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Incentivising Renewable Energy Generation: Lessons for South Africa

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ABSTRACT

South Africa has ambitious goals to transition towards renewable energy, a shift critical for both economic stability and climate resilience. Globally, financial and tax incentives have become instrumental tools in driving renewable energy generation; however, their design and effectiveness vary considerably due to diverse economic, regulatory, and environmental contexts. This paper evaluates South Africa's renewable energy incentive framework in comparison to those in China, Denmark, India, and Germany, examining the successes and challenges of each approach. The findings suggest that South Africa's financial and tax incentives are ineffective in decarbonising the coal-intensive energy sector as well as providing the critical investment to upscale renewable energy adoption. This paper provides lessons for South Africa's policymakers, focusing on optimizing financial and tax incentive frameworks to accelerate renewable energy generation.

1. Introduction

The transition to renewable energy (RE) is a fundamental step towards attaining climate targets, diversifying the energy supply, and reducing economic reliance on fossil fuels. South Africa, as a major coal-dependent economy, faces unique challenges in accelerating renewable energy generation, making financial and tax incentives crucial for meeting its sustainable energy goals. An incentive regime plays a vital role in reducing the cost burden of renewable energy projects, enhancing the competitiveness of green energy against fossil fuels, and promoting overall investment in the sector (Ramushwana & Ramfol, 2024). This paper investigates the efficacy of South Africa's incentive framework drawing comparative lessons from China, Denmark, India, and Germany. Globally, countries have introduced a range of financial instruments and tax incentives to upscale RE access (Chen, Harris & Zolt, 2018; Cox, 2016; Mousavian, Shakouri, Mashayekhi, & Kazemi, 2020; United Nations, 2018). Countries like China, Germany, Denmark, and India are leading in renewable energy generation (REG); having significantly expanded RE investment (IEA, 2024; Qadir, Al-Motairi, Tahir & Al-Fagih, 2021; REN, 2023;

Shurpali, Agarwal, & Srivastava, 2019; Thakur & Chakraborty, 2019). Some of these tax incentives include tax measures, for instance the introduction of a carbon tax to curb fossil fuel use and tax incentives that reduce a taxpayer's tax liability (Azad & Chakraborty, 2021; Shurpali *et al.,* 2019). Similarly, financial instruments include feed-in tariffs (FITs) and net metering (NM) policies that accelerate the payback period on RE investment by incentivising self-consumption and compensating for REG transferred back into the grid (REN, 2023).

This paper adopts a qualitative review of financial instruments and tax incentives in comparative jurisdictions and aims to answer the research questions: What financial instruments and tax incentives are required to support REG in South Africa's business sector? What is the role of financial instruments and tax incentives in upscaling RE access in South Africa? What lessons can be drawn from the financial instruments and tax incentives from the comparative countries to be implemented in South Africa?

The paper proceeds as follows: the following section reviews the South African energy and electricity landscape. Second, commonly used RE financial and tax incentives are discussed. Third, a comparative appraisal is conducted of China, Denmark, Germany, and India's REG incentive regimes. Fourth, policy lessons are drawn from the comparative countries to support upscaling RE in South Africa. Lastly, recommendations and conclusions are presented.

The paper contributes to tax policy scholarship on adopting financial and tax incentives towards upscaling RE access in South Africa's business sector.

2. South African energy landscape

Fossil fuels are the principal source of energy in South Africa's energy-intensive economy (Manyane, 2024) with coal-fired power generation dominating the electricity mix. Coal consumption accounts for over 80.1% (176.6 TWh) of the total energy mix, nuclear energy made up 4.6%, diesel made up 1.6% with RE making up the remaining portion 13.7% (30.2 TWh) (New Development Bank, 2023; Pierce & Le Roux, 2023). Due to the widespread usage of power produced by fossil fuels, greenhouse gas (GHG) emissions are released, contributing to climate change in the energy-intensive sector (Farjana, Huda, Mahmud, & Saidur, 2019; Pierce, & Le Roux, 2023). Eighty percent of South Africa's total GHG emissions come from the energy sector, the main source of GHG emissions (Department of Environment, Forestry and Fisheries, 2020; Pierce, & Le Roux, 2023).

About half of all energy produced in South Africa is used by the industrial sector, which also accounts for 5.6% of all direct business process emissions nationally (Department of Forestry, Fisheries and the Environment, 2022; Department of Mineral Resources and Energy, 2021). This has a major impact on GHG emissions both directly from industrial processes and indirectly from the use of fossil fuels for energy (Makamela & Ramfol, 2023).

Transiting from coal to RE sources can stimulate the green economy in South Africa (Akinbami, Oke, & Bodunrin, 2021) and mitigate the country's power shortages (Ramushwana & Ramfol, 2024). Financial instruments and tax incentives collectively serve as important government tools in stimulating investment in the RE sector and reducing the amount of carbon emissions. These policy goals can be achieved through a range of policy reforms that promote the low-carbon economy, including taxing fossil fuels, offering tax incentives for low-carbon emission substitutes (UNEP, 2018), and providing financial instruments and tax incentives to upscale REG (Qadir *et al.,* 2021). Investment in RE can include a combination of government subsidies, regulatory, financial, and fiscal policies, that can be used to encourage decarbonization of the energy system (Meier, Vagliasindi & Imran, 2014), improve energy security, and boost economic development (UNCTAD, 2023).

Dippenaar (2018) study identified that RE investment choices are motivated by non-tax factors and recommended that the qualifying criteria for tax incentives should be expanded and simplified. Engelbrecht and Hassan (2024) study found that the solar photovoltaic panel tax incentive is restrictive. The incentive affords tax relief to higher-income taxpayers that can fund the initial upfront cost and thereby excludes access to several South Africans (Engelbrecht & Hassan, 2024). Additionally, the high cost of compliance in fulfilling the prerequisites for the tax incentives is regarded as being unduly challenging, costly, and onerous (Ramushwana & Ramfol, 2024). Moreover, inconsistencies between multiple government agencies towards the tariff structure capacity charges erodes the financial benefits afforded by the Section 12B rooftop solar tax incentive and will deter investment in RE (BusinessTech, 2023). Other limitations include the lack of a battery storage tax incentive, and delays in policy supporting FITs and NM (Ramushwana & Ramfol, 2024).

Supporting REG in South Africa requires a mix of financial and tax incentives. Table 1 below reviews the challenges associated with the deployment of a range of renewable energy generation policy instruments: NM, FIT, and tax incentives.

Table 1: South Africa's renewable energy incentive regime challenges

Policy instrument	**Challenges and threats**
FIT	• Short time frames identified with the old FIT introduced in 2009. • Policy ambiguity created by tariff rate volatility. • Bureaucratic hold-ups. • Inconsistent statements and assertions from various government departments.
NM	• Only a draft of NM is available, however, not meeting the standards of an effective NM policy. • The draft does not mention capping of the largest net-metered generator that can be used, nor whether the size of a generator for a home and business setting would vary. • The draft does not consider setting an aggregate capacity limit, which restricts the total amount of net-metered generation that can be installed. • The draft falls short on details such as what must be contained in the customised contracts for NM clients such as including the tariff details, an assurance that exported energy would be purchased under regular operating circumstances, and customer and utility responsibilities on legal, technical, safety, and financial matters.
Tax incentives	• Tax incentives are complex and onerous.
General	• Poor and inadequate education of the financial and fiscal incentives. • Instruments are complicated and difficult to comply with. • High cost of compliance. • Not easy to claim. • Multiple government agencies dealing with incentives and also between government departments are inconsistent. • Businesses do not know how to apply to access the incentives.

Source: Authors own compilation.

3. Renewable energy incentive regime design considerations

Designing effective and efficient renewable energy incentive policies requires a comprehensive approach that considers market dynamics, investor interests, and regulatory trade-offs. By optimizing incentive structures and coordinating investments, policymakers can promote sustainable energy development and achieve environmental goals (Abdmouleh, Alammari, & Gastli, 2015).

Policy mechanism designed to accelerate investment in RE technologies include feed-in-tariffs (FIT), net metering (NM) and tax incentives. FIT and NM are used to regulate the power purchase and offer support for a guaranteed RE market; and are benchmarked as efficient instruments to upscale REG (Mousavian *et al.,* 2020). Tax incentives help lower the initial cost of RE projects, making them more attractive to investors.

3.1.1 Feed-in tariffs

FITs are the most widely used form of RE financial instrument and are used as the most common form of grid connection incentive (Dong, Wei, Liu, & Zhao, 2023). They are imposed by governments to reward companies that generate electricity from RE (IEA, 2024). With FITs, the producer benefits from a fixed price of electricity that is set by the government (Zhao, Zhou, & Wen, 2021). Legislative measures are necessary to bind the power grid companies to purchase power generated by such RE producers (Dong *et al.,* 2023).

A FIT system forces grid operators to buy the electricity output and guarantees a premium price for green electricity produced (Eslamizadeh, Ghorbani, Costa, Künneke, & Weijnen, 2022; Poullikkas, Kourtis, & Hadjipaschalis, 2013). Good characteristics of a FIT include being easy to understand and simple to use, with set rates, and transparent capacity targets (Guild, 2019). A budget cap and uniformity in policy are also essential components of policy (Couture, 2010).

The key factors on an FIT are the design, transparency, finding the right tariff level, and contract duration of the FIT policy (Guild, 2019; IEA, 2024). Easy to understand and simple to use FIT policy, with set rates and transparent capacity targets. Other essential FIT elements include guaranteed grid access, stable and long-term purchase agreements that typically last 20 to 25 years (Dong *et al.,* 2023; Guild, 2019; Mousavian *et al.,* 2020; Ramushwana & Ramfol*,* 2024). Long-term agreements provide certainty to businesses (REN21, 2023).
If the FIT rate is too high, society will have to bear the cost through taxes, and this will create an unnecessary burden to the fiscus as government would be using the fiscus to grant the FIT to businesses. However, if the rate is too low, the financial instruments will not convince businesses to invest in REG as the FITs would not be attractive. Reduced administrative burden is another characteristic of a FIT (Haas, Panzer, Resch, Ragwitz, Reece, & Held, 2011).

3.1.2 Net metering

With net metering, the grid is used as a free virtual energy storage and the benefit of using the grid for energy storage is its capacity which is larger than that of the ordinary battery (United Nations, 2023). If a government rolls out net metering, it is therefore necessary to have the grid guarantee, because the grid is significant as the storage capacity for excess RE generated (Thakur & Chakraborty, 2019). In a NM system, state-regulated retail rates are used to pay for the energy; these rates reflect the total cost of the electricity, including delivery, administrative, tax, and profit costs, that utilities charge end-user customers. Most countries use retail rates in their NM

programmes to reimburse the prosumer[1] (Thakur & Chakraborty, 2019). Because it does not require any new procedures, new rates to be established, or unique equipment, NM is easy to administer (Abdmouleh *et al.,* 2015).

For NM to be successful, it is necessary to consider the rate that is used, i.e., whether it is the main retail rate or the cost avoidance rate. Avoided cost rates are based on the costs that an energy supplier would have incurred if electricity were produced internally or acquired from another source (Revesz & Unel, 2016). A second factor to consider is the duration i.e., the duration a customer's monthly excess generation may be "carried over" to subsequent billing cycles and utilised to offset electricity consumption (Revesz & Unel, 2016). The export rate must be established at a level that does not result in higher tariff charges than the costs saved. The key elements for NM are therefore the rate and grid guarantee by the utility company (Abdmouleh *et al.,* 2015).

When designing NM policies, it is necessary to consider the rate, i.e., whether it is the main retail rate or the cost avoidance rate (Ramushwana & Ramfol, 2024). The rate must be established at a level that does not result in higher tariff charges than the costs that are saved (UNCTAD, 2023). This is of essence to avoid excessive subsidies which may overburden the fiscus as governments usually use the fiscus to offer the NM to businesses. NM brings into effect the ability of the grid to store extra energy generated during the day for use at night (Saquib, Chakma & Shiblee, 2022). NM is an easy-to-understand billing concept, reducing the need to construct new infrastructure, and the ability for prosumers to receive compensation for excess electricity, which increases businesses financial return on investment (Rauf, Al-Awami, Kassas & Khalid, 2021). Furthermore, NM does not require significant regulatory changes and is easy to implement in conjunction with current retail rates (Thakur & Chakraborty, 2018).

3.1.3. Tax incentives

Tax incentives should have the following four characteristics in order to achieve and maximise a net benefit: effectiveness, neutrality, efficiency, simplicity, and transparency (Blake, 2022; Celani, Dressler & Wermelinger, 2022). A tax incentive is defined as a preferential treatment of particular taxpayers based on a beneficial specific outcome (UNEP, 2018). A tax incentive is a provision that allows for an exemption, credit, preferential tax rate, or a delay in tax payment (Blake, 2022). The success of a tax incentive scheme rests on how well they are designed, carried out, and monitored (United Nations, 2018). Financial incentives can take the shape of tax breaks, grants, refunds, loan programmes, guarantees, and credit upgrades, however, they can also be performance-based. Value added tax (VAT) incentives, and property tax, are forms of tax benefits (UNEP, 2018). To encourage the deployment of REG, tax policies offer tax discounts, credits, and/or the reduction or elimination of certain taxes. In contrast, grants, rebates, and performance-based incentives offer a direct monetary incentive to support RE and do not require payback.

Before a technology is implemented, grants may be given for feasibility studies, business development, research, development, and demonstration, or other purposes. Alternatively, grants may be provided after a system is up and running. Grants are monetary assistance that does not have to be repaid, and that is granted by government for specified purposes to an eligible recipient (Abdmouleh *et al.,* 2015). Rebates are frequently given after the

[1] Produces and consumes electricity.

sale and/or installation of a vehicle and are usually applied to discrete purchases such as appliances. Performance-based incentives are given in accordance with how well an installed technology performs in real time, such as a payment of cents per kilowatt-hour (Cox, 2016; Celani *et al.,* 2022; OECD, 2022).

Globally, tax incentives are the most common fiscal instrument used for the transition to RE (Qadir *et al.,* 2021; UNCTAD, 2023). However, there are various opinions about their effectiveness in addressing environmental challenges and altering consumer behaviour (Dippenaar, 2018; UNCTAD, 2023). Tax incentives are strong, effective, adaptable tools for advancing the RE sector (UNEP, 2018; OECD, 2022). The design considerations are central to the success or failure of the tax incentive policy instrument. Effectiveness, neutrality, efficiency, simplicity, and transparency were identified as key qualities of the tax incentives (Blake, 2022; Celani *et al.,* 2022). Transparency reduces the possibility of corruption whilst predictability ensures stability of the tax incentives granted - these principles are important for businesses as they are used for decision making. Simplicity and transparency relate to the lowering of compliance costs and streamlining of administrative activities which can be achieved most effectively through clear, uncomplicated regulations that are easy for taxpayers and tax administrations to understand and follow (Blake, 2022:35).

4. Comparative analysis

A comparative analysis is performed to establish policy lessons from countries which are advanced in RE deployments by adopting various financial instruments and tax incentives. Lessons are drawn from the comparative country analysis to benchmark solutions to upscale RE generation in South Africa. The table below, table 2 analyses the policy options in the comparative countries.

Table 2: Comparative country policy options

	SOUTH AFRICA	**CHINA**	**GERMANY**	**DENMARK**	**INDIA**
FINANCIAL INSTRUMENTS AND TAX INCENTIVE MIX	R&D NM draft FIT draft Tax incentives Carbon tax	R&D NM FIT Import & custom duty Accelerated depreciation VAT & CIT reduction	R&D FIT Import & custom duty Accelerated depreciation VAT & CIT reduction Carbon tax and fossil fuel taxes	R&D NM FIT Import & custom duty Accelerated depreciation VAT & CIT reduction Carbon tax and fossil fuel taxes	R&D NM FIT Import & custom duty Accelerated depreciation VAT & CIT reduction
Weakness in SA policy	High cost of compliance. Poor taxpayer education on the incentives. Complex and onerous. Incoherent government policies by multiple government agencies communicating conflicting messages create inconsistencies ultimately negatively impacting REG investment choices.				

China

FIT

A unique feature in the FIT is the zonal FIT policy in China, which offers improved identification opportunities to assess its influence on the expansion of PV capacity. China's FIT policy is zonal, and the tariff is based on the distribution of solar radiation resources in China. A zone with superior solar resources is subject to a lower tariff.

NM

The impact of electricity usage is considered when designing the fair NM subsidy. To prevent excessive subsidies, the NM subsidies of distributed PV systems are lower for areas with high power demand.

Tax

Waving of import taxes and custom duty on the purchase of RE equipment etc. Carbon tax and taxes on fossil fuel are implemented with fossil fuel taxes implemented to raise revenue that is used for the upscale of RE. Both the fossil fuel tax and carbon tax assist in reducing GHG. VAT reduction and VAT exemption are also implemented as well as CIT reduction. Because of its special technique of calculating tax liability (output VAT less input VAT), VAT is thought to have minimal economic distortion and low administration costs, therefore making VAT reduction an easier lesson to implement.

India

FIT

FIT is more efficient as they immediately lower the cost of implementing RE projects, improving their financial viability. FIT agreements are for a period of 20 to 25 years in India.

NM

Affordable, regulatory backing, and more business-friendly NM regulations. Simplicity with a single meter.

Tax

The implementation of a single-window clearance system has significantly enhanced the process of granting land for REG. The government has clear, uncomplicated administrative processes and paperwork. The government further offer businesses grants and subsidies which are non-repayable direct cash to reduce the initial capital outlay of a RE project and this enhances its viability. The government made it mandatory for the energy utility to purchase electricity generated from RE projects. Tax exemptions, capital allowances, VAT exemptions, capital subsidies and credits incentivise the acquisition of RE technologies, reduce the financial strain on businesses, and increase the viability of RE projects. The implementation of waiving of excise duty and import tax for the purchase of RE related items is an important mechanism to facilitate upscale of RE. The Indian government provides accelerated depreciation in year one of up to 80 to 100 percent.

Germany

FIT

The FIT system lowers entrance barriers. Timely modifications to pertinent policies and laws are crucial, as demonstrated by the growth of RE. Timely modifications are critical especially with FIT policy agreements in line with reduction of REG costs. The FIT system in Germany has lower administration costs, is simple to implement, and can quickly be revised to account for new capacities or to accommodate any modifications and or changes required. How a FIT system is designed is critical for its success.

Tax The German government supports RE businesses through a variety of additional measures, such as investment aid, tax exemptions or reductions, tax refunds, tax credits, R&D tax incentives, and deductions. Germany implemented tax policies that were highly restrictive, including an ecological tax reform, by imposing a tax on the use of fossil fuel-derived electricity, primarily to lower GHG and support the economic development of RE.
Denmark **FIT** It is suggested that policy design and commitment are key factors for success of the FIT policy. **NM** A NM hourly policy is the most effective incentive responsible for the upscale of RE in Denmark. **Tax** R&D, investment grants such as direct subsidies, energy tax exemptions, energy supply taxes and tax exemptions are some of the incentives available for businesses in Denmark. Denmark levies a tax on CO_2 emissions from the burning of fossil fuels like coal. These taxes on CO_2 taxes result in revenue to boost RE upscale.

Source: Author compilation.

5. Policy lessons for South Africa

The most commonly used tax incentives to promote RE adoption are VAT, CIT, FIT, import duty and carbon tax. Commonly used financial instruments include FITs and NM (IEA, 2024; REN21, 2023). FITs are the most common form of grid connection incentive (Dong *et al.,* 2023). With FITs, the producer benefits from a fixed price of electricity that is set by the government (Zhao *et al.*, 2021).

5.1. Feed-in tariffs and Net metering

A FIT is the worldwide instrument that is most frequently utilized to encourage RE generation. China, India, Denmark, and Germany utilise FIT to accelerate RE adoption (Sun, Zhan & Du, 2020; Dong *et al.,* 2023; Li, *et al.,* 2021). First, there should be simplicity in the design of instruments such as FIT and NM (Guild, 2019). Improving the simplicity will ensure that more businesses take on RE investments, helping with decarbonisation efforts as well as improving energy security. For FIT to incentivize investments in RE generation, the government guarantees the purchase of generated RE for a fixed price that is higher than the grid price for a specific length of time (Poullikkas *et al.,* 2013; Eslamizadeh *et al.,* 2022).

China implemented a zonal FIT policy where the regions with abundant solar radiation apply a lower FIT rate (Dong *et al.,* 2023). Since South Africa receives abundant sun during the year for over 200 days, there is no need to apply a zonal FIT. South Africa should focus on an optimal rate, minimising undue burden on the taxpayer (SARS, 2023). South Africa can adopt FITs with adequate rates to accelerate their roll out. Furthermore, South Africa needs to accelerate FIT and NM implementation with adequate rates. This will incentivise businesses to invest in RE to obtain a return on investment from the sale of electricity and recover high investment costs (Cox & Esterly 2016; Zhao *et al.*, 2021; Guild, 2019; Mousavian *et al,* 2020; United Nations, 2023).

Acceleration of FIT roll-out will further benefit the energy regulatory authority and government at large as they are easy and simple to implement with lower administration costs. Acceleration of NM roll-out will assist businesses to avoid wastage of excess RE generated during the day as the grid is used as a virtual storage (Eslamizadeh *et al.,* 2022; Pilz & Al-Fagih, 2019). This can assist with grid capacity for storage of excess energy relative to ordinary batteries.

5.2. Tax incentives

Simplicity, neutrality, efficiency and transparency are foremost attributes towards designing RE tax incentives (Blake, 2022). Simplicity and transparency relate to the lowering of compliance costs and streamlining of administrative activities which can be achieved most effectively through clear, uncomplicated regulations that are easy for taxpayers and tax administrations to understand and follow (Celani *et al.,* 2022). Effectiveness emphasises the need to lessen the negative effects of taxes and increase economic gains. Efficiency emphasizes the importance of the relationship between the benefits of tax incentives and their associated costs (Blake, 2022).

5.3. Other tax policy instruments

Lower prices for renewable energy systems can accelerate adoption by reducing financial barriers for consumers, fostering the transition to a cleaner energy mix. Zero-rating Value-Added Tax (VAT) for renewable energy products and services is a potential policy tool to incentivize the adoption of clean energy technologies. This approach could be particularly effective in countries like South Africa where affordability is a key barrier to renewable energy adoption. Zero-rating VAT will reduce the high investment costs associated with acquiring renewable energy technologies that are a barrier to advancing the uptake of RE. This measure can encourage investment in renewable energy technologies and stimulates demand, which can lead to market growth, job creation, and innovation in the sector.

While the VAT instrument is a simple and easy instrument to utilise it also has low administration costs (SARS, 2023). VAT contributes significantly to government revenue in many countries. Zero-rating renewable energy products could lead to revenue loss unless offset by other measures. Ensuring that zero-rating is applied correctly and not misused by businesses can be challenging, requiring robust monitoring systems. On its own, zero-rating VAT might not address all barriers to renewable energy adoption but can support other instruments in the policy mix. The benefits of zero-rating VAT could be disproportionately captured by higher-income taxpayers, reducing its equity impact.

China offers reductions in VAT on RE equipment lowering the RE investment cost (Kammen, 2008; Li et al., 2021). South Africa can apply a sunset clause to a temporary reduction on VAT and CIT to promote RE upscale and acceleration thereof. South Africa can further consider subsidies for the manufacturing of certain items in relation to RE as this would encourage manufacturing.
China offers CIT reductions from time to time when the need arises for RE investment (Liming, 2009; Zhao *et al.*, 2021; Sun *et al.,* 2020; Xia, *et al,* 2020; Dong *et al.,* 2023). South Africa can also consider CIT reductions. When offering reduced CIT rates, the difference between the actual and the reduced rate can be used as a contribution to the renewable fund in order to alleviate the pressure on the fiscus due to the diminishing South African tax base. The same rationale can apply to VAT reduction. India provides concessional sales tax exemptions, five years of income tax vacations, and 100% depreciation in year one (Elavarasan, Shafiullah,

Padmanaban, Kumar, Annam, Vetrichelvan, Mihet-Popa, & Holm-Nielsen, 2020; Ghosh, 2015; IEA, 2024; Liming, 2009; OECD, 2018; Rathore & Panwar, 2022; Shurpali *et al.,* 2019). As some businesses are not VAT vendors, they may therefore not directly benefit from the VAT adjustments. Therefore, it might be beneficial to have reduced rates for businesses for a certain period as the reduction can be used fund RE.

South Africa can benchmark the following policy options: Germany and Denmark tax policies are more restricted, including environmental carbon taxes. Fossil fuel use in the industrial sector is decreased by the imposition of carbon taxes (IEA, 2024; Zhao *et al.,* 2021). China and India exempt businesses from import and excise taxes on essential RE components and equipment (Elavarasan *et al.,* 2020; Ghosh, 2015; IEA, 2024; Rathore & Panwar, 2022; Shurpali *et al.,* 2019). R&D are amongst the tools used to encourage RE adoption in Denmark, China, Germany, and India.

Furthermore, South Africa can benchmark policy lessons from India which offers low administration, easy and simple instruments for upscaling and acceleration of REG; and increased carbon tax incentive rates to benefit businesses that invest in RE due to the cost of tax exceeding the benefits of adopting RE (Elavarasan *et al,* 2020; Moorthy, Patwa, and Gupta, 2019; Shurpali *et al.,* 2019). The comparative countries levy fossil fuel and other environmental taxes which can support the policy instrument mix (Azad *et al.,* 2021; Shurpali *et al.,* 2019; Thapar, Sharma & Verma, 2016). The revenue generated from taxes imposed on fossil fuel and a carbon tax can be put in a fund that can be utilised to offer nonrepayable grants to be used as an initial capital outlay for South African businesses. It is also important to educate taxpayers about the RE instruments offered and empower businesses to have a basic understanding of various REG instruments. It is also recommended to lower compliance costs and make it simple and easy to comply with the requirements of accessing RE financial and tax incentives. This will ensure that the tax compliance of businesses is improved. Lastly, it is important to reduce the regulatory requirements and number of agencies responsible for financial instruments and tax incentives. India implemented a single-window clearance system that potentially reduce complexity (Kumar, Pal, Kar, Mishra, & Bansal, 2022). Implementing a single-window clearance system in South Africa will ensure that the taxpayer deals with only one regulatory authority, such as the South African Revenue Services, rather than having to comply with NERSA, the Department of Environmental Affairs, Eskom, and National Treasury. Thereby minimising inconsistencies and conflicting messaging. India provides further benchmarks on implementing an incentive regime that offers a clear, uncomplicated, administrative processes (Elavarasan *et al.,* 2020; Moorthy *et al.,* 2019; Rathore & Panwar, 2022; Shurpali *et al.,* 2019).

6. Conclusion and Recommendations

The demand for sustainable energy sources has led countries to develop incentives for REG. By adapting key elements from the comparative countries, South Africa can strengthen its financial and tax incentive framework to accelerate REG effectively. Stable, inclusive, and regionally adaptable policies are critical for South Africa's success in transitioning to sustainable energy.

South Africa's RE financial instruments and tax incentives policy is ineffective in incentivising RE investment. Adequately designed tax incentives and financial instruments as well as their execution and monitoring are key for the reduction of fossil fuel reliance which can reduce high levels of GHG emissions. Simple and easy tax and financial incentives with low compliance costs can be easily adopted by businesses, and lead to energy security as evidenced in comparative countries. It is important to reduce the regulatory requirements and

number of agencies so that businesses deals with only one regulatory authority. This minimises inconsistencies and conflicting messages. As a way of improving compliance, it is important to provide education campaigns on the RE instruments and incentives to make them more accessible to the South African market.

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