemptions, or uniform depreciation rules may channel resources toward projects that would have proceeded even without support, while leaving riskier but high-impact technologies underdeveloped. Such fiscal inefficiency is particularly problematic for developing countries with limited public budgets, where every dollar of foregone revenue must be carefully justified.

A more strategic and responsive approach would involve performance-based or cost-reflective incentives, such as tax credits calibrated to levelized costs, technology maturity, or production performance. By linking incentive levels to real investment barriers, governments can enhance fiscal efficiency, better target public support, and encourage a broader range of renewable energy solutions. Targeted incentives would also allow policy-makers to align fiscal measures more closely with long-term national energy goals, such as grid stability, industrial development, and resilience to climate impacts.

Duration of Incentives

For most countries, the duration of tax incentives depends on the location of the investment.

Granting green tax incentives for indefinite periods is fiscally unsustainable because it limits a government's ability to forecast the cost of the incentive. It may also reduce policy flexibility to adapt the incentive as market conditions change and risks providing windfall gains to projects that no longer need support. Best practice is to make incentives time-bound and periodically reviewed, ensuring they remain targeted, cost-effective, and aligned with evolving market conditions and policy priorities.

In many EMDEs, renewable energy sectors are still in the nascent stage, making it challenging to determine the optimal duration for tax incentives (IEA, 2024a; IRENA, 2023d). Well-designed measures should balance predictability with flexibility, providing investors with sufficient certainty to recover high upfront costs while avoiding open-ended fiscal commitments (Mataba et al., 2023; UNCTAD, 2023). Tailoring incentive duration and scale to the specific cost profiles and support needs of different renewable energy technologies can

help ensure that such instruments remain both effective and fiscally sustainable (Merrill et al., 2024; OECD, 2021). According to information in the database, renewable energy investments in more remote or rural regions typically receive incentives of a longer duration, signalling the intention of various governments to use incentives to achieve broader socio-economic goals, such as expanding electricity access, stimulating local job creation, and fostering regional economic development. This approach is most common amongst surveyed countries within the Asian region. The longest profit-based incentive runs for 21 years, while the shortest is for 3 years. On average, green tax incentives are granted for between 7 and 10 years.

These differences reflect how governments balance investment promotion, fiscal sustainability, and broader policy goals. Governments often use longer-term incentives to attract capital-intensive projects or to build investor confidence in higher-risk markets by providing revenue certainty over the project life cycle. In contrast, shorter incentives may signal a government's desire to limit fiscal exposure, pilot an instrument before scaling, or reserve flexibility to revise its policy framework as market conditions evolve.

Despite high upfront costs in the sector, the use of cost-based incentives is less prevalent.

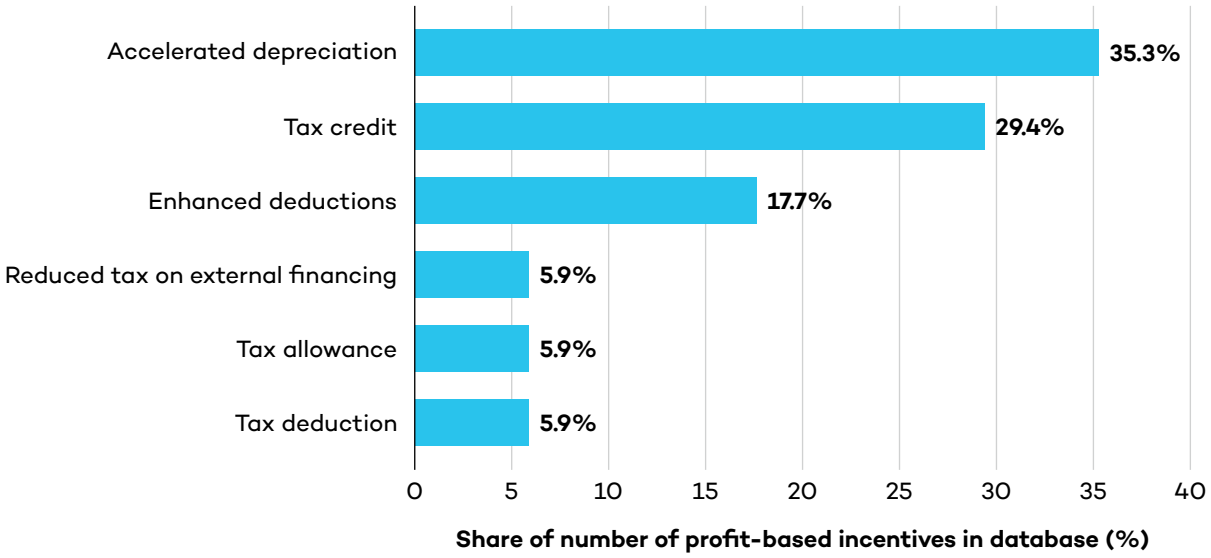
Cost-based incentives—such as accelerated depreciation and investment allowances—represent only 21% of the incentives captured in the IISD database, despite strong evidence of their effectiveness in supporting early-stage renewable energy projects.

These incentives reduce upfront project costs and provide earlier tax relief, improving cash flow and enhancing bankability. Unlike profit-based tools, their value is not contingent on project profitability, making them particularly suitable for capital-intensive investments in high-risk environments. Accelerated depreciation, for instance, has been credited as a major driver of clean energy investment in countries such as India and the United States.

From a fiscal planning perspective, cost-based incentives also offer more predictable revenue impacts, as they are directly tied to the volume of investment rather than uncertain profit projections. However, their adoption remains limited, often due to their administrative complexity or a lack of awareness of their benefits.

Rebalancing incentive portfolios to include a greater share of cost-based measures could significantly enhance the effectiveness of renewable energy promotion strategies in EMDEs, especially where investment risk remains a major barrier.

Figure 8. Prevalence of cost-based incentives



Source: IISD Database on the use of Green Incentives in Emerging and Developing Countries.

Indirect tax and duty relief are the second most prevalent category of incentives, which could result from the high reliance on imported equipment in many developing countries.

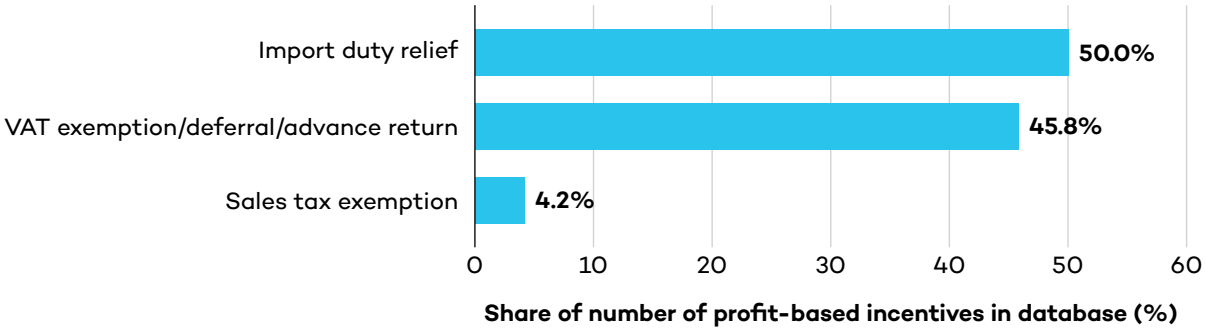
Indirect tax incentives, including import duty exemptions and VAT relief, are the second most common category of green tax incentives identified in the IISD database, accounting for 29% of total measures. Their widespread use reflects the high dependence of many EMDEs on imported equipment for renewable energy projects, especially in contexts where local manufacturing capacity is limited. These incentives can significantly reduce upfront capital costs—particularly for solar and wind technologies, where imported panels, turbines, and components often make up a large share of project expenditure. In this sense, they address a tangible and immediate investment barrier for renewable energy deployment by lowering costs for developers and improving project viability in the short term.

However, these measures also involve important trade-offs. By reducing the cost of imports, indirect tax relief can inadvertently weaken incentives to develop local supply chains or stimulate domestic manufacturing, especially when applied broadly and without industrial policy safeguards. This tension is particularly visible in countries like India, where the government's decision in 2024 to roll back duty exemptions for solar equipment reflected growing concern over lost fiscal revenue and the need to protect domestic industry (Bharadwaj, 2024). Similar dynamics are emerging in Southeast Asia and parts of Latin America, where governments are increasingly balancing efforts to attract investment with ambitions to localize value creation.

In addition to their industrial implications, indirect tax incentives can carry administrative and fiscal risks. Without strong oversight, they may be misused through misclassification of goods, over-reporting of eligible imports, or even re-exporting. In many cases, the burden of verification lies with under-resourced government agencies, reducing enforcement capacity and increasing the potential for leakage.

To manage these trade-offs, governments should consider carefully targeting and time-limiting indirect tax relief, while pairing it with complementary incentives that encourage local value addition, such as cost-based tax deductions or linked investment requirements. Doing so can help reconcile the dual objectives of lowering costs and fostering domestic industrial development, while also safeguarding fiscal space and policy coherence.

Figure 9. Prevalence of indirect taxes and duties



Source: IISD Database on the use of Green Incentives in Emerging and Developing Countries.

The limited renewable energy manufacturing capacity in many emerging and developing countries has led to a heavy reliance on imports from more technologically advanced economies to meet current deployment needs (South African Institute of International Affairs, 2024). Countries should carefully weigh the costs and benefits of rapid deployment using lower-cost renewable energy imports with higher-cost domestically produced components. Strategies to localize renewable energy value chains by attracting foreign and domestic investment in manufacturing, assembly, and component production might be suitable for some countries, but not all. For those wanting to pursue domestic manufacturing of elements of the supply chain, targeted tax incentives can play a catalytic role by lowering costs for investors and directing capital toward more strategic, high-impact segments of the value chain. While such incentives may reduce government revenue in the short term, they can generate broader industrial and economic benefits over time, including job creation, technology transfer, and improved supply chain resilience. However, it is important to note that this dependence is not unique to EMDEs; many high-income countries also rely heavily on imported components, such as wind turbines from Southeast Asia, highlighting the global nature of renewable energy supply chains.

Based on this premise, incentives that lower the costs of imports, such as import duty relief, respond directly to the barriers to investment that these countries face. Indirect tax and duty incentives across all industries are, however, vulnerable to abuse and can lead to significant revenue leakages (Montagnat-Rentier, 2019). For example, in December 2024, India

withdrew a policy measure that allowed for the duty-free import of equipment for solar power generation, partly as a result of concerns over revenue losses but primarily to protect domestic manufacturing from cheap Chinese imports (Prasad, 2024).

Box 1. Factors increasing the revenue loss risks and administrative burden from import duty relief

1. Fragmentation of laws and provisions granting the customs duty or tax relief can complicate ascertaining the eligibility of certain importers.
2. In most countries, importers must obtain pre-authorization before planned imports, which creates high volumes of applications for relevant government agencies, which are under pressure to assess these diligently.
3. Many of the identified legal regimes identified in our survey place the onus on the administering agency for proving an item meets the duty-free conditions. In practical terms, governments will have to provide the exemption except where they can prove that specific goods are both manufactured domestically and at commercially competitive prices.
4. Upon arrival, goods must be inspected to ensure compliance, which is also time consuming and burdensome on low-capacity agencies.
5. Due to capacity constraints, many governments fail to verify that goods are used in accordance with the conditions set forth in the law, which can include conditions that the goods are not re-exported.

5.0 Implementation Experiences and Lessons Learned From Case Study Countries

Introduction

To better understand the opportunities and risks associated with green incentives, a series of interviews were conducted with government officials involved in the design, administration, and evaluation of green tax incentives. These conversations provide grounded insights into how incentive policies are crafted, implemented, and adjusted in response to evolving political, fiscal, and energy transition priorities.

There is growing empirical evidence that tax incentives can play a meaningful role in promoting renewable energy. For example, Wang et al. (2020) found that VAT relief significantly encouraged R&D spending and green innovation in Chinese firms. Similarly, Abbruzzese et al. (2024) observed that a mix of fiscal incentives played a critical role in accelerating investment in renewable technologies across OECD countries. However, the literature shows that the impact of these tools can vary significantly by context.

In several EMDEs, tax incentives have suffered from weak uptake, administrative inefficiencies, and poor alignment with environmental or energy policies factors that can dilute their impact and fiscal sustainability (Bello et al., 2024). Despite these variable outcomes, the IISD database shows that green tax incentives continue to be a preferred instrument in many EMDEs.

From the interviews conducted, we confirmed that governments in EMDEs often prefer green tax incentives over direct subsidies because they are less visible in budgets and require no upfront expenditure. Instead, they function by foregoing future tax revenue, an attractive proposition for countries with limited fiscal space (IMF et al., 2015; OECD, 2022). However, the effectiveness of these tools depends on the scale and type of technology being targeted. For example, while tax incentives may reduce costs for distributed solutions like solar home systems, utility-scale projects often require more robust instruments, such as concessional loans, public guarantees, or long-term PPAs (IRENA, 2023c).

There are also risks. Poorly designed tax incentives can impose substantial fiscal costs without materially changing investor behaviour. Lessons from sectors like mining demonstrate that tax breaks alone are rarely decisive: investors consistently cite regulatory stability, infrastructure quality, and market access as more important drivers of location decisions (Kronfol & Steenbergen, 2020)—and these patterns hold in the renewable energy sector. According to KPMG's *Energy Transition Investment Outlook: 2025 and Beyond* (Hill et al., 2024), 78% of investors cited regulatory uncertainty as their top concern. While tax incentives were viewed as helpful, they were not sufficient on their own; investors emphasized the need for a stable, long-term policy framework that includes predictable access to incentives, but also encompasses broader regulatory certainty, grid access, and clear renewable energy targets.

These insights suggest that tax incentives must be carefully calibrated and regularly reviewed. International guidance is increasingly pushing for more targeted and transparent incentive regimes, with stronger alignment to policy outcomes and cost-effectiveness goals (OECD, 2025). The experiences shared in this section help illustrate both what works—and what remains challenging—when it comes to deploying green tax incentives as part of a broader energy transition strategy.

Design Tax Incentives Strategically and Integrate Them into Broader Policy Frameworks

Green tax incentives are not neutral tools. They are designed to achieve specific policy objectives and involve trade-offs that must be clearly understood and quantified. One of the most important considerations is the fiscal cost, including estimates of foregone public revenue. Governments need to assess the potential costs and investment gains to avoid overcommitting scarce resources. However, governments also need to consider the broader macroeconomic benefits and policy goals underlying the promotion of clean energy, including jobs, economic development, and reductions in air pollution and greenhouse gas emissions. The duration, generosity, and targeting of an incentive should, therefore, reflect the country's development, environmental, and social priorities as well as its fiscal constraints.

Just as importantly, the effectiveness of any tax incentive depends on how well it is integrated into a broader and coherent policy framework. Incentives aimed at accelerating renewable energy deployment are unlikely to succeed in isolation. They must be aligned with complementary policies, such as deployment instruments (for example, auctions or FITs), industrial and trade strategies (such as local content rules or import duties), and finance and investment policies (including concessional loans, guarantees, or public–private partnerships). Evidence from both developed and developing countries reinforces this point. In Vietnam, tax exemptions were paired with FITs to drive rapid solar uptake (IEA, 2021). Indonesia combined tax holidays with concessional finance and risk-sharing tools to encourage renewable energy investment (Asian Development Bank, 2023). In Kenya, investment in geothermal and wind power was enabled not just by tax support, but also by standardized PPAs, concessional loans, and strong procurement frameworks (World Bank, 2020). Similarly, South Africa's Renewable Energy Independent Power Producer Procurement Programme bundled accelerated depreciation with competitive auctions and long-term contracts to de-risk projects and attract private capital (IRENA, 2018). In Germany and other OECD countries, fiscal incentives are often accompanied by disincentives for fossil fuels, such as carbon pricing and levies, creating a balanced incentive environment that nudges investment toward clean energy (OECD, 2021). Without such alignment, incentives may be poorly targeted, duplicative, or even counterproductive, undermining policy coherence and reducing impact.

Guard Against the Double Use of Incentives Where Parallel Incentive Regimes Exist

In some countries, investors in the renewable energy sector can access incentives through both general investment promotion laws and sector-specific legislation, a dual framework

that can lead to overlap and administrative complexity (UNCTAD, 2023). In the Philippines, for example, renewable energy investors must choose between incentives offered under the Renewable Energy Act of 2008 or the broader Corporate Recovery and Tax Incentives for Enterprises (CREATE) Act. The CREATE MORE Act of 2024 further expanded the range of incentives available to investors.

However, the coexistence of these regimes created confusion and administrative inefficiencies, prompting regulatory reforms to streamline their application. In the Philippines, initially, investors could claim deductions under both frameworks, resulting in greater-than-anticipated revenue losses and complicating the evaluation of either regime's impact. A 2022 regulation issued by the Fiscal Incentives Review Board (FIRB) now requires investors to elect a single incentive regime per financial year; failure to do so defaults them to the Renewable Energy Act, disqualifying them from CREATE Act benefits (FIRB, 2022). This change has necessitated stronger monitoring and enforcement by the FIRB and the Board of Investments.

Furthermore, despite the Renewable Energy Act offering more generous incentives in certain circumstances, many investors prefer the CREATE framework due to its familiarity and simpler administrative processes, leading to underutilization of renewable energy-specific incentives (FIRB, 2022).

Define Eligibility Criteria Clearly to Align Incentives with Long-Term Industrial Goals

Many countries require investors to meet specific eligibility criteria in order to access green tax incentives, a practice intended to align incentives with national development objectives and ensure accountability (OECD, 2022). While this is a commendable practice, the effectiveness of such criteria depends on how clearly and measurably they are defined. In Lao PDR, for example, investors were historically required to demonstrate environmental sustainability, generate local employment, apply modern technologies, and contribute to value-added production (Law on Investment Promotion, Lao PDR, 2016/2024). However, these requirements were often vaguely articulated, leaving significant room for interpretation and potential misuse.

Recognizing these shortcomings, the Lao government is now reviewing its Investment Instruction to make eligibility conditions more specific and enforceable. The reforms aim to tie incentives to clearly defined short- and long-term policy goals, for example, by specifying which renewable technologies qualify, setting production and employment thresholds, linking tax relief to compliance with environmental regulations, and establishing time-bound expectations for skills transfer and technology adoption. This approach illustrates how green tax incentives can be structured not only to attract investment but also to lay the foundation for future localization of value chains and industrial capability building.

To lower administrative costs and be accessible to investors, incentives should be designed to be easy to interpret and apply.

To minimize administrative costs and improve accessibility, green tax incentives must be easy to interpret and apply. In South Africa, for instance, Section 12B of the Income Tax Act allows for accelerated capital depreciation, while Section 12BA offers a 125% allowance for qualifying generation assets used between 2023 and 2025. However, the lack of clear definitions for key terms such as "generation assets" has created confusion, particularly regarding the eligibility of storage and conversion assets.

Uncertainty around eligibility has led to delays in investment decisions and increased administrative burden, as tax authorities must assess each claim individually (National Treasury, 2023). Although the National Treasury later issued a clarifying policy note, earlier guidance would have improved investor confidence and policy effectiveness.

The Ministries of Finance should lead the design and administration of green tax incentives, with support from line ministries and investment promotion agencies.

Ministries of finance should lead the design, implementation, and evaluation of green tax incentives, given their central role in safeguarding fiscal sustainability, ensuring policy coherence, and assessing the revenue implications of incentives. Their leadership helps consolidate incentives into transparent frameworks and align measures with national development and budgetary priorities. Line ministries, such as those responsible for energy, environment, or industry, play a supporting role by identifying sector-specific investment needs, advising on technical design, and contributing to monitoring efforts. Investment promotion agencies are also critical partners, providing market intelligence, promoting incentive schemes to investors, and offering feedback on how incentives operate in practice. Effective coordination mechanisms, such as interagency committees chaired by ministries of finance, are essential to ensure incentives are strategic, targeted, and efficient.

Green tax incentives may have a varying role to play as a country's renewable energy sector evolves.

While green tax incentives may be helpful at early stages of renewable energy development, their role often changes as markets mature. Countries such as China and India initially used tax incentives to address capital cost barriers and attract investment. Over time, they transitioned toward market-based mechanisms like auctions, carbon pricing, and green bonds.

In China, generous incentives, including VAT and corporate income tax exemptions, were complemented by robust FITs and targeted manufacturing incentives that helped scale up wind and solar deployment rapidly in the 2000s. FITs were the primary driver of investment, offering long-term revenue certainty and stimulating large-scale deployment, while manufacturing incentives supported the development of a competitive domestic supply

chain (IEA, 2021; Zhang & Gallagher, 2016). As the sector matured, these supports were gradually phased out and replaced by competitive pricing mechanisms and green electricity trading schemes (IRENA, 2023b). By 2023, China had installed over 1,300 GW of renewable energy capacity and was redirecting fiscal support toward emerging technologies such as green hydrogen (Kolaczkjowski et al., 2024; Zeng, 2025).

India similarly used accelerated depreciation and FITs to scale up wind and solar. These were later replaced with auctions and targeted incentives for manufacturing and storage, contributing to the country's 180 GW of renewable capacity as of 2023 (Kolaczkjowski et al., 2024; Zeng, 2025).

These experiences underscore the importance of policy sequencing where incentives evolve as sectoral barriers are reduced (OECD, 2025).

The Continued Utility of Incentives Should Not Be Assumed

Regular evaluation of green tax incentives is critical for ensuring their relevance and avoiding unnecessary revenue loss. The Philippines' FIRB exemplifies how oversight bodies can monitor and balance the goals of investment promotion with fiscal responsibility. Independent oversight and periodic reviews help update incentive regimes, improve transparency, and ensure alignment with national development goals.

Leverage Regional Cooperation to Achieve Scale in Localization and Industrial Policy

Policy lessons from large economies such as China and India must be applied with caution in smaller markets. While these countries successfully localized renewable energy value chains by leveraging large domestic demand and economies of scale, replicating these strategies in smaller economies is not feasible at the national level. Instead, the relevant policy insight is the role that market size and demand aggregation play in enabling industrial development (IRENA 2022; UNCTAD, 2023).

Smaller economies can achieve similar benefits through regional coordination, pooling demand, and harmonizing trade and investment frameworks. For instance, the European Union's single-market approach to energy and industrial policy provides a compelling example of how regional blocs can coordinate procurement, standard setting, and investment promotion (European Commission, 2020). For countries in Africa, the Association of Southeast Asian Nations, or Latin America, regional power pools, harmonized incentive frameworks, and cross-border infrastructure planning could similarly enable the emergence of regionally distributed value chains. Designing tax incentives, local content rules, and skills policies with this regional dimension in mind can make them more viable, attractive, and developmentally impactful (African Union, 2021).

6.0 Principles for Effective Green Tax Incentive Design

The following section provides some expanded recommendations aimed at guiding policy-makers contemplating the use or review of green tax incentives. The proposed recommendations aim to strengthen the design, implementation, and evaluation of green tax incentives, with attention to the unique challenges and evolving needs of renewable energy markets. They are based on lessons learned during interviews with governments on the topic, as well as broader principles of good governance of tax incentives as articulated by the OECD and the Platform for Collaboration on Tax, which should apply regardless of the sector, with some nuances.

- **assess contextual fit:** Determine whether profit-based incentives are suitable based on the technology's maturity, prevailing investment risks, and the type of investor targeted.
- **apply financial modelling:** Use tools such as discounted cash flow, levelized cost of energy, and cost-benefit analysis to assess local costs and assess whether tax incentives for generation are necessary for commercial viability.
- **consolidate incentive sources:** Avoid administrative complexity and potential abuse by streamlining overlapping schemes. Clear designation of eligible incentives minimizes confusion.
- **limit duration strategically:** Restrict incentives to a defined period, to avoid long-term fiscal exposure and encourage timely project execution.
- **monitor fiscal impacts:** Conduct regular tax expenditure analysis to quantify the cost of incentives, evaluate return on investment, and determine whether they remain justified.
- **define eligibility precisely:** Clearly specify which technologies, costs, and investors qualify to reduce ambiguity and limit gaming of the system.
- **link to measurable outputs:** Tie incentives to tangible performance metrics, such as units of clean energy generated, grid-connected capacity installed, or fossil fuels displaced, to improve accountability.
- **adjust over time:** Introduce tapering mechanisms or time-based reductions in support as technologies mature or market conditions improve.
- **strengthen oversight mechanisms:** Require pre-approvals, implement third-party audits, and impose penalties for non-compliance to minimize misuse.
- **set fiscal boundaries:** Cap total incentive allocations in proportion to sector needs and conduct periodic reviews to guard against excessive public spending.
- **incorporate sunset clauses:** Ensure incentives are temporary and subject to review, aligned with evolving local manufacturing capacity and sector maturity.
- **encourage domestic value addition where feasible:** Gradually reduce exemptions as local supply chains develop, using incentives to support but not displace domestic industry. In contexts where local supply chain development is unlikely, policies could

instead focus on maximizing technology transfer, skills development, or regional sourcing where possible.

Box 2. A holistic approach to green tax incentives: Lessons from China and India

China and India offer instructive examples of how green tax incentives can catalyze renewable energy investment when embedded in a broader, coordinated policy framework. In the early 2000s, both countries faced high capital costs, limited private investment, and heavy reliance on imported technologies. To overcome these barriers, they introduced a wide range of fiscal tools including income tax holidays, accelerated depreciation, and VAT exemptions, alongside FITs and import duty relief (Isoaho et al., 2017; Kolaczkjowski et al., 2024; Zeng, 2025).

These incentives were not deployed in isolation. Instead, they formed part of broader reforms, including

- the creation of dedicated renewable energy ministries and long-term national targets (e.g., China's Five-Year Plans, India's National Solar Mission);
- regulatory guarantees like grid access and standardized PPAs;
- public financing from development banks and local content policies to build domestic supply chains (IRENA, 2023a).

As of mid-2025, China's total installed renewable energy capacity reached approximately 2.16 TW, including 1.1 TW of solar and 573 GW of wind, accounting for nearly 60% of its total power generation capacity (IEA, 2025a). In India, total installed renewable energy capacity (excluding large hydro) reached around 233 GW, including over 116 GW of solar and 51 GW of wind (IEA, 2025a). Both countries added record levels of capacity in the first half of 2025, with China installing 268 GW of renewables and India adding 22 GW, reflecting the acceleration of clean energy deployment (IEA, 2025a). As markets matured and technology costs declined, both countries transitioned from broad-based tax relief to market-based instruments (Muro et al., 2012; Zhang et al., 2023), including

- competitive auctions for new capacity,
- carbon markets and renewable energy certificates, and
- performance-linked schemes like India's Production Linked Incentive for battery storage and solar manufacturing (Kolaczkjowski et al., 2024; OECD, 2022; Zeng, 2025).

Key lessons for EMDEs include the importance of using tax incentives strategically in early market stages to de-risk investment, while phasing them out as conditions improve. Fiscal incentives are most effective when integrated with regulatory reform, concessional finance, and industrial policy. Incentive design should be tailored to local needs, with cost-based tools often more suitable in high-risk or early-stage markets. Finally, governments should exercise fiscal prudence by monitoring costs and avoiding long-term subsidies that may undermine efficiency.

Green tax incentives can make a meaningful contribution to accelerating renewable energy deployment when implemented strategically. However, their effectiveness depends on continuous adaptation to sectoral changes, transparent governance, and rigorous monitoring. Aligning incentives with evolving market realities and long-term fiscal sustainability is critical to ensuring these tools support rather than distort the clean energy transition.

7.0 Conclusions

This report demonstrates that many emerging and developing economies continue to rely on green tax incentives as a central instrument for attracting investment in the renewable energy sector. However, our analysis suggests a mismatch between the most common types of incentives, particularly profit-based measures, such as income tax holidays, and the specific barriers to investment that prevail in these contexts. This finding, which aligns with prior research by UNCTAD (2023), raises important questions about the policy rationale guiding current incentive regimes.

Despite widespread use, there is little evidence to suggest that profit-based incentives are the most effective means of catalyzing renewable energy deployment, especially in markets where projects face long payback periods, high capital costs, and limited profitability in the short term. In contrast, cost-based measures and targeted indirect tax relief may offer more immediate and contextually appropriate support, yet they remain underutilized.

The reasons for this policy preference remain insufficiently understood. It is plausible that institutional path dependency, administrative simplicity or investor lobbying may explain their persistence. However, these hypotheses warrant deeper investigation.

As long as governments continue to deploy green tax incentives, these tools must be strategically targeted, fiscally sustainable, and responsive to the evolving structure and maturity of the renewable energy sector.

This report has primarily focused on the legislative design and institutional experience associated with green tax incentives. Several important questions remain that merit further investigation:

1. What is the quantitative impact of green tax incentives on actual investment flows in renewable energy, and how does this compare with other forms of support such as FITs, concessional finance, or auctions?
2. How do green tax incentives interact with other investment promotion tools in practice? Can synergies or trade-offs be identified when incentives are combined with other instruments?
3. How do investors perceive and respond to different types of green tax incentives in EMDEs? Are certain types of investors (e.g., multinationals vs. local firms) more responsive to specific incentive structures?
4. What institutional and administrative conditions are necessary to ensure that incentives are delivered efficiently, with minimal abuse and leakage?
5. How do domestic political dynamics influence their adoption and persistence?

Addressing these questions would provide a more comprehensive understanding of the role green tax incentives can and should play in the renewable energy investment landscape of developing countries. It would also support the development of more targeted, effective, and equitable policy interventions.

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Published by the International Institute for Sustainable Development

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