



GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: FULL SIZED PROJECT

TYPE OF TRUST FUND: GEF TRUST FUND

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PART I: PROJECT INFORMATION

Project Title:	Improving Nigeria's Industrial Energy Performance and Resource Efficient Cleaner Production through Programmatic Approaches and the Promotion of Innovation in Clean Technology Solutions		
Country(ies):	Federal Republic of Nigeria	GEF Project ID: ¹	9741
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	160283
Other Executing Partner(s):	Federal Ministry of Industry, Trade and Investment (FMITI), Federal Ministry of Environment (FMoE), Federal Ministry of Power (FMoP), Energy Commission of Nigeria (ECN), Manufacturing Association of Nigeria (MAN)	Submission Date:	12/23/2016
		Resubmission Date:	03/24/2017
		Resubmission Date:	06/06/2017
GEF Focal Area(s):	Climate Change	Project Duration (Months)	48
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>	Corporate Program: SGP	<input type="checkbox"/>
Name of parent program:	[if applicable]	Agency Fee (\$)	370,335

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
CCM-1 Program 1	GEFTF	3,898,265	22,000,000
Total Project Cost		3,898,265	22,000,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To accelerate the adoption of industrial energy efficiency (IEE) and to improve enterprise environmental performance under the wider umbrella of Resource Efficiency and Cleaner Production (RECP) best practices and innovative approaches within selected small, medium and large scale industrial enterprises in Nigeria.

Project Components	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
1.0. Strengthening of national industrial and environmental policies and regulatory frameworks for IEE and environmental management standards.	TA	1.1. Improved Government knowledge base for strengthened national policy & regulatory environments in regard to Industrial Energy Efficiency (IEE) and Resource Efficient and Cleaner Production (RECP).	1.1.1. National industrial, energy and environmental policies and regulations reviewed with recommendation formulation. 1.1.2. Mapping of industrial energy usage and waste hotspot(s) carried out (with a database of industrial highly energy intensive, resource consuming and waste producing enterprises developed).	GEFTF	456,000	2,000,000

¹ Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

² When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#) and [CBIT guidelines](#).

³ Financing type can be either investment or technical assistance.

			1.1.3. Government capacity building programme initiated with a focus on promoting and strengthening capacity in policy/regulation formulation, performance monitoring as well as enforcement mechanisms for environmental and industrial regulations			
		1.2. International management standards' functionality improved through enhanced national ISO 50001 series & ISO 14000 series accreditation and certification capacity.	1.2.1. Standard Accreditation and Certification capacity building programme on ISO50001 and ISO14000 (ISO14001 & ISO14004) implemented.			
2.0. Modular IEE EnMS/ESO and RECP Industrial Enterprise and Engineering Consultancy Base Training and Capacity Building Programme.	TA	2.1. The capacity of the Nigerian industrial sector and the industrial consulting base is strengthened in regard to the, EnMS/ESO and RECP methodologies within a sustainable framework that supports long-term competency development and the delivery of technical assistance on, EnMS/ESO and RECP to industrial enterprises.	2.1.1. EnMS, ESO technical training methodologies/ courses adapted to current national realities/needs (incl. all support, resource packages, toolkits and learning materials) and delivered to 300 designated staff/employees of selected enterprises of Nigeria's industrial and manufacturing sector. 2.1.2. RECP technical training methodologies/ courses adapted to current national realities/needs (incl. all support, resource packages, toolkits and learning materials) and delivered to 200 designated staff/employees of selected enterprises of Nigeria's industrial and manufacturing sector.	GEFTF	1,168,000	3,400,000
		2.2. Strengthened internal capacity of selected and expanded Nigerian EnMS/ESO/RECP training centre/project host in order to provide and coordinate EnMS/ESO/RECP training and related implementation	2.2.1. Project host/centre internal programme of EnMS, ESO & RECP capacity building (as well as teacher training where appropriate) strengthened to ensure internalization and embedding for long-term ownership.			

		technical assistance to Nigerian enterprises on a long-term and ultimately commercially sustainable basis.	2.2.2. EnMS / ESO / RECP business planning and corporate strategy training for the national Project Host/centre to ensure long-term provision of EnMS/ESO/RECP training and technical assistance to the Nigerian industrial and manufacturing sector.			
3.0. EnMS, ESO, and RECP piloting and demonstration programme.	TA	3.1. Through targeted piloting and demonstration, national awareness on: (i) EnMS & ESO; (ii) improved productive use of natural resources and manufacturing inputs (water, chemicals & materials); and (iii) waste/emission minimization, the Nigerian industrial sector is strengthened within the scope of regulatory compliance and increased competitiveness.	3.1.1. EnMS, ESO and RECP demonstration programme within 70 industrial enterprises (large & SMEs) across relevant sections of the Nigerian industrial sectors planned, organized and implemented.	GEFTF	670,000	2,000,000
	Inv	3.2. Through a limited financial investment assistance package for participating ESO & RECP pilot companies the uptake of the ESO and RECP implementation and associated investment is increased under the Project	3.2.1. Limited pilot enterprise financing in the form of partial post-enterprise ESO/RECP project implementation equipment cost reimbursement.	GEFTF	600,000	10,000,000
4.0. Enhanced investment in Industrial Energy Efficiency improvement(s) and Cleaner Production within relevant sections of the Nigerian industrial sector.	TA	4.1. Nigerian industrial, manufacturing sectors have increased access to finance mechanisms (commercial and Government) needed for the financing of energy efficiency projects and cleaner production, resource efficient projects to realize the cost-saving benefits of	4.1.1. Targeted capacity building programme for 70 key enterprises within Nigeria's industrial sub-sectors to strengthen their IEE EnMS/ESO and RECP business proposal development capacity.	GEFTF	230,000	2,000,000
			4.1.2. Targeted technical IEE EnMS/ESO and RECP support to suitable FIs/IFIs and Government financing mechanisms to enhance understanding of the methodologies and			

		EnMS/ESO and RECP.	therefore access to funding mechanisms, incentives and financial packages/credit streams for industrial enterprises implementing EnMS/ESO and RECP measures.			
5.0. Industrial and commercial EnMS, ESO and RECP awareness, promotion, service demand generation and sharing of lessons learned.	TA	5.1. Enterprise management (across the entire Nigerian industrial sector and selected commercial sectors) is aware of the potential financial, economic and environmental benefits that adopting EnMS, ESO and RECP can yield.	5.1.1. EnMS/ESO, and RECP publicity events/workshops/ corporate briefings in collaboration with designated Government entities, NGOs and key actors within the industrial sector planned and held.	GEFTF	522,633	2,000,000
			5.1.2. Industrial, commercial and environmental benefits of implementing the EnMS, ESO and RECP methodologies highlighted and effectively propagated - including case studies of selected demonstration plants			
			5.1.3. Enterprise Recognition Programme / Competition for Innovative RECP applications.			
6.0. Project Monitoring and Evaluation.	TA	6.1. The GEF Project is fully monitored and evaluated under periodic implementation assessment of impact.	6.1.1. The Project and its activities are monitored and evaluated on a periodic basis in line with GEF, UNIDO and Government requirements.	GEFTF	66,000	100,000
		6.2. Effectiveness of the Project outputs are well monitored, corrective actions taken and experience documented after thorough evaluation exercise.	6.2.1. Annual and periodical reports on the best practices, information on the Project and key indicators of progress made to be prepared and distributed to the key stakeholders and agencies.			
Subtotal					3,712,633	21,500,000
Project Management Cost (PMC) ⁴				GEFTF	185,632	500,000
Total Project Cost					3,898,265	22,000,000

For multi-trust fund projects, provide the total amount of PMC in Table B, and indicate the split of PMC among the different trust funds here: ()

⁴ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
GEF Agency	UNIDO	Grants	79,000
GEF Agency	UNIDO	In-kind	155,000
Recipient Government	Federal Ministry of Power (FMoP)	In-kind	1,500,000
Recipient Government	Federal Ministry of Industry, Trade and Investment (FMITI)	In-kind	1,500,000
Recipient Government	Federal Ministry of Environment (FMoE)	In-kind	250,000
Recipient Government	Energy Commission of Nigeria (ECN)	In-kind	500,000
Recipient Government	Bank of Industry/Bank of Development	Loans	8,000,000
Private Sector	National Private Sector Banks		5,000,000
Private Sector	Manufacturing Association of Nigeria (MAN)		756,000
Private Sector	Nigerian Industrial Enterprises		2,260,000
	To be secured		2,000,000
Total Co-financing			22,000,000

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES), FOCAL AREA AND THE PROGRAMMING OF FUNDS ^{a)}

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) ^{b)}	Total (c)=a+b
UNIDO	GEFTF	Nigeria	Climate Change	(select as applicable)	3,898,265	370,335	4,268,600
Total GEF Resources					3,898,265	370,335	4,268,600

a) Refer to the [Fee Policy for GEF Partner Agencies](#).

E. PROJECT PREPARATION GRANT (PPG)⁵

Is Project Preparation Grant requested? Yes No If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

Project Preparation Grant amount requested: \$120,000					PPG Agency Fee: 11,400		
GEF Agency	Trust Fund	Country/ Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee ⁶ (b)	Total c = a + b
UNIDO	GEF TF	Nigeria	Climate Change	(select as applicable)	120,000	11,400	131,400
Total PPG Amount					120,000	11,400	131,400

⁵ PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF up to \$2m (for MSP); up to \$100k for PF up to \$3m; \$150k for PF up to \$6m; \$200k for PF up to \$10m; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁶ PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁷

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	<i>Hectares</i>
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	<i>Hectares</i>
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	<i>Number of freshwater basins</i>
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	<i>Percent of fisheries, by volume</i>
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO _{2e} mitigated (include both direct and indirect)	<i>Direct: 850,000 tons of CO₂ MTCO_{2e}; Indirect: 1,870,000 MTCO_{2e}; Total: 2,620,000 MTCO_{2e} metric tons</i>
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	<i>. metric tons</i>
	Reduction of 1000 tons of Mercury	<i>. metric tons</i>
	Phase-out of 303.44 tons of ODP (HCFC)	<i>ODP tons</i>
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	<i>Number of Countries:</i>
	Functional environmental information systems are established to support decision-making in at least 10 countries	<i>Number of Countries:</i>

PART II: PROJECT JUSTIFICATION

1. **Project Description.** Briefly describe: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed; 2) the baseline scenario or any associated baseline projects, 3) the proposed alternative scenario, GEF focal area⁸ strategies, with a brief description of expected outcomes and components of the project, 4) [incremental/additional cost reasoning](#) and expected contributions from the baseline, the GEFTF, LDCF, SCCF, CBIT and [co-financing](#); 5) [global environmental benefits](#) (GEFTF) and/or [adaptation benefits](#) (LDCF/SCCF); and 6) innovation, sustainability and potential for scaling up.

1.1. Global Environmental and/or Adaptation Problems, Root Causes and Barriers

1.1.1. Global Environmental Problems

Globally, industries account for one-third of the total energy consumption and for almost 40% of worldwide CO₂ emissions. The International Energy Agency (IEA) has shown that globally, industries will need to reduce their current direct emissions by about 24% in comparison to 2007 levels, if they are to reduce global emissions by half

⁷ Provide those indicator values in this table to the extent applicable to your proposed Project. Progress in programming against these targets for the Projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF, SCCF or CBIT.

⁸ For biodiversity projects, in addition to explaining the project's consistency with the biodiversity focal area strategy, objectives and programs, please also describe which [Aichi Target\(s\)](#) the project will directly contribute to achieving.

between 2005 and 2050. The need to reduce energy consumption, environmental degradation, and resource depletion by industries in emerging economies is especially evident, since global growth in industrial production since 1990 has been dominated by emerging economies like India and China, both of which accounted for over 80% of increased industrial production during this period.

The most current and accurate overview of the global environmental pressures can be found in the 2016 Environmental Performance Index (EPI). The 2016 EPI provides an overview of global environmental performance, identifying key trends and the status of high-priority issues by ranking countries' performance on high-priority environmental issues in two areas: protection of human health and protection of ecosystems (Yale University, 2016).

In relation to the context herein proposed, the 2016 EPI report put forward that more than 3.5 billion people – half of the world's population – live in nations with unsafe air quality. This can be attributed to industrial solid waste and air pollution resulting from the use of fossil fuels as sources of energy. The report presented a more detailed picture of the global environmental problem saying that: A nation's environment is not its own but is shared with its neighbours and the rest of the world. Consequently, pollution is not one country's problem, rather everyone bears a burden. Local actions can lead to global environmental change while the effects of national policies often exceed state borders. Environmental health is not merely a consideration for some people, but it is central to human well-being.

European nations dominate the EPI's rankings by consistently retaining the top 10 spots while New Zealand, an Asian Pacific country, follows ranked as 11th. At the Index's low end, Sub-Saharan African countries are the poorest performers, occupying 16 of the bottom 20 positions. Only three nations in the bottom 20 are outside the African continent – these countries being Afghanistan, Bangladesh, and Haiti.

The EPI score for Nigeria in 2016 is 58.27, ranking it 133 out of 178 countries; this indicates a marked improvement from previous studies conducted over the last decade.

1.1.2. Root Causes

Industry in Nigeria depends mostly on erratic electricity generation from hydro and gas powered plants with on-site diesel power generation as the main backup. This, together with other factors and weak enforcement has permitted industries to engage in activities that not only impact negatively on the immediate national environment but also contribute to global problems such as climate change, desertification, loss of biodiversity and pollution of water bodies. Anthropogenic emissions and discharges from Nigerian industries have become major sources of environmental pollution and non-optimization of raw materials has resulted in unnecessary wastages, reduced profits and the promotion of unsustainable development.

Despite these problems/challenges, with a population of over 170 million, Nigeria is now classified as a middle income, mixed economy and emerging market, with expanding financial, services, communications, technology and entertainment sectors. Nigeria is ranked as the 21st largest economy in the world in terms of nominal GDP, and the 20th largest in terms of Purchasing Power Parity. After the rebasing of the economy in 2014, Nigeria has become the largest economy in Africa. According to the World Bank and NKC African Economics (2014) researches, 23.1% of Africa's industries are concentrated in Nigeria alone, thereby making the country a major industrial hub in the continent.

Aside from the daily domestic demand and consumption of energy by Nigeria's large population, the manufacturing industries, as well as other commercial entities in the country, also consume a significant amount of energy in terms of fuels and power every year. According to the Federal Ministry of Power as of June 2016, power generation stood at 2,464.01 MWh/H while the power distributed was 2,422.75 MWh/H. Peak-power generation reached a peak of 5,074.7 MWh/H as recorded on the 02 February, 2016.

The oil and gas sector remains the major driver of the country's economy, accounting for over 95% of export earnings and approximately 85% of Government revenue between 2011 and 2012. Throughout the 1990s and 2000s, Nigeria continued to rely heavily on the export of oil thus resulting in the beginning of the decline in manufacturing as a share of national GDP.

Even with its relatively declining share of national GDP, the Nigerian industrial sector is still considered to be one of the driving forces behind the country's economic growth. Manufacturing activities are mainly located in Lagos and its periphery and to a lesser extent some other commercial towns such as Warri, Asaba/Onitsha, Aba, Port Harcourt,

Calabar, Kano, and Kaduna. Prior to 2014, over half of Nigeria's GDP was attributed to primary sectors such as, agriculture, forestry, fishing and mining.

The decline of the 1900s and 2000s resulted in situations where manufacturing firms within the industrial sector became non-export oriented and lacking efficiency, thereby beginning the trend of competitive companies relocating abroad. Just a handful of key manufacturing industries - such as beverages, textiles, cement and tobacco - kept the sector afloat, albeit, operating at under half their capacities. Hence, the sector only contributed between 3% and 5% to the overall GDP of the country in these years (2.78%, 3.76%, 4.78% in 2008, 2009, and 2010 respectively). While the industrial sector situation in Nigeria remains challenging, the outlook and the sector's performance, has improved over more recent years.

The industrial, transport and buildings sectors are the major primary energy consumers and of all the ongoing challenges enterprises within the Nigerian industrial sector face, electrical power is arguably one of the most serious issues. The estimated national power supply currently generated in Nigeria averages about 4,000MW, while an adequate national capacity of 15,000MW would be required to meet demand. Thus, power supply is deemed to be highly inadequate and unstable, forcing the majority of businesses and households to rely on diesel and petrol generators as a primary or back-up source of electricity. These diesel generators are inefficient and costly to run as well as highly polluting. At the same time, there is considerable potential for energy saving within the Nigerian industrial sector which could help relieve some degree of pressure on the national grid. Because of the high cost of power generation by diesel generators, the existing opportunities for energy savings are highly cost effective and will result in considerably attractive savings in electricity and hence, production costs.

The country's transformation agenda - otherwise known as "*Nigeria Vision 20:2020*" - sets the direction for the current industrialization policy in the country. The industrialization strategy aims at achieving greater competitiveness within the production of processed and manufactured goods by linking industrial activities with the primary sector activity (agriculture, fishing mining (including oil exploration), domestic and foreign trade and service activities. Despite an ambitious strategy (outside of the oil and gas sector) industrialization and/or manufacturing in the country is still low due to a lack in competitiveness of manufactured goods compared to imported items.

The cost of production, the use of input materials, water, energy, packaging options, and quality of products and, most importantly, the methods of production are just some of the challenges facing the Nigerian industrial sector. As a result, manufacturing capacity utilization has been below 60% over the last five years (KPMG 2014). This being said, after rebasing the country's industrial sector, the situation is beginning to improve with, the sector accounting for 9% of GDP during 2013, compared to 2.5% prior to rebasing.

Economic growth in the sector has been rapid at a pace of almost 18% per annum during 2011-2013 which suggests that the manufacturing sector still has greater potential in terms of productivity improvement with an abundant semi-skilled work force, a reasonable availability of "some" domestically sourced inputs, and most importantly, a huge domestic demand for consumer products (National Bureau of Statistics - Nigeria).

1.1.3. Barriers to Energy and Efficiency Cleaner Production

The Nigerian industrial sector, particularly the manufacturing subsector, has to a large extent failed to adopt energy efficient and cleaner production techniques, having not properly put into use national/international waste management standards or energy efficiency programs despite several initiatives launched by the government, international donors and other partners within the country. A number of barriers still contribute to the limited uptake of cleaner production and energy efficiency measures by small, medium and large manufacturing industries in Nigeria. These barriers include:

Informational barriers: Informational barriers contribute significantly to the widespread failure to recognize the present opportunities in energy efficiency and cleaner production. There is a lack of updated information or platforms where available options, internationally recognized best practices, and benchmarks can be accessed by operators in the industrial subsectors. Although some Federal Ministries, Departments and Agencies (MDAs), and even international donor partners, have carried out some awareness activities to disseminate information on IEE and Resource Efficiency and Cleaner Production, best industrial/production practices, a rapid assessment of some manufacturing industries showed that the level of applying the information into their management systems/structures seems to be very low.

Government initiatives focusing on energy management and cleaner production in industries are at the nascent stage and are cited more on the policy dissemination level than in terms of actual groundwork. In fact, industrial enterprise top management and decision-makers are not aware of the opportunities that energy efficiency and cleaner production can bring in terms of reduced production costs, improved competitiveness, and reduced environmental pollution from production activities. As a result, there is very limited commitment on the part of management to promote on a regular basis the methodologies herein proposed under this PIF document.

Technical barriers: The absence of technical expertise constitutes a major barrier to the improvement of industrial energy efficiency, resource efficiency and cleaner production in most industrial and commercial facilities in the country. In addition, the high turnover of plant personnel assigned to the operation of industrial systems and changes in production leads to a lack of persistence and a short term approach to industrial energy efficiency, resource efficiency and cleaner production improvements.

Market barriers: Most manufacturing industries in the country have a budgetary disconnect between capital projects and operating expenses (energy and maintenance). Life cycle assessments of purchases are rarely considered in industrial energy efficiency and cleaner production projects, with low investment costs taking priority in the decision-making process when changing equipment. In cases where consulting technical expertise for industrial energy efficiency, resource efficiency and cleaner production is available in the country, it tends to be limited to technology and not on processes and systems.

Financial barriers: The financial barriers to investment in industrial energy efficiency and cleaner production projects are closely related to the lack of information on available financial mechanisms and incentives, and how to access them. At the financial institution and bank levels, there are three main issues: (i) lack of understanding of the particular needs of industrial energy efficiency and cleaner production projects and how to properly evaluate them; (ii) disconnect between the available financing products and the individual particulars of energy efficiency and cleaner production projects; and (iii) perspective that industrial waste reduction and optimization projects are high risk and thus, collateral is a requirement to mitigate this perceived risk.

Policy barriers: There are many policy and regulatory measures being implemented by the Government of Nigeria to promote cleaner industrial production and energy conservation in the country. These initiatives have resulted however, in very few achievements within the industrial sector due to a lack of targets for the improvement of waste management, low carbon emission production and energy efficiency in small, medium and large manufacturing industries. Hence, there is an inherent weakness of the existing instruments intended to educate market players (industries, consultants, equipment suppliers, and banks) on the promotion of industrial energy efficiency and cleaner production, as well as inadequate financial incentives and mechanisms.

1.2. Baseline Scenario and Baseline Projects

1.2.1. Baseline Scenario

The proposed Project has two distinct but related focus areas, these being firstly, increased industrial energy efficiency through the introduction of EnMS and ESO and secondly, the application of resource efficiency methodologies which will lead to further GHG emission reductions through such mechanisms as reduced utilization of industrial inputs and their associated energy costs (e.g. industrial water usage), increased recycling through industrial symbiosis and reduced waste within the local environment that may decompose releasing GHGs (e.g. CH₄). Therefore, due to the multiple focuses of the Project, the baseline that needs to be considered also has a multi-dimensional focus.

The Energy and Power Baseline - The power sector in Nigeria is seen by many analysts as the key constraint on economic development. Assessing the security of the electricity supply system, the World Bank ranked Nigeria 187 of 189 countries in the 2015 edition of its “Doing Business” report. For example, for a business in Lagos to secure a grid connection it takes 260 days (World Bank 2014⁹). Once connected to the electricity provider, Nigerian businesses’ biggest reported problem is the erratic power supply. About 83% of all enterprise managers surveyed by the WB considered electricity outages to be a serious problem – a score higher than any other constraint. Firms of all sizes, in all states and sectors, report average power outages equivalent to eight hours per day. The average firm claims outage

⁹ World Bank; 2014; Nigeria - Power Sector Guarantees Project: Project Appraisal Document (14 Apr 2014) Abuja, Nigeria

related losses equivalent to more than 4% of sales. No peer country experiences such severe business losses related to power supply (World Bank 2011¹⁰). Beyond the issues of grid connectivity and the reliability of supply, electricity price is a serious issue facing Nigerian enterprises. The cost of grid power has risen very substantially over the past few years with the present 2017 cost of electricity now standing at 25.50NGN/KWh (0.08US\$/KWh) according to the Nigerian Bulk Electricity Trading (NBET). This situation is worse when one considers the real cost to industrial enterprises factoring in the cost of running diesel generators to ensure a constant supply of power, with the cost of diesel power presently standing at an average of 65.00-70/kWh (0.21-0.22 US\$/kWh).

The availability of a reliable power supply is crucial to industrial productivity. Productivity can be said to be an average measure of the efficiency of production which can be expressed as the ratio of output to inputs used in the production process, i.e., output per unit of input. Hence, improving productivity performance is critical not only for the Nigerian industrial sector as a whole but also for the manufacturing enterprises in order for them to become efficient in their productive activities, and therefore more competitive, as well as making them conscious of the proper means and methods of production.

The primary target beneficiaries of the proposed Project will be medium and large manufacturing companies (to identified during the PPG stage) within the Nigerian industrial sector that consume energy, make use of natural resources including water as material inputs, and whose methods of production generate industrial wastes and emissions that have adverse effects on the environment, the wider economy, and the people.

Currently, the country's technical capacities to generate electricity for industrial, commercial and domestic uses has deteriorated sharply in the last 24 months. This has further hampered production activities within industrial enterprises. Key manufacturing operators within the sector are witnessing a progressive deterioration of their margin virtually on all sides of their investment, operations and sales. Given this situation, most of the manufacturing companies have to some degree devised alternative means of production in a bid to just break-even or generate profits above their investment costs.

Manufacturing companies in the country cater for 70% of their generating power through privately installed heavy duty generators with high costs of fuel/diesel and maintenance. Consequently, they rely only 30% on power transmission companies, which are nationally known as Distribution Companies (DISCOs), who redistribute electricity generated from fossil fuel powered plants and/or hydroelectric stations. The majority of Nigeria's thermal power generating plants whether on-grid or off-grid, depend on gas supplies from the Nigeria Gas Company, a subsidiary of Nigerian National Petroleum Corporation (NNPC).

Relating to the above mentioned, it can be said that power generation on the one hand is a major problem in the country which, on the other hand, has direct economic consequences on manufacturing capacities and the country as a whole. As of March 2016, it was reported in one of the country's major newspapers (Vanguard) that many of the generating plants had been having issues, especially with plant upgrades and re-tooling, which are being frustrated by the scarcity of foreign exchange and inability to import the necessary tools. The cost of production in the country was further increased for manufacturers, commercial and private houses with a power tariff hike of 40% across the board. The hike affected the manufacturing industry immensely, thereby significantly boosting the need for greatly increased energy efficiency and optimization within companies.

Industrial Resource Utilization and Waste Baseline - Aside from the unavailability of constant power supply being a major constraint to the development and growth of the Nigerian industrial sector, there is also the issue that most manufacturing industries carry out their activities without having a "clean bill of health", i.e. the production processes adopted by these companies have been (and/or are being) found not to be operating with the Best Available Techniques (BAT¹¹) and Best Environmental Practices (BEP¹²) including, where appropriate, clean technology, in regard to their obligations to reduce and prevent environmental pollution (land, sea and air). Compared to the G20 countries, Nigeria can be considered as an emerging economy, and like most emerging countries, the industrial sector (primary, secondary and tertiary) is faced with severe environmental degradation and resource depletion, which

¹⁰ World Bank: Nigeria 2011, An Assessment of the Investment Climate in 26 States Abuja, Nigeria

¹¹ BAT could be defined as the latest stage of development (state of the art) of processes, of facilities or of methods of operation, which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste.

¹² BEP is defined as the application of the most appropriate combination of environmental control measures and strategies.

threaten opportunities for sustainable economic and industrial growth. Therefore, there is an urgent need for the “Greening of Industries” in Nigeria.

The greening of industries will promote sustainable patterns of production and consumption, i.e. patterns that are resource efficient, low-carbon and low waste, non-polluting and safe, and which produce products that are responsibly managed throughout their lifecycle. In other words, there is a need for manufacturing companies within the Nigerian Industrial sector to adopt globally accepted standards that will ensure, regardless of the subsector they belong to, size and location, that they will continuously improve their environmental performance. This includes commitment and actions aimed at reducing the environmental impacts of processes and products through more efficient use, phasing out toxic substances, substituting fossil fuels with renewable and innovative energy sources, improving occupational health and safety, taking increased producer responsibility and reducing the overall risks.

The ongoing challenges which hinder productivity and competitiveness in the Nigerian industrial sector can be addressed by (but not limited to) two of UNIDO's practical approaches which are: (i) Industrial Energy Efficiency (IEE) based on EnMS and ESO; and (ii) Resource Efficiency and Cleaner Production (RECP).

1.2.2. Baseline Policies

A. National Renewable Energy and Energy Efficiency Policy (NREEEP)

This policy recognizes the multi-dimensional nature of energy and therefore addresses diverse issues such as renewable energy supply and utilization; renewable energy pricing and financing; legislation, regulation and standards; energy efficiency and conservation; renewable energy project implementation issues; research and development; capacity building and training; gender and environmental issues; planning and policy implementation. The overall thrust of this policy is the optimal utilization of the nation's energy resources for sustainable development. This policy encourages the development of national renewable energy action plan and national energy efficiency action plan, which will facilitate the overall achievement of the objectives set out in this policy.

In its definition of terms, the NREEEP could be considered as one of the first government-approved documents that officially defined energy efficiency as a source of energy since it would reduce inefficient consumption, thereby providing greater access to electricity consumers. The NREEEP considers energy efficiency to be measures to reduce the amount of energy required to provide goods and services or efforts to improve energy conservation.

As a policy document, it went on to give examples of energy efficiency measures such as including installing high efficiency lighting, natural skylights or other energy efficient devices; insulating a home for optimal cooling or heating and the use of appliances such as water heaters; as well as the use of low-energy or efficient refrigerators, freezers, ovens, stoves, water pumps and other appliances. From this policy, both renewable energy and energy efficiency can be viewed in Nigeria as part of a strategy to achieve cleaner and greener energy.

The policy marks the initial steps of aligning the Nigerian renewable energy and energy efficiency policy with the ECOWAS renewable energy (EREP) and ECOWAS energy efficiency policies (EEEP). It, therefore, mandates the implementation of the national renewable energy action plan (NREAP) and a national energy efficiency action plan (NEEAP), at the completion of which a revised renewable energy and energy efficiency policy will update the NREEEP.

The purpose of this policy on renewable energy and energy efficiency is to:

- i. Set out a framework for action to address Nigeria's challenge of inclusive access to modern and clean energy resources, improved energy security and climate objectives;
- ii. Recognize the national significance of renewable electricity generation activities by providing for the development, operation and maintenance, and upgrading of new and existing renewable electricity generation activities;
- iii. Declare that the proportion of Nigeria's electricity generated from renewable energy sources shall increase to a level that meets or exceeds the ECOWAS regional policy targets for renewable electricity generation and energy efficiency for 2020 and beyond;

- iv. Declare Energy Efficiency as a large, low cost, and under-utilized Nigerian energy resource offering savings on energy bills, opportunities for job creation, improved industrial competitiveness, and lower air pollution;
- v. Recognize that poverty mitigation and environmental protection are hindered by the continued predominance and inefficient use of oil and natural gas in meeting Nigeria's energy needs;
- vi. Take a step in the right direction and broaden the definition of energy security to include renewable energy and energy efficiency as equally important indigenous sources of energy, in addition to oil and gas;
- vii. Incorporate provisions for renewable energy and energy efficiency generation activities into state policy statements and plans, and recognize the importance of enabling framework conditions for private investment in renewable energy and energy efficiency;
- viii. Set national targets for achievements in electricity from renewable energy and energy efficiency capacity addition by 2020 and beyond;
- ix. Require the preparation of national action plan for renewable energy and for energy efficiency and set a time frame within which implementation is required;
- x. Recommend that signatory parties to this policy should collaborate in preparation of the action plans and work together in achievement of the final mandatory targets;
- xi. Make it mandatory for the Ministry of Power to facilitate the development of an integrated resource plan (IRP) and ensure the continuous monitoring and review of the implementation and effectiveness of the action plans prescribed under the national policy statement and;
- xii. Facilitate the establishment of a framework for sustainable financing of renewable energy and energy efficiency projects and programmes in Nigeria.

The proposed Project under this PIF will contribute to the successful implementation of the NREEEP and at the same time help consolidate on gains already made on policy items: iv (Improving industrial competitiveness, and lower air pollution); vii (Recognizing the importance of enabling framework conditions for private investment in renewable energy and energy efficiency); and xii (Facilitate the establishment of framework for sustainable financing of renewable energy and energy efficiency projects and programmes in Nigeria).

Thus, it can be summarized that, this Project aims at using EnMS and ESO IEE and RECP methodologies (as well as the analogous UNIDO Programme 'Transfer of Environmentally Sound Technologies (TEST)) in addressing the numerous issues that have held back Nigeria's non-oil sector for years, thus assisting industries to improve their productivity and output in accordance to Government policy. Consequently, this Project will aim to highlight the facts that that, better industrial performance using the right methodologies is critical not only for Nigeria's industrial sector but also for enterprises to become efficient in their production activities, and hence more competitive, as well as making them conscious of utilizing the means and methods for environmentally sustainable production.

B. Nigeria Industrial Revolution Plan and (NIRP)

The proposed Project is consistent with the country's national strategy called "Nigeria Industrial Revolution Plan (NIRP)" which is actually Nigeria's national roadmap for industrialization that was launched in 2014 after the country re-based its economy between 2011 and 2013.

The NIRP was developed by the Federal Ministry of Industry, Trade & Investment (FMITI) (one of the partners under this Project) and UNIDO's Government focal ministry in the country. The NIRP is a five-year plan to rapidly build up industrial capacity and improve competitiveness in Nigeria. The plan identifies industry groups where the country's industrial sector has comparative advantage – Agro Allied and Agro Processing; Metals and Solid Minerals Processing; Oil and Gas related Industries; and Construction, Light Manufacturing, and Services.

The NIRP also addresses the numerous issues that have held back the Nigerian non-oil sectors for years. It aims to address the high cost of funding and lack of long-term finance in Nigeria, build up industrial infrastructure and power for industry, provide for industrial skills, as well as aiming to link innovation and industry. It also aims to improve the countries investment climate, strengthen product standards and promote local patronage. The NIRP's underlying

philosophy is to build Nigeria's competitive advantage, to broaden the scope of industry, and to accelerate expansion of the manufacturing sector. The NIRP adopts both a direct and an indirect approach to promoting industrialization. The direct approach identifies sectors where Nigeria can truly win and dominate, based on an assessment of the country's comparative advantage. The plan proposes specific initiatives and interventions to improve productivity in those target sectors and increase production output.

Furthermore, the NIRP adopts an indirect approach in tandem, thereby acknowledging that it is sometimes difficult to predict where free market forces will lead industry and which sectors will be transformational winners. As such, the NIRP establishes cross-cutting interventions that address the competitiveness of the entire manufacturing sector in Nigeria (i.e. regardless of sub-sector). These indirect interventions create a broad "Nigerian platform" for manufacturing to thrive, while private capital will determine which sectors will grow.

The NIRP, for the first time in Nigeria's history, links the country's trade policy, with its investment and industrial policies. This brings coherence in the government's agenda to diversify the Nigerian Economy. With NIRP, the country aims to increase manufacturing from 4.0 percent of GDP, to over 10 percent by 2017, adding about) 5.0 trillion Nigerian Nira (NGN) to manufacturing annual revenues. It is also important to mention the various interfaces the NIRP has with other development plans in Nigeria. The integral nature of Industry warrants that it integrates with almost every other segment of the economy. The NIRP's governance model therefore adopts an inclusive structure, bringing in other government agencies such as the Ministry of Mines and Steel, Agriculture, Petroleum, Power, Transport, Finance, Works, ICT, Science & Technology and the private sector to ensure adequate policy synergy and consistency.

1.2.3. Associated Baseline Projects

While there are a number of different energy and climate change related projects in different stages of implementation in Nigeria, most either focus on the power supply sector or on renewables for increased energy access, with support to industrial energy efficiency being not so well addressed. One notable exception to this is the ongoing project entitled "*Nigerian Energy Support Programme (NESP)*" funded by the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development. The Project is being implemented by the GIZ.

The NESP project aims to advise the Nigerian Government on how best to provide reliable and sustainable electricity and promoting investments in renewable energy, energy efficiency and rural electrification. During the preparation of this PIF, technical working sessions were held with the GIZ NESP Project Team in order to identify areas of cooperation and mutual project support in terms of approach, outreach and implementation in the area of industrial energy efficiency. The NESP does have an intention to promote EnMS, but the Project presently does not have the capacity, experience or the tools that UNIDO has developed in this field. Therefore, there exists a considerable scope for the NESP and the Project proposed within this PIF to collaborate and extend the impact of both projects in the area of EnMS with Industry – and potentially beyond to large commercial and public installations.

1.3. Proposed Alternative Scenario and Project Components, Expected Outcomes and Outputs

The proposed Project will significantly contribute towards the GEF's "CCM-1 Program 1", whereby well-proven IEE and identified RECP environmentally methodologies will be transferred to targeted industries in Nigeria. In order to ensure uptake of EnMS/ESO and RECP methodologies to be introduced under the Project, demonstration and deployment of such mechanisms within companies will build on the experience gained under UNIDO's previous international EnMS/ESO and RECP projects, particularly UNIDO's original EnMS/ESO project in South Africa. Additionally, capacity building and awareness raising initiatives among company representatives and government officials will ensure the sustainability and acceleration of implemented IEE and RECP interventions. Thus, this initiative will employ UNIDO's considerable experience and technical assistance packages to effectively support the greening of Nigerian industries through the reduction of GHG emissions from energy and non-energy source and processes. The Project will also improve resource efficiency and waste generation as well as local pollution performance through the non-energy aspects of the RECP and TEST approach by default.

The Project will aim to assist the Nigerian Government in promoting and facilitating improvement in firstly, the energy efficiency/energy performance of the industrial sector; and secondly, to generate additional GHG emission savings through increasing industrial resource efficiency in regard to process inputs that have significant embedded

carbon (or other GHG) contents/factors, as well as through reducing industrial GHG releasing wastes either through waste generation minimization or recycling through such options as industrial symbiosis.

During the development of this PIF, it has been determined that the Project's EnMS/ESO and RECP technical assistance should be focused on the industrial regions of Lagos, Ogun, Benin/Sapele, Warri, Asaba/Onitsha, Port Harcourt/Aba, Abuja, Kaduna and Kano and with a particular focus on industrial energy-intensive sub-sectors, such as cement, agro-industries, chemicals, pharmaceuticals, automotives, oil (up and down stream), food processing and the manufacturing sector.

The Project will use UNIDO's now well-proven EnMS/ESO/ISO 50001 Series project approach adapted to Nigeria's industrial sector conditions. The Project will offer an integrated assistance package, which aims at creating a sustained and vibrant local market for energy efficiency EnMS and ESO services and investment through the following measures: improving policy, regulatory, and financing frameworks; strengthening institutional capacity; building technical capacity focusing on (i) EnMS, based on the ISO 50001 standard, and (ii) ESO, as well as establishing demonstration pilot projects and mechanisms for scaling up investments (particularly in ESO measures). In terms of policy and regulatory aspects, the Project will focus on technical assistance supporting the Government in the adoption of Energy Management Standards and related complementary policy measures (incentive mechanisms, voluntary agreements and performance recognition schemes). Where working with industrial enterprises is concerned, the Project will firstly focus on the delivery of tailor-made training and tools focusing on industrial energy system optimization; and secondly provide target EnMS and ESO enterprise TA for implementation. Lastly, where ESO is concerned, the Project will assist selected enterprises in ESO implementation financing through the provision of reimbursable grants to partially refund the cost of ESO equipment.

The Project will target all players in the industrial energy efficiency market (government, regulators, factory personnel, industry managers, service providers and equipment vendors) while building the environment and capacity needed to promote, support, affect and sustain such industrial system optimization approaches and energy management system standards.

In Nigeria, the need to foster improved, or in some cases even basic, cleaner production remains a pressing issue. Enterprises within the industrial sector need to make sure that: (i) all natural resources are used productively; (ii) chemicals are produced, used and managed in a safe and responsible manner; and (iii) that polluting waste streams (gaseous, liquid and solid) are either eliminated, minimized or recycled. UNIDO's standard Resource Efficient and Cleaner Production TA package entails the continuous application of preventive environmental strategies to processes, products and services in order to increase efficiency and reduce risks to humans and the environment. RECP addresses three sustainability dimensions individually and synergistically:

- (i). Production efficiency, which emphasizes the optimization of productive use of natural resources - materials, energy and water;
- (ii). Environmental management, which deals with the minimization of impacts on environments and nature through the reduction of waste and emissions; and
- (iii). Social enhancement, which targets the minimization of industrial/chemical risks to the well-being of workers and communities.

The programme promotes enterprise management and operational practices with regard to the optimization of input production materials, water, energy as well as the generation of waste, in the frame of business efficiency and profitability. In other words, the RECP methodology covers the application of preventive management strategies that increase the productive use of natural resources, minimize the generation of wastes and promote their recycling and reuse as well as reducing effluent discharges and the generation of greenhouse gases (GHG) and other emissions, while fostering safe and responsible production.

Hence, from the RECP perspective, it can be said that manufacturing enterprises within the Nigerian industrial sector do have some critical challenges which have to do with a lack of appropriate industrial production equipment, improper operational planning and organizational structures of production as well as poor regulatory compliance. The RECP methodology, and support packages, that the Project will offer will present an umbrella for the application of preventive environmental strategies, as well as Cleaner Production, to achieve the triple aim of production efficiency,

environmental management and human development within the Nigerian industrial sector. The RECP Programme of the Project will build national capacities, foster dialogue between industry and the Nigerian Government, and facilitate investment for the transfer and adaptation of Environmentally Sound Technologies (ESTs). The Project will ensure that the RECP methodologies will be sustained by putting the national capacity in place to adopt and adjust methods, practices and policies to local conditions that are prevalent in the Nigerian industrial sector.

UNIDO has a well-proven record on implementing EnMS/ESO industrial energy efficiency projects and RECP projects, but as separate projects under segregated methodologies. However, upon the request of the Nigerian government the Project presented in this PIF addresses both areas in a combined project where effectively, the EnMS/ESO methodology will replace the normal energy auditing and more general energy efficiency aspects of the UNIDO RECP package of industrial services. This has an implication for the non-energy RECP target areas of the Project and how mitigated GHG emissions will be calculated.

Therefore, under this Project, the GHG emission mitigation functions of the RECP component will seek to decrease the GHG emission footprint of enterprises within the industrial sector by focusing on promoting: (i) water efficiency; (ii) Material input optimization; (iii) waste minimization through the 3R principles (reduce, reuse and recycle) ; and (iv) waste symbiosis. During the PPG Phase, GHG accounting methodologies will be developed to: (i) identify non-energy GHG mitigation options and possible interventions within Nigerian industrial enterprises; and (ii) measure, monitor and analyse GHG emissions reduction data and results.

Lastly, the Project would seek to further promote the uptake of RECP input optimization measures, industrial recycling and symbiosis options etc. by competitively recognizing the Project's early adopters and best performers of innovative applications and approaches to reducing their GHG and environmental footprints.

This non-energy GHG emission mitigation aspect of the Project not only poses an innovative approach for UNIDO itself, but also offers the opportunity to be ground-breaking in regard to the development of national (and beyond) knowledge on the GHG functions of industrial material input, industrial water usage, waste minimization and industrial recycling and symbiosis.

Project Components

Component One: Strengthening of National Industrial and Environmental Policies and Regulatory Frameworks for IEE and Environmental Management Standards

Objective of the Component: To assist the Nigerian Government in the development of policy and regulations that will better foster increased investment in industrial energy efficiency (under the EnMS and ESO methodologies), as well as resource efficiency and cleaner production while at the same assisting in the strengthening of national standards bodies/institutions in regard to accreditation and certification capacity for the ISO 50001 and ISO 14000 series. The component aims to realize the following two outcomes:

Outcome 1.1: Improved Government knowledge base for strengthened national policy & regulatory environments in regard to Industrial Energy Efficiency (IEE) and Resource Efficient and Cleaner Production (RECP).

Outcome 1.2: International management standards' functionality improved through enhanced national ISO 50001 series & 14000 series accreditation and certification capacity.

The aim of realizing Outcome 1.1 is to support the technical capacities of relevant Government ministries, departments and agencies (MDAs) with a view to enhance institutional policy and regulatory frameworks in the country which can actively steer the introduction, promotion and implementation of energy efficiency (in terms of EnMS/ESO) and RECP as well as other innovative low-carbon and environmental management applications and technologies across different industrial sub-sectors.

During the PPG stage, working with national experts and initially selected Project Focal Point Partner Institutions, the necessary industrial and environmental policies, legal/regulatory and frameworks will be collected from all relevant government MDAs and initially reviewed. The review will identify obsolete regulatory standards within existing

national industrial and environmental policies and frameworks. Based on this review, an initial policy summary report will be jointly prepared with the Government Stakeholders, with a view to propose recommendations for the most suitable policy and regulatory development plan for the full-scale project.

Under the full-scale project, Output 1.1.1 activities will follow on from the PPG initial policy/regulatory work with a detailed analysis of the present regulatory frameworks in Nigeria with key enhancement recommendations being formulated with respect to UNIDO's methodologies concerning best-practices worldwide. In this regard, the country's environmental and industrial management standards for the manufacturing sectors will be improved with due consideration to alignment under the ISO 50001 and ISO 14000 standards.

In order to have effective policy and regulatory regimes, as well as good compliance/enforcement regimes, good data is vital. Therefore, Output 1.1.2 will focus on the mapping of industrial energy usage and resource usage, as well as waste generation. The Project will seek that capacity will be put in place so that the data gathering exercises and mapping analysis will be a sustainable fixture of the Government's environmental management operations through the development of tools and capacities which will be embedded within the relevant Government institutions (hazardous chemicals will also be included as a sub-focus of this mapping work upon the request of the Nigerian Government). Under Output 1.1.3, a targeted governmental and regulatory body capacity building programme will be established with a view to instil the necessary awareness, knowledge and international experience to facilitate the development, refinement, strengthening and enforcement of policy and regulatory frameworks. These frameworks will actively promote the uptake of the Project's EnMS/ESO IEE and RECP interventions and environmental performance improvements within Nigerian industrial enterprises.

Through realizing Outcome 1.2, the Project will directly assist the Nigerian government and relevant standard bodies/institutions to firstly operationalize the full ISO 50001 series, and secondly, further strengthen the application and reach of the ISO 14000 series of standards within the Nigerian industrial sector. Output 1.2.1 activities will therefore support the accreditation and certification capacities of relevant stakeholders and project partners.

The expected Outputs are:

Output 1.1.1 - National industrial, energy and environmental policies and regulations reviewed with recommendation formulation.

Output 1.1.2 - Mapping of industrial energy usage and waste hotspot(s) carried out (with a database of industrial highly energy intensive, resource consuming and waste producing enterprises developed).

Output 1.1.3 - Government capacity building programme initiated with a focus on promoting and strengthening capacity in policy/regulation formulation, performance monitoring, as well as enforcement mechanisms for environmental and industrial regulations.

Output 1.2.1 - Standard Accreditation and Certification capacity building programme on ISO50001 and ISO14000 (ISO14001 & ISO14004) implemented

The outcomes and outputs of Component 1.0 will firstly contribute to a long-term focus on continuously improving energy and environmental performance regulations/standards in Nigeria. This should contribute to improving environmental and industrial performance regardless of the size of the companies, location where they operate in and the kind of products/services they manufacture/offer and Government capacity. Furthermore, strengthened policy/regulatory frameworks, and associated internal Government capacity, should also contribute to ensuring a stronger commitment to action for the reduction of the environmental impact of production processes currently being used by manufacturing companies in Nigeria.

Component Two: Modular IEE EnMS/ESO and RECP Industrial Enterprise and Engineering Consultancy Base Training and Capacity Building Programme

Objective of the Component: To assist Nigerian industry in developing IEE/RECP technical capacity through the implementation of UNIDO's expert training programmes on the different methodologies. The training will target industrial enterprise engineering personnel and management, as well as the independent engineering consultancy fraternity. Achieving sustainability of the methodologies within the Nigerian industrial environment is a central objective of this component and this will be achieved by working with an appropriate national host to a point where

they 'own' the methodologies and are able to provide long-term training and technical assistance to industrial enterprises, either on a purely commercial or a long-term blended commercial/government funding basis beyond the lifetime of the GEF Project. The component aims to realize the following two outcomes:

Outcome 2.1: The capacity of the Nigerian industrial sector and the industrial consulting base is strengthened in regard to the EnMS/ESO and RECP methodologies within a sustainable framework that supports long-term competency development and the delivery of technical assistance on EnMS/ESO and RECP to industrial enterprises

Outcome 2.2: Strengthened internal capacity of selected and expanded Nigerian EnMS/ESO/RECP training centre/project host is strengthened in order to provide and coordinate EnMS/ESO/RECP training and related implementation technical assistance to Nigerian enterprises on a long-term and ultimately commercially sustainable basis.

Through realizing Outcome 2.1, the GEF Project will employ UNIDO's now well-proven and world leading EnMS/ESO/RECP training programmes to build the capacity of the industrial sector (incl. the Nigerian Society of Engineers (NSE) and the Association For Consulting Engineering in Nigeria (ACEN)) of on these methodologies so that industrial companies can improve their energy and environmental performance in the scope of improving production efficiency and profitability.

The PPG will conduct an initial review/ gap analysis in regard to human capital to highlight the necessities of having a pool of private individuals (experts) or firms/institutions with the right skills, knowledge, as well as technical and professional experience that can/will offer specialized services and support in terms of training, monitoring, control and implementation of new innovations. The PPG will aim to identify the groups of enterprise and consultancy trainees. Under the full-scale project, Output 2.1.1 activities will quickly move into delivering the EnMS/ESO/RECP training courses. They will aim to build *national* capacity as until only recently, the Nigerian industrial sector was characterized by a high degree of technical dependence on foreign know-how, while the domestic human engineer potential of the country was grossly neglected. A critical appraisal of the nature of the industrial development challenge of the 1970s reveals that the limitation was not so much that of finance but dearth of human capital including techno-managerial capabilities and skills required for initiating, implementing, and managing industrial projects¹³.

In this regard, Output 2.1.1 and Output 2.1.2 activities will invest in sustainable efforts towards building the EnMS/ESO/RECP technical and managerial capacities of target groups/persons (to be identified and selected by the Project) who will become the resource pool of engineering consultants for manufacturing companies of the Nigerian industrial sector offering specialized services across different sub-sectors.

Lastly, the Output 2.1.1 and 2.1.2 activities will seek to ensure that EnMS/ESO/RECP methodologies become firm fixtures within the Nigerian industrial culture, fully institutionalizing the different courses at the professional qualification level and possibly the higher engineering educational level under an institutional framework of career development and higher learning.

The realization of Outcome 2.2 is of central importance to the sustainability of the Project and the long-term application of the IEE /RECP methodologies within Nigerian industry. This is due to the fact that a capable, industry-respected long-term host/institution for the methodologies must be identified and strengthened over the course of the Project so as to either operate commercially or under long-term Government support post project completion - the selection of the most suitable institute/entity will be done in close cooperation with Government. Therefore, the PPG will strongly focus on identifying the most suitable Nigerian institution/entity that offers the best option for long-term sustainability (presently the leading candidate is the Manufacturing Association of Nigeria (MAN)). Under the full-scale project, activities under Output 2.2.1 will seek to internalize the EnMS and ESO IEE/RECP training and technical assistance capacity, as well as ensure that the centre builds a suitable network of training and enterprise consultants. Activities under Output 2.2.2 will seek to ensure that the centre has suitable management capacity and

¹³ "Industrial Development and Growth in Nigeria" 2014, Louis N. Chete, John Olatunji Adeoti, Foluso M Adeyinka, Olorunfemi O. Ogundele; WIDER Working Paper 19/2014UNU-WIDER, © AfDB/Brookings/UNU-WIDER

long-term business planning with the aim to offer IEE/RECP training and technical assistance services over the long-term either on a commercial basis, under long-term Government support or a hybrid model.

The expected outputs are:

Output 2.1.1 - EnMS, ESO technical training methodologies/courses adapted to current national realities/needs (incl. all support, resource packages, toolkits and learning materials) and delivered to 300 designated staff/employees of selected enterprises of Nigeria's industrial and manufacturing sector.

Output 2.1.2 - RECP technical training methodologies/courses adapted to current national realities/needs (incl. all support, resource packages, toolkits and learning materials) and delivered to 200 designated staff/employees of selected enterprises of Nigeria's industrial and manufacturing sector.

Output 2.2.1 - Project host/centre internal programme of EnMS, ESO & RECP capacity building strengthened (as well as teacher training where appropriate) to ensure internalization and embedding for long-term ownership.

Output 2.2.2 - EnMS/ESO/RECP business planning and corporate strategy training for the National Project Host/Centre conducted to ensure long-term provision of EnMS/ESO/RECP training and technical assistance to the Nigerian industrial and manufacturing sector.

Component Three: EnMS, ESO, and RECP Piloting and Demonstration Programme.

Objective of the Component: To assist Nigerian industry to become aware of the commercial and environmental benefits that can be realized through adopting the EnMS/ESO/RECP methodologies through targeted piloting and demonstration. The Component aims to realize the following outcome:

Outcome 3.1: Through targeted piloting and demonstration, national awareness on: (i) EnMS & ESO; (ii) improved productive use of natural resources and manufacturing inputs (water, chemicals & materials); and (iii) waste/emission minimization, the Nigerian industrial sector is strengthened within the scope of regulatory compliance and increased competitiveness.

Outcome 3.2: Through a limited financial investment assistance package for participating ESO & RECP pilot companies the uptake of the ESO and RECP implementation and associated investment is increased under the Project

The PPG will carry out a needs gap assessment of the primary, secondary and tertiary industrial sectors in the country. After the assessment, in collaboration with relevant stakeholders, the Project will proceed to decide on the number, as well as examine the nature of the industries, in order to identify and select the key manufacturing industries in which the EnMS/ESO/RECP methodologies will be introduced, piloted and demonstrated. However, it can be expected that the Project will target the following sub-sectors within the industrialized zones of the country (Warri, Asaba/Onitsha, Aba, Port Harcourt, Calabar, Kano, and Kaduna), such as (i) building materials (brick, cement and other input materials); (ii) iron and steel; (iii) non-ferrous metals; (iv) food processing; (v) agriculture; (vi) glass; (vii) breweries and distilleries; and (viii) numerous manufacturing sub-sectors including automotive vehicle production.

In terms of setting and defining the rules for final enterprise selection, these will be elaborated during the PPG phase but inter-alia it can be expected that the selection will be overseen by the Project Steering Committee. In regard to the selection criteria that will be applied for selecting the enterprises that will participate within the EnMS/ESO and RECP demonstration programme, the considerations are as follows:

- Enterprise potential for energy and resource saving characterized by: (i) high inefficiency; (ii) high costs; and (iii) where energy and/or resource costs form a high percentage of enterprise production costs
- Preliminary cost-benefits analysis
- Enterprise willingness to commit to long-term EnMS/ESO and RECP
- Existing enterprise commitments
- Enterprise readiness to be part of information and knowledge sharing mechanisms

- Potential eligibility for incentives and associated financial mechanisms
- Supply chain replication potential

The key outcome of this component will be realization of improved environmental performance (as well as increased competitiveness) of the participating industries as a result of the adoption of Environmental Management Accounting (EMA), Environmental Management Systems (EnMS), raw material cost accounting, Cleaner Production (CP), and the ESO energy efficiency improvements. The Project would aim to undertake wide-ranging ESO and EnMS implementations as well as RECP interventions within its pilot enterprises. The Project will aim to complete a minimum of 70 EnMS, ESO and RECP enterprise pilots across plants of different sizes, ranging from SMEs, to large installations. The piloting and showcasing activities will form sector-specific case studies which will be promoted through various means to as wide an audience of enterprise management as possible. The case studying of the Project's best practices will contribute towards the further reduction of industrial waste, as well as GHG emissions throughout the industrial sectors and feeding back into Government policy development initiatives.

To support the realization of Outcome 3.2 (and its programme of 70 EnMS/ESO/RECP pilot/demonstration enterprise projects), the Project will establish a limited *Financial Support Package* for its enrolled participating pilot companies. This financial support will take the form of post (i) EnMS; (ii) ESO; and (iii) RECP implementation equipment cost reimbursement (up to a determined cap for the three types of intervention), where an enterprise that has implemented ESO or RECP measures and investments within their plant will be reimbursed 30% of the verified value of the ESO and RECP equipment installed. Where EnMS is concerned, support will focus on energy usage metering systems and reimburse the pilot company 50% of the value the metering systems installed.

Financial Support Package Area One – EnMS Equipment: Actual EnMS pilot enterprise implementation will not be explicitly financially supported, as the cost of EnMS implementation in terms of equipment is typically negligible as the methodology is a people based methodology far more geared towards management practices and behavioural changes. That said, for a large and system diverse enterprise to have a detailed and mature EnMS in place, the phase 'you cannot manage what you cannot measure', begins to take on more relative importance. Where large multi-system or multi-workshop industrial plants are concerned, the installation of energy metering (and sub-metering) systems becomes attractive (and eventually necessary) in order to assess the energy performance (and improvement) of individual shops and production lines of a facility. Therefore, the Project will plan and budget to supply up to 15 metering/sub-metering sets and the accompanying monitoring software (approx. US\$ 10,000 per set for a medium to large plant) at a rate of 50% reimbursement.

Financial Support Package Area Two – ESO Equipment: The majority of financial enterprise equipment support from the GEF Project will be used for ESO interventions, as UNIDO experience has shown investments in ESO to be highly and quickly effective measures to generate large energy and CO₂ savings. The equipment purchases under ESO interventions typically fall under three main stages. The first stage looks at very basic and low-cost housekeeping equipment (i.e. energy flow software, clip on meters, small ancillary components, small amounts of cladding/insulation, and proper servicing equipment).

The second stage of ESO optimization is more financially involved, depending on the nature of the ESO system topic (pumps, steam, compressed air, fans and motors) and typically involves the installation of new connectivity aspects between significant energy consuming components of a production line. A good example from UNIDO's previous pumps optimization portfolio in South Africa would be where a major car plant examined their welding shop cooling water pumping system. The intervention centred around replacing T-junction cooling water piping from a three-pump system to a piping configuration that employed single angled flow. The original T-junction configuration was causing fluid flow instability resulting in the motor-driven pumping set having to work harder than it needed to. The single angled flow configuration eliminated the flow instability, thereby reducing the load on the motor-driven pumping set to point where for the same amount of work, the energy consumption of the pumping set was reduced annually by 323,000 kWh. The initial investment had a payback period of 3.0 months and generates continual annual CO₂ savings of 309 tons.

With the other ESO topics, the nature of the inventions and their associated costs vary but they remain configuration-based for the most part (although some low-to-medium cost energy consuming components are required) and typically aim for production line energy savings of 20%, with the result that the measures are extremely cost effective.

The GEF Project's financial support package would target this level of ESO enterprise intervention, with the Project expecting to financially assist in the commissioning of up to 200 individual ESO projects within its pool of pilot plants (enterprises typically engage multiple ESO projects over time either as part of a EnMS or as multiple stand-alone projects) at a rate of 30% reimbursement.

The third stage of ESO optimization focuses on Significant Energy User (SEU) component replacement. Again, UNIDO's ESO work in South Africa provides a good example where UNIDO worked with a medium-sized textile enterprise to optimize their steam systems. The steam system optimization technical support provided to this enterprise started with simple housekeeping and better system practice and maintenance measures (stage one), before moving on to interventions looking at better boiler combustion (oxygen flow etc.), better steam flow dynamics and improved steam transmission insulation (stage two). After a period though, the enterprise in question decided that they had enough robust confidence in the South African UNIDO IEE Project Team to take up the larger and more involved recommendations and they started to one-by-one replace their boilers (stage three). While the UNIDO Project did supply project oversight and guidance support during the boiler replacement process, it did not need to supply financial support as the level of funding required was beyond the scope of the project. Under the proposed GEF Project for Nigeria, financial support would also not be supplied for this stage or level of investment, with the Project instead providing further technical assistance under Output 4.1.1, where the Project will assist enterprises in obtaining commercial loans and/or grant funding from IFs/IFIs as well as Government and others donors (where grants or concessional financing are available).

Financial Support Package Area Three – RECP Equipment: Under UNIDO's RECP projects and its application in industries, there are three absolute indicators namely, water use, material use, and energy use. More specifically, UNIDO's RECP approaches: (i) contribute to reducing wasteful consumption of water which a finite resource (but yet essential input) for a unit of output of goods produced, (ii) help in reducing organic and inorganic industrial wastewater which is based on the different industries and the contaminants; (iii) help in the prevention and reduction of industrial wastes - through better material flow accounting/environmental management techniques, (iv) help in material win-back (during/after production) and also in value recovery. As such, standard UNIDO RECP investment at the plant-level equipment usually relates to and low-carbon equipment substitution as well as material recycling and reuse equipment/options and end-of-pipe pollution mitigation measures.

As mentioned previously, the energy management and industrial energy efficiency aspects of this Project are to be covered by UNIDO's EnMS/ESO programme, with the RECP Programme assistance focusing on non-energy consuming production aspects within the Nigerian pilot enterprises. However, the RECP non-energy related measures that will be employed under this Project will focus on their 'embedded energy and GHG mitigation potential'. Water efficiency is a good indicative example due to the energy content of purifying and pumping water. This said, the environmental benefits will range beyond national energy savings and GHG emission mitigations.

Therefore, the Project's financial support will be dedicated to non-energy related equipment and/or technology options for small, medium and large industrial sizes and across different industrial sub-sectors. The RECP preventive and environmental management investments will include modular automated or integrated systems and technologies which are reliable and effective to regulate water consumption, control and measure water consumption, material usage and measure the level of pollution load in effluents. Examples of this type of investment would be: (i) Jet Dyeing Technology, a water efficiency measure for the rope manufacturing, textile, leather sub-sector; (ii) Sequential Batch Reactors, a type of activated sludge process for the treatment of wastewater; (iii) Belt Filter Technology which is an industrial machine used for solid/liquid separation processes, particularly the dewatering of sludge and slurry and juice extraction from fruits and grapes in winemaking; and (iv) Bio-filtration Techniques (Vermifilters) which use an aerobic treatment system, comprising a biological reactor containing media to filters organic material from industrial wastewater.

The Project will financially support, through reimbursement, the deployment and installation of RECP modular systems/technologies as pilots and/or demonstrations within selected industries. Depending on the industrial sub-sector, the Project will (in total) plan and support up to four modular water efficiency systems, three pilot waste water treatment/recycling systems in high usage industries (food/beverage processing, steel, pulp and paper and or chemical) and up to three industrial solid waste management systems. The exact form, degree of assistance and the modalities of the financial assistance package (and its verification functions) will be determined during the PPG stage.

In addition, as also previously mentioned the PPG stage will begin the process of developing an appropriate methodology for the monitoring, measurement and eventually verification, of the energy savings and GHG emissions reductions from the non-energy related RECP measures deployed by the Project.

Long-Term Equipment Feasibility and Usage

Due to the nature of the type of ESO equipment investments that the Project will partially support, there is little risk of the equipment falling into disuse when the Project comes to a close. This is because the ESO equipment is hardwired into an enterprise's production line/processes. Once the equipment is installed, the different components become simply part of the production process, while at same time, the optimized nature of the entire system yields highly significant and highly profitable energy savings that management sustains. For EnMS, UNIDO experience in South Africa has an 89% success and sustainability rate with EnMS implementations and therefore, the energy metering equipment that will be partially supported by the Project can be considered long-term sustainable within the plants that receive the support. The point to consider is that EnMS and ESO are not an environmental compliance burden to an enterprise; they are in fact profit and competitive enhancing measures and once embedded within company management practices they have been proven to be both sustainable and progressive. Where RECP and the equipment investments to be supported by the Project are concerned, again the Project will target and support profitable measures that will also improve enterprise environmental performance both in terms of water efficiency, discharges and resource usage. Given the national regulatory enforcement environment, all measures, and their corresponding equipment investments, should be profitable to ensure their long-term use and sustainability.

Lastly, beyond the nature of the equipment investments to be supported, the Project will employ careful vetting of the recipient pilot enterprises. In regard to the selection criteria that will be applied for selecting the enterprises that will receive support for EnMS and ESO investments, the Project will consider the following: (a) Enterprise potential for energy saving characterized by: (i) high inefficiency; (ii) high costs; and (iii) where energy costs form a high percentage of enterprise production costs; (b) Preliminary cost-benefits analysis; (c) Enterprise willingness to commit to long-term EnMS and ESO; (d) Existing enterprise commitments; (e) Enterprise readiness for to be part of information and knowledge sharing mechanisms; (f) Potential eligibility for incentives and associated financial mechanisms; and finally (g) Supply chain replication potential.

Assessment of Pilot EnMS/ESO/RECP Intervention Impact

To assess the impact of the EnMS/ESO/RECP interventions to be piloted within the participating enterprises, it will be necessary to establish *Control Groups*. The challenge with this is that enterprises generally don't want to be in a control group when a project is offering to supply valuable money-saving technical assistance and training as well as limited financial support, while at the same time they are being requested to supply production and financial data. To circumvent this challenge, the Project will seek to establish three levels of control groups:

- ***Control Group One – Government Reporting:*** If similar enterprises within a given industrial sub-sector can be found that are reporting aggregate energy and process input consumption levels to Government, it will be possible to work with a selected company and compare (at a high-level) the performance of the EnMS/ESO/RECP Pilot Plant interventions against the energy consumption of a similar company that is not receiving assistance. It can be expected that use of this Control Group, given the state of data submission to the Central Government in Nigeria (and most countries in fact), will be minimal – but the option and its scope for meaningful data extraction will be thoroughly examined during the PPG stage.
- ***Control Group Two – Staged Piloting Implementation:*** The second level of control grouping will be established by conducting the EnMS/ESO/RECP piloting programme under an annually staged approach where enterprises with similar production facilities are concerned. This effectively means forging long-term agreements with potential pilot plants, and staggering the implementation of the assistance between the comparison plants in order to measure the physical and behavioural change impact aspects of the EnMS/ESO/RECP measures. In other words, if there are two similar enterprises, the Project can choose to work with Enterprise One in Year One to establish an EnMS while at same time working with Enterprise Two to establish a detailed energy baseline and reporting agreement and system on the provision that in Year Two, they will receive the Project's assistance (both technical and financial) to implement their EnMS/ESO/RECP measures.

- **Control Group Three – Intra-Enterprise Comparison:** The most effective and easy to sell (to enterprises) control group is where the Project would work with internal groups. The most obvious way to achieve this is where the company in question has two or more similar production facilities in the country under a central head office authority and control. Unfortunately, such nationally distributed companies are not particularly prevalent in Nigeria – with only the Nigerian Iron Ore Mining Company (NIOMCO), a steel producer, having multiple production sites.

Therefore, the way to establish data rich impactful Control Groups (both for quantitative energy savings and for assessing the more human behavioural changes) is work within industrial facilities that are large enough to work with individual production shops within the overall facility. Working with selected parts or production shops of large industrial facilities is basically the way in which UNIDO’s EnMS/ESO (and RECP) programmes generally function. This stepwise methodology is employed for a number of reasons, such as: (i) building incremental acceptance for the interventions within the host plants’ management structure; (ii) within a very large and complex industrial facility total-site EnMS and multiple ESO topic implementation can be overwhelming, thus a stepwise approach is often more manageable and absorbable where one implements within individual production lines or shops; (iii) minimized overall plant production disruption.

Where large multiple production line/production shop facilities exist, intra-enterprise control group comparison analysis and baselining will be possible, and will form the main basis for the Project’s control groups.

While the PPG Stage will assess the viability of the above three baseline/control group options in detail, it can be assumed that Control Group Three will produce the most significant energy/GHG emission/production cost comparison data. It should be noted though that in the case of EnMS, the enterprise’s previous energy performance is the baseline, or its own control group, as EnMS requires continuous energy performance improvement measured and assessed against previous performance levels. However, EnMS control groups will still be established particularly to capture and evaluate the behavioural change benefits as well as energy performance improvements. The value of these control groups is that they will facilitate a clearer and more precise mechanism for the evaluation and demonstration of the impact of the EnMS/ESO and RECP interventions within each pilot plant. This information will then be packaged for different uses such as: to better inform Government policy options; to better inform the evaluation process of the Project and ascertain the investment impact of the Project funding in terms of energy and GHG emissions savings; and finally, to further promote the ‘real in-country’ benefits of EnMS/ESO and RECP to additional industrial facilities.

The expected outputs are:

Output 3.1.1 - EnMS, ESO and RECP demonstration programme within 70 industrial enterprises (large & SMEs) across relevant sections of the Nigerian industrial sectors are planned, organized and implemented.

Output 3.2.1- Limited pilot enterprise financing in the form of partial post-enterprise ESO/RECP project implementation equipment cost reimbursement.

Component Four: Enhanced Investment in industrial Energy Efficiency Improvement and Cleaner Production within Relevant Sub-Sectors of the Nigerian Industry.

Objective of the Component: To firstly assist Nigerian industry to become aware and better capacitated to take advantage of possible funding mechanisms and options available to undertake EnMS/ESO/RECP investments; and secondly, to provide targeted technical EnMS/ESO/RECP support to suitable Financial Institutions/International Financial Institutions and Government financing mechanisms in order to enhance their understanding and acceptance of the methodologies so as to increase access to such funding, incentives and financial packages/credit streams for industrial enterprises wishing to implement the methodologies herein proposed. The Component aims to realize the following outcome:

Outcome 4.1: Nigerian industrial, manufacturing sectors have increased access to finance mechanisms (commercial and Government) needed for the financing of energy efficiency projects and cleaner production, resource efficient projects to realize the cost saving benefits of EnMS/ESO and RECP.

Under Output 4.1.1 activities, the proposed GEF Project will assist the 70 selected industries in developing bankable energy efficiency and cleaner production and resource optimization projects to improve their chances of attracting finance from commercial/industrial development banks in the country and other international finance institutions.

Under Output 4.1.2 activities, the proposed GEF Project will aim to promote and enhance understanding of the EnMS/ESO and RECP methodologies to relevant financial mechanisms and FI/IFIs through assisting Government and FI/IFIs to evolve their respective financial mechanisms and loan packages to be better able to appreciate the bankability of EnMS/ESO and RECP projects. A potential financial partner of particular interest is the “Private Financing Advisory Network (PFAN)” which is a relatively new institution dedicated to increasing access to capital in the area of climate-friendly investment. PFAN is a financial leveraging agent that is mandated to assist enterprises to develop, prepare and submit project proposals to financing institutions. PFAN is a natural fit with the objectives of this component. That said, one of the main goals of the Component is to broaden the IEE/RECP understanding of the national financing (IF/IFI) sector and such the FI/IFI selection for training will be made through open calls to participate under the Project EnMS/ESO/RECP banking awareness training programme.

The expected outputs are:

Output 4.1.1 - Targeted capacity building programme for 70 key enterprises within Nigeria's industrial sub-sectors to strengthen their IEE EnMS/ESO RECP business proposal development capacity.

Output 4.1.2 - Targeted technical IEE EnMS/ESO and RECP support to suitable FIs/IFIs and Government financing mechanisms to enhance understanding of the methodologies and therefore access to funding mechanisms, incentives and financial packages/credit streams for industrial enterprises implementing EnMS/ESO and RECP measures.

Component Five: Industrial and Commercial EnMS, ESO and RECP Awareness, Promotion, Service Demand Generation and Sharing of Lessons Learned.

Objective of the Component: To build awareness in regard to the potential that EnMS/ESO/RECP can deliver in terms of financial, energy, GHG emission savings within the Nigerian industrial sector and the relevant parts of the commercial sector, thereby building demand for the Project’s training/capacity building and pilot services. The Component aims to realize the following outcome:

Outcome 5.1: Enterprise management (across the entire Nigerian industrial sector and selected commercial sectors) is aware of the potential financial, economic and environmental benefits that adopting EnMS, ESO and RECP can yield.

Under Outputs 5.1.1 and 5.1.2, the component will implement a series of activities, consisting of a wide-range of media, trade and industry initiatives that will be employed for the purposes of raising awareness on EnMS/ESO/RECP as well as promoting the Project and its services. The component will include a number of Government-supported high-level industrial, promotional and information sharing events. Under Output 5.1.2, a series of targeted industry papers and articles will be developed and released. As mentioned above in the description of Component 4.0, the detailed examination of the energy/GHG emission performance improvement of the Project’s pilot enterprises (particularly those who receive financial assistance) against control groups will facilitate the construction and dissemination of detailed in-country case studies, as well as other methods to share experiences and results in regard to the positive economic and environment impact that adopting EnMS/ESO and RECP methodologies can yield.

Under Output 5.1.3 activities, the Project will further promote the uptake of RECP input optimization measures, industrial recycling and symbiosis options through establishing a national competition to recognize the Project’s early adopters and best performers of innovative applications and approaches aimed at reducing their GHG and environmental footprints through implementing such measures within their enterprises.

The expected outputs are:

Output 5.1.1- EnMS/ESO and ESO RECP publicity events/workshops/corporate briefings in collaboration with designated Government entities, NGOs and key actors within the industrial sector planned and held.

Output 5.1.2 - Industrial, commercial and environmental benefits of implementing the EnMS, ESO and RECP methodologies highlighted and effectively propagated - including case studies of selected demonstration plants.

Output 5.1.3 - Enterprise Recognition Programme/Competition for Innovative RECP applications.

Component Six: Project Monitoring and Evaluation (M&E)

Objective of the Component: The objective of this project component is to put in place an adequate and robust M&E mechanism. This will allow for not only the monitoring of the Project's progress but also the construction of an overall project impact assessment on a rolling periodic basis, built-up from the Project's different components.

Outcome 6.1: The GEF Project is fully monitored and evaluated under periodic implementation assessment of impact.

Outcome 6.2: Effectiveness of the Project outputs are well monitored, corrective actions taken and experience documented after thorough evaluation exercise

The analysis of the M&E and impact assessment results of the different components will allow for periodic reviews of the Project's intervention and subsequent implementation strategies and work plans. Methodologies/tools will be developed to use the collated information for better planning and decision-making. An annual report and periodical reports on the best practices, information on the Project and key indicators of progress made will be prepared and distributed to the key stakeholders and agencies.

Beyond the M&E and Impact Assessment (IA) approach, the proposed Project would also come under UNIDO's standard M&E approach for GEF funded projects, this consisting of a mid-term review and an independent final evaluation, as well as defined period project implementation reporting based on the GEF/UNIDO templates.

The independent final evaluation will be conducted three to six months prior to a terminal review meeting by all stakeholders to be identified at the PPG stage. The final evaluation will look at the impact and sustainability of results, including the contribution to the capacity development and the achievement of global environmental benefits goals. The final evaluation will also provide recommendations for the follow-up activities for national partners.

1.4. Incremental/Additional Cost Reasoning and the Expected Contributions from the Baseline, the GEFTE, LDCF/SCCF and Co-financing

The GEF support of energy efficiency applications and low-carbon technologies, as well as the promotion of resource efficiency and cleaner production in the manufacturing sector in Nigeria will promote the sustainable production of good and services and at same time strengthen the competitiveness of the small and medium scale manufacturing companies of Nigeria's industrial sector.

In order to ensure sustainable linkages between industrial production/activities and environmental sustainability, there is a need to adopt new, energy efficient and greener methods of production. Furthermore, it is also necessary to improve resource efficiency in the use of fossil fuels, cleaner production, industrial energy efficiency and energy optimization thus directing the industrial sector and the national economy towards a green industry and low-carbon development path.

A recent UNIDO policy study on RECP in Nigeria (2013) and a GIZ/Manufacturing Association of Nigeria Rapid Assessment on IEE (2015/16) revealed that the Nigerian Industrial sector has significant potential for the uptake of resource efficient, cleaner technologies coupled with energy management and the optimization of energy systems to boost the productivity of manufacturing firms in the country. The technical assistance and financial support from the GEF, combined with the support of the government, will function as an important leverage for increasing IEE and RECP in the manufacturing sector. By all these means, the much needed technical and managerial capacities needed by the country's public and private sectors will be developed and sustainable results will be obtained from this project through a cost-effective approach.

As part of the technology demonstration component, small and medium sized manufacturing industries, which are currently using fossil fuel generators to generate power will be targeted. The substitution of petrol or diesel fuel meets the national development goals of Nigeria by choosing energy optimization and cleaner production technologies. The GEF grant will thus be used to cover the incremental cost between a less costly, more polluting option and a more

environmentally friendly option which is more costly at the beginning when introduced and implemented at the industrial levels. Moreover, as a result of the awareness training sessions for FIs/IFIs, the additional economic incentives brought by the implementation of TEST, the proposed Project will have a catalytic effect in providing the legal and institutional framework to support countrywide investments in low carbon technology upgrades and capacity building towards advancing IEE/RECP methodologies in the country. Thus be one of the key factors inducing project co-financing. Finally, the Project will build on existing structures resulting from non-GEF funded projects sponsored by the Federal Government of Nigeria and relevant donor partners. The use of the baseline/control groups described under Component 3.0 will also assist ascertaining increased impact in regard to enterprise on-site investments.

The incremental reasoning for this project thus lies in the provision of a state-of-the-art and low-carbon energy solution when upgrading these enterprises. More quantitative details on the costs will be collected during the PPG phase, through visits and energy audits in representative target companies. These visits will provide a conclusion on which size of enterprises should be targeted, and which low-carbon applications are most commercially and technically appropriate.

1.5. Global Environmental Benefits (GEFTF) and/or Adaptation Benefits (LDCF/SCCF)

According to the International Energy Agency (IEA) which states that, industries (globally) will need to reduce their current direct emissions by about 24% in comparison to 2007 levels, if they are to reduce global emissions by half between 2005 and 2050.

Based on previous worldwide UNIDO experiences with EnMS/ESO IEE and RECP projects, the IEE and RECP methodologies herein proposed will contribute to global efforts that are aimed at alleviating cumulative (negative) impacts on earth's systems (land, air, water) resulting from the use of natural resources for the production of goods and services, generation industrial waste/pollutants and GHG emissions.

The RECP approach will contribute to solving most of today's most pressing environmental challenges caused by lack of cleaner technologies and production methods in Nigeria. The approach will also assist in mitigation of resource use related to GHG emissions of climate change and at same time offer environmentally sound management of chemicals and wastes, and the security of supply of water, energy and other natural resources being used as input material in manufacturing industries.

The IEE approach will also identify and promote the use of renewable energy applications (such as bio-energy) and other low-carbon technologies (such as energy efficiency) within the intended pilot/demonstration industries as this requirement is contained under the ISO50001 Energy Systems Standard as the ultimate measure that must be included to meet its 'continual improvement' conditions. Energy efficiency and optimization will contribute towards mitigating the use of fossil fuels for heat and/or power generation and thus, GHG emissions arising from combustion of these fossil fuels will be prevented.

The combination of innovative policy instruments on resource efficient, cleaner production, energy efficiency and capacity building of relevant professionals is likely to ensure that the replication of similar IEE and RECP initiatives can be achieved within the industrial sector through the of umbrella bodies such as the "Manufacturers Association of Nigeria (MAN)" of energy efficiency and cleaner production professionals, as well as technical consultants and service providers will continue to provide services to industry after the completion of the Project.

In light of the above mentioned, this Project will make a significant contribution to a reduction in GHG emissions of the selected manufacturing companies within the country's industrial sector. At the same time, the Project will introduce cleaner and more efficient production processes and energy efficiency that will improve manufacturing companies' resilience in facing uncertainties of energy costs. The improvements in energy efficiency, reliability and productivity will contribute to the increased competitiveness of manufacturing companies in the country and put the country's economy a low-carbon path.

1.6. Innovativeness, Sustainability and Potential for Scaling-Up

(i) Innovativeness

This proposed Project will be the first of its kind in Nigeria that will bring relevant stakeholders from the public and private sectors for the review of industrial, energy and environmental policies/regulations energy mapping, waste

hotspot analysis, cleaner/safer production, monitoring/enforcement, capacity building and the implementation of a complete package as they would relate to IEE and RECP.

The combination of UNIDO's EnMS/ESO and RECP methodologies will present a synergistic approach aimed at offering smart, effective solutions to numerous production, energy and environmental challenges being faced by small and medium size manufacturing companies within the Nigerian industrial sector for a long time either in a specific sense or as part of general and holistic plant upgrading. UNIDO usually conducts IEE EnMS/ESO and RECP projects separately, meaning the focus was either solely on EnMS/ESO or RECP. The innovative approach of combining both of these UNIDO methodologies provides a complete package ranging from material inputs, to cost accounting, cleaner production, energy efficiency, waste management and plant optimization. Furthermore, the Project will develop and field a methodology (and corresponding tracking tools) to realistically determine the embedded energy and carbon savings that will be generated through the application of the different RECP measures. This methodology will then be available for further expansion and use under the worldwide RECP network and initiatives.

The Project will also assist the development of innovative and affordable local energy efficient and cleaner production technologies and optimization systems for (identified and selected) manufacturing companies which are competitive in the local market, while also encouraging knowledge sharing within and across sectors. Furthermore, the Project's efforts to introduce and mainstream cleaner production methods and energy efficiency/optimization technologies within Nigerian industrial sector can be considered a new approach for the country that has significant potential to build a resource base of professionals that deliver value-added services, improved competitiveness and energy savings.

(ii) Sustainability

The policy activities under Component 1.0 will seek to institutionalize strategies that will ensure project sustainability. Information, workshops and seminars will be held to build the understanding of UNIDO's methodologies of financial institutions and commercial banks. This will assist in the strengthening and diversification of national financing schemes which will have a similar effect by increasing not only the mobilization, but also the customization of funding for energy efficiency and cleaner production projects for manufacturing companies.

The Project's holistic approach will be crucial to the sustainability strategy of the proposed project. Extensive capacity building for manufacturing companies, as well as for financial institutions and banks, and increased awareness of the socio-economic benefits of cleaner production techniques and using energy efficient technologies will encourage the sustainability of replication projects.

The mapping of raw materials, energy consumption, water, production cost, and environmental implications by/for manufacturing companies will help counterparts from the public and private sectors continue such efforts well beyond the project implementation period.

In terms of the sustainability of the Project's pilot EnMS/ESO/RECP enterprises, as mentioned previously, the sustainability of the installed equipment (and the wider EnMS practices) can be considered as high due to the nature of the equipment and the fact that it is hardwired in the production lines of the enterprises concerned.

One of the most important sustainability factors will be securing a national host, owning and champion of the EnMS/ESO/RECP methodologies and their training and technical assistance packages. The Manufacturers Association of Nigeria has already firmly indicated that it wishes to be this entity and it has the capacity, reputation, and membership as well as Government support to ensure long-term sustainability of the methodologies within the industrial sector of Nigeria.

(iii) Potential for Scaling-Up

In terms of scaling up, the policy support component is expected to have a significant impact on the industrial sector, and it is foreseen that this success can be replicated in additional areas and sub-sections after project completion. This will be achieved through close involvement with local counterparts – such as, but not limited to Manufacturers Association of Nigeria (MAN) – thus facilitating the dissemination of information and the implementation of further trainings. By building confidence and technical capacity with key players of the industrial sector, the Project will be able to effectively tap into the replication potential of Nigerian manufacturing sub-sections, thus achieving significant long-term savings. The present industrial enterprise membership of MAN is over 2,500 with representing

approximately 40% of the overall industrial sector. Therefore, by partnering with MAN, the Project can be expected to have a large replication potential throughout Nigeria beyond its initial EnMS/ESO/RECP piloting programme.

Based on extensive experience that UNIDO has developed with its (i) EnMS/ESO/ISO50001; and (ii) RECP/TEST Programmes, it can be expected that over the lifetime of the Project, an additional 200-250 enterprises will implement the EnMS/ESO and/or RECP methodologies. The key to realizing this will be the Project's training courses as they will reach more enterprises than the Project's piloting programme. The UNIDO EnMS/ESO and RECP training courses are so detailed and rounded, it is typically observed that if those trained are from enterprises with committed and progressive management, they will often move forwards with implementation independently.

Lastly, the Project will work the ECOWAS 'Centre for Renewable Energy and Energy Efficiency (ECREEE)' to firstly promote Nigeria, and the MAN, as a regional centre of excellence for EnMS/ESO/RECP as well as resource point for commercially based assistance for EnMS/ESO/RECP training and enterprise implementation technical assistance.

2. Stakeholders. Will project design include the participation of relevant stakeholders from civil society organizations (yes /no) and indigenous peoples (yes /no)? If yes, identify key stakeholders and briefly describe how they will be engaged in project preparation.

2.1. Executing Partners

This Project will be a cross-cutting one which will aim at building production capacities of the identified manufacturers of the Nigerian industrial sector, enhancing rapid economic and industrial growth and, at same time, advancing environmentally sustainable growth, building institutional capacities (government and private enterprises) for greening industries through cleaner production technologies and industrial energy efficiency methodologies (RECP and IEE). Due to the nature of the project, it will not have any impact on indigenous people, but over its implementation period, this factor will be monitored.

2.1.1. Roles of Executing Partners

The roles and responsibilities/mandates of these executing agencies will jointly lead to a decision-making process of choosing a Project Steering Committee chair. When chosen, the Chair and the entire Steering Committee will be responsible for inter-ministry communication facilitation and policy matters concerning environmental pollution, emission (FMOEnv), industrial competitiveness and trade (FMITI), energy efficiency, standard and optimization (ECN).

In line with its mandate of accelerating the growth of the industrial sector and enhancing productivity in Nigeria, the FMITI will contribute towards achieving the goals of this proposed Project through one of its various programmes, namely the Nigerian Industrial Revolution Plan (NIRP), thus creating an enabling environment for the promotion of investment, industrialization of the country.

As the GEF Implementing Agency, UNIDO will lead the process of project preparation and development with the participation of key stakeholders from the Government and the Private Sector. The project execution will be undertaken through multiple contractual arrangements between UNIDO and national governmental entities, and industry associations. On request of the Government, UNIDO will also provide targeted technical assistance and administrative execution support, which will be further discussed with national stakeholders during the PPG phase and elaborated in detail in the CEO Endorsement document.

Furthermore, the role of the Energy Commission of Nigeria (ECN) will be to assist the Project to promote the message that energy should be utilized in an environmentally responsible manner under the various sectors of the economy.

The Manufacturers Association of Nigeria (MAN) is a national industrial association serving and representing over 2,800 manufacturing companies in the private sector. With its corporate headquarters in Lagos, a liaison office at Abuja and twelve branches nationwide, MAN has become a force to be reckoned with as a veritable umbrella for coordinating the activities of manufacturers. Through its representative membership, the Association serves and acts as a central point of reference for government. MAN is in business to create a climate of opinion in this country in

which manufacturers can operate efficiently and profitably for the benefit of all. As the collective voice of its members, MAN was established to promote and protect manufacturers' collective interests.

MAN has indicated that it wished to be the Executing Partner for this Project and the long-term host, owner and champion of the EnMS, ESO and RECP methodologies in Nigeria. It is initially envisaged that MAN will, among other things, provide technical advice and consultations on which sub-sections of the industrial sector EnMS/ESO IEE and RECP will be most beneficial for while considering the operations of its members nation-wide and seeking their participation and support for the implementation of this project. Furthermore, they will additionally be responsible for planning, co-ordinating and facilitating training sessions and workshops with industries within their member networks thus creating an enabling environment for industrial development, growth and prosperity of the society at large.

2.2. Stakeholders

Stakeholders (in no order of priority) for the Project will include:

- ***National Office for Technology Acquisition and Promotion - Nigeria (NOTAP).***

NOTAP is an Agency of the Federal Ministry of Science and Technology (FMST), which was established in response to Nigeria's need to facilitate the emergence of a strong science and technology and innovation system reflective of the desire to evolve a strong economy based on Science and Technology. NOTAP systematically tracks the inflow of technology into Nigeria and strategizes for its adaptation and domestication. Most importantly for this proposed Project, NOTAP will serve as a functional bridge in sustaining the link between the research community and industry (a role it already plays), thus making it a strong anchor for stimulating national development.

- ***Nigerian Investment and Promotion Commission (NIPC)***

The Nigerian Investment Promotion Commission (NIPC) is a Federal Government Agency in Nigeria established by the NIPC Act NO. 16 of 1995 to promote, co-ordinate and monitor all investments in Nigeria. For this project, the role of the NIPC among other things will be to maintain liaison between investors and ministries, government departments and agencies, institutional lenders and other authorities concerned with investments on IEE and RECP. At the same time, the NIPC will advise the Federal Government on Project-related policy matters, including possible measures designed to promote the IEE and RECP based industrialisation within Nigeria.

Further stakeholders to the proposed Project include the Chambers of Commerce of Nigeria – whose role will be to advocate for public policy as well as to create and facilitate commercial and industrial opportunities towards the benefit of its members and the overall business community – as well as the financial institutions to be identified during the PPG phase – with whom a financial mechanism will be developed to promote bankable projects in the future.

- ***Nigerian Society of Engineers***

The Nigerian Society of Engineers (NSE) was established in 1958 to provide a central organization for Engineers in Nigeria and generally to engage in activities that could be necessary to maintain a strict standard of professional ethics amongst its members, and to advance the interest of engineering profession in Nigeria. The NSE has, over the years showcased its relevance, either under consultation or by direct intervention to ensure that correct industrial practices are followed and production facilities are in line with national and ISO Standards, while at the same time promoting that the best available technologies are being used in all engineering sections within the country.

Nigerian Society of Engineers (NSE) will serve as the umbrella organization of qualified engineers from whose pool of technical experts, persons will be identified and selected for further RECP, IEE technical training and capacity building. The NSE serves as a potential source of qualified engineers that can offer RECP/IEE services to the manufacturing sector in Nigeria.

- ***Association for Consulting Engineering in Nigeria (ACEN)***

The Association for Consulting Engineering in Nigeria (ACEN) was established in 1972 and consists of a body of registered, independent, private engineering consultancy firms. The association was established with the purpose of fostering equal opportunities, increasing competitive advantage and improving national standards with international best practices in the field of engineering consulting.

ACEN looks to increase the technical competence as well as the business ethics of firms involved in the sector in addition to growing the sector as a whole. By monitoring standards of practice in the industry, ACEN looks to ensure that stakeholders get the maximum value in return for investments. In addition, ACEN has recently been mandated by The Council for the Regulation of Engineering in Nigeria (COREN) – the statutory body responsible for regulating all engineering activities in Nigeria – to register all consulting engineering firms in the country. Currently, ACEN has over 300 members located in 30 of the 37 states.

ACEN provides tailored activities and services to its members ranging from providing training – through the ACEN School of Consulting Engineering – and standards certification to hosting professional forums and conferences in order to discuss key topical issues affecting members. Engineering consults are always a key target group for UNIDO EnMS/ESO/RECP projects as they free to provide services to multiple enterprises (unlike industrial enterprise employees who are usually only able to carry out engineering assessments and implementation within their own company). As such, the ACEN will be an central stakeholder under the Project.

- ***Universities, Research Institutions, CSOs and Associations***

The Project will also aim to collaborate with Universities, Technical Universities, Polytechnics and research institutions (at the Federal and State levels) in Nigeria. These universities/research institutions will support technical training on cleaner production processes, waste minimization and energy efficiency in cooperation with manufacturing enterprises in the country.

- ***Bank of Industry and Commercial Banks in Nigeria***

The Bank of Industry Limited (BOI) is Nigeria's oldest, largest and most successful development financing institution. It was reconstructed in 2001 out of the Nigerian Industrial Development Bank (NIDB) Limited, which was incorporated in 1964. The bank was launched in 1964 with an authorized share capital of 2.0 million (GBP).

Following a successful institutional, operational and financial restructuring programme embarked upon in 2002, the BOI has transformed into an efficient, focused and profitable institution that is well placed to effectively carry out its primary mandate of providing long term financing to the industrial sector of the Nigerian economy. The BOI will be a principle recipient of EnMS/ESO/RECP investment evaluation training under Component 4.0 and it is also hoped a significant lender to industrial enterprises under the ESO and RECP piloting programme under Component 3.0. In addition, by proving the business and investment case for particularly ESO and RECP improvements, it is hope that the BOI will continue to finance ESO/RECP investment far beyond the lifetime of the Project.

- ***Private Financing Advisory Network (PFAN)***

The PFAN is an existing multilateral public private partnership, initiated by the Climate Technology Initiative (CTI), a technology cooperation mechanism under the International Energy Agency, and the Expert Group on Technology Transfer (EGTT) of the UNFCCC. PFAN has just opened a West Africa Office that will aim to match private financing with innovative low carbon, climate resilient projects in Nigeria with a small public investment through a low-risk, low overhead networking model based on fixed fee project development, transaction advisory services, and investor forums, meeting a need recognized in international development and climate circles. PFAN will aim to support Nigerian companies for low carbon, climate resilient projects in the areas of upstream technology development and downstream technology deployment for renewables, energy efficiency and climate adaptation. The PFAN model will aim mobilize the national expertise of private sector companies in financing climate-friendly projects and technologies to screen business plans and select the most economically viable and environmentally and socially beneficial projects. For the Nigerian entrepreneurs and businesses selected, PFAN would provide guidance on economic feasibility, project structure, investment and financing, preparation of the business plan, and introductions to investors. As such, PFAN will be natural Project partner under Component 4.0 (and Component 3.0) as their objectives and planned operations are significantly in line with those of the Project.

3. Gender Equality and Women’s Empowerment. Are issues on gender equality and women’s empowerment taken into account? (yes /no). If yes, briefly describe how it will be mainstreamed into project preparation (e.g. gender analysis), taking into account the differences, needs, roles and priorities of women and men.

UNIDO recognizes that gender equality and the empowerment of women have a significant positive impact on sustained economic growth and inclusive industrial development, which are key drivers of poverty alleviation and social progress. Commitment of UNIDO towards gender equality and women’s empowerment is demonstrated in its policy on Gender Equality and the Empowerment of Women (2015), which provides overall guidelines for establishing a gender mainstreaming strategy. UNIDO has also developed an operational energy-gender guide to support gender mainstreaming of its sustainable energy initiatives.

The Nigerian industrial sector is primarily dominated by a male workforce. Albeit and with various women emancipation programmes at work places, women are increasingly becoming involved "hands-on" in different sections of the production line in manufacturing/consulting as well as taking supervisory roles and responsibilities thereof. Nevertheless, UNIDO recognizes that Cleaner Production, Resource Management and Energy Efficiency interventions are expected to have an impact not only on the staff and management of selected enterprises but on all people and the entire country at large and, as such, the proposed UNIDO methodologies, are therefore, not gender-neutral.

In fact, due to diverging industrial needs and rights regarding energy consumption and production, women and men are expected to be affected differently by the Project (in terms of their rights, needs, roles, opportunities, etc.). Therefore, regardless of the Project’s gender category, the Project aims to demonstrate good practices in mainstreaming gender aspects into IEE and RECP approaches wherever possible and avoid negative impacts on women or men due to their gender, ethnicity, social status or age. Consequently, it will be considered to include the gender dimension during the whole project cycle.

During the Project’s PPG phase, continued evaluation and scoping exercises will be held with national gender experts to ensure that the relevant gender dimensions are considered. Consequently, the Project will actively seek to gender-mainstream the whole project cycle. To mainstream gender into the Project during the PPG phase, an in-depth gender analysis will be conducted to identify entry points for defining gender aware project outcomes, outputs as well as activities, and the Project log-frame will be developed to reflect key gender dimensions of the respective outputs, activities, indicators and targets.

A guiding principle of the proposed Project will be to ensure that both women and men are provided equal opportunities to access, participate in and benefit from the Project, without compromising the technical quality of the Project results. In practical terms, gender-sensitive identification and selection will be practiced at all levels where possible, especially in selection of industry staff, project staff and stakeholders. Gender responsive TORs will be used to mainstream gender in the activities of consultants and experts. In cases where the Project does not have direct influence, gender-sensitive recruitment will be encouraged. Furthermore, whenever possible, existing company staff will be trained and their awareness raised regarding gender issues.

All decision-making processes will consider gender dimensions. At project management level, Project Steering Committee meetings will invite observers to ensure that gender dimensions are represented. Also, at the level of project activity implementation, effort will be made to consult with stakeholders focusing on gender equality and women’s empowerment issues.

4. Risks. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

<i>Risk Category</i>	<i>Risk</i>	<i>Level</i>	<i>Proposed Mitigation Measure</i>
Policy and Institutional Risk	Since the advent of a new Government in the country, there might be a change of national	Low	The newly elected federal government of Nigeria has ensured that they are committed to continue the implementation of NIRP, NREEP and INDC through the respective ministries, departments and agencies. These three

	priorities regarding regulations and policies that should promote EnMS/ESORECP and their introduction implementation.		national priorities provide a more valid reason for the development and implementation of this project as it will on the one hand strengthen the government's capacities to having effective regulatory and monitoring mechanisms and on the other hand, assist key stakeholders in the manufacturing sectors to improve their productivity, achieve their energy efficiency targets, reduce waste of scarce input resources (water, material) and ultimately reduce environmental waste and carbon emissions.
Technical Risk	1. Associated with upgrading and improving cleaner production and material inventory, waste reduction and new technological innovations.	Medium	As proposed in Component 4.0, this Project aims to ensure that the country's industrial sector and subsectors have increased their managerial and financial capacities and are able to design bankable business proposals to get loans from financial institutions. To mitigate this risk, this project will identify industrial/commercial banks in the country with a view to explain the IEE concept, identify and highlight business and investment opportunities to the banks and how they can finance the introduction and adaptation energy efficient technologies with good returns on their investment over a period of time.
	2. Associated with energy efficient technologies not being affordable or adaptable by small and medium scale industries.	Low	The Project will employ the services of highly skilled experts with specific expertise in resource efficiency and cleaner production and with proven records of being able to carry out Cleaner Production Assessments (CPAs) at the industry level. A good CPA will be useful to establishing better environmental management accounting (EMA) especially in companies that do not have a well-established management accounting system and environmental controlling system to provide information on material flows and the costs associated with them.
Economic Sustainability Risk	Willingness of manufacturing companies to accept introduction of IEE and RECP methodologies and allow their sites to be used as a demonstration.	Low	The Project will highlight and emphasis the benefits of enterprise participation and acceptance of the introduction RECP and EnMS/ESO to their plant operators and technicians while using their industries as demonstration sites for the implementation of the methodologies herein proposed. Modalities and mechanisms towards ensuring the participation of the organized private sector which constitute the beneficiary groups will be fully analyzed at the PPG phase.
Climate Change Risk	Increased environmental waste as a result of non-adaptation RECP methodologies	Low	Higher levels of CO ₂ emissions caused by use of fossil fuels coupled with lack of energy optimization systems in industries, may pose a challenging factor for the country and the manufacturing sector to achieve the desired triple bottom line goal (social, environmental/ecological and financial.) The design of the Project at the PPG phase will include climate risk analysis and integrate mitigation strategies even at the industries' level. During the project preparation phase, an assessment of the country's industrial climate change demands and vulnerability based on different scenarios will be carried out and, when necessary, possible alternatives will be identified.

4. Coordination. Outline the coordination with other relevant GEF-financed and other initiatives.

The Project will provide an innovative approach as it aims to work together with government ministries, departments and agencies, civil society, academic/financial institutions, development agencies (GIZ in particular), and key players of the organized private sector involved with environmental initiatives of significant magnitude. These will primarily focus on the issues of conservation of natural resource by industries, optimum utilization of input materials, cleaner production, reduction of industrial waste and industrial energy efficiency. The Project will partner with the Ministry of Environment and other relevant government ministries who serve as counterpart ministries for other relevant GEF Projects in Nigeria to ensure that synergies are identified amongst on-going GEF projects and proper coordination is put in place to avoid replication.

5. Consistency with National Priorities. Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes /no). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

Nigeria’s Intended Nationally Determined Contribution (INDC)

Aligned with the IEE EnMS/ESO and RECP and methodologies to be introduced and implemented at the industry levels, the Project herein proposed will be consistent Nigeria’s Intended Nationally Determined Contribution (INDC). Intended Nationally Determined Contribution identifies the actions a national government intends to take under the Paris Agreement agreed in December 2015 at the 21st session of the Conference of the Parties (COP21). INDCs are, therefore, the basis of post-2020 global emissions reduction commitments included in the climate agreement. The acronym “INDC” was introduced at COP19 in Warsaw (in 2013). The term “contributions” emerged as a compromise between “QUELRO – Quantified Emissions Limitation and Reduction Objective” and “NAMAs – Nationally Appropriate Mitigation Actions” that in the Kyoto Protocol’s language and its follow up identify emission reduction actions, respectively. INDCs indeed refer both to developed and developing countries’ plans. In their INDCs (to be named NDCs, Nationally Determined Contributions, after the Agreement comes into force), UNFCCC Parties are requested to outline the steps they are taking/will take to reduce emissions at national level. According to negotiating developments in Lima (COP20), countries might also address other issues, such as undertakings in adaptation planning.

Nigeria has been actively engaged in international climate policy negotiations since it became a Party to the UN Framework Convention on Climate Change (FCCC) in 1994 ratifying its Kyoto Protocol in 2004. Nigeria submitted its First National Communication (FNC) in 2003 and a Second National Communication in February 2014. Nigeria is host to a number of Clean Development Mechanism projects, as well as projects financed by the Adaptation Fund. In September 2012, the Federal Executive Council approved the Nigeria Climate Change Policy Response and Strategy. The President of the Federal Republic of Nigeria approved the Nigeria INDC on 26 November 2015.

The INDC promotes sustainable development and delivering on government priorities. The policies and measures included in the Nigeria INDC will deliver immediate development benefits and do not compromise sustainable growth; on the other hand, ambitious mitigation actions are economically efficient and socially desirable for Nigeria, even when leaving aside its climate benefits. Furthermore, by not undertaking these measures, Nigeria would incur significant adaptation costs from exacerbated climate change. The table below summarizes Nigeria’s INDC¹⁴.

<i>Aspect</i>	<i>Details</i>
Type of objective	Reduction from Business as Usual (BAU)
Target year	2030
Implementation Period	2015-2030
Base data period	2010-2014
Summary of objective	Economic and social development: grow economy 5% per year, improve standard of living, electricity access for all

¹⁴ Conference of Parties to the United Nations Framework Convention on Climate Change (COP-UNFCCC) in Preparation for the Adoption of Climate Change Agreement at the Paris Conference on Climate Change coming up in December, 2015 Prepared by the Federal Ministry of Environment, Abuja, 27 October 2015

Unconditional and Conditional mitigation objectives	20% unconditional, 45% conditional
Key measures	<ul style="list-style-type: none"> • Work towards ending gas flaring by 2030 • Work towards Off-grid solar PV of 13GW (13,000MW) • Efficient gas generators • 2% per year energy efficiency (30% by 2030) • Transport shift car to mass transit • Improve electricity grid • Climate smart agriculture and reforestation
Emissions per US\$ (real) GDP	0.873 kg CO _{2e} (2015) [0.491 kg CO _{2e} (2030)]
GDP per capita (US\$)	2,950 (2014) 3,964 (2030; real 2015 US\$)
Estimated emissions per capita	Current: around 2 tonnes CO _{2e} 2030 BAU: around 3.4 tonnes CO _{2e} 2030 Conditional: around 2 tonnes CO _{2e}
Conditions for implementation /financial support required	International support, in the form of finance and investment, technology and capacity building.
Cost Estimate Data	National Cost = \$142b; National Benefits = \$304b (World Bank report “Low Carbon Development Opportunities for Nigeria” (2013))
Gases covered	CO ₂ , N ₂ O, CH ₄
Emissions as % of global total	<1% (2010)

This Project aims to contribute to a national 2% per year energy efficiency effort through the introduction and implementation of IEE-RECP methodologies at the industry levels with innovations and technologies that increase productivity, assist in reducing energy consumption and at same time have minimal environmental impacts and CO₂ emissions.

6. Knowledge Management. Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

Knowledge management will be a key approach of the proposed Project. This will be achieved through the development of a database to manage the guidebooks, training materials and strategies on enterprise-level IEE/RECP project development. This will benefit users/utility such as, the Non-Government Organizations (NGOs)/Civil Service Organizations (CSOs), community group, individual firm, government agencies, industries.

In addition, the Project will ensure that the lessons learned and best practices from ongoing UNIDO projects in Nigeria and the region are incorporated into the Project design and implementation. UNIDO has a large experience in the implementation of industrial energy efficiency projects and this knowledge and network will be leveraged by the proposed Project to ensure knowledge management within and across UNIDO projects and for global level initiatives. For example, project data such as number of experts trained, GHG emissions savings, types of technologies implemented will also be compiled to allow for improved measurement, assessment and comparison. This approach will enable and facilitate knowledge sharing between industries and project partners and also provide an ongoing coordination mechanism that will remain in place beyond the project period.

Efforts will be made to ensure both women and men have access to, benefit from, and can contribute to the knowledge; while lessons learned and best practices demonstrate gender impacts and potentially feature projects that empower women.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT¹⁵ OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):
 (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [SGP OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Mr Amos Ibrahim Tanko	GEF Operational Focal Point	FEDERAL MINISTRY OF ENVIRONMENT	12/19/2016

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies¹⁶ and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Mr. Philippe R. Scholtès, Managing Director, Programme Development and Technical Cooperation (PTC), UNIDO GEF Focal Point		06/06/2017	Mr. James New 	+431 26026 3641	j.new @unido.org

C. ADDITIONAL GEF PROJECT AGENCY CERTIFICATION (APPLICABLE ONLY TO NEWLY ACCREDITED GEF PROJECT AGENCIES)

For newly accredited GEF Project Agencies, please download and fill up the required [GEF Project Agency Certification of Ceiling Information Template](#) to be attached as an annex to the PIF.

¹⁵ For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

¹⁶ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, SCCF and CBIT