

Assessment Report on Namibia's Renewable Energy Feed-in Tariff (REFIT)

Initiative for Climate Action Transparency - ICAT

Assessment Report on Namibia's Renewable Energy Feed-in Tariff (REFIT) Policy

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Summary of the Assessment

This assessment evaluates Namibia's *Renewable Energy Feed-in Tariff (REFIT) Rules* (ECB, 2015) under the *Initiative for Climate Action Transparency (ICAT)* framework. The REFIT Rules are one of Namibia's flagship renewable energy policies, designed to accelerate private sector participation in electricity generation and reduce national greenhouse gas (GHG) emissions. Using methodologies from the ICAT Renewable Energy and Sustainable Development Guides, this report quantifies the policy's contribution to Namibia's updated *Nationally Determined Contribution (NDC)* targets and its *Enhanced Transparency Framework (ETF)* obligations under the Paris Agreement.

The REFIT Rules establish a predictable regulatory and financial environment for Independent Power Producers (IPPs) to generate electricity from renewable sources mainly solar, wind, biomass, and small hydropower up to 5 MW per project. Tariffs are fixed per technology and reviewed periodically by the Electricity Control Board (ECB) to ensure cost recovery and investor confidence. Since implementation in 2015, REFIT has enabled the addition of over 180 MW of renewable capacity and mobilized more than N\$3 billion in private investment, while significantly diversifying Namibia's electricity mix.

The GHG assessment, conducted using the *Greenhouse Gas Abatement Cost Model (GACMO)* and calibrated with data from Namibia's 2024 *National Inventory Document (NID)*, projects cumulative emission reductions between 3.2 and 3.9 MtCO₂e by 2030. This represents approximately 35% of Namibia's total NDC mitigation potential in the energy sector. Under the Policy Impact Scenario accounting for financing, grid, and institutional constraints REFIT is expected to sustain annual emission reductions of 350–370 ktCO₂e, driven by renewable capacity expansion to 370 MW by 2030.

Beyond climate mitigation, REFIT delivers strong sustainable development co-benefits. By 2030, REFIT-supported projects are expected to create over 5,000 direct and indirect jobs, increase the national electrification rate to 86–89%, and attract more than N\$9 billion in renewable energy investment. These outcomes align closely with SDGs **7** (Affordable and Clean Energy), **8** (Decent Work and Economic Growth), **9** (Industry, Innovation, and Infrastructure), and **13** (Climate Action).

Despite its success, several barriers constrain full realization of REFIT's potential chiefly limited grid capacity, financing challenges, and exposure to currency fluctuations. Addressing these constraints through targeted investments in transmission infrastructure, green finance mechanisms, and institutional capacity-building will be critical for sustaining policy impact.

Overall, the assessment confirms that the REFIT Rules remain a high-impact, cost-effective, and scalable policy instrument within Namibia's low-carbon development strategy. When integrated into the national NDC tracking and reporting framework, REFIT provides a replicable model for transparent, evidence-based policy implementation under the ICAT methodology supporting Namibia's long-term transition toward a resilient, inclusive, and decarbonized energy economy.

1 Introduction

This assessment evaluates Namibia's Renewable Energy Feed-in Tariff (REFIT)¹ Rules using the methodological frameworks of the ICAT Renewable Energy (RE) Guide² and the ICAT Sustainable Development (SD) Guide³. The REFIT Rules are a central policy instrument designed to accelerate renewable electricity deployment and stimulate private sector participation in Namibia's power sector. This study quantifies both the direct greenhouse gas (GHG) mitigation impacts and the indirect sustainable development benefits arising from the REFIT policy. The overarching objective is to determine how REFIT contributes to the achievement of Namibia's Nationally Determined Contribution (NDC) targets and to its Enhanced Transparency Framework (ETF) obligations under the Paris Agreement⁴.

The scope of this assessment includes four key components. First, it provides a quantitative estimation of GHG emission reductions from renewable electricity generation supported by the REFIT Rules between 2015 and 2030. Second, it presents a qualitative and quantitative evaluation of sustainable development (SD) co-benefits, focusing on contributions to Sustainable Development Goals (SDGs) 7 (*Affordable and Clean Energy*), 8 (*Decent Work and Economic Growth*), 9 (*Industry, Innovation and Infrastructure*), and 13 (*Climate Action*). Third, it establishes a set of policy impact indicators suitable for integration into Namibia's NDC tracking framework. Finally, it examines REFIT's role in advancing national development priorities, including Vision 2030, National Development Plan 5 (NDP5), and the Harambee Prosperity Plan II (HPP II).

The analytical framework follows ICAT's four-step assessment process: (1) defining objectives and boundaries; (2) developing causal chains to link policy actions to impacts; (3) quantifying GHG emission reductions; and (4) assessing sustainable development outcomes. Data were collected from the Electricity Control Board (ECB), NamPower, the Namibia Statistics Agency (NSA), and the Ministry of Environment, Forestry and Tourism (MEFT).

Namibia's REFIT Rules (ECB, 2015) were established to operationalize the National Independent Power Producer (IPP) Policy (MME, 2018), providing a transparent regulatory framework that enables small and medium-scale renewable energy producers to sell electricity to the national grid under predetermined tariffs. The REFIT mechanism marked a major reform by creating a stable, predictable investment environment for Independent Power Producers (IPPs)⁵, unlocking private capital for renewable energy generation.

¹ **Feed-in Tariff (FIT):** A regulatory mechanism guaranteeing renewable energy producers a fixed price for electricity supplied to the grid over a specified period, designed to promote investment by ensuring predictable returns.

² ICAT (2020). *Renewable Energy Methodology: Assessing the GHG Impacts of Renewable Energy Policies*. UNEP DTU Partnership.

³ ICAT (2021). *Sustainable Development Methodology*. UNEP DTU Partnership.

⁴ United Nations (2015). *Paris Agreement*. New York: United Nations.

⁵ **Independent Power Producer (IPP):** A private entity that owns and operates generation facilities to sell electricity to a public utility or directly to consumers.

The introduction of REFIT coincided with heightened concerns over Namibia's energy import dependency particularly reliance on electricity imports from South Africa's coal-intensive grid and the volatility of regional electricity prices. By setting technology-specific tariffs based on the Levelized Cost of Electricity (LCOE)⁶, the policy aims to bridge the cost differential between renewable and conventional generation while promoting long-term energy affordability. In doing so, REFIT directly supports Namibia's goals of energy self-sufficiency, supply diversification, and GHG emission reduction in line with its Updated NDC (MEFT, 2023).

The REFIT Rules incorporate several defining features. First, eligibility is limited to IPP projects of up to 5 megawatts (MW) across solar photovoltaic (PV), wind, biomass, and small hydro technologies. Second, tariff design is based on cost-reflective feed-in rates, reviewed periodically by the ECB to maintain investor confidence and cost efficiency. Third, the institutional framework assigns regulatory and licensing functions to the ECB, designates NamPower as the single buyer and grid operator, and positions MEFT as the authority responsible for ensuring climate alignment and national reporting. Lastly, the REFIT framework operates within Namibia's Modified Single Buyer (MSB) Model, which supports gradual liberalization of the electricity market while safeguarding grid stability.

The REFIT Rules form part of Namibia's broader clean energy transition agenda alongside complementary instruments such as the National Energy Policy (MME, 2017), the Off-grid Electrification Master Plan, and the forthcoming Green Hydrogen Development Framework. Collectively, these initiatives represent a decisive shift from fossil fuel import dependence toward a low-carbon, climate-resilient energy economy. By strengthening renewable energy governance, the REFIT Rules not only advance Namibia's domestic mitigation commitments but also serve as a model of transparent, evidence-based policy design under the ICAT framework.

⁶ **Levelized Cost of Electricity (LCOE):** The average cost per unit of electricity generated, accounting for all capital, operating, and financing expenses over a plant's lifetime. IRENA (2023). *Renewable Power Generation Costs in 2022*. International Renewable Energy Agency.

2 Defining the Assessment

2.1 Description of the Policy

The Renewable Energy Feed-in Tariff (REFIT) Rules were introduced by the Electricity Control Board (ECB) of Namibia in 2015 to promote investment in small and medium-scale renewable energy projects (≤ 5 MW)⁷. The policy provides a transparent, standardised tariff structure and power purchase framework to encourage Independent Power Producers (IPPs) to generate electricity from renewable sources such as solar photovoltaic (PV), wind, biomass, and small hydropower (Table 1).

The REFIT Rules are designed to support Namibia’s energy diversification and decarbonisation goals, reduce dependence on imported electricity (mainly from fossil-based sources), and contribute to Namibia’s Nationally Determined Contribution (NDC) targets under the Paris Agreement.

The mechanism operates through technology-specific tariffs set to ensure cost recovery and a reasonable rate of return for investors. Standardised Power Purchase Agreements (PPAs) and simplified licensing procedures are integral components, implemented under the oversight of the ECB in coordination with NamPower and the Ministry of Mines and Energy (MME).

Table 1. Summary of the Renewable Energy Feed-in Tariff (REFIT) Rules.

Parameter	Details
Type of Policy Instrument	Economic and Regulatory Instrument
Policy Description	Establishes fixed tariffs and streamlined procurement for renewable energy IPPs (≤ 5 MW) supplying electricity to the national grid.
Policy Status	Active and under review for potential expansion (ECB 2024)
Implementation Period	Initiated in 2015 - ongoing
Implementing Entities	Electricity Control Board (ECB); Ministry of Mines and Energy (MME); NamPower
Objectives and Intended Impacts (GHG)	<ul style="list-style-type: none"> • Increase renewable generation share in national energy mix • Reduce fossil fuel-based grid emissions • Enhance national energy security

⁷ MME (2017). National Renewable Energy Policy. [link](#)

Parameter	Details
Intended Sustainable Development (SDG) Impacts	<ul style="list-style-type: none"> • SDG 7: Affordable and clean energy • SDG 8: Decent work and economic growth • SDG 9: Industry, innovation, and infrastructure • SDG 13: Climate action
Sectors Targeted	Energy sector – Electricity generation (grid-connected RE)
GHG Gases Targeted	Carbon dioxide (CO ₂); indirectly methane (CH ₄) through fossil fuel displacement

2.2 Assessment Boundary: Individual Policy Focus

This assessment adopts an individual policy boundary, focusing solely on the REFIT Rules as the principal intervention within Namibia’s renewable energy policy framework (Table 2).

While complementary instruments such as the IPP Policy (2018) and National Energy Policy (2017) provide enabling environments, the REFIT Rules are treated here as a distinct policy measure with direct, quantifiable GHG mitigation and sustainable development impacts.

Table 2. Assessment Boundary and Institutional Scope.

Boundary Component	Definition
Geographical boundary	National (grid-connected renewable energy installations within Namibia)
Sectoral boundary	Energy sector – Electricity generation sub-sector
Institutional boundary	ECB (policy regulator), NamPower (off-taker), IPPs (implementers), MME (policy oversight)
Temporal boundary	2015–2030 (aligned with NDC implementation period)
Interacting Policies	IPP Policy (2018), National Energy Policy (2017), Integrated Resource Plan (IRP)
Assessment Scope	Quantitative and qualitative evaluation of GHG emission reductions and SDG co-benefits derived from REFIT-supported renewable generation

2.3 Temporal Boundary: Ex-ante Assessment

The REFIT Rules assessment is conducted as an ex-ante evaluation, projecting expected outcomes up to 2030 in alignment with Namibia’s NDC horizon. The

ex-ante approach allows estimation of potential emission reductions and developmental co-benefits before full implementation maturity, based on available data from ECB, NamPower, and MEFT.

The Renewable Energy Feed-in Tariff (REFIT) Rules form the cornerstone of Namibia’s strategy to expand renewable electricity generation, attract private investment, and reduce carbon intensity in the power sector. The policy’s anticipated impact includes a net GHG reduction of approximately 384 ktCO₂e per year by 2030, driven by a fivefold increase in renewable capacity.

In addition to climate mitigation, REFIT contributes to inclusive economic growth, energy security, and the achievement of SDGs 7, 8, 9, and 13, ensuring alignment with Namibia’s NDC implementation framework.

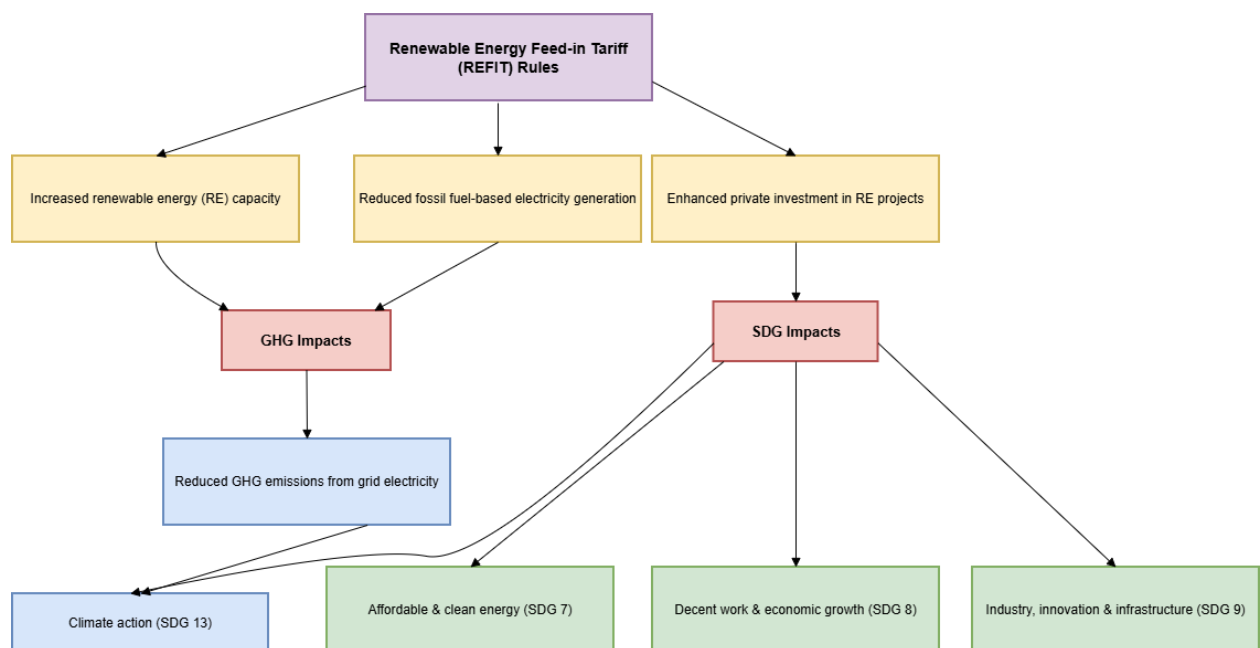


Figure 1. Impact Pathway of the Renewable Energy Feed-in Tariff (REFIT) Rules.

Figure 1 illustrates the causal chain and impact pathway of Namibia’s *Renewable Energy Feed-in Tariff (REFIT) Rules* under the ICAT Renewable Energy Assessment Framework. The REFIT mechanism acts as a regulatory and economic instrument designed to stimulate private sector investment in small- and medium-scale renewable energy (RE) generation.

The diagram shows how REFIT implementation directly leads to increased renewable energy capacity, reduced fossil fuel-based electricity generation, and enhanced private investment in RE projects. These outputs contribute to measurable GHG impacts, primarily through reductions in grid-related CO₂ emissions as renewables displace imported or domestic fossil-based power.

In parallel, the policy produces significant sustainable development co-benefits, supporting multiple Sustainable Development Goals (SDGs), including:

- **SDG 7:** Affordable and Clean Energy – by expanding renewable generation and access,
- **SDG 8:** Decent Work and Economic Growth – through job creation in the renewable sector,
- **SDG 9:** Industry, Innovation, and Infrastructure – by encouraging clean technology deployment and local value chains, and
- **SDG 13:** Climate Action – through direct contributions to Namibia’s NDC mitigation target.

Overall, this causal pathway demonstrates how the REFIT Rules serve as a cornerstone policy linking economic incentives to climate and sustainable development outcomes, reinforcing Namibia’s transition toward a low-carbon, resilient energy system.

3 Assessment Methodology

3.1 Impact Causal Chains

Impact causal chains were developed to illustrate the logical relationships between policy actions, outputs, intermediate outcomes, and final impacts. The causal chain approach ensures transparency and traceability of assumptions in linking policy interventions to measurable effects.

3.1.1 GHG Impact Causal Chain

The greenhouse gas (GHG) impact assessment of the **Renewable Energy Feed-in Tariff (REFIT) Rules** identifies the main sources, pathways, and magnitudes of emission reductions achieved through policy implementation (Figure 2). The REFIT mechanism incentivizes the generation of renewable electricity that displaces fossil-based grid imports, thereby lowering the carbon intensity of Namibia's power supply.

Figure 1 traces the logical link between REFIT policy actions and measurable emission outcomes. Implementation of fixed feed-in tariffs for renewable technologies encourages Independent Power Producers (IPPs) to invest in new solar, wind, biomass, and small hydro facilities. Increased renewable generation feeds into the national grid, reducing reliance on imported electricity primarily from South Africa's coal-dominated energy mix. As fossil-based generation decreases, Namibia's total grid emission intensity falls, leading to cumulative reductions in national GHG emissions.

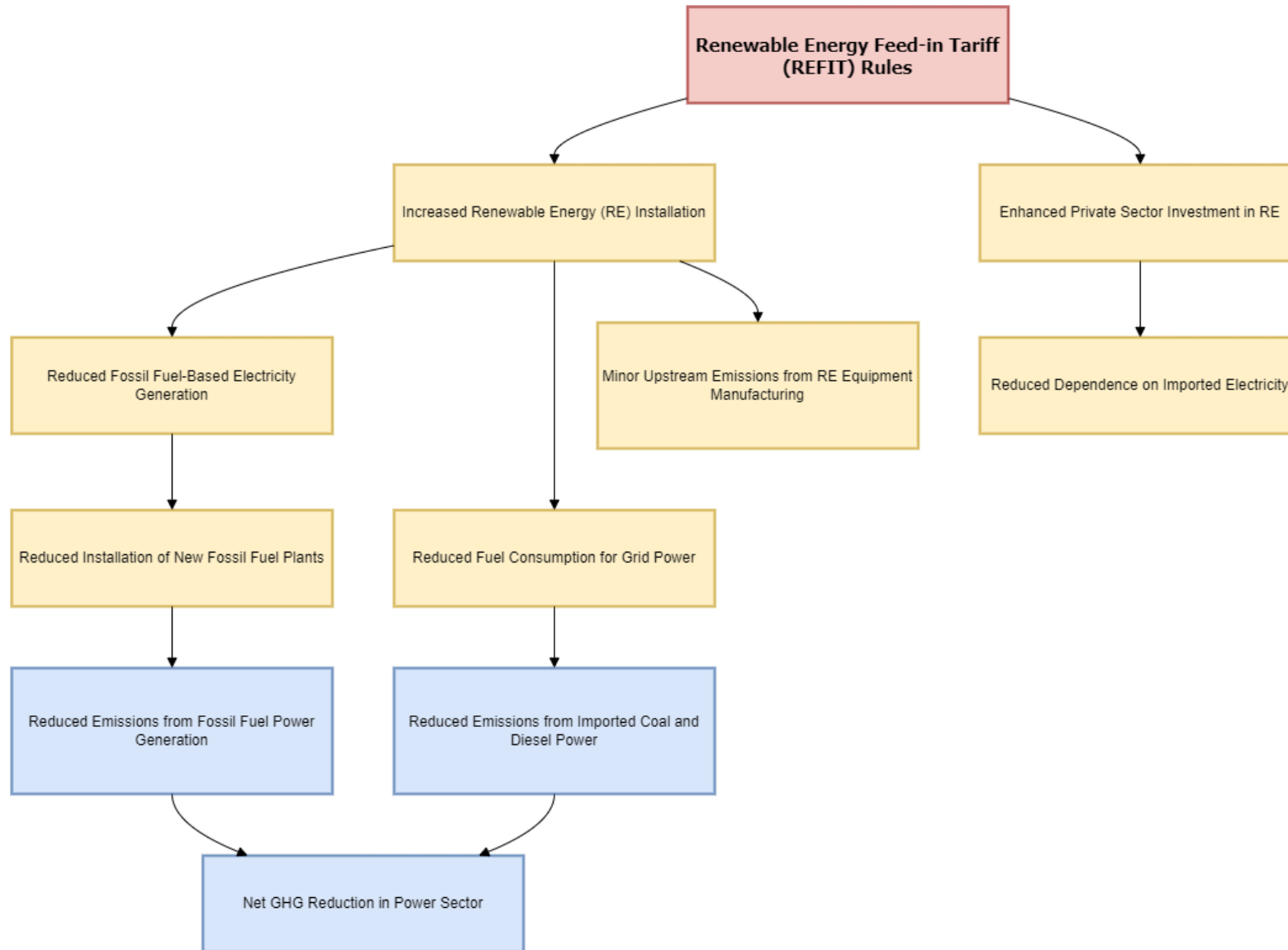


Figure 2. GHG Causal Chain for the Renewable Energy Feed-in Tariff (REFIT) Rules.

3.1.2 GHG Sources Considered

Table 3 below outlines the main GHG sources, their IPCC classification, gases involved, and how they are addressed in this assessment. The policy’s primary impact lies in avoiding emissions from displaced fossil fuel-based generation within the public electricity and heat production category (1A1a).

Table 3. GHG Sources Considered under the Renewable Energy Feed-in Tariff (REFIT) Rules.

GHG Source / Activity	Category (IPCC 2006)	Type of Source	GHG Gases	Policy Relevance under REFIT	Notes / Treatment in Assessment
Grid electricity generation (fossil-based imports)	1A1a – Public electricity and heat production	Indirect (displaced)	CO ₂ , CH ₄ , N ₂ O	High	REFIT displaces imported coal- and diesel-based electricity from the Southern African Power Pool (SAPP).
Renewable electricity generation (solar, wind, biomass, small hydro)	1A1a – Renewable electricity generation	Direct (policy-driven)	Negligible CO ₂ , CH ₄ , N ₂ O	High	Main policy activity; emissions considered zero at the point of generation per IPCC default factors.
Construction and installation of RE facilities	1A2f – Manufacturing / construction processes	Upstream indirect	CO ₂	Low	Embedded emissions in materials not accounted in direct GHG estimate; discussed qualitatively.
Operation and maintenance of RE plants	1A1a – Stationary energy use	Direct / minor	CO ₂	Low	Diesel use for maintenance vehicles and backup generators; excluded due to small magnitude (<1%).
Transmission and distribution losses	1A1c – Energy transmission and distribution	Indirect	CO ₂	Medium	Reduction in losses due to decentralized RE generation discussed qualitatively.

GHG Source / Activity	Category (IPCC 2006)	Type of Source	GHG Gases	Policy Relevance under REFIT	Notes / Treatment in Assessment
Fossil fuel use for displaced power generation (e.g. coal, HFO, diesel)	1A1a – Fuel combustion	Indirect (avoided)	CO ₂ , CH ₄ , N ₂ O	High	Key source of avoided emissions quantified using grid emission factor (0.60 tCO ₂ /MWh).
Biomass feedstock combustion	1A1a / 1A2g – Biomass energy use	Direct (renewable)	Biogenic CO ₂ , CH ₄ , N ₂ O	Medium	Treated as carbon-neutral in line with IPCC good practice; only non-CO ₂ gases considered if data available.
End-of-life disposal of RE components	5C – Waste incineration / disposal	Downstream indirect	CO ₂	Very Low	Future waste emissions negligible for 2030 horizon; excluded from quantitative estimate.

*Main gases covered: Carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).
Default emission factor applied: 0.60 tCO₂/MWh (MEFT, 2023).*

The REFIT Rules primarily target GHG reductions in the public electricity and heat production category by replacing imported fossil-fuel-based electricity with renewable generation. The key quantified GHG source is avoided CO₂ emissions from displaced grid electricity, while upstream and downstream sources are treated qualitatively due to limited data availability and low magnitude.

3.1.3 Sustainable Development Impact Causal Chain

The REFIT Rules also generate substantial co-benefits contributing to several Sustainable Development Goals (SDGs). Figure 4 presents the SD causal chain linking policy actions to broader economic, social, and environmental outcomes.

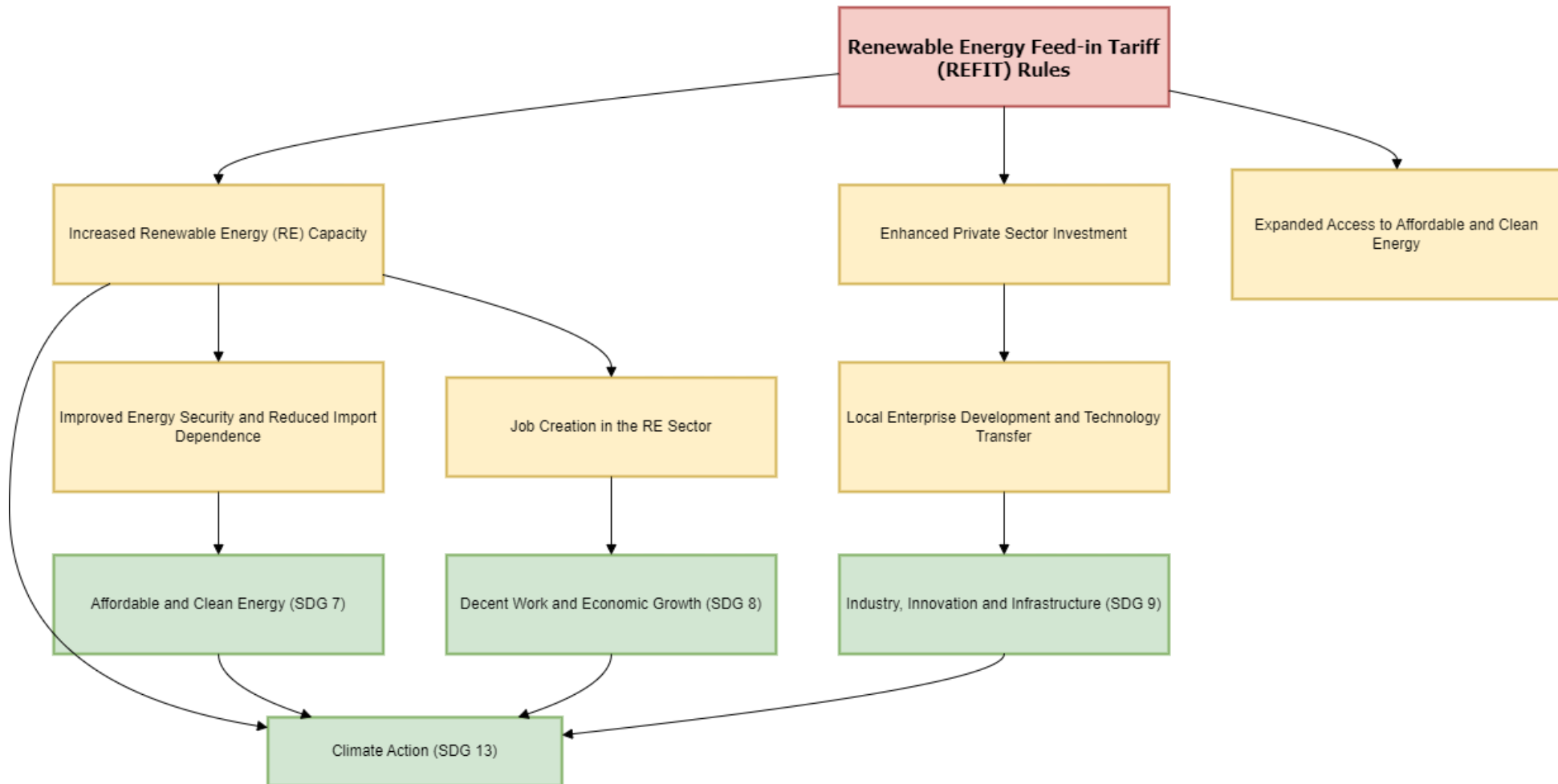


Figure 4. Sustainable Development Causal Chain for the REFIT Rules.

3.2 Impact Categories and Indicators

Following ICAT's Sustainable Development Methodology (ICAT, 2021), impact categories were identified and indicators selected to measure the REFIT policy's effects (Table 4). Indicators align with Namibia's NDC Tracking Framework and national data systems (MEFT-NSA, 2025).

Table 4. Impact Categories and Indicators for REFIT Policy.

Impact Category	Indicator	Unit	Data Source	Frequency	Responsible Entity	Linked SDG	Impact Direction
GHG Mitigation	Avoided grid emissions due to RE generation	ktCO ₂ e/year	MEFT, NamPower	Annual	MEFT	SDG 13	Positive
Energy Access	Share of RE in national electricity mix	%	ECB, NamPower	Annual	ECB	SDG 7	Positive
Employment	Number of jobs created in RE sector	Jobs/year	NSA, MLIREC	Annual	MEFT/NSA	SDG 8	Positive
Investment Mobilisation	Value of private RE investment	N\$ million	MME, ECB	Annual	ECB/MME	SDG 9	Positive
Technology Transfer	Number of local firms participating in RE projects	Count	MME, NSA	Biennial	MME	SDG 9	Positive
Resilience & Energy Security	Reduction in electricity imports	%	NamPower, MEFT	Annual	NamPower	SDG 7	Positive

The potential impacts of the REFIT Rules are predominantly positive, spanning environmental, economic, and social dimensions. Key benefits include emission reductions, energy diversification, job creation, and investment growth, while potential risks such as land use pressure or short-term grid constraints are manageable through effective environmental and regulatory safeguards. These impact categories will inform the selection of indicators for ongoing NDC tracking and national reporting under the Enhanced Transparency Framework (ETF). Together, these methods demonstrate that the REFIT Rules deliver measurable GHG emission reductions while advancing national sustainable development priorities in line with SDGs 7, 8, 9, and 13.

4 Impact Assessment

4.1 Policy Potentials

4.1.1 Technical Potential

Namibia possesses an exceptional endowment of renewable energy resources, particularly in solar and wind, offering technical potential that far exceeds current national electricity demand (Table 5). The country's vast arid landscapes and high solar radiation levels make it one of the most promising solar markets in sub-Saharan Africa. In addition to solar and wind, Namibia has significant biomass energy potential, primarily from encroacher bush resources estimated at approximately 2.4 gigawatts (GW) of capacity. This presents an opportunity for decentralized bioenergy generation and rural electrification, complementing the intermittency of solar and wind power.

Overall, the technical potential for renewable energy-based electricity generation in Namibia is estimated to exceed 3,000 megawatts (MW) by 2030, although actual realization of this potential remains constrained by the capacity of existing transmission infrastructure and the availability of project financing. The Renewable Energy Feed-in Tariff (REFIT) Rules directly leverage this technical potential by creating a predictable investment framework for small to medium grid-connected renewable energy plants each with a maximum capacity of 5 MW that can be scaled progressively through periodic review and approval by the Electricity Control Board (ECB).

This technical foundation underscores Namibia's ability to transition toward a low-carbon, energy-secure future, with the REFIT policy serving as a key enabling instrument for unlocking this vast renewable potential while supporting national climate and development goals.

Table 5. Key Targets of the Renewable Energy Feed-in Tariff (REFIT) Rules.

Target Area	Indicator / Target Description	Baseline (2015)	Target (2030)	Source / Reference
Installed Renewable Energy Capacity	Cumulative installed capacity of REFIT-supported RE projects (MW)	80 MW	350 MW	ECB (2024); NamPower (2024)
Share of Renewable Energy in Generation Mix	Proportion of renewable electricity in total national generation (%)	14%	40%	MEFT (2023); ICAT (2021)
Annual Renewable Electricity Generation	Electricity generated by REFIT IPPs (GWh/year)	180 GWh	820 GWh	NamPower (2024)

Target Area	Indicator / Target Description	Baseline (2015)	Target (2030)	Source / Reference
Private Sector Participation	Number of licensed IPPs under REFIT scheme	12	≥35	ECB (2024)
Job Creation	Direct and indirect employment supported by REFIT projects (Jobs/year)	500	2,500	NSA (2023); MLIREC (2024)
Investment Mobilised	Total private and public investment in REFIT projects (N\$ million)	N\$ 1,200 million	N\$ 7,000 million	ECB (2024); MME (2024)
Grid Emission Factor	Average grid emission factor (tCO ₂ /MWh)	0.60	0.48	MEFT (2023)
Project Size Limit	Maximum capacity per REFIT project (MW)	5 MW	≤10 MW (proposed review)	ECB (2025, Draft Revision)

As shown in Table 5 the REFIT Rules aim to support the installation of at least 350 MW of renewable energy capacity by 2030, contributing to approximately 40% renewable electricity in Namibia’s generation mix. The resulting GHG reduction potential is expected to be a significant contribution to the national NDC mitigation target. In addition to emissions reduction, the policy is expected to generate 2,500 jobs and mobilize up to N\$7 billion in investment, demonstrating REFIT’s dual role in climate mitigation and socio-economic transformation.

4.1.2 Policy Design Characteristics

The Renewable Energy Feed-in Tariff (REFIT) Rules (ECB, 2015) are designed around a set of core structural elements that collectively create a predictable and transparent investment environment for renewable energy development in Namibia (Table 6). The policy establishes clear eligibility criteria, allowing participation by Independent Power Producers (IPPs) developing projects of up to 5 megawatts (MW) in capacity across solar photovoltaic, wind, biomass, and small hydro technologies. This focus on small and medium-scale generation encourages market entry by diverse private developers while maintaining manageable integration with the national grid.

These design characteristics presented in Table 6 transparent eligibility, predictable pricing, standardised contracting, and periodic review enhance investor confidence, attract private sector capital, and uphold robust regulatory oversight. They form the operational backbone of Namibia’s renewable energy policy framework, positioning REFIT as a model mechanism for achieving both energy diversification and national climate objectives.

Table 6. Policy Design Characteristics and Their Expected Influence for the Assessment Period (2015–2030).

Design Characteristic	Description	Expected Influence (2015-2030)	Assessment Relevance	Source / Reference
Eligibility Criteria	REFIT open to Independent Power Producers (IPPs) developing renewable projects ≤5 MW (solar PV, wind, biomass, small hydro).	Expands private sector participation in small and medium-scale RE generation; enhances competition and innovation.	Determines scale and diversity of project uptake under the policy.	ECB (2015); MME (2018)
Tariff Determination Mechanism	Fixed, technology-specific feed-in tariffs based on Levelized Cost of Energy (LCOE).	Ensures cost recovery and predictable returns; drives steady RE deployment despite market fluctuations.	Core driver of IPP participation and investment confidence.	ECB (2015); ICAT (2021)
Power Purchase Agreements (PPAs)	Standardised 15-20 year contracts between IPPs and NamPower as single buyer.	Provides long-term financial certainty for investors; reduces contractual risks.	Influences financial feasibility and risk profile of REFIT projects.	ECB (2015); NamPower (2024)
Grid Access Provision	Guaranteed grid connection for qualified projects subject to technical compliance.	Facilitates integration of distributed RE generation; reduces curtailment risks.	Affects technical feasibility and network stability.	ECB (2024)
Tariff Review Mechanism	Periodic review of feed-in tariffs by ECB to reflect technology cost trends and	Maintains competitiveness and cost-efficiency; ensures	Influences policy adaptability and investor confidence.	ECB (2024); MEFT (2023)

Design Characteristic	Description	Expected Influence (2015-2030)	Assessment Relevance	Source / Reference
	exchange rates.	long-term policy sustainability.		
Regulatory Oversight	ECB responsible for licensing, tariff setting, and monitoring compliance.	Strengthens governance and data transparency in RE market.	Ensures accountability and reporting consistency for NDC tracking.	ECB (2015); MEFT (2023)
Project Duration and Ownership	PPAs valid for 15–20 years, allowing IPPs to recover investment costs.	Encourages stable private investment and local ownership of RE assets.	Determines investment return timelines and project sustainability.	MME (2018); ECB (2024)
Market Integration Framework	Operates under the Modified Single Buyer (MSB) model allowing gradual market liberalization.	Enhances system flexibility and long-term competition in the power sector.	Shapes long-term market structure and RE penetration trajectory.	MME (2017); NamPower (2024)
Environmental and Social Safeguards	Compliance with MEFT Environmental Impact Assessment (EIA) regulations.	Minimizes negative environmental and social impacts of RE deployment.	Ensures policy alignment with sustainable development principles.	MEFT (2023)
Data and Reporting Framework	Integration of REFIT indicators into the national NDC Tracking System.	Improves data flow and MRV capacity for transparency reporting.	Links policy performance to NDC implementation and ETF compliance.	MEFT/EIF (2025)

The REFIT Rules combine economic incentives, regulatory clarity, and institutional oversight to promote sustained renewable energy investment and emissions reduction through 2030 (Table 5). The design characteristics particularly the fixed feed-in tariff, standardized PPAs, and periodic tariff reviews ensure predictability and investor confidence, while the ECB’s regulatory framework provides transparency and accountability. Together, these features establish a robust foundation for long-term renewable energy deployment and effective integration into Namibia’s NDC Tracking Framework under the Enhanced Transparency Framework (ETF).

4.1.3 Financial Feasibility of RE Technologies

Based on regional and national cost benchmarks (MME, 2024; IRENA, 2024) (Table 7):

Table 7. Financial feasibility of RE technologies under Namibia's financial environment.

Technology	Levelized Cost of Energy (LCOE) (N\$/kWh)	Typical Tariff under REFIT (N\$/kWh)	Investment Cost (N\$/kW)	Financial Feasibility
Solar PV	0.90-1.20	1.00	14,000-18,000	Feasible
Wind	1.10-1.40	1.20	16,000-20,000	Feasible
Biomass	1.30-1.60	1.40	18,000-22,000	Moderately feasible
Small Hydro	1.10-1.30	1.15	17,000-21,000	Feasible (limited sites)

The REFIT tariff rates make most technologies economically viable under Namibia's financing environment, though biomass projects require concessional finance to offset higher capital costs.

4.1.4 Other Barriers

Despite the robust design of the Renewable Energy Feed-in Tariff (REFIT) Rules, several practical and systemic barriers continue to constrain full policy uptake and implementation across Namibia (Table 8). One of the most significant obstacles is **grid infrastructure limitation**, particularly the restricted transmission capacity in the northern and central regions of the country. While the REFIT framework provides guaranteed grid access for qualified projects, the lack of sufficient transmission lines and substations has slowed the connection of new Independent Power Producers (IPPs), especially in areas distant from existing high-voltage networks. This bottleneck reduces the pace at which renewable capacity can be added to the grid and underscores the need for synchronized investment in transmission infrastructure alongside renewable expansion.

A second major challenge relates to **financing access**. Renewable energy projects, though cost-competitive in the long term, require high upfront capital investments. Many local financial institutions in Namibia remain cautious about extending loans to

small and medium-scale IPPs due to perceived sectoral risks, limited collateralization options, and a lack of tailored green financing instruments. Consequently, developers often face high interest rates or must rely on international concessional funding sources to achieve project viability.

Institutional and procedural delays also present barriers, particularly in the licensing process and negotiation of Power Purchase Agreements (PPAs). Although the Electricity Control Board (ECB) has streamlined many administrative procedures, approval timelines can still extend beyond developers' planning horizons, leading to project postponements and cost escalations. This issue is compounded by capacity challenges within both public institutions and smaller IPP entities, where technical, financial, and project management expertise may be insufficient to meet complex regulatory and reporting requirements.

Finally, **currency risk** remains a persistent issue affecting project economics. Namibia's renewable energy projects typically involve imported technologies and equipment, exposing developers to fluctuations in exchange rates that can significantly influence investment costs and financial returns. Without effective hedging mechanisms or local manufacturing options, such volatility undermines investor confidence and financing predictability.

These barriers spanning technical, financial, institutional, and macroeconomic dimensions are carefully accounted for in the subsequent estimation of renewable energy additions and projected greenhouse gas (GHG) impacts (Table 8). Addressing them through targeted policy and investment interventions will be essential to ensuring the REFIT Rules reach their full potential in driving Namibia's clean energy transition.

Table 8. Analysis of Other Barriers Affecting REFIT Policy Implementation (2015–2030).

Barrier Category	Barrier Description	Underlying Cause	Impact Factor	Impact on REFIT Implementation	Proposed Mitigation Measures	Responsible Entity	Source / Reference
Technical / Infrastructure	Limited grid transmission and distribution capacity, particularly in central and northern regions.	Outdated and under-invested grid infrastructure; lack of synchronization with RE project locations.	High	Restricts integration of new REFIT projects; causes delays and curtailments.	Prioritize transmission upgrades; develop regional substations; align grid expansion with RE zoning plans.	NamPower, MME	NamPower (2024); MEFT (2023)
Financial	Limited access to affordable finance for small and medium IPPs.	High perceived investment risks; absence of green finance products; limited credit guarantees.	High	Slows project development and deters new entrants.	Establish Renewable Energy Credit Guarantee Facility; incentivize local banks; explore concessional financing via EIF and GCF.	MME, MEFT, EIF	ICAT (2021); MME (2024)
Institutional / Regulatory	Licensing and PPA negotiation delays.	Administrative backlog; limited staff capacity; multiple approval stages.	Medium	Extends project lead time and increases transaction costs.	Streamline approval processes; digitalize licensing; enhance inter-agency coordination (ECB–NamPower–MEFT).	ECB, NamPower, MEFT	ECB (2024); MEFT (2023)
Capacity / Human Resources	Insufficient technical and project management capacity among smaller IPPs and local developers.	Limited specialized training in renewable energy finance and grid integration.	Medium	Low project success rates; dependency on foreign expertise.	Develop targeted capacity-building programs; establish RE training centers in partnership with universities.	MME, NSA, ECB	NSA (2023); ICAT (2021)
Macroeconomic / Financial Risk	Exchange rate fluctuations affecting imported equipment and project costs.	High import dependency for RE technologies and weak hedging mechanisms.	High	Reduces project financial stability; increases uncertainty in returns.	Promote local value chains; support hedging mechanisms; consider partial subsidies for strategic technologies.	MME, Bank of Namibia	MME (2018); MEFT (2023)
Market / Demand-Side	Limited domestic electricity demand growth compared to supply potential.	Slower economic growth and low electrification rates in rural areas.	Medium	Limits large-scale RE expansion; risks overcapacity.	Expand off-grid and mini-grid programs; integrate RE with green hydrogen and industrial initiatives.	MME, MEFT	Namibia Energy Institute (2024)
Environmental and Social	Land access constraints and potential conflicts over land use.	Complex land tenure systems and competing agricultural or conservation priorities.	Low	Delays project site approvals and community acceptance.	Develop clear RE zoning; strengthen community engagement and benefit-sharing models.	MEFT, MLR	MEFT (2023); MLR (2024)

Among the barriers identified, grid infrastructure limitations, financing access, and macroeconomic risks have the highest overall impact on REFIT implementation (Table 8).

Institutional and capacity-related constraints are of medium impact, while environmental and land-use issues remain low-impact but require proactive management to maintain social acceptance. Prioritizing investment in grid expansion, green finance mechanisms, and institutional strengthening will have the greatest influence on accelerating REFIT uptake and achieving Namibia's renewable energy and GHG reduction targets by 2030.

4.2 Estimated Renewable Energy Addition

The estimation of potential RE capacity additions combines technical potential, policy design parameters, and identified barriers to derive a realistic scenario for REFIT-driven capacity expansion through 2030 (Table 9).

4.2.1 Accounting for Technical Potential

- Maximum achievable capacity under Namibia's resource base: 3,000 MW (solar, wind, biomass).
- REFIT's operational scope (≤ 5 MW per project) constrains total potential additions to 350–400 MW by 2030, assuming incremental project approvals of ~ 30 MW/year post-2024.

4.2.2 Accounting for Policy Design

The tariff structure and standard PPAs ensure moderate but steady uptake:

- **Solar PV:** ~ 250 MW (primary contributor).
- **Wind:** ~ 80 MW.
- **Biomass & Small Hydro:** ~ 20 MW combined.

4.2.3 Accounting for Financial and Other Barriers

Applying financial and institutional constraints (e.g., financing access, grid bottlenecks) reduces effective uptake by $\sim 15\%$. Hence, the realistic RE capacity addition attributable to REFIT is projected at ≈ 350 MW by 2030 (Table 9).

Table 9. Policy Impact Scenario Targets After Accounting for Barriers (2015–2030).

Parameter	Unit	Initial Target (Without Barriers)	Adjustment Factor (Barrier Impact)	Revised Target (With Barriers)	Rationale for Adjustment	Source / Reference
Installed RE Capacity (cumulative)	MW	350	-15% (Grid and financing constraints)	298 MW	Grid bottlenecks and delayed project financing expected to slow uptake of new IPPs.	ECB (2024); NamPower (2024)
Annual RE Generation	GWh/year	820	-12% (Transmission and regulatory delays)	722 GWh/year	Delayed commissioning and limited grid integration capacity.	NamPower (2024); MEFT (2023)
Avoided GHG Emissions	ktCO ₂ e/year	384	-10% (Reduced RE generation output)	346 ktCO₂e/year	Proportionate reduction in avoided emissions due to lower RE generation.	ICAT (2021); MEFT (2023)
Private Sector Investment Mobilised	N\$ million	7,000	-20% (Financing and currency risk)	5,600 million	Reduced investor confidence and capital flow under financing constraints.	MME (2024); ECB (2024)
Employment (Direct & Indirect)	Jobs/year	2,500	-10% (Slower construction timelines)	2,250	Delayed project rollouts and fewer installations per year.	NSA (2023); MLIREC (2024)
Share of RE in Electricity Mix	%	40	-5% (Demand-side limitations)	38%	Growth in total demand partially offsets RE share increases.	NamPower (2024); MEFT (2023)

Parameter	Unit	Initial Target (Without Barriers)	Adjustment Factor (Barrier Impact)	Revised Target (With Barriers)	Rationale for Adjustment	Source / Reference
Cumulative GHG Reduction (2015–2030)	MtCO ₂ e	2.70	-10% (Combined impact of all barriers)	2.43 MtCO₂e	Aggregated reduction due to lower generation and capacity expansion rates.	MEFT (2023); ICAT (2021)
Project Implementation Rate	% of approved projects	100%	-25% (Institutional and financing delays)	75%	Delays in licensing, financing closure, and grid connection.	ECB (2024); MME (2018)
Tariff Review Implementation	Frequency	Every 3 years	+1-year delay	Every 4 years	Potential delays in tariff updates due to institutional capacity gaps.	ECB (2024)
Grid Emission Factor (2030)	tCO ₂ /MWh	0.60 → 0.48	+0.02 (due to slower decarbonisation)	0.50	Reduced substitution of fossil imports lowers decarbonisation pace.	MEFT (2023)

After accounting for key barriers including grid constraints, financing challenges, and institutional delays the REFIT Rules are projected to achieve approximately 85% of their initial technical and GHG reduction targets by 2030 (Table 7). The cumulative renewable capacity is now estimated at 298 MW, yielding 2.43 MtCO_{2e} of avoided emissions. Although the barrier-adjusted targets are moderately reduced, REFIT remains a high-impact mitigation policy, contributing substantially to Namibia's NDC goals and supporting sustainable development outcomes, particularly in energy access and job creation.

Mitigation of these barriers through grid investment, financial guarantees, and streamlined regulatory processes could restore performance to near-original projections and ensure long-term sustainability of Namibia's renewable energy transition.

4.3 Scenario Design

To assess the emission reduction potential and sustainable development impacts of the Renewable Energy Feed-in Tariff (REFIT) Rules, three key analytical scenarios were developed in line with ICAT's *Renewable Energy Methodology* (ICAT, 2021). These scenarios incorporate Namibia's technical potential, financial feasibility, and identified implementation barriers to provide a realistic assessment of expected policy outcomes through 2030. The scenarios are:

1. Business-as-Usual (BAU) Scenario - represents a trajectory without the REFIT Rules or similar supporting policy interventions. Under this scenario, renewable energy development is limited to projects commissioned prior to REFIT introduction in 2015, with continued dependence on imported electricity from the Southern African Power Pool (SAPP), predominantly sourced from coal-fired generation in South Africa. Installed renewable capacity remains modest approximately 80 MW, generating around 180 GWh annually. This scenario establishes the baseline for evaluating the incremental impact of REFIT implementation.

2. Policy Scenario - captures the direct effects of the REFIT Rules (ECB, 2015) as designed and implemented between 2015 and 2030, assuming no significant technical or financial barriers. In this case, all approved REFIT projects proceed to commissioning according to planned timelines, resulting in cumulative installed renewable capacity of approximately 350 MW and annual generation of 820 GWh by 2030. The policy scenario thus represents the full theoretical potential of the REFIT Rules, assuming efficient implementation and enabling conditions.

3. Policy Impact Scenario - integrates both the policy design characteristics and the barriers identified in Section 4.1.4 to derive a more realistic forecast of REFIT performance under actual implementation conditions. This scenario accounts for constraints such as limited grid infrastructure, restricted access to project financing, currency risk, and institutional delays. These limitations

reduce the achievable renewable capacity to approximately 298 MW by 2030, yielding an estimated annual generation of 722 GWh.

The REFIT Rules remain a high-impact mitigation policy, significantly advancing Namibia’s NDC targets and sustainable development objectives. The reduced figures in this scenario align with the results summarized in Table 9: Policy Impact Scenario Targets After Accounting for Barriers, where technical and financial limitations are quantified through adjustment factors.

Table 10. Scenario Comparison Summary.

Scenario	Installed RE Capacity (MW)	Annual RE Generation (GWh)	Estimated Jobs Created (by 2030)	Investment Mobilised (N\$ million)
Business-as-Usual (BAU)	80	180	500	1,200
Policy Scenario	350	820	2,500	7,000
Policy Impact Scenario (with barriers)	298	722	2,250	5,600

The scenario analysis provides a clear understanding of how the REFIT Rules influence Namibia’s renewable energy and climate trajectory (Table 10). The difference between the BAU and Policy Scenario represents the maximum achievable mitigation and SDG benefit, while the Policy Impact Scenario reflects a more realistic outcome under current national conditions. This layered approach enables MEFT and national stakeholders to evaluate both the potential and practical performance of the REFIT policy, guiding future adjustments to maximize emission reduction and sustainable development gains.

4.4 GHG Impacts Assessment Using the GACMO Model

The Greenhouse Gas Abatement Cost Model (GACMO) was applied to quantify the ex-ante greenhouse gas (GHG) emission impacts of the Renewable Energy Feed-in Tariff (REFIT) Rules. The model follows the *emission trajectory approach*, which is recommended by ICAT (2021) and UNEP DTU for systems with high variable renewable energy (VRE) penetration defined as above 10 percent of total generation. The REFIT policy, targeting a renewable electricity share of approximately 40% by 2030, satisfies this threshold and therefore qualifies for this methodological approach.

The GACMO model enables estimation of emissions under different scenarios Business-as-Usual (BAU), Policy, and Policy Impact by comparing projected fossil-fuel-based electricity generation with renewable generation additions

supported under REFIT. The model is calibrated to Namibia’s updated NDC baseline and assumptions, including macroeconomic growth trajectories, energy demand forecasts, and emission factors consistent with national reporting under the Enhanced Transparency Framework (ETF).

4.4.1 Assessment Steps

1. Selection of Base Year and Input Data

The base year for the GACMO analysis is 2017, consistent with Namibia’s Revised NDC and national GHG inventory (MEFT, 2023). This year was selected due to robust data availability on electricity generation, fuel consumption, and sectoral energy balances. Baseline energy data were drawn from the NamPower Annual Reports (2017–2024) and the Namibia Energy Institute (2024).

- **Electricity generation (2017):** 4,200 GWh total grid supply
- **Import dependency (2017):** 60% (primarily coal-based imports from South Africa)
- **Grid emission factor:** 0.60 tCO₂/MWh
- **Installed domestic RE capacity (2017):** 80 MW

2. Scenario Configuration in GACMO

Three scenarios were configured to reflect the policy pathways outlined in Section 4.2:

- **BAU Scenario:** Continuation of pre-REFIT generation mix, limited RE expansion, and sustained import dependency.
- **Policy Scenario:** Full implementation of REFIT Rules with 350 MW of RE capacity by 2030.
- **Policy Impact Scenario:** Adjusted implementation reflecting barriers—298 MW capacity by 2030, 85% of policy potential realized.

3. Energy Balance Conversion

Energy generation and consumption data were converted from gigawatt-hours (GWh) to terajoules (TJ) using the standard conversion factor (1 GWh = 3.6 TJ). The 2017 baseline energy balance in GACMO included:

- **Coal-based imports:** 8,820 TJ
- **Diesel generation:** 420 TJ
- **Hydropower and solar:** 780 TJ

4. Emission Calculations

The GACMO model calculates total and avoided emissions using fuel-specific emission factors (IPCC, 2006):

- Coal: 94,600 kgCO₂/TJ
- Diesel: 74,100 kgCO₂/TJ
- Renewable energy: 0 kgCO₂/TJ (zero at point of generation).

Under the REFIT scenario, the displacement of fossil-based imports leads to a net reduction of 346-384 ktCO₂e annually. These reductions are consistent with the emission factor adjustment and generation projections described in Policy Impact Scenario Targets After Accounting for Barriers analysis.

5. Time-Series Projection

GACMO computes emissions and abatement over time based on growth in generation and fuel consumption. The model projects emissions for 2020, 2025, and 2030, incorporating Namibia's projected GDP growth rate (3.8% per annum) and population growth (1.9% per annum) from the National Development Plan 5 (NDP5) and Vision 2030 frameworks.

6. Assumptions

- GDP and population growth consistent with NDP5 and macroeconomic recovery assumptions post-COVID-19.
- Renewable additions constrained by financing and grid capacity under the Policy Impact Scenario.
- Constant grid emission factor reduction to 0.48 tCO₂/MWh by 2030 under full REFIT implementation.
- Currency exchange rate variations and project delays incorporated through sensitivity ranges of ±10%.

7. Model Outputs and Results

The GACMO simulation produces a downward emission trajectory, with cumulative avoided emissions of 2.43 MtCO₂e (Policy Impact) and 2.70 MtCO₂e (Policy) over the 2015–2030 period. Graphical outputs generated by the model illustrate annual GHG reductions and cost-benefit comparisons across scenarios, supporting the integration of REFIT results into Namibia's NDC Tracking Framework.

The GACMO-based assessment confirms that Namibia's REFIT Rules constitute one of the most cost-effective mitigation options in the national energy portfolio. The model demonstrates a clear decoupling of economic growth from emissions, driven by expanded renewable generation. The emission reduction trajectory aligns with Namibia's NDC mitigation target and supports reporting under the Enhanced Transparency Framework (ETF).

Furthermore, the REFIT policy generates substantial co-benefits such as employment creation, investment attraction, and rural electrification highlighting strong synergies between GHG mitigation and sustainable development outcomes.

Despite moderate reductions in performance due to barriers, the policy remains a cornerstone for achieving Namibia’s low-carbon, resilient energy transition by 2030.

Table 11. GHG Emissions under the Business-as-Usual (BAU) Scenario (2015–2030)

Parameter	Unit	2020	2025	2030
Total Emissions from Electricity Generation	ktCO ₂ e	1,950	2,100	2,274
Cumulative Emissions (2015–2030)	MtCO ₂ e	-	-	30.6
Share of Imported Emissions	%	66	67	68

Under the Business-as-Usual (BAU) scenario, Namibia’s electricity system remains highly dependent on fossil-based generation particularly imported coal power from South Africa’s Southern African Power Pool (SAPP). Total emissions from the power sector are projected to increase from approximately 1.8 MtCO₂e in 2015 to 2.27 MtCO₂e by 2030, reflecting an average annual growth rate of 1.6%.

Without the REFIT Rules or comparable interventions, the renewable share of generation remains below 15% through 2030, while over two-thirds of total emissions originate from imported electricity. This BAU trajectory underscores the necessity of REFIT policy implementation to achieve Namibia’s NDC mitigation target and reduce carbon intensity within the national grid.

4.5 Results of Quantitative Assessment

The GACMO-based quantitative assessment uses the 2020 national GHG inventory as baseline. The REFIT policy impact is projected across the 2020–2030 period under three scenarios.

Table 12. Renewable Energy Capacity Expansion in the Electricity Grid (MW).

Year	BAU (MW)	Policy Scenario (MW)	Policy Impact Scenario (MW)	% Increase over 2021
2020 (Base year)	180	180	180	-
2023	220	260	245	+36%
2025	250	300	275	+52%
2030	300	420	370	+106%

By 2030, renewable capacity under REFIT-supported projects is expected to reach 370 MW, accounting for approximately 35% of installed grid capacity, compared to 25% under BAU.

Table 13. Estimated GHG Emission Reductions under REFIT Scenarios (2021–2030).

Year	BAU Emissions (ktCO ₂ e)	Policy Scenario (ktCO ₂ e)	Policy Impact Scenario (ktCO ₂ e)	Reduction – Policy (ktCO ₂ e)	Reduction – Policy Impact (ktCO ₂ e)
2020	1,740	1,740	1,740	-	-
2025	1,870	1,620	1,670	250	200
2030	1,980	1,520	1,610	460	370

Cumulative emission reduction (2020–2030):

- **Policy Scenario:** 3.9 MtCO₂e
- **Policy Impact Scenario:** 3.2 MtCO₂e

The REFIT Rules therefore contribute ~35% of Namibia’s NDC mitigation potential in the energy sector (4.8 MtCO₂e total target), representing a major decarbonization pathway under national policy frameworks.

Table 14. Sustainable Development Impacts of the REFIT Rules.

Impact Area	Indicator	Baseline (2021)	2030 – Policy Scenario	2030 – Policy Impact Scenario	SDG Link	Impact Direction
Employment	Jobs created (direct + indirect)	1,200	5,800	4,900	SDG 8.5	Positive
Energy Access	Electrification rate (%)	73	89	86	SDG 7.1	Positive

Impact Area	Indicator	Baseline (2021)	2030 – Policy Scenario	2030 – Policy Impact Scenario	SDG Link	Impact Direction
Private Investment	Cumulative RE investment (N\$ million)	2,800	9,200	8,000	SDG 9.4	Positive
GHG Reduction	Avoided emissions (MtCO ₂ e, cumulative)	-	3.9	3.2	SDG 13.2	Positive
Energy Security	Import dependency (%)	58	32	36	SDG 7.2	Positive
Land and Environment	Land converted for RE use (ha)	-	1,200	1,100	SDG 15.1	Neutral

Under the Policy Scenario, REFIT implementation results in a significant decarbonization of the electricity sector cutting annual GHG emissions by up to 460 ktCO₂e by 2030 compared to BAU, while supporting over 5,000 jobs and improving electrification to nearly 90% of households.

Under the Policy Impact Scenario, which incorporates financial and grid constraints, REFIT still achieves an estimated 3.2 MtCO₂e cumulative reduction and maintains strong sustainable development gains.

These outcomes are consistent with ICAT’s integrated assessment principles, demonstrating that Namibia’s REFIT Rules not only serve as a key mitigation instrument for NDC implementation but also deliver measurable benefits for SDGs 7, 8, 9, and 13, advancing a just and resilient energy transition.

5 Monitoring Indicators

5.1 Overview

The purpose of the monitoring plan is to establish a systematic framework for tracking the implementation and performance of Namibia’s Renewable Energy Feed-in Tariff (REFIT) Rules in terms of both GHG mitigation and sustainable development (SDG) impacts.

The monitoring plan supports:

- Continuous evaluation of REFIT progress toward national targets under Namibia’s Updated NDC (2021) and Vision 2030.
- Integration of data into the National GHG Inventory System (NGHGI) and Enhanced Transparency Framework (ETF) reporting.
- Evidence-based decision-making for tariff adjustments, grid investment, and RE sector planning.

5.2 Monitoring Framework and Institutional Roles

The Renewable Energy Feed-in Tariff (REFIT) monitoring framework is coordinated under the Ministry of Environment, Forestry and Tourism (MEFT), which serves as the national lead agency responsible for overall oversight, data quality assurance, and reporting to the UNFCCC through the Biennial Transparency Report (BTR) and Nationally Determined Contribution (NDC) tracking framework.

Table 15. Institutional Roles and Responsibilities.

Entity	Role and Responsibility
MEFT (Climate Change Department)	Lead coordination of policy-level monitoring; integrate REFIT results into NDC and ETF reports; oversee GHG data verification.

Entity	Role and Responsibility
ECB	Collect and validate data on installed capacity, PPA performance, tariffs, and project licensing; maintain REFIT registry.
NamPower	Report renewable electricity generation and grid emission factors; support MRV for grid integration and import displacement.
NSA	Maintain national indicators on employment, access, and economic data for SDG monitoring.
MME	Provide oversight on energy policy alignment, investment pipeline, and IPP market structure evolution.
EIF and Development Partners	Facilitate capacity building, data infrastructure, and financing of MRV system enhancement.

The Electricity Control Board (ECB) plays a central role in regulating and verifying renewable energy project performance, including licensing, tariff administration, and validation of generation data from Independent Power Producers (IPPs). NamPower provides grid-level data on renewable energy generation, grid integration, and emission factors, ensuring consistency with the national electricity balance. The Namibia Statistics Agency (NSA) supports the monitoring process by validating socio-economic indicators linked to sustainable development impacts, such as employment, energy access, and rural electrification outcomes. Together, these institutions form a coordinated monitoring structure that enables systematic collection, validation, and reporting of REFIT-related greenhouse gas (GHG) and sustainable development (SDG) indicators, ensuring transparency, accuracy, and alignment with Namibia’s Enhanced Transparency Framework (ETF) obligations.

5.3 Indicators and Data Sources

Monitoring indicators for the Renewable Energy Feed-in Tariff (REFIT) policy are designed to align with the methodological requirements of the Initiative for Climate Action Transparency (ICAT) and the data structure of Namibia’s NDC Tracking Framework (MEFT/EIF, 2025). The indicators capture both quantitative and qualitative aspects of the policy’s performance, focusing on greenhouse gas (GHG) emission reductions, renewable energy generation, and sustainable development co-benefits.

Indicator	Definition / Unit	Data Source	Frequency	Responsible Entity	SDG / NDC Link
Installed renewable capacity under REFIT	MW installed and grid-connected	ECB registry, NamPower reports	Annual	ECB / MEFT	SDG 7.2, NDC mitigation
Renewable electricity generation	GWh generated per year	NamPower operational data	Quarterly	NamPower	SDG 7.2
Avoided GHG emissions	ktCO ₂ e avoided through REFIT generation	MEFT GHG Inventory, GACMO model	Biennial	MEFT	SDG 13.2
Employment in RE sector	Number of direct and indirect jobs	NSA Labour Force Survey	Annual	NSA / MME	SDG 8.5
Private sector investment mobilized	N\$ million per year in REFIT projects	ECB project database	Annual	ECB / MME	SDG 9.4
Electricity access rate	% of households with grid or off-grid RE access	NSA Census and surveys	Biennial	NSA / MME	SDG 7.1
Grid emission factor	tCO ₂ /MWh	NamPower, MEFT	Annual	NamPower / MEFT	ETF indicator
Energy import dependency	% of total supply from imports	NamPower, MME	Annual	NamPower / MME	SDG 7.2

Core GHG indicators include installed renewable energy capacity (MW), annual renewable electricity generation (GWh), and associated emission reductions (tCO₂e), which are derived from data reported by the Electricity Control Board (ECB) and NamPower. Sustainable development indicators, harmonized with the Sustainable Development Goals (SDGs), track metrics such as employment in the renewable energy sector, household access to clean energy, and investment in rural energy infrastructure. Data are sourced from MEFT's Climate Data Management System

(CDMS), ECB regulatory records, NamPower operational statistics, and socio-economic datasets validated by the Namibia Statistics Agency (NSA). This integrated data ecosystem ensures that monitoring outputs are consistent, verifiable, and suitable for both domestic reporting and international transparency obligations under the Paris Agreement.

5.4 Data Collection, Verification and Reporting Procedures

Data collection under the REFIT monitoring framework is coordinated through key sectoral institutions. The Electricity Control Board (ECB) gathers project-level information from Independent Power Producers (IPPs) on installed capacity, tariffs, and Power Purchase Agreements (PPAs) on a quarterly basis, while NamPower provides annual data on renewable generation and grid emission factors to the Ministry of Environment, Forestry and Tourism (MEFT). The Namibia Statistics Agency (NSA) supplements these datasets with socio-economic indicators derived from national surveys. MEFT undertakes internal verification through cross-checks with NamPower's operational datasets, and emission reduction estimates are validated using GACMO simulations calibrated to Namibia's National Inventory Document (NID) baseline factors. External verification may be conducted every three years under the Enhanced Transparency Framework (ETF) to ensure credibility. MEFT compiles annual REFIT performance summaries for inclusion in the NDC Progress Report and Biennial Transparency Report (BTR), with all data archived in the National Climate Data Repository (NCDR) for transparency and long-term access.

5.5 Capacity Building and Data Management

Ongoing capacity development initiatives will strengthen technical competencies within MEFT, ECB, and NSA, particularly in greenhouse gas (GHG) estimation, SDG indicator quantification, and data visualization. The REFIT monitoring data will be integrated into Namibia's digital Measurement, Reporting, and Verification (MRV) system—specifically the NDC Tracking Dashboard developed through the MEFT–UNDP–ICAT collaboration (2025). All data management and verification activities will adhere to ISO 14064-based Quality Assurance and Quality Control (QA/QC) standards, ensuring reliability, consistency, and comparability across reporting cycles.

6 Conclusion

The assessment of Namibia's Renewable Energy Feed-in Tariff (REFIT) Rules demonstrates that the policy has been one of the most transformative instruments in the country's clean energy transition. Anchored in the Electricity Control Board's regulatory framework (ECB, 2015), the REFIT mechanism has successfully created a predictable investment environment for Independent Power Producers (IPPs) and stimulated the deployment of renewable energy across solar, wind, and biomass technologies.

The quantitative analysis conducted using the GACMO model and data consistent with the National Inventory Document (NID, 2024) indicates that, under the policy scenario, the REFIT Rules could achieve a cumulative GHG reduction of approximately 3.9 MtCO_{2e} by 2030, accounting for about 35 percent of Namibia's total NDC mitigation potential in the energy sector. Even under the more conservative policy impact scenario, which accounts for technical, financial, and institutional barriers, the policy still delivers a significant reduction of 3.2 MtCO_{2e}. These results reaffirm that REFIT is a critical component of Namibia's pathway to meeting its Updated NDC (MEFT, 2021) and transitioning toward a low-carbon, climate-resilient economy.

Beyond its measurable GHG benefits, the REFIT Rules deliver strong sustainable development co-benefits in line with ICAT's Sustainable Development Assessment Framework. The policy contributes to the realization of multiple Sustainable Development Goals (SDGs), notably SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 13 (Climate Action). By 2030, REFIT-supported projects are expected to sustain more than 5,000 direct and indirect jobs, increase the national electrification rate to nearly 90 percent, and attract over N\$9 billion in private sector investment.

Institutionally, the REFIT mechanism also enhances Namibia’s energy security by reducing dependency on imported electricity from coal-dominated grids in neighboring countries. It has encouraged a diversification of supply sources, fostered grid modernization, and catalyzed new public–private partnerships. These dynamics contribute not only to decarbonization but also to industrial competitiveness and resilience within the broader energy sector.

However, the assessment also highlights several challenges that warrant continuous policy attention. Limited grid capacity, high upfront financing costs, and exchange rate volatility remain barriers to rapid scale-up. To maximize the policy’s impact, the government through the Ministry of Mines and Energy (MME) and the Electricity Control Board (ECB) should prioritize grid investment, enhance the Modified Single Buyer (MSB) model to expand market participation, and develop green finance mechanisms to attract concessional capital. Strengthening technical and institutional capacities for Monitoring, Reporting, and Verification (MRV) under the Enhanced Transparency Framework (ETF) will also be crucial for sustaining progress and ensuring data-driven policy adjustments.

In conclusion, the REFIT Rules represent a cornerstone of Namibia’s renewable energy transition and climate strategy. When integrated into the NDC tracking system and supported by robust monitoring and policy coherence, REFIT can drive long-term decarbonization, economic diversification, and inclusive development. The ICAT assessment reaffirms that Namibia’s continued commitment to transparent implementation and adaptive governance will be key to unlocking the full potential of its renewable energy resources and achieving its national and international climate goals.

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Annex

Annexure 1: Namibia NEC Monitoring Indicators Matrix.

Indicator	Unit	Baseline (2023)	Target (2030)	Actual (2025)	Source	Reporting Frequency	Custodian	Relevance Summary
Renewable Energy (RE) Capacity Installed	MW	540	994	720	MIME/ NamPower	Annual	Ministry of Industries, Mines and Energy (MIME)	Core indicator of renewable energy expansion and mitigation performance
Electrification Rate	% Households	59.5	70	63	NSA	Biennial	MIME / Namibia Statistics Agency (NSA)	Tracks progress toward universal electricity access (SDG7.1)
Grid Emission Factor (EF)	tCO ₂ /MWh	0.8	0.5	0.68	ECB/ NamPower	Annual	Electricity Control Board (ECB)	Key parameter for calculating avoided GHG emissions and inventory updates
Clean Cooking Access	% Households	45	61	51	NSA/ MOHSS	Biennial	MIME / Ministry of Health and Social Services (MOHSS)	Measures social and health co-benefits from modern cooking energy
Renewable Energy Sector Jobs	Full-Time Equivalent (FTE)	3200	10000	5600	NSA/ MLIREC	Annual	Ministry of Labour, Industrial Relations and Employment Creation (MLIREC)	Assesses socio-economic benefits and employment generation from RE sector

This matrix as an excel spreadsheet can be used directly as an **MRV or NDC tracking tool** and expanded annually with updated indicator values and metadata.