Sustainable energy systems for urban-industrial development in South Africa

Part I: Project Information

GEF ID
10817

Project Type
MSP

Type of Trust Fund
GET

CBIT/NGI
CBIT **No**
NGI **No**

Project Title
Sustainable energy systems for urban-industrial development in South Africa

Countries
South Africa

Agency(ies)
UNIDO

Other Executing Partner(s)
Department of Trade, Industry and Competition (dtic), National Cleaner Production Centre of South Africa (NCPC-SA)

Executing Partner Type
Government

GEF Focal Area
Climate Change

Taxonomy
Focal Areas, Climate Change, Climate Change Mitigation, Financing, Technology Transfer, Energy Efficiency, Renewable Energy, Influencing models, Transform policy and regulatory environments, Demonstrate innovative approache, Convene multi-stakeholder alliances, Deploy innovative financial instruments, Strengthen institutional capacity and decision-making, Stakeholders, Beneficiaries, Communications, Behavior change, Public Campaigns, Awareness Raising, Type of Engagement, Consultation, Participation, Information Dissemination, Partnership, Local Communities, Private Sector,

Capital providers, SMEs, Large corporations, Financial intermediaries and market facilitators, Civil Society, Community Based Organization, Non-Governmental Organization, Academia, Gender Equality, Gender results areas, Participation and leadership, Capacity Development, Knowledge Generation and Exchange, Gender Mainstreaming, Gender-sensitive indicators, Integrated Programs, Sustainable Cities, Municipal waste management, Energy efficiency, Integrated urban planning, Municipal Financing, Capacity, Knowledge and Research, Knowledge Generation, Training, Seminar, Workshop, Knowledge Exchange, Conference, Peer-to-Peer, Enabling Activities, Learning, Indicators to measure change, Theory of change, Innovation

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 2

Climate Change Adaptation

Climate Change Adaptation 0

Duration

48 In Months

Agency Fee($)

115,874.00

Submission Date

5/12/2021

A. Indicative Focal/Non-Focal Area Elements

Programming Directions	Trust Fund	GEF Amount($)	Co-Fin Amount($)
CCM-1-1	GET	609,861.00	5,335,000.00
CCM-1-3	GET	304,930.50	2,667,500.00
CCM-1-4	GET	304,930.50	2,667,500.00
	Total Project Cost ($)	**1,219,722.00**	**10,670,000.00**

B. Indicative Project description summary

Project Objective

Reducing GHG emissions and other environmental and social impacts by accelerating the decarbonization of industrial parks and other related environmental impacts, by addressing both the energy supply and demand side.

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
1. Fostering the coordination towards sustainable energy transformation of IPs by creating a conducive enabling environment under consideration of social equity	Technical Assistance	Outcome 1: Government and local authorities ensure a conducive IP-associated policy and regulatory environment, especially with regard to energy generation and consumption formulated in a sustainable and inclusive manner	Output 1.1: The coordinative capacity for sustainable energy solutions in IPs are strengthened on municipality and IP management level(s) Output 1.2: Analysis of typical energy profiles is made available to IPs, industrial establishments, the government and municipalities supported by introduced energy audits Output 1.3 IP management and tenant companies are provided with guidance on establishing IP energy strategies at local sites that are sustainable and foster social inclusion Output 1.4: Key	GET	241,500.00	530,000.00

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
2. Demonstration of low-carbon and sustainable energy through IP pilots	Investment	Outcome 2: IP managements and manufacturing businesses gain confidence and sufficient evidence of the technical, economic, social and environmental viability of sustainable energy solutions for industrial production in the urban-industrial-energy nexus	Outputs 2.1: Sustainable energy infrastructure at IP pilot projects is implemented demonstrating sustainable energy solutions at IP level Output 2.2: Lesson learned, including social and equity impacts, from the sustainable energy pilot demonstration in the urban-industrial-energy nexus are derived Output 2.3: Knowledge about best practice examples for low-carbon IP activities in South Africa and globally are disseminated amongst IP managers through a Community of Practice	GET	668,322.00	8,515,000.00

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
3. De-risking scheme for upscaling and replication of sustainable energy solutions in EIPs	Technical Assistance	Outcome 3: The Government and the financial sector enhance the financial and investment environment to de-risk investments in sustainable energy infrastructure in IP	Output 3.1: Strategy for upscaling of IP sustainable energy pilot programme is in place considering gender lens investment principle Output 3.2: A project pipeline for investment replicating the IP sustainable energy pilot approaches identified Output 3.3: The understanding of key stakeholders on financing options for sustainable energy activities in IP are strengthened through establishing a marketplace	GET	149,000.00	505,000.00

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount($)	Co-Fin Amount($)
4. Monitoring and evaluation	Technical Assistance	Outcome 4: Project achieves objective through effective monitoring and evaluation	4.1: Mid-term review 4.1.2: Gender analysis and regular monitoring of the gender mainstreaming action plan 4.1.3: Final evaluation	GET	50,500.00	
				Sub Total ($)	**1,109,322.00**	**9,550,000.00**

Project Management Cost (PMC)

GET	110,400.00	1,120,000.00
Sub Total($)	**110,400.00**	**1,120,000.00**
Total Project Cost($)	**1,219,722.00**	**10,670,000.00**

C. Indicative sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Recipient Country Government	dtic / NCPC-SA	Grant	Investment mobilized	900,000.00
Recipient Country Government	dtic / NCPC-SA	In-kind	Recurrent expenditures	300,000.00
GEF Agency	UNIDO	Grant	Investment mobilized	50,000.00
GEF Agency	UNIDO	In-kind	Recurrent expenditures	120,000.00
Recipient Country Government	South African Local Government Association (SALGA)	In-kind	Recurrent expenditures	50,000.00
Other	Industrial Development Corporation (IDC)	Loans	Investment mobilized	3,000,000.00
Donor Agency	Development Bank of South Africa (DBSA)	Loans	Investment mobilized	5,000,000.00
Donor Agency	UNIDO / SECO	Grant	Investment mobilized	1,250,000.00
			Total Project Cost($)	**10,670,000.00**

Describe how any "Investment Mobilized" was identified

Co-financing was identified through project/barrier assessments and initial discussions with ministries and implementing partner. The following co-finance source for mobilising investment have been identified: ? Loans by Industrial Development Corporation (IDC) are used to mobilised investments. IDC?s offers special financing schemes such as the AFD Green Energy Fund providing finance to renewable energy and energy efficiency investments (fund size ZAR 1 billion). IDC is the largest state-owned development finance institution that provides funding for the development of industry in South Africa and the rest of Africa. ? Loans by the DBSA though it?s finance facilities under the Green Climate Fund (GCF) o FP098 : DBSA?s Climate Finance Facility (supporting infrastructure projects that mitigate or adapt to climate change (USD 170 million for bankable projects in South Africa and Rand-based economies ? Swaziland,

Namibia, Lesotho). o FP106 : The GCF-DBSA Embedded Generation Investment Programme (?EGIP?) will support the implementation of renewable energy projects with a capacity of 330 MW, which is comprised of 280 MW Solar PV and 50 MW Wind (USD 537 million) Further co-finance funding will be explored during PPG. Initial discussions are ongoing with World Bank?s International Finance Corporation (IFC) and with dtic, e.g. under its Industrial Parks Revitalization Programme . In addition, co-finance will be provided in-kind by the dtic, SALGA, UNIDO and the NCPC-SA including co-financing of project management costs. Investment mobilized identified will be further defined and confirmed during the PPG phase.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNIDO	GET	South Africa	Climate Change	CC STAR Allocation	1,219,722	115,874	1,335,596.00
			Total GEF Resources($)		**1,219,722.00**	**115,874.00**	**1,335,596.00**

E. Project Preparation Grant (PPG)

PPG Required **true**

PPG Amount ($)

50,000

PPG Agency Fee ($)

4,750

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNIDO	GET	South Africa	Climate Change	CC STAR Allocation	50,000	4,750	**54,750.00**
				Total Project Costs($)	**50,000.00**	**4,750.00**	**54,750.00**

Core Indicators

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)	3330000	0	0	0
Expected metric tons of CO?e (indirect)	11000000	0	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)				
Expected metric tons of CO?e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)	3,330,000			
Expected metric tons of CO?e (indirect)	11,000,000			
Anticipated start year of accounting	2022			
Duration of accounting	20			

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)				

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	4,500			
Male	10,500			
Total	15000	0	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

There is a significant potential for energy efficiency and renewable energy supply, and hence a significant decline of fossil fuel-based electricity generation in the country in the longer term. In South Africa the production of electricity is mainly based on domestic coal generated in coal fired power plants of ESKOM as the leading utility. The grid emission factor in the national grid currently amounts to approx. 0.950 tCO2/MWh. Hence, with every MWh saved due to energy efficiency gains or replacement with clean renewable energy sources 0.950 tCO2 could be reduced. For instance, at an IP renewable energy can be generated through solar PV with an installed capacity of 1 MWp and supply the tenants with clean power of 1,460 to 2,045 MWh/a (depending on the region and solar irradiation) up to 1,400 - 2,000 tonnes of CO2 emission can be reduced. At the pilot activities a potential emission reduction of at least 165,000 tCO2/a is estimated (assuming 3 pilot IPs equivalent to the size and GHG emission balance of the ELIDZ, i.e., 55 ktCO2/a emission reduction potential. See Textbox under Output 2.1). Direct beneficiaries is calculated to be approximately 15,000 individuals working in manufacturing and service jobs in industrial parks. This estimate is based on numbers of employees working in ELIDZ: 4,770 in 2019/2020 and assumed for 3 industrial parks of equivalent size. The current proposal assumes as 30/70 split in terms of female/male ratio based on data from the South Africa Department of Women, Status of Women in the South African Economy Report which found that 30% of employees in the manufacturing sector were female. Disaggregation by gender will be further investigated during the PPG phase. Additional sustainable development and co-benefits (environmental and social-economic, such as additional revenue and costs savings, attraction of private investments, job creation, waste diversion, etc) will be further analysed for the PPG phase in consultation with key stakeholders.

Part II. Project Justification

1a. Project Description

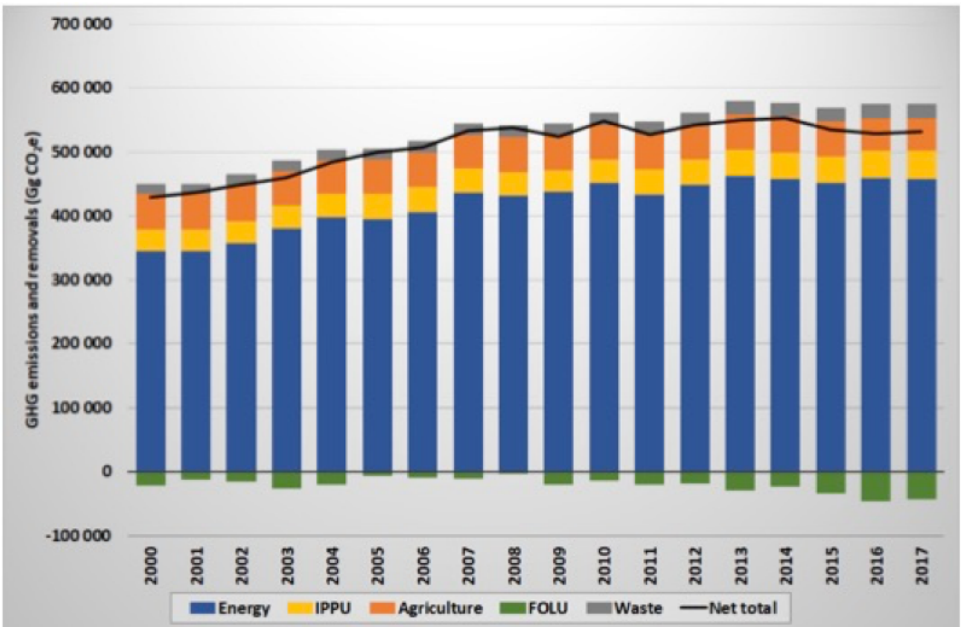
a) Global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description)

Environmental problem and current situation

Energy and industry sector driving high levels of GHG emissions

1. South Africa?s CO_2 emissions per capita are amongst the highest per capita emissions in the developing world, which is mainly due to a high energy intensity profile. Since 2000, the country?s GHG emissions (excl. FOLU) have increased by 27.9%, and GHG emissions (including FOLU) have increased by 24.2% (with an average annual growth rate of 1.5% between 2000 and 2017).

Figure 1: South Africa?s GHG emissions between 2000 and 2017 by sector



*Source: DEPARTMENT OF ENVIRONMENT, FORESTRY AND FISHERIES, 2020**[1]***

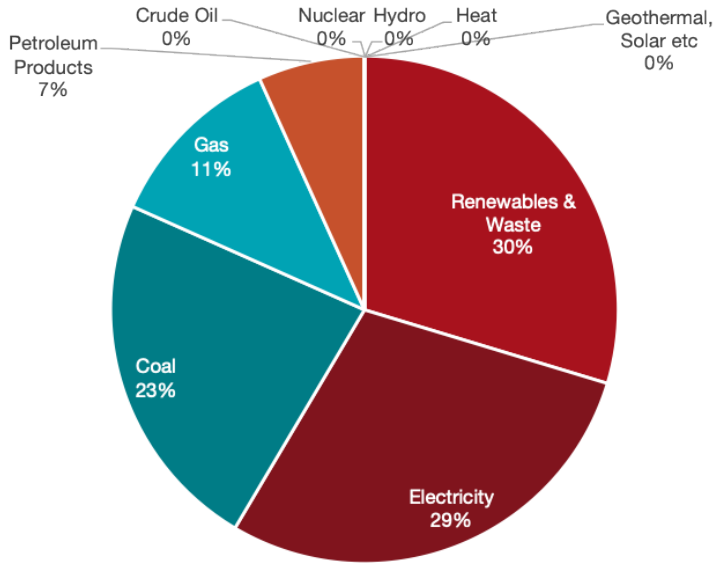
[1] SOUTH AFRICA?S 4th BIENNIAL UPDATE REPORT TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (zero order draft), available from https://www.environment.gov.za/sites/default/files/gazetted_notices/biennialupdatereport04tounfccc_zeroorderdraft.pdf

2. South Africa?s **energy consumption is the main contributor** to these constantly increasing GHG emission levels. A strong reliance on a coal-based energy production system for the generation of electricity and for the production of a significant proportion of the liquid fuels consumed in the country, including for transport. Also, the economy is dominated by large-scale, energy-intensive primary minerals beneficiation industries and mining industries. So far, renewable energy resources are used only to a limited extent as energy sources. Thus, the primary energy supply in South Africa is dominated by coal (59%), followed by crude oil (16%), renewable resources and waste (20%)[1], natural gas (3%) and nuclear energy (2%).[2] Coal is the main source of energy for power generation (mainly by the Electricity Supply Committee or 'Eskom'). The share of renewable energies for electricity generation is still low: By 2016 and 2017, the penetration levels of wind and solar energy resources had increased to 3% (6.9 TWh) and 4% (10.8 TWh), respectively.[3]

3. In terms of GHG emissions, the total amount of **emissions from the energy sector** for 2017 is estimated to be 458.6 $MtCO_2e$, with fuel combustion activities being the main contributor, accounting for 93.4% of emissions from the sector. Overall, power generation (energy industries) is the main source of emissions from the energy sector, accounting for 60.2% (followed by transport with 17.0% and manufacturing industries and construction with 8.2%, respectively). Furthermore, the residential and commercial sectors are both heavily reliant on electricity for meeting energy needs.

[1] Industrial and residential heat production from biomass.
[2] Department of Energy (2017): Energy Balance for 2017. Department of Energy, Pretoria, South Africa. Available at: http://www.energy.gov.za/files/media/Energy_Balances.html
[3] Also compare Green Cape (2020): Utility-scale renewable energy 2020. Market Intelligence Report. Available from https://www.greencape.co.za/assets/Uploads/RENEWABLE_ENERGY_MIR_20200330_WEB.pdf

Figure 2: Energy use of industry sector by type, South Africa 2017



Source: Authors, based on Department of Energy 2017 (http://www.energy.gov.za/files/media/Energy_Balances.html). Note that energy used from ?renewables and waste? is 100% attributed to biomass.

4. South Africa?s **industry sector is of high relevance for addressing the high levels of GHG emissions**. With 47%, the industrial sector (which includes mining, iron and steel, chemicals, non-ferrous metals, non-metallic minerals, pulp and paper, food and tobacco, and other) is the largest user of energy in South Africa.[1] In terms of sources, most energy is used from biomass (30%), electricity (29%), followed by coal (23%), gas (11%) (see figure above). Note that biomass is used commercially in industrial processes to generate process heat.

5. Accordingly, **GHG emissions from the industry sector are significant.** Emissions from the industrial processes and product use (IPPU) sector are slowly increasing (except for the reduced emissions during the recession). The main GHG emission driving processes in the IPPU sector are the metal industries, particularly iron and steel production and ferroalloy production. In 2017, the Industrial Process and Product Use (IPPU) sector produced 43.2 $MtCO_2e$, which corresponds to 7.5% of South Africa?s emissions (excluding FOLU).[2]

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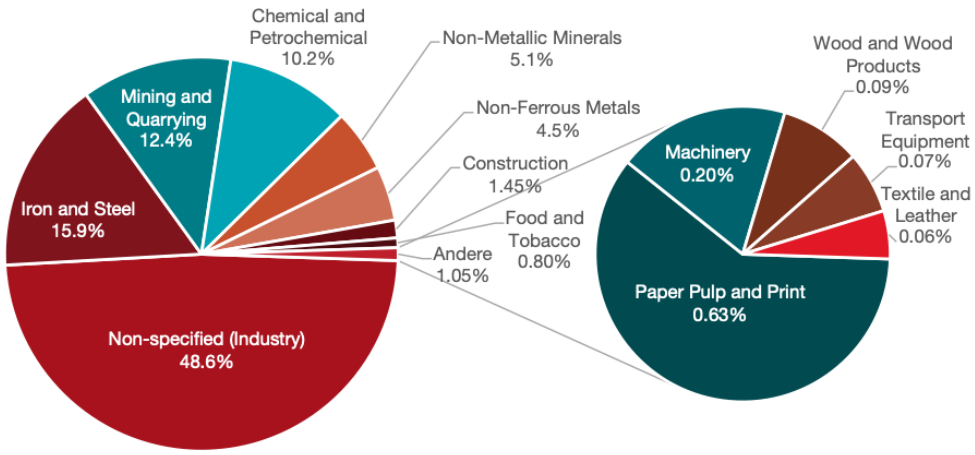
[1] DEPARTMENT OF ENVIRONMENT, FORESTRY AND FISHERIES (2020): SOUTH AFRICA?S 4th BIENNIAL UPDATE REPORT TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (zero order draft), available from https://www.environment.gov.za/sites/default/files/gazetted_notices/biennialupdatereport04tounfccc_zeroorderdraft.pdf

[2] Note that industry sector also includes non-energy related emissions from industrial processing plants. The main emission sources are releases from industrial processes that chemically or physically transform raw material, e.g., ammonia products manufactured from fossil fuels. GHG emissions released during these processes are CO_2, CH_4, N_2O, HFCs and PFCs.

Figure 3: Split of industry sector energy consumption, South Africa 2017



Source: Authors, based on Department of Energy 2017 (http://www.energy.gov.za/files/media/Energy_Balances.html).

6. A clear focus of this GEF project is thus on energy consumption of industrial, manufacturing and commercial establishments in the urban context.

Industrial activities and agglomerations

7. With a share of 25% of the GDP and employing an estimated 23% of the country?s workforce, the industry sector serves as an important backbone of the South African economy. As mentioned above,

major industrial sectors are mining (Platinum, Gold, Chromium), automobile assembly, metal-working and machinery. Manufacturing is contributing some 12% of the total GDP and 58% of the exports in 2018. The manufacturing activities are predominantly concentrated in the metropolitan areas of three provinces, namely Gauteng, Western Cape and Kwa-Zulu Natal, leaving many other parts of the country with low manufacturing capacity.[1] At the same time, South Africa has experienced limited economic growth over the last years as a result of global dynamics, political uncertainties, corruption, labour and social aspects, as well as unstable electricity supply, leading to an associated decline in manufacturing in the country.

Table 1: Defining industrial parks and zones in South Africa

Category	Managing entity	Specific features / Definition
Industrial Parks	Private as well as Government funded	An industrial park as defined in South Africa generally exists to support, manage and administer industrial activities within a specified area in order to facilitate socioeconomic benefits for the surrounding area, its tenants and the country as a whole.
Industrial Development Zone / Special Economic Zone	National Government / Government owned	An Industrial Development Zone (IDZ) is a purpose-built industrial estate linked to an international seaport or airport and which is capable of leveraging fixed direct investments in value-added and export-orientated manufacturing industries. All IDZs have, or are in process of, transition to become SEZs. Special Economic Zones (SEZs) are geographically designated areas set aside for specifically targeted economic activities. They are supported through special arrangements (that may include laws) and systems that are often different from those that apply in the rest of the country. The Special Economic Zones Act 16 of 2014 provides for the designation, promotion, development, operation and management of SEZs.

Source: adapted from UNIDO (2020), Global Eco-Industrial Parks Programme - South Africa: Country level intervention Project Document

[1] UNIDO (2020), Global Eco-Industrial Parks Programme - South Africa: Country level intervention Project Document

8. In this regard, for manufacturing and industrial production, the approximately 450 South African **industrial parks play an important role as hubs for business and centres of employment**. Those parks are categorized as industrial parks, industrial development zones (IDZ) and special economic zones (SEZ), as summarized below, and accommodate a broad spectrum of the country?s industrial and manufacturing production capacity.[1] Currently 27 government owned industrial parks and 15 SEZs operate in South Africa. In addition, approximately 300 smaller privately-owned industrial parks exist, while some 100 municipality-owned industrial parks operate in South Africa. Apparently, no inventory exists for of these private and municipal-owned parks in South Africa. This information is only available at the municipality level.[2]

9. While certainly not being representative, taking a closer look at the country?s SEZs and IDZs provides a fair overview of the broad composition and specialization of industrial park settings in South Africa. The table below illustrates the spectrum of production activities, ranging from manufacturing such as automotive or renewable energy plants, over electronics and agro-processing to air transport and logistics services.

Table 2: Selected SEZs and IDZs in South Africa

Name	Production Focus	Municipality
Atlantis Greentech SEZ	Renewable Energy	City of Cape Town
Coega IDZ	Automotives	Nelson Mandela Bay
Dube Trade Port	Agro-processing and electronics	eThekwini
East London IDZ	Automotives	Buffalo City
Maluti-A-Phofung SEZ	Automotive logistics, agro-processing, pharmaceutical	Maluti a Phofung
Mthatha SEZ	Agro-processing	King Sabata Dalindyebo
Musina Makhado SEZ	Logistics, petrochemicals and trade hub	Makahdo / Musina
Nasrec SEZ	ICT and electronics	City of Johannesburg
Nkomazi SEZ	General Logistics	Nkomazi
OR Tambo International Airport IDZ	Air transport	Ekurhuleni
Platinum Valley SEZ	Platinum Group Metals	Moses Kotane
Richards Bay IDZ	Beneficiation of natural resources	uMhlathuze
Saldanha Bay IDZ	Marine Engineering, with a focus on oil and gas	Saldanha Bay
Tubatse SEZ	Platinum Group Metals	Greater Tubatse
Upington SEZ	Solar Corridor	Khara Hais

[1] http://www.thedtic.gov.za/wp-content/uploads/SEZ_Fact_Sheet.pdf
[2] According to UNIDO (2020): Global Eco-Industrial Parks Programme - South Africa: Country level intervention Project Document

10. As highlighted above, when it comes to decarbonizing the industry sector, South Africa faces considerable challenges to curb its GHG emission levels. The **dependency of fossil-fuel based energy** (particularly from the state utility Eskom) is still predominant.

11. While limited data on the use of energy in individual IPs is available, it appears that **sustainable energy aspects of industrial activities are insufficiently integrated into the operation of parks** and the urban development planning of municipalities. In general, municipalities in South Africa are expanding in a resource-intensive and inefficient manner, in part because of the challenges with integrated planning within the institutions. Sustainability needs to be embedded into municipal development agendas and seen as central to service delivery, not as a separate ?green agenda?. As municipalities and industrial parks/zones are truly interconnected entities, IPs have the potential to contribute significantly to the development of more sustainable municipalities by providing joint infrastructures and industrial urban synergy options (?urban-industry nexus?). In South Africa, the development of industrial parks is intended to integrate with local and regional development activities. As they form part of a greater ecosystem, it is important that the impact and benefits of interventions in industrial parks have positive downstream effects on the community, city/town and municipality.[1]

12. Given the relevance of manufacturing and industrial production for the country?s energy demand, understanding and unlocking the huge potential for sustainable energy consumption and supply at IPs is thus of core importance. There is a clear need for ongoing support to industrial parks in South Africa, including support with implementation of priority ?eco-industrial park? (EIP) opportunities as well as the identification and prioritization of EIP opportunities in other parks. This includes the promotion of sustainable energy.[2]

[1] Compare UNIDO (2020): Global Eco-Industrial Parks Programme - South Africa: Country level intervention Project Document. Also see UNECA?s report ?Economic Report on Africa 2017: Urbanization and Industrialization for Africa?s Transformation?, available from https://www.uneca.org/sites/default/files/fullpublicationfiles/era-2017_en_fin_jun2017.pdf

[2] As concluded by a GIZ / UNIDO project on Eco-Industrial Parks. See also NCPC-SA and Sofies (2019): National Workshop ? 3 December 2019: Taking stock and advancing the transition to Eco-Industrial Parks (EIPs) in South Africa. Summary report for dtic and UNIDO.

Root causes and barriers that need to be addressed

13. Further development of industrial parks towards a clearly sustainable energy setting is required to decrease the energy intensity and related GHG emissions. In general, important common barriers or challenges hindering the further development of industrial parks in South Africa cover a comprehensive spectrum, including aspects of security and reliability of water, electricity supply, technical and management capacities of park management entities, outdated and malfunctioning infrastructure, access-to-finance for new and existing companies, or functional and aesthetic deficiencies.[1] These general barriers are to a large extent confirmed by the stakeholder interviews.

14. According to NCPC-SA, dtic and UNIDO (2019) these root causes are systemic problems and therefore need to be addressed in a holistic manner at national, provincial, and municipal, as well as industrial park and factory levels, when fostering industrial park development. With respect to the context of energy, research and stakeholder interviews generally confirm the above. For better addressing the problem statement that sustainable energy aspects of industrial activities are insufficiently integrated into the operation of IPs and the urban development planning of municipalities, the most relevant issues can be clustered along four barriers, as presented below.

[1] See UNIDO (2020): Global Eco-Industrial Parks Programme - South Africa: Country level intervention Project Document

Barrier 1: Insufficient integration and coordination of sustainable energy strategies, policies and regulation for IP's at government level (national, provincial and municipal)

15. The stakeholder interviews made clear that an important barrier is the existing regulatory environment, which more or less prevents IPs from moving towards sustainable energy. This includes the legislation for electricity generation from RE (and Independent Power Providers - IPPs) as well as the dominant role of Eskom, a variety of rules and laws differing between municipalities (and IPs), and insufficient coordination and integration of sustainable energy aspects in urban planning.

Root causes leading to this barrier comprise:

- ? Missing coordination between national, provincial and municipal level and horizontal coordination across ministries / departments.
- ? Limited priority of sustainable energy aspects in urban planning, i.e., regulatory issues and policy agenda
- ? Lack of integrated municipal planning (on energy aspects and related infrastructure), leading to disconnection of IPs and neighbouring communities

- ? Lack of capacity of responsible institutions, e.g., municipalities and IP management as well as parks tenants
- ? Limited coordination efforts amongst IP management and tenant companies regarding the IP ?s energy strategy

Barrier 2: Industrial parks do not consider sustainable energy and/or integrated energy solutions due to insufficient proven experience

16. First attempts to convert IPs into eco-industrial parks exist[1], and some parks are actively progressing such a green transformation (be it driven by tenant companies or by external regulators). Though, these are at rather early stages and cannot yet serve as champion projects guiding development in other parks. So far, for the broad majority of stakeholders in manufacturing and industrial processes the opportunities of sustainable energy solutions are simply not conceived (while challenges are assumed). A lack of sufficient knowledge, for instance on sustainable energy business models and trust in maturity of renewable energy supply opportunities prevents tenants, park managers as well as municipal decision makers from embarking on a sustainable energy pathway. Developing, implementing, testing and successful running of innovative concepts for energy on both demand and supply side in industrial parks, but also related aspects such as mobility, is urgently needed. In this context, the lack of data on energy use is imminent. According to stakeholder interviews, the general quality of data on energy use is poor, and for the majority of parks one can assume that hardly any data on self-generation is known. Though, for addressing the challenges related to high energy intensity and high carbon intensity of industrial and commercial activities, energy data and profiles for each tenant and on aggregated park level are required.[2] Furthermore, only few practical examples exist in the country, hence stakeholders fail to understand how to overcome practical barriers (in particular with bureaucracy) and are discouraged to take action.

Root causes leading to this barrier comprise:

- ? Limited priority of sustainable energy aspects in IPs on management and tenant level
- ? Continued reliance on fossil fuels
- ? Larger industrial companies are reserved towards renewable energies due to:
  - ? Required space, e.g., roof top area if solar panels were used;
  - ? Power stability insufficient for their technical requirements;
  - ? High upfront cost, with a long pay-back period.
- ? Partial shortcomings of renewable energy in producing the high-temperature heat required by industries
- ? Insufficient baseline and energy data (energy profiles of tenants and IPs)
- ? Lack of proven experience and limited best practice examples

Barrier 3: Missing financial and investment environment and related confidence for investments in sustainable integrated energy infrastructure for IPs

17. In alignment with the first two barriers, financing sustainable energy solutions in industrial parks is a barrier in itself. The financial and investment environment as well as existing incentives (such as tax schemes) are not sufficiently attractive for overcoming investment barriers, particularly for SMEs. A lack of knowledge, for instance on sustainable energy business models and trust in maturity of renewable energy supply opportunities oftentimes lead to risk premiums charged by commercial banks, which hamper investment opportunities[3]. Also, existing service providers are insufficiently able to effectively support companies and IPs on identification, evaluation and implementation of sustainable energy solutions. Attractive incentives for service providers (such as Energy Service Companies (ESCOs) and Independent Power Providers (IPP) will be required beyond the existing programmes.[4]

Root causes leading to this barrier comprise:

- ? Perceived investment risks for sustainable energy solutions by IP management / tenant companies
- ? Lack of service providers and business models for ESCOs and IPPs
- ? Challenging technical aspects of energy supply

Barrier 4: Lacking capacities and awareness on sustainable energy supply and demand side solutions, collective park level energy services as well as of sustainable energy logistics opportunities within industrial parks

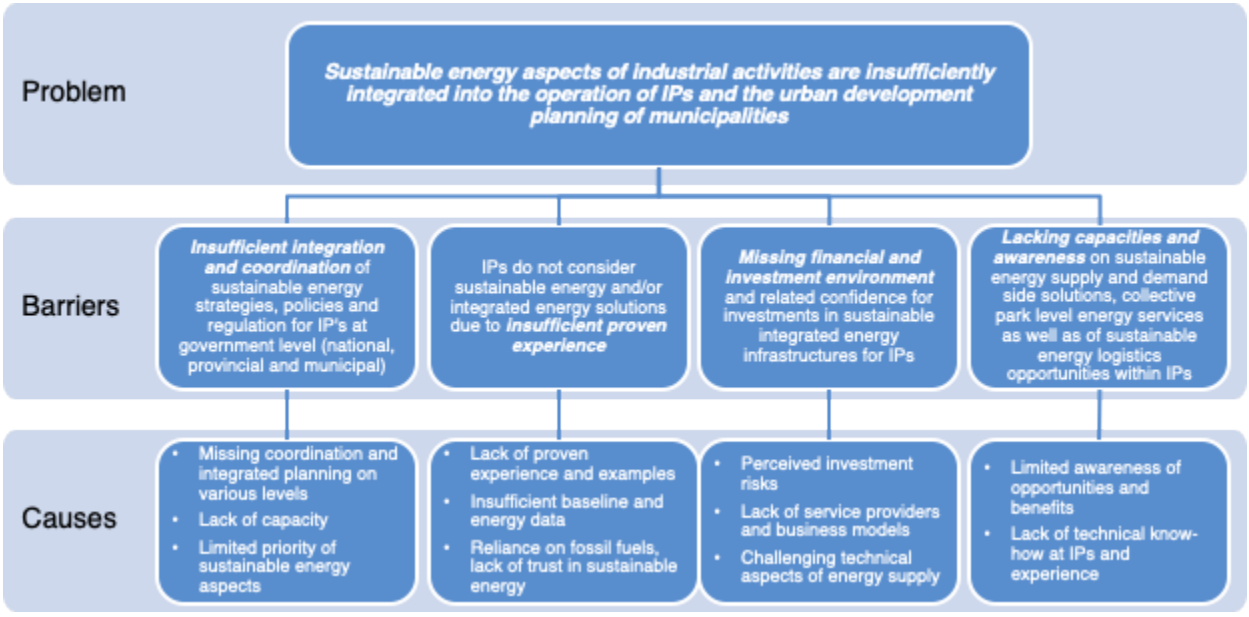
18. This fourth barrier complements the three previous barriers ? a lack of knowledge, understanding and trust in the potential of sustainable energy for industrial parks prevails within many parks (tenant companies and management), and the public sector (on municipal as well as government level). The existing programmes and initiatives that do support renewable energy generation as well as energy efficiency in industrial processes are often times not sufficiently known to a broader group of stakeholders, leaving those in uncertainty about the larger potential of such activities.

Root causes leading to this barrier comprise:

- ? Limited awareness of opportunities and benefits of sustainable energy solutions at tenant and at park management level; limited advocacy therefore
- ? Lack of technical know-how on sustainable energy solutions at park management and tenant level
- ? Lack of understanding the potential for sustainable and economic growth
- ? Lack of experience with the decarbonization of industry and logistics in industrial parks

19. The subsequent figure illustrates a simplified **problem tree** for promoting and accelerating the decarbonization of industrial parks through sustainable energy infrastructure and practice in South Africa.

Figure 4: Simplified Problem Tree



[1] Though with a minor focus on supply and demand side energy; compare the SECO funded UNIDO GEIPP project, with pilots such as in ELIDZ, Phuthaditjhaba, or approaches considered in Atlantis SEZ.
[2] Otherwise, solutions for sustainable energy cannot be harnessed effectively; this includes identifying energy saving potentials and systematic energy approaches (including demand side management, and decentralised energy sources, waste-heat recovery, local renewable energy deployment, potential coupling between tenant sites and the neighbouring communities, etc).
[3] In general, renewable energy and energy efficiency measures come with higher upfront costs and have a rather log-term economics viability. Financial support to cover the upfront cost at IPs are currently not sufficiently available. In addition, many tenants and IP managements are not aware to the overall economics of the investment and perceive an investment risk.
[4] These services will be required, as most companies are currently unable to cover the technical aspects of energy supply beyond the scope of an individual enterprise; especially related to crucial organisational (and regulatory) aspects of an industrial park.

b) Baseline scenario and any associated baseline projects

20. A **variety of initiatives and activities** that respond to the need of modernizing and revitalising industrial parks is already in place or planned. In 1997, the South African Government introduced the Industrial Development Zones (IDZ) programme that aimed to attract foreign direct investment and to promote the export of value-added commodities. After a policy review the Special Economic Zones (SEZ) policy was formulated, with the SEZ programme starting in 2007[1]. The new SEZ policy provides a clear framework for the development, operations and management of SEZs, including addressing challenges of the past IDZ programme. Under the Industrial Park Revitalisation Programme (IPRP) of the dtic, a number of existing industrial parks[2] are being revitalised to allow them to serve as catalysts for broader economic and industrial development in their host regions (townships and rural areas). The IPRP?s objectives include: removing barriers related to infrastructure, market access and supporting firm level competitiveness, assisting regions to build, strengthen and develop strategic, industrial capabilities as well as developing sustainable industrial clusters on the back of the old industrial assets and estates ? including to a minor extent promotion of renewable energy. Eventually, it is envisaged that all industrial parks (this includes the ones operated by local governments as well as privately owned IPs) will operate under the IPRP and its legal framework.

[1] http://www.thedtic.gov.za/wp-content/uploads/Policy_SEZ.pdf
[2] 27 Industrial Parks are part of the programme, funding for the first 10 Industrial parks in Phase 1 was approved in 2020.

Textbox 1: The Industrial Park Revitalisation Programme (IPRP)

The Industrial Park Revitalisation Programme (IPRP) currently to address 26 parks by firstly renovating or upgrading infrastructure and security features, and secondly improving operating conditions and supporting investment promotion and branding of parks. These parks were typically established in pre-1994 apartheid South Africa to provide employment to local communities. The parks are currently owned by provincial governments and operated on their behalf by the relevant provincial development agencies. **SEZs** are governed by an SEZ Act with specific incentives provided therein, while industrial parks have no current incentive or support mechanisms for companies, outside of the standard industry support provided through Department of Trade, Industry and Competition (dtic) incentives. **SEZs** are furthermore subject to much more stringent operating conditions and compliance requirements, but it is planned to bring all government-owned industrial parks into a similar operating framework. The first eleven industrial parks in the IPRP provide employment to approximately 55,000 people and occupancy ranges from **SMEs** to large multinationals. The dtic has been implementing the Industrial Park Revitalisation Programme in the period 2015 to 2020 and onwards. The rationale for the program is that the revitalization of industrial parks and cluster development are critical mechanisms in supporting the objective of industrial decentralization and the diversification of the manufacturing industry in South Africa. Industrial clusters offer a means to overcome the various market and institutional barriers faced by firms. Eco-industrial parks can accelerate economic development by attracting innovative businesses and new technologies, leading to accelerating inclusive industrial development and creating more jobs while enhancing competitiveness. They support start-up companies, new enterprise incubations, and the development of knowledge-based industries. Successful industrial parks offer the opportunity for regional development where the clusters can facilitate innovation and advanced technologies, creating high growth in the regions and attracting investment.

In summary, the objectives of the IPRP are:

- ? Accelerate economic development in the lagging regions by attracting business investments to locate in the areas;
- ? Support job creation in manufacturing and related sectors to arrest negative externalities associated with urban congestion;
- ? Remove barriers related to infrastructure and market access, and support firm-level competitiveness;
- ? Provide new opportunities and support high growth in the townships, rural and distressed peri-urban areas;
- ? Assist regions to build, strengthen and develop strategic industrial capabilities; and
- ? Develop sustainable industrial clusters on the back of the old industrial assets in those regions.

The IPRP consists of five phases, namely:

- ? Phase 1: Security infrastructure upgrade, and providing fencing, street lighting, top structures and critical electricity requirements;
- ? Phase 2: Compliance with regulatory requirements ? landfill sites; waste and water treatment plants; fire, health & safety requirements; and renewable energy initiatives;
- ? Phase 3: Engineering designs, construction of new and maintenance of existing roads, bulk water supply and sewage treatment plants or industrial effluent control;
- ? Phase 4: Upgrading electricity infrastructure, and building new top structures in line with the expansion programme of the parks; and
- ? Phase 5: Development of sustainable industrial clusters in the parks.

*Source: UNIDO 2020****[1]***

[1] UNIDO (2020): Promoting Low Emission Industrial Parks through Low Carbon Infrastructure and Practices in South Africa. Concept Note for GEF Trust Fund

21. By mid 2020, the IPRP accommodates 27 industrial parks and 15 SEZs established in the country[1]. But so far, the programme does not appear to have a significant effect on reducing the energy intensity of production and thus reducing GHG emissions from the industrial sector. Further

enhanced action towards fostering sustainable energy in industrial production (and thus industrial parks) is therefore eagerly required.[2]

22. In this respect, and besides the IPRP, a number of other regulatory developments as well as existing programmes and initiatives are likely to impact of the future development of industrial parks in the country. Those inter alia include:

22.1. **National Climate Change Response Policy of 2011** (NCCRP)[3], which includes recommendations on GHG mitigation, namely a commitment to reduce national GHG emissions to ?make a fair contribution to the global effort to stabilize GHG concentrations at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner?. The NCCRP also introduced the **carbon tax on direct emissions** and the ?Desired Emission Reduction Outcomes? **(DEROs) setting effective sectoral GHG emission limit caps**. Furthermore, the NCCRP established eight ?Near-term Priority Flagship Programmes" that target climate change response in public works, water conservation and demand management, renewable energy, energy efficiency, and energy demand management and transportation, among others.

22.2. The **Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)**, for example, was scaled up as part of the Renewable Energy Flagship Programme. REIPPP is a competitive tender process that was designed to facilitate private sector investment into grid-connected renewable energy generation in South Africa. Also, several policies and measures, both cross-sectoral (Carbon Budgets, GHG Reporting Regulation, Carbon Tax Act together with Carbon Offset Regulation) and sectoral, are in place for achieving the country?s GHG emission reduction targets.[4]

22.3. In terms of renewable energy generation, the **South African Renewable Energy Master Plan (SAREM)** may become a relevant instrument (roll out expected for 2021)[5].

22.4. Concerning green industries, the **Resource Efficient and Cleaner Production (RECP)** activities implemented by the National Cleaner Production Centre of South Africa (NCPC-SA) are of importance.[6]

22.5. Another source of information for any activities relating to sustainable energy in industrial parks is the **Industrial Energy Efficiency (IEE) Project** which was established in 2010 in response to the growing need to improve the energy efficiency of South Africa. The IEE aims to demonstrate the positive impact of energy management as a means of reducing GHG emissions and to demonstrate the effectiveness and financial impact of in-plant energy management.[7]

22.6. Of further importance is a **Swiss State Secretariat for Economic Affairs (SECO)-funded project on EIPs in South Africa (GEIPP)**, which is developed by UNIDO?s Environment Department. GEIPP is specifically focused on water, waste and chemicals (though to a minor extent on energy). Collaboration with this project will be important, as the same or similar beneficiary groups will be addressed.

22.7. On the issue of urban-industrial development, existing activities such as the **Cities Support Program** (CSP) of the National Treasury and work of **CSIR on smart cities** (smart places / smart mobility) can be reflected. The CSP for instance is implementing an Industrial Park Revitalisation programme in partnership with the eThekwini, Ekurhuleni, Tshwane and Johannesburg metropolitan municipalities. The focus industrial parks include Jacobs, Wadeville, Babelegi and Devland.[8]

22.8 Relevant GEF and GCF projects need to be considered. For instance, the Development Bank of Southern Africa (DBSA) is serving as implementing agency for GEF project ?**Equity Fund for the Small Projects Independent Power Producer Procurement Programme (SP-IPPPP)**? (GEF-ID 9085) as well as for the GEF project ?**Cities-IAP: Building a Resilient and Resource-efficient Johannesburg: Increased Access to Urban Services and Improved Quality of**

Life? (GEF-ID 9145). DBSA is also serving as direct access Accredited Entity under the GCF, where it oversees the ?**Embedded Generation Investment Programme (?EGIP?)**? which supports RE project implementation, as well as the ?**DBSA Climate Finance Facility**? that aims to de-risk and increase the bankability of climate projects in order to crowd in private sector investment.

22.9 Also, the GEF-funded UNIDO **Energy Efficiency Low Carbon Transport (LCT-SA) Project** in South Africa (GEF-ID 5737) will be important to reflect, as it aims to support the South African government in promoting and implementing sustainable transport technologies in urban and energy intensive environments.

22.10 The Industrial Development Corporation (IDC) aims to enhance the industrial capability of South Africa, thereby boosting economic growth and industrial development. IDC funds entrepreneurs starting new enterprises or companies that are extending existing operations. In addition, there are a number of special schemes available, such as the **AFD Green Energy Fund** (fund size ZAR 1 billion) providing finance to renewable energy and energy efficiency projects of smaller scale and manufacturing of green products in South Africa.[9]

23. These regulations, programmes and initiatives are reflected during the designing of the GEF project, both concerning their impacts and lessons learned, as well as regarding their scope. Also, as experience and established internal South African capacity is presently independent and compartmentalized[10], integrating and coordinating on-going efforts of these activities is imperative in terms of efficiency and avoiding the duplication of efforts.

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[1] NCPC, dtic and UNIDO (2019). Eco-Industrial Park (EIP) Baseline Assessment Report for South Africa.

[2] Compare also TIPS (2017): Making the Industrial Parks Revitalisation Programme work for employment and firm growth. Available from https://www.tips.org.za/policy-briefs/item/3285-making-the-industrial-parks-revitalisation-programme-work-for-employment-and-firm-growth

[3] Compare https://climate-laws.org/geographies/south-africa/policies/national-climate-change-response-policy-white-paper-nccrp

[4] In the Energy sector, eleven measures have been identified with the main policy drivers being the Integrated Resource Plan, National Energy Efficiency Strategy and, for transport, the Green Transport Strategy. In the IPPU sector it is the Carbon Budgets and Pollution Prevention Plans for process emissions which support the identified measures.

[5] See also: https://www.greencape.co.za/content/first-industry-working-group-hosted-for-south-african-renewable-energy-masterplan/

[6] See http://ncpc.co.za/about-ncpc

[7] Visit http://ncpc.co.za/energy-efficiency/2015-06-23-11-53-02

[8] See also: https://csp.treasury.gov.za/Resource%20_Centre/Conferences/Pages/Indistrial-Park-Revitalisation.aspx

[9] https://www.idc.co.za/afd-green-energy-fund

[10] UNIDO (2020): Promoting Low Emission Industrial Parks through Low Carbon Infrastructure and Practices in South Africa. Concept Note for GEF Trust Fund

COVID-19 recovery efforts by the Government

24. As a response to the impact of the COVID-19 pandemic, the Government of South Africa has released its ?South African Economic Reconstruction and Recovery Plan? in October 2020[1]. The Plan has three phases:

1. Engage and Preserve, incl. comprehensive health response to save lives and curb the spread of the pandemic;

2. Recovery and Reform, incl. interventions to restore the economy while controlling the health risks; and

3. Reconstruct and Transform, entailing building a sustainable, resilient and inclusive economy.

25. The following priority interventions are mentioned in the Plan:

- ? Aggressive infrastructure investment;
- ? Employment orientated strategic localization, reindustrialization and export promotion;
- ? Energy security;
- ? Support for tourism recovery and growth;
- ? Gender equality and economic inclusion of women and youth;
- ? Green economy interventions;
- ? Mass public employment interventions;
- ? Strengthening food security; and
- ? Macro-economic interventions

26. The project will in particular support the government target and interventions related to infrastructure investment, employment orientated strategic localization, reindustrialization and export promotion; as well as energy security and green economy (see also section on COVID-19 risks and opportunities below).

27. To conclude, industrial and commercial activities in South Africa cause a high energy demand, which is mostly met with fossil fuel energy sources. In light of this it appears that ***sustainable energy aspects of industrial activities are insufficiently integrated into the operation of IPs and the urban development planning of municipalities.*** The current and ongoing regulatory developments as well as existing programmes and initiatives still lack to address this fact in a comprehensive and transitional fashion.

[1] https://www.gov.za/sites/default/files/gcis_document/202010/south-african-economic-reconstruction-and-recovery-plan.pdf

c) Proposed alternative scenario with a brief description of expected outcomes and components of the project

28. In order to address the barriers and root causes for industrial park development identified above and to achieve the project objective of reducing GHG emissions and accelerating the decarbonization of industrial parks, an integrated, holistic approach is envisaged for the project for complementing and aligning existing measures[1].

29. Eventually, the full potential of sustainable energy in industrial parks will only be harnessed and lead to a significant impact, if the majority of parks becomes active in this regard. Hence, supporting stakeholders in overcoming barriers requires an approach that does the following:

29.1. Addresses and improves the enabling environment to alleviate challenges facilitating the transformation of IP into low-carbon eco-industrial parks EIP;

29.2. Demonstrates the feasibility and attractiveness of sustainable energy for industrial parks in pilot demonstrations;

29.3 Lays the foundations for an economy-wide upscaling of measures through a supportive strategic framework including an attractive financing mechanism; and

29.4 Accompanies the evolution of low-carbon EIPs through capacity development and awareness raising.

30. The foreseen approach is translated into three components. The respective outcomes and outputs for each of these components are summarized below. The project will target pre-existing Industrial Parks (IPs), which will be upgraded to Eco-Industrial Parks (EIPs) with regard to low-emission energy solutions. The project will not engage in any land acquisition/change, etc. or green field developments.

31. Understanding the opportunities of sustainable energy solutions and decarbonizing industrial parks is imperative for gaining the required economy-wide momentum that can drive the industrial energy transition in South Africa. In this respect, each component aims to educate stakeholders about opportunities and challenges, existing activities and approaches to engage in low-carbon development.

[1] Such an integrated programme approach can address a broad spectrum of topics, including energy efficiency, renewable energy, collective infrastructure, utilities, and IPPs, coordinated research, development and innovation (RDI), 4IR technologies such as smart grid and micro-grid solutions, as well as a strengthened policy, planning and management environment.

Component 1: Fostering the coordination towards sustainable energy transformation of IPs by creating a conducive enabling environment under consideration of social equity

32. This component addresses the level of regulation, planning and coordination, in order to pave the way for stakeholders towards integrated, sustainable energy solutions (incl. energy demand and supply). Since further regulation, programmes and initiatives that serve to improve enabling conditions are planned or operational, in particular for sustainable energy, coordination between those activities is imperative to derive a transparent overview of opportunities and challenges. IPs are in most cases not located in isolation but operate within an urban environment and boundary. Hence, an urban-industrial nexus exists, with particular relevance for energy, resources and related impacts (waste, emissions etc.). Again, coordination is key in this respect. For enhanced coordination, an institutional setting will be created, with a steering committee as well as technical working groups that allow discussion amongst stakeholders and decision makers. This way, also lessons learned from lighthouse activities and related programmes can be harnessed (and duplication of efforts is avoided). Besides targeting IPs, a particular focus of this component lies on public sector authorities (government and municipalities).

Outcome 1: Government and local authorities ensure a conducive IP-associated policy and regulatory environment, especially with regard to energy generation and consumption formulate in a sustainable and inclusive manner

Output 1.1: The coordinative capacity for sustainable energy solutions in IPs are strengthened on municipality and IP management level(s)

33. The project will promote sustainability and energy aspects as one priority area in urban and industrial area planning, i.e. regulatory issues and political agenda. Besides water management (GIZ project) and waste and resource management (UNIDO Environment / SECO GEIPP project), the project will help to put the sustainable energy demand and supply including environmental, socio-economic and technical aspects on the agenda of municipalities and IP management as part of the urban-industrial nexus. Hence, municipalities, IPs and neighbouring communities as well as further key stakeholders are supported on integrated planning of low-carbon IP aspects.

34. Also, regulatory aspects related to energy demand and supply, e.g., IPP licensing, feed-in regulation and potential regulations for public-private-partnerships (PPP) will be investigated for providing recommendations.

Deliverables Output 1.1:

- Integrated planning strategies for 3 selected municipalities, IPs and neighbouring communities

? Proposals for regulatory aspects related to energy demand and supply, e.g., IPP licensing, feed-in regulation and potential regulations for public-private-partnerships (PPP) are provided to the government and municipalities for adoption.

-

Output 1.2: Analysis of typical energy profiles is made available to IPs, industrial establishments, the government and municipalities supported by introduced energy audits

35. Under the output the energy demand and consumption profiles of IPs and representative tenants / industrial establishments will be investigated and summarised for South Africa. The energy profiles (load and supply, and energy balance) are compared against international benchmarks and potential energy solutions are illustrated. The output will deliver a baseline/benchmark database of typical energy intensities of relevant industrial activities in South Africa. Against these baseline/benchmarks (that shall be published by NCPC-SA) the IP managers and tenants can compare their energy demand and identify potential enhancements related to the energy intensity.

36. The project will support dtic and the Department of Mineral Resources and Energy (DMRE), in investigating if and how total industrial energy use is covered by mandatory energy efficiency standards or overall performance targets. International benchmarks can be used for this, such as from Europe, China and India that have introduced energy saving targets for industries. This will also cover the introduction and enforcement of energy efficiency policies, such as the application of the ISO 50001 certification for industrial energy management.[1]

Deliverables Output 1.2:

? Energy demand and consumption profiles of IPs and representative tenants / industrial establishments for representative IPs across South Africa

? Baseline/benchmark database of typical energy intensities of relevant industrial activities in South Africa

Output 1.3: IP management and tenant companies are provided with guidance on establishing IP energy strategies at local sites that are sustainable and foster social inclusion

37. Through consultations and guidance preparation under this output the project will support IP management and tenant companies to enhance the coordination on IP energy strategies. The project will prepare guidance for best practices on how to approach energy analysis and strategies at the IP levels. The guidance covers technical and financial aspects and provides a framework on how IP management and tenants can prepare roadmaps towards low-carbon and sustainable energy practices in their facilities. These roadmaps shall help enhancing the coordination, facilitating the effective implementation and streamlining standards / criteria. This shall also be enabled with improved and established digital data management.

Deliverables Output 1.3:

? Guidance for best practices on how to approach energy analysis and strategies at the IP levels

Output 1.4: Key stakeholders are aware and trained on sustainable energy aspects (including gender dimensions) at IPs

38. Capacity development activities on energy efficiency and renewable energy solutions will be offered for employees and managers of IP tenant companies in form of trainings and stakeholder meetings at parks and municipalities level. IPs management will be trained on potential energy services they can offer to tenants. ESCOs will be involved in the provision of the trainings and workshops. Knowledge about barriers for low-carbon IP action, and opportunities to addressing those barriers (including a broad understanding of active projects and initiatives in South Africa) will be considered during the trainings, workshops and information material.

39. Knowledge products and information will be prepared and disseminated amongst IPs, industrial establishment and municipalities and other stakeholders (including on the regulatory barriers). Besides the lessons learned from the pilot demonstration activities under Component 2, this will also generally comprise opportunities such as increasing renewable energy in industry, decarbonising the ?high-hanging fruit? GHG emissions, increasing low carbon infrastructure, and digitalisation. Within the private sector the focus will be on SMEs.

40. In addition, online resources on sustainable energy and the pilot activities will be offered through the NCPC website. Moreover, for registered IP managers a help desk at NCPC will be established that will help clarifying incoming requests from IPs and is able to facilitate for requested trainings.

41. With the awareness raising activities, the capacity and knowledge of IP managers will be strengthened on sustainable energy infrastructure planning and management.

Deliverables Output 1.4:

- ? Capacity development activities on energy efficiency and renewable energy solutions are provided for employees and managers of IP tenant companies in form of trainings and stakeholder meetings at parks and municipalities level.
- ? Knowledge products and information are prepared and disseminated amongst IPs, industrial establishment and municipalities and other stakeholders.
- ? Help desk to support clarifying incoming requests from IPs and to facilitate for requested trainings.

[1] Building on previous initiatives, such as the Industrial Energy Efficiency (IEE) Project supported by UNIDO.

Component 2: Demonstration of low-carbon and sustainable energy solutions through EIP pilots

42. This component aims to demonstrate the feasibility and attractiveness of low-carbon energy options for industrial parks. This includes the identification and selection of IPs, identification of financial barriers and risks for an EIP programme, conducting stakeholder engagement and information activities, setting-up a financing approach with stakeholders, implementation of a pilot programme, as well as the evaluation of the pilot programme and identification of success factors / lessons.

Outcome 2: IP managements and manufacturing businesses gain confidence and sufficient evidence of the technical, economic, social and environmental viability of sustainable energy solutions for industrial production in the urban-industrial-energy nexus

Output 2.1: Sustainable energy infrastructure at EIP pilot projects is implemented demonstrating sustainable energy solutions at IP level

43. The project will undertake energy audits for up to 3 IPs to identify potential fields of enhancements. Based on the audits a feasibility study for each demonstration project will be conducted, including technical and financial assessment, as well as environmental and socio-economics impacts. The feasibility studies will investigate the technical solutions for sustainable energy solutions in a systematic and comparable way, focusing rather on the park and urban-industrial nexus level, and not so much on individual tenant level.

44. Technical solutions evaluated are not limited to energy efficiency measures (e.g., efficient appliances, motors, lighting etc.) and the installation of renewable energies[1] and will identify interventions in the following areas:

Decentralized renewable energy power generation, usage and storage

- ? Deployment of renewable energies at IP level and urban context
- ? Renewable heat production and district energy solution for cooling, heat and process heat demand within the park but also with potential connection to near urban surroundings.
- ? Storage of excess energy generated from renewable energies within the parks to meet the energy demand (load profiles of different single tenant and / or aggregated energy profiles) energy supply (intermitted energy sources such as wind and solar).

Enhanced and accelerated energy efficiency adoption through DSM and digitalisation

- ? Systematic improvement of the demand side (demand system management - DSM) based on different load profiles within the IPs but also in the connection to the urban surroundings.
- ? Waste-heat-recovery (WHR) for power generation and / or proving (process) heat.
- ? Assessing the potential for 4IR technologies (digitalization, industrial communication, and IoT), such as smart grid and micro grid solutions.

Introduction of cleantech innovation

- ? Use of green hydrogen produced from renewable energies (such as wind or solar).
- ? Low-emission cement and green steel production

Optional subject to co-finance contributions: Systemic impacts for sustainable cities, incl. electric mobility and waste management

- ? Coupling of energy supply and renewable energies with sustainable transport solutions, such as e-mobility or the production of hydrogen (such as envisioned for the Athlone power station in Cape town).
- ? Waste-energy utilisation, i.e., closing or reducing capacity of landfilled close by IPs for energy generation and supply.
- ? Opportunities throughout the value chain and aspects of circular economy, such as enhanced production efficiency, extended product lifespans and increased end-of-life recycling will also be taken into consideration.

45. The output also comprises a strong stakeholder engagement, with focus on capacity development and financing approaches.

46. Under the output the project will develop bankable investment projects together with the IPs owners / management (and if applicable the tenants) for undertaking the investments for enhancing the energy demand and supply infrastructure. Based on preparatory work (pre-assessment and energy audits) and the feasibility study, state of the art energy solutions will be implemented at selected pilot IPs for demonstrating the technical and economic feasibility. The demonstrations will be approached in a systematic manner, i.e., on IP level with interconnection to the surrounding urban areas.

47. For identifying suitable pilot IPs, a number of ongoing activities and initiatives exist in South Africa that can be approached in this respect. The industrial park revitalisation programmes with dtic and the National Treasury, as well as the UNIDO SECO Global Eco Industrial Park Programme (GEIPP) have for instance gathered important lessons and can be consulted in the process of selecting pilot parks.

48. In terms of selection criteria, it will be important to keep the implementation of activities in mind right from the start. Experiences at NCPC-SA show problems with owners / tenant relationship. One should therefore choose park?s that feel responsible for equipment and ideally also have operational control (which may speak towards including municipalities and provincial governments). Concerning the context of energy, selection must consider relevant energy profiles of IPs to achieve the project?s objectives and to ensure buy-in by IP managements, tenants and municipalities. Here a certain experience of IP managers with embracing sustainable energy concepts is helpful. In general, selected

parks should be stable and well populated. While a final selection of pilot park?s will happen at a later stage, good examples with potential for interesting urban-industry-energy activities and first experiences on EIP aspects comprise the East London Industrial Development Zone ELIDZ (Eastern Cape), Phuthaditjhaba Industrial Park (Gauteng), Ekandustria (Gauteng), the Dube Trade Port SEZ (KwaZulu-Natal), Atlantis SEZ (Western Cape) or Richards Bay SEZ[2].

Textbox 2: Energy and GHG inventory of exemplary IP and potential sustainable energy solutions

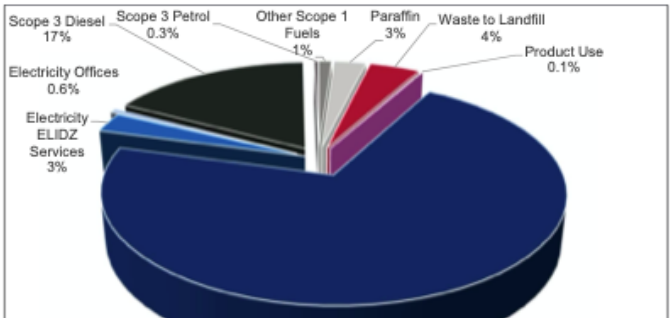
The East London Industrial Development Zone (ELIDZ)[3] is a state-owned company and falls within the geographical boundary of the Buffalo City Metropolitan Municipality (BCMM). It is located in East London south of the Port of East London and adjacent the airport. The ELIDZ is hosting export-led manufacturing and processing as well as automotive industry. It is divided into six zones, which are shown below.

Source: Eastern Cape Freight Transport data bank[4]

- In Zone 1A there are five loose-standing manufacturing operations, two freight companies, two fish farms, as well as the Buffalo City Metropolitan Development Agency (BCMDA) which is an office complex. Zone 1A also has an Automotive Supplier Park (ASP).
- A major waste handling and recycling company operating within the ELIDZ is located in Zone 1B.
- Zone 1C is the Science and Technology Park (STP) which has several offices for tenants
- Zone 1 D has one manufacturing operation and two freight operations
- Zone 1E is a golf course.
- Zone 1F has one manufacturing operation.

According to a study undertaken by USAID?s South African Low-Emissions Development (SA-LED) programme, the estimated GHG emissions in the ELIDZ were estimated to 59 ktCO2e in 2016.[5] The top contributions by source are electricity (75%), diesel for transporting goods/services (17%), solid waste to landfill (4%), paraffin (3%) and on-site diesel usage (1%). In terms of GHG categorization, approximately 96% of emissions occur off-site (Scope 2 and Scope 3 due to electricity consumption and transportation).

Figure 5: GHG emissions in the ELIDZ by source



49. The Output will be supported by the Technical Working Group. For instance, for identifying sustainable district energy potentials and solution for the IPs incl. their urban surrounding UNEP?s District Energy in Cities Initiative will support the assessment, e.g., through rapid-assessments and pre-feasibility studies.

Deliverables Output 2.1:

- ? Energy audits and rapid assessment for up to 3 IPs to identify potential fields of enhancements
- ? Feasibility studies for each demonstration project, including technical and financial assessment, as well as socio-economics impacts
- ? State of the art energy solutions implemented at selected pilot IPs for demonstrating the technical and economic feasibility

Output 2.2: Lessons learned, including social and equity impacts, from the sustainable energy pilot demonstration activity in the urban-industrial-energy nexus are derived

50. IP pilots will lead to an increased understanding of sustainable energy solutions in the urban-industrial nexus. The lessons learned and success factors identified during the preparation, financing and implementation of the pilot demonstration activity will be reflected. In particular energy data and profiles, as well as energy performance will be scrutinized. These information and data will inform the Outputs under Component 3 that relate to financial mechanisms, potential energy services and business models. The pilot activities will, hence, lead to an increased understanding of financial viability and (required) de-risking instruments for the application of sustainable energy solutions. Gender dimensions of sustainable energy in IPs will also be assessed, awareness of stakeholders on gender equality and women?s empowerment (GEEW) will be strengthened and knowledge about lessons learnt and best practices disseminated. The result framework for the project will monitor the *GHG emissions mitigated* from the pilots which are estimated based on the related contextual sub-indicators on *Energy saved* (in MJ) and *Increase in installed renewable energy capacity per technology* (in MW).

Deliverables Output 2.2:

- ? Report on lessons learned contributing to an increased understanding of financial viability and (required) de-risking instruments for the application of sustainable energy solutions in IPs.

Output 2.3: Knowledge about best practice examples for low-carbon IP activities in South Africa and globally are disseminated amongst IP managers through a Community of Practice

51. The project will invite relevant stakeholders such as IP managers, industrial establishments (tenants) and municipalities to participate at a Community of Practice (CoP). National and international experts and representatives from the pilot IPs will be involved in sharing their experiences on a peer-to-peer knowledge exchange. Representatives of the national, provincial and municipal government will be involved in order to strengthen their capacities in the areas of energy infrastructure planning, operation and management for industrial parks. The CoP will be organised at least twice a year in a conference style (with a virtual alternative scenario if required by COVID-19).

Deliverables Output 2.3:

- ? Knowledge exchange of relevant stakeholders such as IP managers, industrial establishments (tenants) and municipalities occurs through a Community of Practice (CoP).

[1] Including solar PV and Concentrated Solar Power (CSP), Solar thermal, geothermal energy, wind, tidal / wave etc.

[2] Research on the Richards Bay SEZ has indicated the potential for cogeneration. A 2-gigawatt electricity power plant has been planned for the Richards Bay Industrial Development Zone and, if cogeneration is coupled with this plant, it has the potential to generate at least 600-megawatt of heat for industrial users. This would provide heat for at least 60 commercial-scale breweries, for example. Further, initial research has indicated the potential for exchanges of heat and fuels in the Richards Bay SEZ reducing the fuel usage, GHG emissions, water use by the plant. See https://www.environment.gov.za/sites/default/files/reports/greeneconomy_policyreview.pdf

[3] https://www.elidz.co.za

[4] Retrieved from (February 2021): http://www.safiri.co.za/ec/east_london_idz_(elidz)_in_east_london.html

[5] Chemonics International for USAID/South Africa (2017). Greenhouse Gas Emissions Inventory for the East London Industrial Development Zone. For the USAID South Africa Low Emissions Development Program.

Component 3: De-risking scheme for upscaling and replication of sustainable energy solutions in EIPs

52. As investment barriers play an important role, this component serves to identify opportunities for de-risking investments in low-emission IP activities and develop concepts for an investment friendly strategic framework. Considering the lessons learned under the low-emission IP pilot programme in Component 2, the formulation of strategic partnerships with investment partners from the financial sector is foreseen. The project will not set up a financial instrument but rather a mechanism that would support the development of bankable investment projects.

Outcome 3: The Government and the financial sector enhance the financial and investment environment to de-risk investments in sustainable energy infrastructure in IP

Output 3.1: Strategy for upscaling of IP sustainable energy pilot programme is in place considering gender lens investment principles

53. Based on the IP pilot demonstrations undertaken in Component 2 and the lessons learned with regards to financial viability and de-risking instruments for the acquisition of sustainable energy technologies, this Output will prepare a strategy for the upscaling and roll out to other IPs in South Africa. The strategy will cover both, a technology and policy roadmap. The technology roadmap will outline technology deployment scenarios towards a decarbonisation of industrial activities and IPs. This will include the systematic view on parks and their urban surroundings. The policy roadmap will comprise the necessary steps to be undertaken from a policy and regulatory point of view in the mid- to long-term perspective (next decade) to provide the required enabling environment. The strategy for upscaling the decarbonisation of industrial activities in South Africa will also help the government in reaching and formulating targets in its NDC and long-term strategy towards the Paris Agreement and UNFCCC.

Deliverables Output 3.1:

- A strategy for upscaling of IP sustainable energy pilot programme
- A technology roadmap as key element of the strategy
- A policy roadmap as key element of the strategy

Output 3.2: A project pipeline for investment replicating the EIP sustainable energy pilot approaches is identified

54. The project will identify suitable financial support scheme(s) to support the uptake of respective measures in additional IPs (public and private) across the country and list those in a database. A small number (<10) of IPs will be supported with the preparation of bankable projects for the introduction of systematic sustainable energy solutions at the park level considering the urban-industrial nexus. Recommendations will be derived based on eligibility and investment criteria of the respective finance scheme / facility, such as the DBSA?s Climate Finance Facility, IDC?s special financing schemes on energy or funding from the International Finance Corporation. The pipeline projects will cover, as mentioned above, renewable energy supply for electricity and heat, DSM, aspects of 4IR such as smart infrastructure (e.g., grids), etc. Importantly, the project will enable a structured dialogue of project proponents and relevant stakeholders (IP managers, tenants, municipalities etc.) with financial sector institutions to identify financing opportunities.

Deliverables Output 3.2:

- ? Recommendations on and database of suitable financial support scheme(s) to support the uptake of respective measures in additional IPs (public and private) across the country
- ? Support for up to 10 IPs with the preparation of bankable projects for the introduction of systematic sustainable energy solutions at the park level
- ? Structured dialogue of project proponents and relevant stakeholders with financial sector institutions for identifying financing opportunities

Output 3.3: The understanding of key stakeholders on financing options for sustainable energy activities in EIP are strengthened through establishing a marketplace

55. The project will facilitate a matchmarking platform (marketplace) for bringing together IP managers, municipalities, and tenants with investors, financial institutions, ESCOs and potential IPPs. The platform will provide information and room for virtual exchange, e.g. through a webpage and webinars. In addition, 3 annual dedicated conferences will be organised for bringing together all interested and relevant stakeholders, in which successfully implemented best practice examples can be presented and new projects ideas can be pitched (with a virtual alternative scenario if required by COVID-19). The output aims to increase the capacity within industrial parks and enterprises to access capital for environmental performance improvement. The regular exchange will increase awareness of financial institutions of investment opportunities on the one side and help IP managers and industrial / commercial enterprises to grasp the potential financial, economic and climate change mitigation and environment benefits of sustainable energy enhancement within the parks and communities, on the other side.

Deliverables Output 3.3:

- ? A matchmarking platform (marketplace) for bringing together key stakeholders
- ? Three annual dedicated conferences for bringing together all interested and relevant stakeholders

Component 4: Monitoring and evaluation

56. Component 4 will focus on the effective monitoring and evaluation (M&E) of the project during implementation and after completion.

The result framework for the project and its monitoring will include the *GHG emissions mitigated, energy saved* and *installed renewable energy capacity per technology.* All monitoring and evaluation tools and documents, such as the monitoring plan, progress reports, final evaluation report, and thematic evaluations (e.g., training needs assessment), will include gender dimensions, and report with respect to an established baseline for gender related

targets. When data collection or assessments are conducted, gender dimensions will be considered. This will include in particular collection of sex-disaggregated data.

Outcome 4: Project achieves objective through effective monitoring and evaluation

Output 4.1: Mid-term review

57. At the mid-point of the project, UNIDO will coordinate an independent mid-term review to identify the achievements to date, make suggestions as needed to revisions of the project, and identify lessons learned to be disseminated within UNIDO.

Output 4.2: Gender analysis and regular monitoring of the gender mainstreaming action plan

58. UNIDO will routinely monitor implementation of the gender mainstreaming action plan.

Output 4.3: Final evaluation

59. UNIDO will facilitate a final evaluation by an independent evaluator within 6 months of project closure to verify achievements to date, make any final suggestions for the closing period of the project, and identify lessons learned.

Theory of change

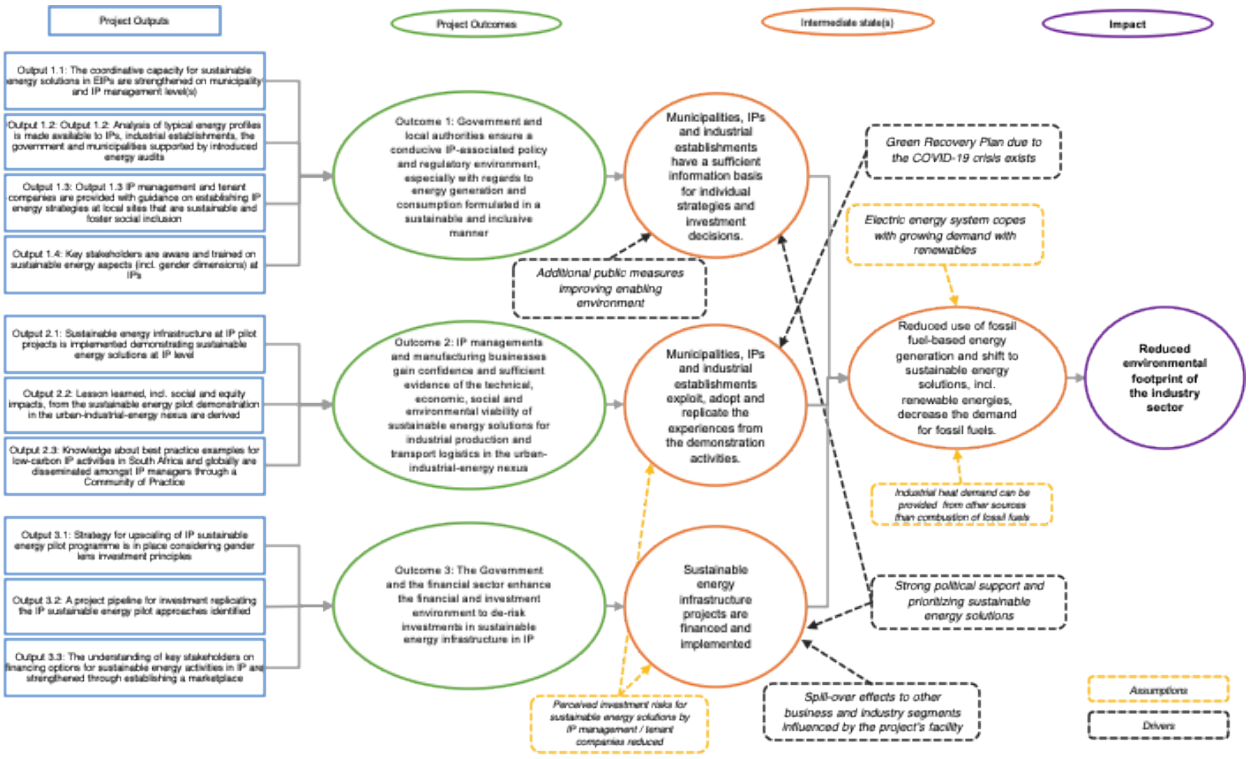
60. The Project aims to reduce GHG emissions and accelerate the decarbonization of industrial parks through providing support to IP managements, tenants, municipalities and other core stakeholders. Though the project intervention the Government and local authorities will be enabled to ensure a conducive IP-associated policy and regulatory environment, especially with regard to energy generation and consumption is established (long-term outcome). Municipalities, IPs and industrial establishments will have a sufficient information basis for individual strategies and investment decisions. This and low-carbon and sustainable energy demonstration projects for dissemination of experiences will allow IP managements and manufacturing businesses to gain confidence and sufficient evidence of the technical, economic, social and environmental viability of sustainable energy solutions for industrial production in the urban-industrial-energy nexus. As a result, municipalities, IPs and industrial establishments exploit, adopt and replicate the experiences from the demonstration activities. In addition, the project preparation facilitation will help the Government and the financial sector to enhance the financial and investment environment to de-risk investments in sustainable energy infrastructure in IP. Hence, if the perceived investment risks for sustainable energy solutions by IP management / tenant companies is reduced, sustainable energy infrastructure projects are financed and implemented. As a result, the use of fossil fuel-based energy generation is reduced and shift to sustainable energy solutions, incl. renewable energies, decrease the demand for fossil fuels. Eventually, this leads to reduced environmental footprint of the industry sector.

61. The industry sector can be transformed to a sustainable low-emission system with a dominance of renewable energies usage. South Africa has established a Green Recovery Plan due to the COVID-19 crisis as a vehicle to transform the society by investing in profitable infrastructure which creates economic, environmental and social benefits, short-term jobs and a long-term greening of the economy. Renewable and sustainable energy solutions and infrastructure are thereby a core feature. The detailed illustration of the theory of change is attached in Annex D.

62. The result framework for the project to be developed during the CEO Endorsement Request will include beside the GEF Core Indicator 6 *Greenhouse gas emissions mitigated (metric tons of carbon dioxide equivalent)* the following two contextual sub-indicators at outcome level: *Energy saved* (GEF Core Indicator 6.3 ? in MJ) and *Increase in installed renewable energy capacity per technology* (GEF Core Indicator 6.4. - in MW).

The ToC graph below illustrates the impact, objectives and outcomes of the project along the three components (excluding monitoring and evaluation) as well as logical pathways under the influence of external factors; drivers and assumptions:

Figure 6: Theory of change for the project



63. An enlargement of the illustration has been included as an attachment.

d) Alignment with GEF focal area and/or Impact Program strategies

64. The proposed project is aligned with Objective 1 of the GEF?s Climate Change Focal Area on ?Innovation and technology transfer for sustainable energy breakthroughs?:

64.1. CCM-1-1: Promote innovation and technology transfer for sustainable energy breakthroughs for decentralized power with energy usage (i.e., through promotion of renewable energies deployment in IPs etc.)

64.1. CCM-1-3: Promote innovation and technology transfer for sustainable energy breakthroughs for accelerating energy efficiency adoption (i.e., through promotion of energy management (DSM) at IP level etc.)

64.1. CCM-1-4: Promote innovation and technology transfer for sustainable energy breakthroughs for cleantech innovation (i.e., through promotion of innovative energy solutions, such as digitalisation of manufacturing processes, green hydrogen, green steel etc.)

65. In addition, through the urban-industrial-energy nexus approach the project potentially contributes through mobilising additional co-financing resources to the GEF-7 Sustainable Cities Impact Program

through urban-related GHG emissions avoidance. This is achieved though project?s activities being related to the following focal area sub-targets:

65.1. CCM-1-2: Promote innovation and technology transfer for sustainable energy breakthroughs for electric drive technologies and electric mobility (i.e., through promotion of e-mobility using renewable energies and / or green hydrogen in IPs etc.)

65.1. CCM-2-5: Demonstrate mitigation options with systemic impacts for sustainable cities impact program (i.e., through addressing the urban-industrial-energy nexus).

e) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

66. Incremental elements of the project are related to the upscale of activities at IP level. The demonstration project will cover only incremental costs associated to potential higher upfront costs to less efficient or conventional energy solutions, e.g., RE supply vs. electricity supply from the grid. In addition, services that are currently not available will be supported by the project so the executing entity can offer them to IPs and their tenants, such as energy audits and the match-making of ESCOs and IPs. At PIF stage, the cost per tonne reduction for GHG mitigated has been calculated at 8.42 USD (based on total direct emissions only).

67. The project will build on activities and programmes of NCPC-SA, UNIDO and other actors (see Baseline section) and extend the scope and raise the ambitions of these activities towards sustainable energy solutions for IPs. This shall in particular be achieved through an upscale from demonstrations at specific IPs to all IPs in the countries. Compared to ongoing projects and programmes, the proposed project will in particular include the urban surroundings beside the IPs in its scope and boundary, i.e., apply an urban-industrial-energy nexus. In other words, the activities go beyond the boundary of the IPs themselves.

68. The additionalities of the project are further summarised in the table below:

Table 3: Incrementality of the project

Components	**Business as usual**	**Incremental cost reasoning**	**Main outcomes expected**

1. Fostering the coordination towards sustainable energy transformation of IPs by creating a conducive enabling environment	Missing coordination between national, provincial and municipal level and horizontal coordination across ministries / departments leads to insufficient integration of sustainable energy strategies, policies and regulation for IP's at government level. Municipal planning (on energy aspects and related infrastructure) is disconnected from IPs and neighbouring communities. Responsible institutions, e.g., municipalities and IP management as well as parks tenants have limited awareness of potential energy solutions. On IP level, limited coordination efforts amongst IP management and tenant companies regarding the IP ?s energy strategy lead to unsustainable energy supply and demand.	The coordinative capacity for sustainable energy solutions in IPs are strengthened on municipality and IP management level(s) For municipal and IP level planning analysis of typical energy profiles are made available to IPs, industrial establishments, the government and municipalities supported by introduced energy audits. IP management and tenant companies are provided with guidance on establishing IP energy strategies at local sites. Key stakeholders are aware and trained on sustainable energy aspects at IPs	Policy and regulatory environment, especially with regard to energy generation and consumption in IP, is enhanced
2. Demonstration of low-carbon and sustainable energy solutions through IP pilots	National experiences and understanding of sustainable energy technology and solutions will remain stagnant in immediate term. Limited priority of sustainable energy aspects in IPs on management and tenant level will continue. Energy supply will continue to rely on fossil fuels. There are still insufficient baseline and energy data (energy profiles of tenants and IPs)	Project will demonstrate application of sustainable energy solution fort IPs. Lessons learned from the sustainable energy pilot demonstration activity in the urban-industrial-energy nexus are derived. Knowledge about best practice examples for low-carbon IP activities in South Africa and globally are disseminated amongst IP managers through a Community of Practice.	Benefits and application of innovative, sustainable energy solutions are understood and considered in decision making and planning of energy system. IP managements and manufacturing businesses gain confidence and sufficient evidence of the technical, economic, social and environmental viability of sustainable energy solutions for industrial production and transport logistics in the urban-industrial-energy nexus

3. De-risking scheme for upscaling and replication of sustainable energy solutions in IPs	Perceived investment risks for sustainable energy solutions by IP management / tenant companies will persist. Lack of service providers and business models for ESCOs and IPPs still exist. Challenging technical aspects of energy supply are not addressed with innovation and sustainable solution.	Strategy for upscaling of IP sustainable energy pilot programme is in place. A project pipeline for investment replicating the IP sustainable energy pilot approaches is identified. The understanding of key stakeholders on financing options for sustainable energy activities in IP are strengthened through establishing a marketplace.	The Government and the financial sector enhance the financial and investment environment to de-risk investments in sustainable energy infrastructure in IP
4. Monitoring and evaluation	Lessons from implementation are not captured and project risks not meeting its objectives	Effective monitoring and evaluation of project is completed	Project achieves objectives with lessons learned for improving future projects

69. Co-financing was identified through project/barrier assessments and initial discussions with ministries and implementing partner. The following co-finance source for mobilising investment have been identified:

•

•69.1. Loans by IDC are used to mobilised investments. IDC?s offers special financing schemes such as the AFD Green Energy Fund providing finance to renewable energy and energy efficiency investments (fund size ZAR 1 billion[1])

•

•69.2. Loans by the DBSA though it?s finance facilities under the Green Climate Fund (GCF)

•69.21. FP098[2]: DBSA?s Climate Finance Facility (supporting infrastructure projects that mitigate or adapt to climate change (USD 170 million for bankable projects in South Africa and Rand-based economies ? Swaziland, Namibia, Lesotho).

•69.22. FP106[3]: The GCF-DBSA Embedded Generation Investment Programme (?EGIP?) will support the implementation of renewable energy projects with a capacity of 330 MW, which is comprised of 280 MW Solar PV and 50 MW Wind (USD 537 million)

70. Further co-finance funding will be explored during PPG. Initial discussions are ongoing with World Bank?s International Finance Corporation (IFC) and with dtic, e.g., under its Industrial Parks Revitalization Programme[4].

71. In addition, co-finance will be provided in-kind by the dtic, SALGA, UNIDO and the NCPC-SA including co-financing of project management costs.

[1] Approx. USD 68 million

[2] https://www.greenclimate.fund/project/fp098

[3] https://www.greenclimate.fund/project/fp106

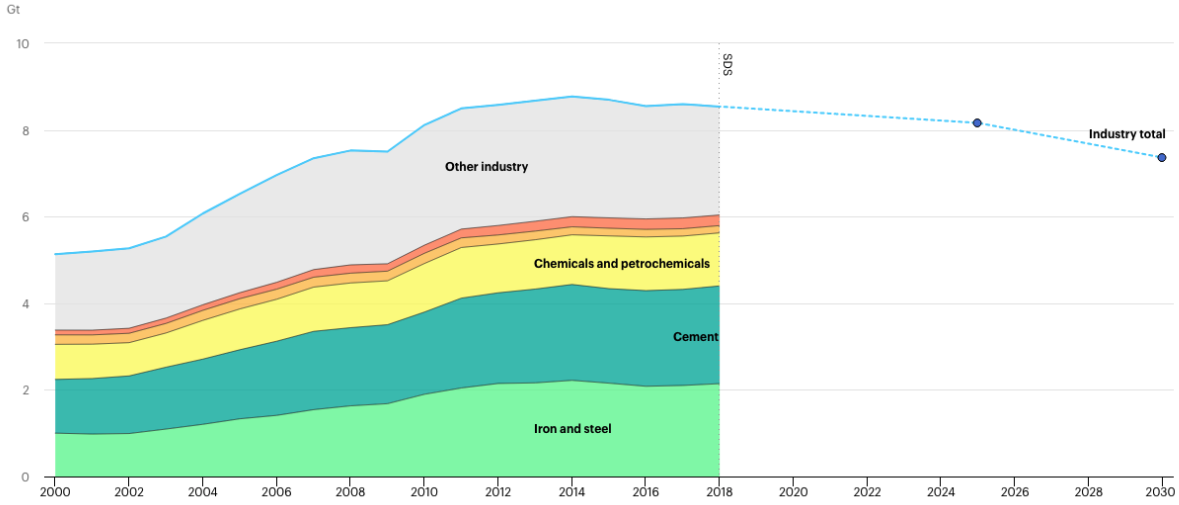
[4] 27 Industrial Parks are part of the Programme. R511 million / USD 35 million were approved for funding of Phase 1 for the first 10 industrial parks.

f) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)

72. According to a report from the International Energy Agency (IEA), direct industrial CO_2 emissions declined in 2018 by 0.6% to 8.5 $GtCO_2$, following relatively flat emissions levels in the years before.[1] Although this appears to be a promising development, there has been an ongoing long-term trend of rising production in energy-intensive industry subsectors (i.e. chemicals, iron and steel, cement, pulp and paper and aluminium), especially in India and the ASEAN countries, and the industry sector?s energy mix has remained relatively unchanged for the past decade.[2] The fossil fuel share of the energy mix decreased from 73% to 69%, while electricity rose only from 18% to 21%. With the energy sector still accounting for around a quarter of global CO_2 emissions and much untapped potential of decarbonisation, innovative low-carbon solutions should be supported in the upcoming years. Following the Sustainable Development Scenario (SDS) designed by the IEA, industry emissions must fall by 1.2% annually to 7.4 $GtCO_2$ by 2030.[3]

[1] IEA 2020a
[2] Ibid.
[3] Ibid.

Figure 7: Industry direct CO_2 emissions in the Sustainable Development Scenario (SDS), 2000-2030



Source: IEA 2020a

73. The project will contribute to the transition within the industry sector towards a low-carbon development. Given the lack of available data on energy supply and demand in industrial parks, robust calculations cannot be undertaken at this stage. This needs to be further investigated during CEO Endorsement Request development. What can be assumed is certainly a significant potential for energy efficiency and renewable energy supply, and hence a significant decline of fossil fuel-based electricity generation in the country in the longer term. In South Africa the production of electricity is mainly based on domestic coal generated in coal fired power plants of Eskom as the leading utility. The grid emission factor in the national grid currently amounts to approx. 0.950 tCO_2/MWh[1]. Hence, with every MWh saved due to energy efficiency gains or replacement with clean renewable energy sources 0.950 tCO_2 could be reduced. For instance, at an IP renewable energy can be generated through solar

PV with an installed capacity of 1 MW_P and supply the tenants with clean power of 1,460 to 2,045 MWh/a (depending on the region and solar Irradiation) up to 1,400 - 2,000 tonnes of CO_2 emission can be reduced[2].

74. At the pilot activities a potential emission reduction of at least 165,000 tCO_2/a is estimated (assuming 3 pilot IPs equivalent to the size and GHG emission balance of the ELIDZ, i.e., 55 $ktCO_2/a$ emission reduction potential. See Textbox under Output 2.1). There is the potential for an indirect uptake at additional 10 IP through the Outputs under Component 3.

75. The result framework for the project will include the GEF Core Indicator 6 *Greenhouse gas emissions mitigated (metric tons of carbon dioxide equivalent)* and the related contextual sub-indicators on *Energy saved* (GEF Core Indicator 6.3 ? in MJ) and *Increase in installed renewable energy capacity per technology* (GEF Core Indicator 6.4. - in MW).

76. Additional sustainable development and co-benefits (environmental and social-economic, such as additional revenue and costs savings, attraction of private investments, job creation, waste diversion, etc) will be analysed for the PPG phase in consultation with key stakeholders.

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[1] IGES List of Grid Emission Factors, "Combined Margin EF (Average), IGES sheet "Grid Summary", January 2019 (Data basis 2017)

[2] Most areas in South Africa average more than 2,500 hours of sunshine per year, and average solar-radiation levels range between 4.5 and 6.5 kWh/m^2 in one day, equivalent to 4.0 to 5.6 kWh/kW_P daily or 1,460 ? 2,045 kWh/kW_P yearly. See: https://globalsolaratlas.info/download/south-africa

g) Innovation, sustainability and potential for scaling up.

77. Innovation: Sustainable and systematic energy service solutions for industry parks are rarely implemented in South Africa. In particular comprehensive planning and cooperation at IP level is an innovative aspect for addressing the energy management and supply challenges in the future. In addition, the project will promote new and innovative technologies for adoption at IP levels, such as: 1) Decentralized renewable energy power generation, usage and storage, 2) Enhanced and accelerated energy efficiency adoption through DSM and digitalisation, 3) Cleantech innovation (e.g., green hydrogen), and 4) Systemic impacts for sustainable cities, incl. electric mobility and waste management.

78. Sustainability: The sustainability of the coordination after the project will be guaranteed by the NCPC-SA and the dtic. As described under Component 2 and 3, the NCPC-SA will work with dtic and the private sector (IPs and tenants) to integrate energy into investment planning with the ultimate goal of ensuring a sustained support to sustainable technologies even after the completion of the GEF-7 project and until the market is able to advance without any further support.

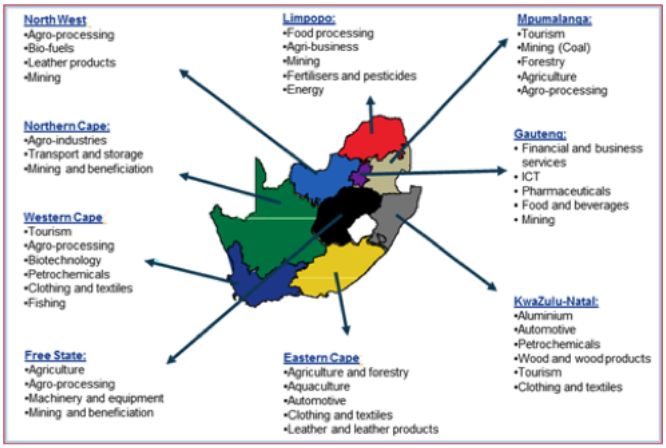
79. Potential for scaling up: The policy, coordination, regulatory work and replicability will be achieved under Component 1 and Component 2, leading to scaling-up potential by setting-up the national and sub-national coordination structures and rules that allow a market to operate at scale. The support under Component 3 to de-risk investments will encourage and enable local authorities and private sector IPs and tenants to undertake the development stages of sustainable energy solutions at IP levels. This will help unlocking investments on sustainable energy projects across the country.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

80. The project interventions will be located throughout South Africa (*Coordinates:* 30.5595? S, 22.9375? E); however, from todays? perspective it cannot be clearly specified in which industrial parks the pilot activities will be selected (as this selection is part of the programme). Thus, an indicative selection of parks with potential relevance is illustrated. This will be further determined and confirmed during the PPG phase.

Figure 8: Location of IPs with potential relevance for the project / Provincial economic focus areas and strengths



Source: Google Maps / UNIDO (2020)[1]

[1] See UNIDO (2020): Global Eco-Industrial Parks Programme - South Africa: Country level intervention Project Document

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Indigenous Peoples and Local Communities No

Civil Society Organizations Yes

Private Sector Entities Yes

If none of the above, please explain why:

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement

81. The project concept has been prepared based on consultations with international, national and local stakeholders. These consultations include participatory events (round tables of industry stakeholder in

South Africa) and local (bilateral) meetings (partially virtual due to COVID-19 restrictions), which discussed the baseline situation, barriers and root causes, potential solution as well as next steps to advance the project and sustainable energy solution for IPs in South Africa. Civil society organizations, local communities, the national government, research institutions and private sector have taken part in these discussions. At the national level, regular meetings have been held with the private sector, represented for instance by IP managers. For the further evolution of the project design, consultations with further relevant actors are foreseen, for instance on aspects such as empowerment of women or youth.

Table 4: Participation of stakeholders

Stakeholder main group	**Stakeholder name / Agency**	**Existing activities with potential to be leveraged**	**Content engagement, contributions to the project and potential role**
Government and National Agencies	Department of Trade, Industry and Competition of South Africa (dtic)	dtic is responsible for the SEZs and the IPRP and is coordinating various processes with relevance for industrial parks.	The leading national counterpart will be the dtic. It is responsible for co-ordination with ministries and national agencies in executing the project activities. dtic will be part of the project steering committee and the project management unit.
	Department of Environment, Forestry and Fisheries of South Africa (DEFF)	DEFF is inter alia responsible for regulations, administration and protection of the environment.	DEFF will be a partner in the execution of the project and will assist the project especially for policies targeting environmental management of industrial parks/zones.
	Department of Mineral Resources and Energy (DMRE)	DMRE is responsible to regulate and transform the sector for the provision of secure, sustainable and affordable energy and the promotion and regulation of minerals and mining.	DMRE will support the project with respective regulatory and coordinative issues concerning energy.
	Industrial Development Corporation of South Africa Limited (IDC)	National development finance institution to promote economic growth and industrial development under the supervision of the dtic.	IDC will provide funding such as debt and guarantees to IPs and tenants.
	National Treasury (NT)	The National Treasury is experienced in funding urban development activities, including in 8 municipalities through its City Support Programme. NT is conducting baseline surveys in selected parks.	The National Treasury will consult the project regarding (domestic) public and private sector funding opportunities and technical support in identifying, approaching and working with municipalities and IPs. Also, NT will support baseline data collection during PPG or the initial project phase.

Stakeholder main group	Stakeholder name / Agency	Existing activities with potential to be leveraged	Content engagement, contributions to the project and potential role
Implementing Agency	UNIDO	With South Africa being one of UNIDO?s priority partner countries, UNIDO has in-depth experience of five national environmental and infrastructure priority areas of: Energy, 4IR technologies (digitalization, industrial communication, and IoT) and sustainable commercial transport. With respect to industrial parks, UNIDO serves as implementing agency for the SECO funded GEIPP project.	UNIDO will serve as the GEF Implementing Agency for the project, through its Department of Energy in Vienna, supported by the UNIDO Regional Office in South Africa.
Project Executing Entity (PEE)	National Cleaner Production Centre of South Africa (NCPC-SA)	NCPC-SA is an experienced actor particularly in the field of energy efficiency, renewable energy, electric vehicle infrastructure and technology gap assessments, and already serves as executing entity of the SECO funded GEIPP project. NCPC-SA has engaged with UNIDO before and has experience with the GEF.	NCPC-SA will serve as execution entity of the project, forming the project management unit jointly with dtic. It will furthermore be part of the project steering committee.
Beneficiaries / Local private sectors	Municipalities	Municipalities are key stakeholders for various aspects of planning and implementation of industrial parks (for example Maluti a Phofong, City of Tshwane, City of Cape Town, eThekwini, Buffalo City, uMhlathuze)	Municipalities will actively participate in the project preparation and execution, especially in project capacity building and awareness raising, demonstration projects, and planning and regulatory aspects. They will be included as members of technical working groups.

Stakeholder main group	Stakeholder name / Agency	Existing activities with potential to be leveraged	Content engagement, contributions to the project and potential role
	Park management and selected tenant companies	Park managers and tenant companies (in selected pilot parks/zones) possess knowledge on opportunities and challenges of fostering sustainable energy solutions for industrial parks (for instance Phuthaditjhaba Industrial Park, Ekandustria, Atlantis SEZ, Dube Trade Port, ELIDZ, Richards Bay SEZ).	Park managers and selected tenant companies (in the pilot industrial parks) will actively participate in the project preparation and execution, especially in project capacity building and awareness raising, demonstration projects, and standards and data management. They will be included as members of technical working groups.
Financial Sector	Development Finance Institutions (DFIs)	DFIs understand the opportunities and challenges of de-risking infrastructure and development project activities. Potential partners comprise the Development Bank of Southern Africa (DBSA), the Industrial Development Corporation (IDC), the International Finance Corporation (IFC)	DFIs will support the project in finance the pilot demonstrations and in setting up the financial investment environment (see Component 3), e.g., as members of financial working groups.
Financial Sector	Commercial banks	Commercial banks are the experts in financing the operation of their clients, including from the industry sector.	Commercial banks can be supportive in setting up the financial investment environment with their practical experience for financing industrial and manufacturing activities.
Provincial Governments	Provincial Governments / entities	Provincial Governments are relevant for various aspects of planning and implementation of industrial parks	Provincial Governments will be consulted during project preparation and execution. They will be included as members of technical working groups.

Stakeholder main group	Stakeholder name / Agency	Existing activities with potential to be leveraged	Content engagement, contributions to the project and potential role
Implementing Partners / Local Academia and Research institutions	Sector experts	Sector efforts possess in-depth sector knowledge from research and capacity development in industrial processes. Sector experts include for instance GreenCape, TIPS, CSIR, SANEDI, SAREBI, UNEP District Energy Initiative, etc	Under the project sector experts can consult the project with sector expertise, e.g. as members of technical working groups.
Implementing Partners / Local Governments	South African Local Government Association (SALGA)	SALGA is active as local government association, hosting an urban energy support network[1][1] which is a forum on energy and environment (co-hosted by Sustainable Energy Africa & South African City Network)	SALGA will facilitate access to municipalities and IP managements and support the information dissemination through their network (co-finance provided as in-kind contributions).
Implementing Partners / Intergovernmental Organisations	Development Cooperation	Development partner institutions conduct numerous activities that target greening the South African economy and industry. Institutions comprise for instance GIZ or SECO, among others.	Development partner organizations will help to coordinate with and access information from related activities, in order to provide technical know-how and best practice experience, e.g., as members of technical working groups.

[1] https://www.cityenergy.org.za

82. A list of specific stakeholder consultation meetings conducted to date is provided below. For the elaboration of this PIF, the following stakeholders were met virtually between November 2020 and February 2021. In addition, regular meetings between UNIDO, dtic and NCPC-SA were conducted, and the project team participated in EIP Roundtable events organized by dtic.

Table 5. Participation of stakeholders

No	Organization	Name	Date	Topics discussed

1	National Cleaner Production Centre (NCPC-SA)	Faith Mkhacwa, Henry Nuwarinda, Victor Manavhela, Alf Hartzenburg	06/11/2020	General exchange with NCPC-SA on the planned intervention and the way ahead.
2	National Cleaner Production Centre (NCPC-SA)	Alf Hartzenburg	13/11/2020	Details of proposed intervention, as well as general barriers for fostering sustainable energy in IPs
3	South African National Energy Development Institute (SANEDI)	Barry Bredenkamp	18/112020	Opportunities and challenges of RE supply and energy efficiency services in South Africa, as well as barriers for IP development.
4	South African Renewable Energy Business Incubator (SAREBI)	Helmut Hertzog	20/11/2020	Opportunities and challenges of RE supply and energy efficiency services in South Africa, as well as barriers for IP development.
5	Department of Mineral Resources and Energy (DMRE)	Xolile Mabusela	23/11/2020	General exchange with DMRE on the planned intervention and the way ahead.

6	City of Capetown	Kadri Nasiep	25/11/2020	Besides the enabling framework and barriers for fostering sustainable energy in IPs, capacity development needs, best practice examples and lessons learned, a focus was on the Athlone power station and the potential for a hydrogen production strategy.
7	Trade and Industrial Policy Strategies (TIPS)	Gaylor Montmasson-Clair	25/11/2020	The enabling framework and barriers for fostering sustainable energy in IPs, capacity development needs, best practice examples and lessons learned
8	Department of Trade, Industry and Competition (dtic)	Annalize van de Merwe	26/11/2020	The enabling framework and barriers for fostering sustainable energy in IPs, capacity development needs, best practice examples and lessons learned (such as Atlantis SEZ).

9	Atlantis SEZ	Pierre Voges, Matt Cullinam, Iemrhan	30/11/2020	Discussion of approaches taken to attract green tech investors and making Atlantis SEZ sustainable, including green investment principles.
10	Green Cape	Jack Radmore, Bruce Raw	02/12/2020	General exchange with Green Cape on the planned intervention and the way ahead.
11	Industrial Development Corporation (IDC)	Stephen Nel	21/01/2021	Overview of project development to date and had preliminary discussion on opportunities to create synergies with IDC initiatives.
12	International Finance Corporation (IFC)	Amina Khaled El Zayat, Kobina Egyir Daniel, Gokhan Akinci	25/01/2021	General exchange with IFC on planned interventions under project. IFC outlined upcoming initiatives and opportunities to compliment project?s work.
13	Development Bank of South Africa (DBSA)	Olympus Manthata, Nomsa Zondi	29/01/2021	General exchange with DBSA on planned interventions under project proposal.

14	National Cleaner Production Centre (NCPC-SA) and Council for Scientific and Industrial Research (CSIR)	Workshop with NCPC and CSIR staff	02/02/2021	Feedback collected on finding of research and stakeholder consultations to date.
15	Development Bank of South Africa (DBSA)	Olympus Manthata, Nomsa Zondi	04/02/2021	DBSA?s shared ongoing initiatives and opportunities to compliment project.
16	National Treasury	Anthea Stephens, Karen Harrison, Rudewaan Arendse	12/02/2021	Present status of project and exchange on areas relevant to project, including City Support Programme.
17	South African Local Government Association (SALGA)	Silas Mulaudzi, Melusile Ndlovu	12/02/2021	Challenges and opportunities for supporting municipalities in context of urban-industrial energy nexus.
18	Industrial Development Corporation (IDC)	Stephen Nel Malebana Mogoba, Stuart Bartlett	16/02/2021	Opportunities to link relevant initiatives with project.

[1] *https://www.cityenergy.org.za*

Stakeholder engagement plan for the project preparation

83. To ensure strong country ownership - in line with the GEF guidelines on the implementation of the policy on stakeholder engagement and the GEF policy on gender equality - the project preparation will be undertaken in consultation and engagement with government, private sector, academia, civil society organizations and other relevant stakeholders ? in particular those who will

benefit from and be directly involved in the implementation of the project (i.e. direct project beneficiaries) and those who may be impacted (positively or negatively) by the project.

84. Based on the initial stakeholder engagement and analysis conducted during the PIF preparation, the engagement for the project development will be pursued in an inclusive and gender-responsive manner, so that the rights of women and men and their different structural barriers, knowledge, needs, roles and interests are recognized and addressed. An updated list of stakeholders and project beneficiaries (e.g. IPs), including civil society organizations and local communities, will be prepared and included in the project document. In addition, a report and protocols are prepared summarizing all stakeholder consultations held and listing the stakeholders consulted.

85. During the project preparation phase the above-mentioned stakeholder and additional ones that are identified to be relevant will be further engaged and consulted for the final project design preparation, as follows:

85.1. Regular dialogues between UNIDO and NCPC-SA in coordination with dtic for the proper organisation and implementation of the project preparation will be arranged. This will ensure NCPC-SA?s ownership and main responsibility for project implementation.

85.2. In the beginning of the preparation phase an inception workshop will take place bringing together all key actors involved in the project preparation phase, incl. civil society organisation and NGOs. This will serve the purpose of consulting with the relevant national counterparts, discuss the baseline situation, map the gaps and barriers, collect relevant country data, agree upon the project intervention logic (logframe and results framework) aligned with the PIF and initial institutional arrangements for execution. The consultation workshop will seek feedback on the proposed project approach and guidance on adapting it to local conditions. For allowing this a project summary and a brief description of the draft outcomes and outputs will be circulated among the stakeholders.

85.3. Following the inception workshop, bilateral and multi-lateral stakeholder consultation and engagement meetings for the project will be organised with the stakeholders listed in Table 4 to identify their views on the project, the potential contributions and roles to its implementation (see indicative roles and contributions from main stakeholders in Table 4). During the consultation meetings, co-finance contributions to the project will be discussed and agreements be sought. For validation of the barrier and baseline situation, to raise interest and gain better data, meetings and consultations with municipalities, IPs management and tenants will take place. In general, the bilateral meetings shall support to substantiate the project implementation structure and define individual roles and responsibilities. In addition, the engagement shall help to increase the individual ownership though onboarding the stakeholder to the project.

85.4. Finally, in close coordination between the Implementing Agency and the Project Executing Entity a stakeholder validation workshop will be organised to validate the developed project documents (incl. logframes, results framework, budget, workplan, gender action plan, etc.) with key country counterparts.

3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

86. Women and girls face many challenges that hinder them to equally lead, contribute to and benefit from the energy transition. These include limited access to finance, lack of secure land title and time poverty, caused by unbalanced distribution of care work. For instance, globally, women only receive about 2% of venture capital?in the sustainable energy sector, this is even lower. Social and legal restrictions often limit their rights to own land, borrow money and make their own economic decisions. Barriers such as a lack of access to credit and training, a lack of digital literacy, as well as pervasive cultural and gender norms prevent women from entering and sustaining studies in STEM fields, thus limiting the possibilities for women to develop and use energy-based technologies. The gender disparity is replicated in terms of **access to trainings and skills** development, contributing to a correspondingly low percentage of women employed as professionals who then face a lack of support and enabling environment for advancing in these sectors.

87. Another area in which the gender gap is expressed markedly is the access to the benefits of energy services. Women and young girls tend to be responsible for **fuel-gathering** and suffer from the negative impacts of traditional **cooking** options, such as particulate matter inhalation (UNDP, 2016). Women are typically found in the less lucrative parts of agricultural value chains (e.g., production, basic processing, unskilled labour). Their movement to more rewarding opportunities is hindered by a combination of social norms and market constraints that manifest in different ways.

88. Gender perspectives are often overlooked in the energy sector in general, and in energy policies in particular. Women?s different and specific needs, experiences and knowledge are not yet well-represented in energy planning and policymaking?leading to energy policies that exacerbate existing inequalities. Underlying all key **policy** actions is a need for the generation, collection, and use of gender **statistics,** including gender-disaggregated quantitative and qualitative data, that reflect all aspects of energy production, consumption and development impacts.

89. There is a growing recognition of the role of **women within the energy workforce** ? from representation in **leadership** and boards, to technical **training** and **mentoring** (IRENA 2019). There is strong evidence linking gender-diverse boardrooms with better company performance and the promotion of innovation and development. Women- led businesses have been found to be more efficient and achieve higher growth in profits. In light of this, the dialogue on gender and energy is shifting from women being identified as part of **vulnerable** groups to acknowledging the **power** they hold as **key agents of change:** as consumers, producers, distributors, and decision makers across the energy value chain (ESMAP, Global Alliance).

90. Nevertheless, research demonstrates that, to date, the **gender gap in the energy sector remains as wide** as ever. While the participation of women can vary significantly by energy subsector, it remains well below the economy-wide proportion of 48 percent globally, with 22%in oil and gas and 32% in renewables (IEA, 2020). The gap is even more pronounces at boardroom levels, where women usually make up for less than 20%. Moreover, it was found that, on average, electricity and gas companies show a gender pay gap of 15.2%, meaning that women make an average 91.8 pence for every pound earned by their male counterparts.

92. The impacts of COVID-19 on women and youth unemployment will be felt both in the short term, due to the sudden downturn in the global economy and loss of immediate employment, and the long term, due to current disruptions in education and early career opportunities. Low-skilled labour has been particularly hard hit, whereas opportunities are emerging for those focusing on new areas of the economy e.g., developing digital skills. Undoubtedly, there are challenges related to COVID-19 pandemic that impact youth more than other groups such as disruption to education, underemployment and unemployment. Nevertheless, this crisis and the clean energy transformation also offers opportunities for women.

93. Post-apartheid, the South African government has made significant shifts through social policy to abolish discriminatory practices in women ownership of businesses and participation in the labour force. Even though women represent over half of the population the likelihood of black women owning businesses is slim. In general, black women are employed within sectors classified as ?care work? for example domestic work, public service professions and retail.

94. High unemployment and informal work among women (26.5% of women and 22.9% of men in 2013)[2], low numbers of female entrepreneurs (560,000 reported male employers at the beginning of 2011, 13,800 female employers were reported at the end of 2012) and graduates in science, technology and engineering, specifically in engineering (35,000 engineers in South Africa, of whom only 3,000 are women)[3].

95. Apart from the public sector, women dominate in lower-income sectors than men. This is not entirely based on differences in educational backgrounds between women and men as educational levels are equal or sometimes higher than men. The legacy of the apartheid era is attributed to the exclusion and poor outcomes for women participation. In addition, the bulk of employment opportunities gravitate to urban hubs and economic activity and employment in non-urban areas is often scarce.

96. The dtic programmes that aim at redistributing economic power by the inclusion of black-owned small businesses into supply chains of established companies are not always successful in consistently focusing on women inclusion. Moreover, the industrial policy does not cater for strategies within sectors or industries where women can dominate. Through the Industrial Development Corporation (IDC), the dtic provides initiatives that target women-owned businesses with small funding allocations. However, for women-owned businesses access to finance is an ongoing restraint. [4]

97. The low-carbon economy provides many opportunities to reduce gender inequalities and increase women?s economic participation. Promoting women participation early in the project development phase is therefore essential. Ensuring capacity building and skills transfer is important for women?s inclusion in technical and management roles. Providing opportunities for new businesses and economic activities will create a platform for increased participation

of women. In this respect, NCPC-SA can capitalize on experiences with gender mainstreaming from on-going projects, including measures such as:

? Free online gender mainstreaming awareness raising training (?I know gender?)

? Fully subsidised fundamental and expert level training on energy management systems (EnMS), engineering service outsourcing (ESO), energy management basic principles and concepts (EnM101), energy performance measurement and indicators (EnPMI) for women

? Gender mainstreaming awareness raising workshops and conferences

? Technical Skills upskilling/support for female experts & consultants

? Sponsorship of female students (undergrads & postgrads) mentorship

? Policy advocacy

98. The exact scope and details of gender mainstreaming activities will be subject to further discussion in the project formulation during the PPG Phase.

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[1] https://www.engerati.com/energy-retail/fixing-the-gender-pay-gap-in-the-energy-industry/

[2] http://www.oecd.org/gender/data/employmentandunemploymentratebysexandagegroupquarterlydata.htm

[3] http://www.scidev.net/global/education/opinion/south-africa-must-attract-more-women-to-science-1.html

[4] See https://www.environment.gov.za/sites/default/files/reports/greeneconomy_policyreview.pdf.

99. In recent years, women?s economic empowerment and sustainable energy have emerged as key components of inclusive and sustainable growth, both as goals and, more significantly, as catalysts and strategies to accelerate and promote poverty reduction through productive activities. This welcomed recognition has impacted the international discourse surrounding the global development agenda. Now, gender equality and women?s empowerment (GEEW) have become widely accepted as preconditions for the success and sustainability of any initiative?policy formulation, project design and implementation, capacity building, etc.

100. UNIDO recognizes that gender mainstreaming is a key strategy for achieving gender equality and the empowerment of women (GEEW) which are crucial for achieving a significant positive impact on sustained economic growth and inclusive industrial development, which are key drivers of poverty alleviation and social progress. The project aims to demonstrate good practices in mainstreaming gender aspects through its activities, wherever possible, and avoid negative impacts on people, due to their gender. Consequently, gender dimensions will be considered throughout the whole project cycle. Guiding principle of the project will be to ensure that both women and men are provided equal opportunities to

lead, participate in and benefit from the project. Therefore, the outcomes, outputs and activities will be designed to meet the different needs and priorities of women and men.

Gender Mainstreaming approach:

101. The analysis above shows the importance of considering gender dimensions in all project activities to enhance the effectiveness and sustainability of the project intervention. Accordingly, the project logical framework incorporated, wherever possible, the gender dimensions with specific indicators and target in line with UNIDO and GEF Gender Policies and Strategies. In practical terms, the project will address, among others, following actions:

101.1 A **detailed gender analysis** will take place and based on that a **gender mainstreaming action plan** will be developed during the inception phase. This will inform the project annual work plan to promote women's engagement in the project execution and be adhered throughout the project execution and considered for regular monitoring of the progress.

101.2 Efforts will be made to promote **participation** of women and men in capacity building and awareness raising activities, at community, managerial and technical levels, as participants (such as entrepreneurs) and trainers. Given that some of the trainings to be provided by this project will be of a technical nature, if necessary, the project will also provide bridging training courses so that women who may not have a technical background will have an intermediary training.

101.3 **Gender-sensitive recruitment** will be practiced at all levels where possible, especially in selection of project staff. Gender responsive TORs will be used to mainstream gender in the activities and tasks of consultants and experts. In cases where the project does not have direct influence, gender sensitive recruitment will be encouraged. In cases where the project is not expected to affect women and men differently, gender-sensitive recruitment will still be encouraged to ensure diversity in team composition. Furthermore, whenever possible existing staff will be trained, and their awareness raised regarding gender issues.

101.4 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, while also the gender balanced composition in project committee will be emphasized. For this purpose, women?s groups and associations, gender experts and /or other stakeholder concerned with gender and energy will be consulted.

101.5 When **data-collection or assessments** are conducted, gender dimensions will be considered. This can include sex-disaggregated data collection, performing gender analysis, etc.

102. All **training materials and knowledge management** activities will be gender mainstreamed. This includes integration of gender dimensions into publications, for instance presenting sex-disaggregated data, gender-energy nexus theory, gender sensitive language in publications, photos showing both women and men, and avoid presenting stereotypes, as well as assuring that women, men and the youth have access to and benefit from the knowledge created.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes

closing gender gaps in access to and control over natural resources;

improving women's participation and decision-making; and/or Yes

generating socio-economic benefits or services for women. Yes

Will the project?s results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Will there be private sector engagement in the project?

Yes

Please briefly explain the rationale behind your answer.

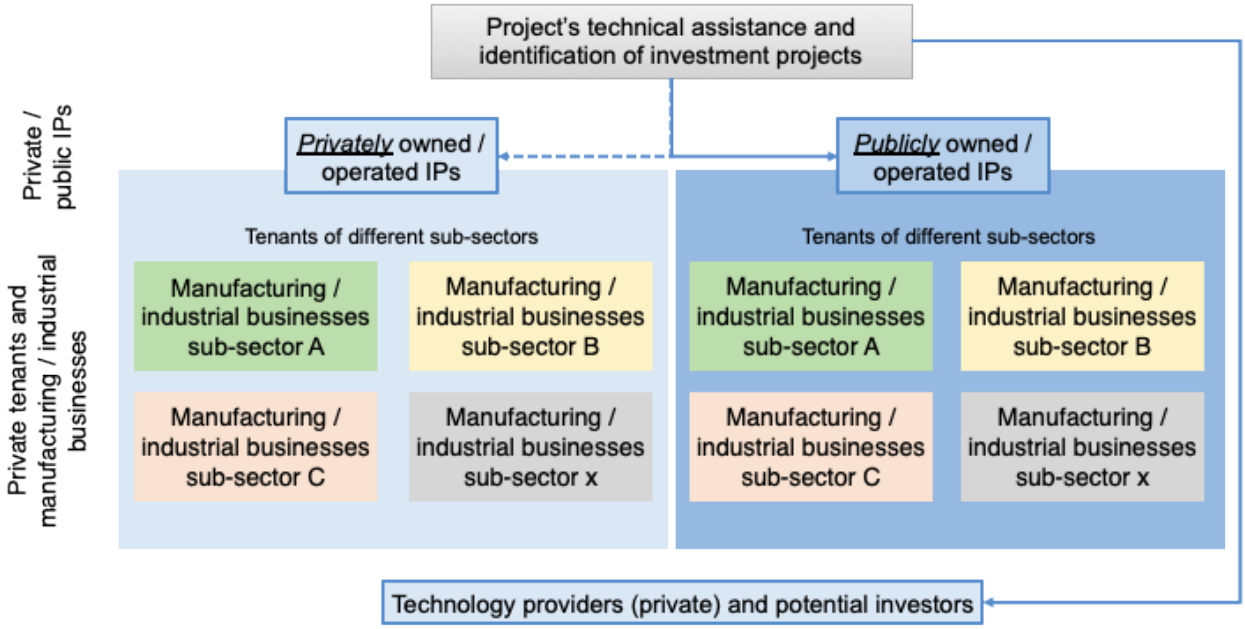
103. The private sector will be engaged in the project through the following stakeholders:

103.1. The **National Cleaner Production Centre South Africa (NCPC-SA)**: The NCPC-SA is the articulating arm of the Department of Trade, Industry and Competition, which is responsible for implementing government programmes on energy efficiency, water and resource management in the industry and manufacturing sector. The NCPC is not a private sector institution, but it helps to mobilize the private sector. It is a foundation whose mission is to promote, strengthen and consolidate the efficient use of energy in the industry sectors, contributing to the competitive and sustainable development of the country. It promotes the reduction of energy consumption, incl. the engagement of the private sector at industrial park and tenant (industrial company) level.

103.2. **Private IPs and private sector establishments operating at IPs:** Most IPs in South Africa are privately owned and operated. Hence, private IP managements are part of the main target group of the project for adopting and implementing sustainable energy practice at their parks. In addition, most manufacturing establishments and companies located within both governmental and privately run IPs are private companies as tenants. These companies are main beneficiaries and key target group of the project. In general, the project will deal with IP management and individual tenant companies of different industrial sub-sectors operating in publicly owned / operated IPs (main target group) and potentially in privately owned / operated IPs (see Figure 9).

103.3**. Technology providers and potential investors** like private ESCOs, IPPs or utilities will be encouraged to actively provide their services to IPs and manufacturing companies. In the municipalities and IPs receiving support under Component 2 of the project, a multi-stakeholder coordination group will be established. This will be helpful and beneficial to bring all local stakeholders around the table, potentially including local private energy service provides and community representatives. In addition, the financial sector and commercial banks as experts in financing the operation of their clients, including from the industry sector, will be mobilised to finance investment project identified under the project.

Figure 9: Private sector engagement and involvement



5. Risks to Achieving Project Objectives

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)

Table 6. Project risks

Risk description	Main category	Impact severity	Likelihood	Risk Mitigation Strategy and Safeguards	By Whom / When?
General: National government engagement and project governance					
National Government ministries remove their support for the project, including due to political or social change	Political	High	Low	The Project has been given permission to be executed by the Department of Trade, Industry and Competition. UNIDO has received the letter of endorsement from Ministry of Environment for the project activities. Further Ministries will be involved as implementing partners closely in the project to ensure their participation. The Ministries are part of the current National Steering Committee.	UNIDO Throughout the project.
Co-finance partners remove support for the project	Political and organizational	Medium	Low	Liaise constantly with potential partners. Other private and public institutions interested in the project could be part of the project in case current co-finance partners decline or leave the project.	UNIDO Implementing Partners Throughout the project.

Risk description	Main category	Impact severity	Likelihood	Risk Mitigation Strategy and Safeguards	By Whom / When?
Local municipalities and IPs remove support for the project (e.g., by change of government or changing priorities)	Political	High	Medium	A removal of support from one or more municipalities will require to identify additional municipalities in order to meet the deliverables of Component 2. Therefore, the project will be in dialog with a number of cities interested in support on sustainable energy solution for local IPs in their cities, in order generate a pipeline of other cities that can be selected.	NCPC-SA UNIDO dtic Throughout the project.
Component 1: Fostering the coordination towards sustainable energy transformation of IPs by creating a conducive enabling environment					
Lack of interest from local authorities to support and coordinate the projects	Political	High	Low	The project will be in constant exchange with local municipalities and governmental operated IP to ensure awareness and demonstrate benefits.	NCPC-SA UNIDO dtic Municipalities Throughout the project.
Accessibility of reliable energy data for energy database, e.g. due to confidentiality and competitiveness	Technical	Medium	Low	The project will engage third party auditors for gathering data and setting up the database. Information will be treated confidential. The database could follow the example of the GNR (?Getting the Numbers Right?) Database of the Global Cement and Concreate Association.	NCPC-SA UNIDO Throughout the project.
Component 2: Demonstration of low-carbon and sustainable energy through IP pilots					

Risk description	Main category	Impact severity	Likelihood	Risk Mitigation Strategy and Safeguards	By Whom / When?
Investors are not interested in pilot activities	Financial	High	Low	Support feasibility studies and invite international peers for exchange experiences. Increase transparency on permitting process and planned national government support (e.g. in coordination etc.). Increase awareness raising to private sector.	NCPC-SA UNIDO dtic Municipalities Throughout the project.
The pilot projects cannot be implemented and commissioning as planned in accordance with the expected performance.	Technical	High	Low	Install a strong project management to allow tendering and commissioning of projects in time. Conduct pre-feasibility studies and assessment according to international best practice. Ensure in the tender process international and national best available technologies are used for the projects.	NCPC-SA UNIDO dtic Municipalities Throughout the project.
Component 3: De-risking scheme for upscaling and replication of sustainable energy solutions in IPs					

Risk description	Main category	Impact severity	Likelihood	Risk Mitigation Strategy and Safeguards	By Whom / When?
Inadequate support/will from local authorities and other stakeholders to commit to strategies, policies and regulations	Political	High	Low	The project will establish a multi-stakeholder marketplace to bring together authorities, private sectors and financial institutions to demonstrate interest in the development of sustainable energy projects. Municipalities of pipeline project will be encouraged to provide an official letter confirming the engagement in the activities, confirming co-finance and commitments to implement a policy, programme, or action related.	NCPC-SA UNIDO dtic Municipalities Throughout the project.

Risk description	Main category	Impact severity	Likelihood	Risk Mitigation Strategy and Safeguards	By Whom / When?
Other cities are not attracted by the outreach activities	Technical	Medium	High	The project will establish a multi-stakeholder marketplace to bring together authorities, private sectors and financial institutions to demonstrate benefits and best practice as well as to raise awareness and interest in the development of sustainable energy projects. Focus will be put on cost-benefit analysis and the sustainable impact of the interventions, incl. co-benefits on local environmental, social and economic aspects. UNEP?s Global industry Programme will demonstrate the benefits of municipalities and private sectors joining the project also from a regional and global perspectives.	NCPC-SA UNIDO dtic Throughout the project.
Other risks					

Risk description	Main category	Impact severity	Likelihood	Risk Mitigation Strategy and Safeguards	By Whom / When?
Social and Gender Risk Resistance against or lack of interest in the project activities from stakeholders, especially with regard to the active promotion of gender equality. Low participation rates of suitable female candidates due to lack of interest, inadequate project activity or missing qualified female population within the i.e., engineering sector.	Political and organizational	Low	Medium	This project will pursue thorough and gender responsive integration and ensure stakeholder involvement at all levels, with special regard to involving women and men. Following UNIDO ESSP and gender policy requirements, the gender mainstreaming plan will be applied to mitigate this risk	NCPC-SA UNIDO dtic Throughout the project.

[1] https://gccassociation.org/sustainability-innovation/gnr-gcca-in-numbers/

COVID-19 opportunity analysis

104. For the project, opportunities in the context of measures taken in response to the COVID-19 pandemic exist regarding innovation in climate change mitigation and engaging with the private sector, also in line with the ?South African Economic Reconstruction and Recovery Plan? in October 2020.

Table 7: COVID-19 risk analysis

Risk	Risk level	Risk mitigation measure
Further project evolution in PPG phase cannot be executed as per expected timelines due to the pandemic, leading to a delay with the CEO endorsement request.	Low/ Medium	Some delays in communications and consultations with counterparts and stakeholders are expected, in case lockdown regulations and directions in South Africa continue to be enforced throughout the year 2021. The PPG work plan will be developed in consideration of such risk factors, and initial communications with the stakeholders will provide extra emphasis on the timelines so that the counterparts and stakeholders are fully aware of the timelines within which the project development must take place. Also, opportunities in post-recovery measure of COVID-19 will be communicated to increase level of confidence of stakeholders in how the project can support South Africa in addressing not only its climate challenges, but also in supporting economic growth. In the case that delays are still foreseen, UNIDO will immediately inform the GEF Focal Point of South Africa and the GEF Secretariat to seek support and guidance.

Availability of Technical Expertise and Capacity and Changes in Timelines	Low	The project will carefully anticipate and monitor any possible implications of COVID-19 for a project start in 2022. This includes inter alia continued lockdown regulations and their respective implications on planning and working conditions in IPs (including for park managers and the labour force of tenant companies), as well as capacity changes with the executing entity and other project partners. Regarding capacity changes at core partners, this will require the project to identify alternative stakeholders; the foreseen diversity of partners will allow to decrease the risk, and communication within the technical working groups and other for a such as roundtables allows to retain a constant open dialogue with the urban-industry-energy nexus ?community? in this respect.
Stakeholder Engagement Process	Low	Hybrid stakeholder engagement processes consisting of both virtual and face-2-face meetings are foreseen throughout the project. In light of experiences made with the pandemic in 2020, the project will ensure that all exchanges foreseen as physical meetings (such as Communities of Practice, conferences, workshops) will be planned with a virtual alternative scenario. The foreseen helpdesk and matchmaking platform, as well as the increased experience with using virtual conferencing solutions help to decrease this risk.
Enabling Environment	Low	Fostering sustainable energy in the urban-industrial context is in line with the focus of the Economic Reconstruction and Recovery Plan of the South African Government, which includes priority interventions inter alia in energy security, reindustrialization, and green economy. The project will thus seek to harness opportunities with respective COVID-19 measures.
Financing (National debt crisis, availability of co-financing, price increases in procurement)	Low	As per the foreseen budgeting approach, GEF funding and a diversity in co-financing allows the project to develop a certain resilience against financing risks. A close monitoring of financing risks and an open dialogue with co-financiers will be done by the project executing entity.

Table 8. COVID-19 Opportunity Analysis

Opportunity	**Opportunity level**	**Opportunity optimization measure**
Promote energy efficiency improvements and low and zero-carbon technologies such as renewable energy, while not increasing the use of harmful chemicals and ensuring the ability to recapture and recycle materials at the end of life;	High	By its design the project foresees fostering of sustainable energy activities and as such can harness opportunities with recovery measures in the country.

Promote local business development projects which improve resilience to climate change;	High	Fostering sustainable energy activities in IPs allows parks to become more resilient to the adverse impacts of climate change, e.g. concerning the reliability of energy supply.
Promote sustainable business practices that are bio-based, energy efficient and chemicals free (as far as possible).	High	Energy efficiency measures are part of the scope of measures for IPs to improve their practices

[1] https://www.gov.za/sites/default/files/gcis_document/202010/south-african-economic-reconstruction-and-recovery-plan.pdf

Preliminary climate risk assessment

South Africa?s sensitivity to climate change, and its impacts

105. Like many other developing countries, South Africa is especially vulnerable to the impacts of climate change. Water is the primary medium through which the impacts of climate change are being felt in South Africa. Increases in climate variability and climatic extremes are impacting both water quality and availability through changes in rainfall patterns, with more-intense storms, floods and droughts; changes in soil moisture and runoff; and the effects of increasing evaporation and changing temperatures on aquatic systems. South Africa has been experiencing a serious drought since 2015, with associated crop losses, water restrictions, and impacts on food and water security.

106. Observational records show that temperatures in the region have been increasing over the last century and that the rate of warming has been increasing ? most notably in the last two decades. For the period 1961 to 2014, temperatures over the region have increased at a rate of 0.4 ?C per decade (Figure 1). Temperature trends across seasons show a slightly larger warming in summer (December-January-February) and autumn (March-April-May) compared with the other seasons. These observed increases in land surface temperatures have occurred simultaneously with increases in evapotranspiration across the region.[2]

107. According to Davis-Reddy and Vincent (2017), trends in sea surface temperatures (SST) demonstrate warming at all latitudes along the entire southern African coastline. Changes in SST have important implications for the upwelling strength in the Benguela Current system as well as the Agulhas Current, both of which are important drivers of regional climate. Rainfall over southern Africa is characterised by strong inter-annual and inter-decadal variability. These alternating patterns of above-normal/below- normal rainfall periods clearly illustrate the rainfall cycles prevalent in southern Africa where extreme wet and dry years have resulted in floods and droughts. Against this variability there is little evidence of a substantial change in mean annual rainfall (wetting or drying) over the period 1961 to 2014. Changes in many extreme weather events have been observed since 1950. Some

changes are evident with clear long-term trends (e.g. more frequent hot days), whilst others are more difficult to detect (e.g. tropical cyclones and thunderstorms).

[1] Department of Environmental Affairs, 2017. South Africa?s 2nd Annual Climate Change Report. Pretoria: Department of Environmental Affairs

[2] Davis-Reddy, C.L. and Vincent, K. 2017: Climate Risk and Vulnerability: A Handbook for Southern Africa (2nd Edition), Council for Scientific and Industrial Research, Pretoria, South Africa.

Projected climate futures

108. According to recent results of Global Climate Models (GCMs), temperatures in South Africa are projected to continue to increase during the 21st century, with the rate of increase reflecting the concentrations of GHG in the atmosphere. Average annual temperatures are likely to increase by 1-3 ?C by 2050, with higher increases expected during summer months. Warming is likely to be greatest towards the interior of the region, and lower in coastal areas.

109. Projected changes in rainfall vary more, due to differences in the ability of climate models to replicate observed rainfall patterns and simulate rainfall- producing processes. However, there is agreement between models that central southern Africa (incl. the southwestern Cape of South Africa) is likely to be drier. Climate change is projected to alter the frequency and intensity of some extreme events in the future. Projections based on dynamical downscaling suggest that the annual frequency of very hot days (number of days when the maximum temperature exceeds 35 ?C) will increase and that the frequency of extreme rainfall events (20 mm or more of rain falling within 24 hours) will increase over the eastern parts of southern Africa.

110. Based on information from the IPCC Special Report in Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) and IPCC Fifth Assessment Report (AR5), projected increases in extreme temperatures combined with dry spells may increase the risk of wildfires. Coastal storm surges are expected to increase as a result of sea level rise. Higher sea levels will mean that smaller storms are likely to have an increased impact on the coastline.

[1] See Davis-Reddy, C.L. and Vincent, K. 2017

Climate risks and mitigation measures by output

111. Changes in climate will progressively impact infrastructure and the vulnerability of the energy sector will depend on the changing demand for power, the capacity of existing energy services and the ability to invest in low-carbon technologies. In addition, a rapidly growing urban population, coupled with the expected increases in climate hazards and inadequate infrastructure, will make cities (more) vulnerable to climate change. Both aspects, will be addressed by the project.

Table 9. Climate risk and mitigation measures by output

Project Objective and Output	**Climate risks over the period 2020 to 2050**	**Resilience practices and mitigation measures**

Project Objective and Output	Climate risks over the period 2020 to 2050	Resilience practices and mitigation measures
Outputs under Component 1	Not expected	N/A
Outputs under Component 2 and 3	Climate risks and hazards could affect project?s objectives or outputs over the period 2020 to 2050. Impact from climate change may occur projects and infrastructure at the IPs leading to physical, project and institutional impacts. This could include: Changing climate hazard / pattern, such as increasing average temperature, change in average seasonal precipitation (drought, floods); increasing storm surge height etc. Physical impact, incl. changing availability of raw material and natural resources; changing assets and site conditions; impact on operational performance. Project and institutional impact, incl. technical (lowered energy output) and financial performance (increasing CAPEX and OPEX)	The risks are expected to be moderate and manageable. Financial, environmental and social underperformance or failure of the project and the pilot activities is unlikely. The project pre-feasibility studies (as part of Component 2) will consider potential changing conditions in its sensitivity analyses and design the plants accordingly. Resilience towards climate change impact is one of the added benefits of decentralized energy systems at IP level, as a combination of available renewable energy sources will provide more flexibility to the local energy system to adapt to potential impacts of climate change. Since not all locations of the pilot IPs and local energy systems are known yet the project will undertake a climate risk screening for each project (as part Component 2). This will include a climate vulnerability assessment and plan actions as part of the feasibility studies to increase the resilience of the project's outputs and outcomes.

Technical and institutional capacity and information needed to address climate risks and resilience enhancement measures

112. Potential responses to the climate risks in the focus sectors, i.e., energy, industry and urban settlement, of the project in South Africa include:

- ? Ensuring affordability of renewable energy (e.g., market creation, incentives for innovation)
- ? Policy environment to regulate energy production, transmission and consumption
- ? Air quality monitoring
- ? Policy and legislative guidelines for air quality management

? Planning infrastructure should take into account mitigation and adaptation to climate risks. Buildings can be designed using features that promote adaptation, for example to enable circulation of air for cooling, and with shaded windows in the direction of the sun ? whilst also being constructed with energy-efficient materials.

? Urban management (e.g., natural ventilation for cooling, safeguard critical infrastructure; create rainwater storage and flood retention areas)

? Land-use planning (e.g., protect high-yield agricultural land, environmentally sensitive areas and natural landscapes from urban sprawl; plan greater inter-connectivity between different land uses and transport; intensify land uses where appropriate; revise flood lines)

? Soft adaptation options, e.g., livelihood protection, social safety nets

113. Awareness-raising and education, communication of climate information and early warning systems are important adaptations across all sectors. These require institutional cooperation and coordination across sectors, particularly in planning and development practices that reduce vulnerability to climate hazards. Key element is the strengthening of institutional capacities at local, national and regional levels for integrated resource and energy management.

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[1] See Davis-Reddy, C.L. and Vincent, K. 2017

6. Coordination

Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

114. UNIDO as the GEF Agency will be responsible for the implementation of the project, which entails oversight of project execution to ensure that the project is being carried out in accordance with agreed standards and requirements. The project will be executed by a national Project Executing Entity (PEE), the National Cleaner Production Centre South Africa (NCPC-SA).

115. The proposed institutional structure for the GEF funded project comprises a number of bodies. In general, the project will be managed by a Project Manager at the Project Executing Entity that works in close cooperation with dtic. The main project bodies are the following:

116. The **Implementing Agency (IA)** for the project will be United Nations Industrial Development Organization (UNIDO), i.e., UNIDO?s Department of Energy in Vienna supported by the UNIDO Regional Office in South Africa; UNIDO supports the project implementation and serving as counterpart towards GEF.

117. The **Project Executing Entity (PEE)** for the project is responsible for the management and administration of the project as well as managing the delivery of project outputs. The PEE for the project is the NCPC-SA, which has been executing related projects on behalf of CSIR/dtic. The envisaged PEE was nominated by the Government.

118. The **Project Steering Committee (PSC)** is a high-level cross-sectorial committee comprising of lead policy makers and heads of departments. It consists of representatives from the following institutions and is chaired by the dtic:

? Department of Trade, Industry and Competition of South Africa (dtic)

? The Project Executing Entity (PEE): National Cleaner Production Centre South Africa (NCPC-SA)

? UNIDO

119. The project steering committee will be created to supervise and provide guidance to the project execution. The function of the PSC is to focus mainly on procurement, institutional arrangements and financial management of the project. It will meet at least twice a year or more frequently, if required. The selection of consultancies and companies is the responsibility of the PSC. The PSC will consult and coordinate the project with relevant line ministries and national authorities, i.e., Department of Environment, Forestry and Fisheries of South Africa (DEFF), Department of Mineral Resources and Energy (DMRE) and National Treasury.

120. The **Project Management Unit (PMU)** is the project implementation supervisor, whose core structure consists of a Project coordinator (PC) and component coordinators with specialized expertise hired by NCPC-SA to work on specific components. The PMU is designed to achieve efficiency and coordination in the management of funding from a variety of donors, the government and non-governmental organizations (NGOs). The PMU also ensures effective coordination and efficiency when there are project activities that are similar and inter-dependent on each other for execution.

121. **Technical working groups (TWG)** will be formed to facilitate the involvement of interested partners in the implementation of the project components. Participation will be opened to any interested stakeholder upon request addressed to the PSC. The TWGs are expected to provide technical advice as well as to facilitate networking at the national and international level. The TWGs will meet quarterly during project implementation, under the leadership of one governmental department and with secretarial support from the PMU.

122. **Financial working groups (FWG)** will be formed to facilitate the involvement of interested partners in the financing of the project components. Participation will be opened to any interested stakeholder upon request addressed to the PSC. The FWGs are expected to provide technical advice as well as to facilitate networking at the national and international level. The TWGs will meet quarterly during project implementation, under the leadership of one governmental department and with secretarial support from the PMU.

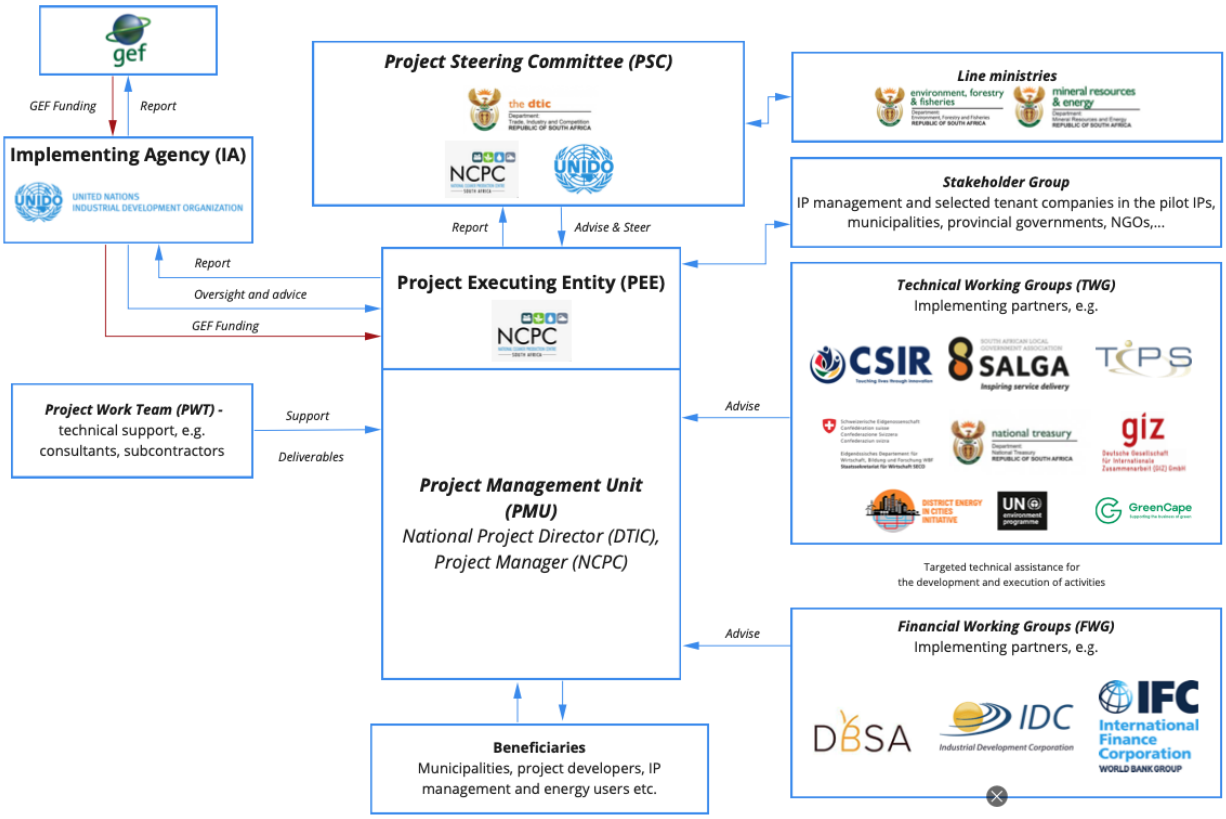
123. The project will also seek to engage further with the forthcoming UNIDO Global Industry Programme, which is under development by UNIDO? Energy Systems and Infrastructure Division (ESI) under the Department of Energy. The ESI Division focuses on promoting sustainable energy solutions and infrastructure for industrial development. The promotion of industrial de-carbonization through crosscutting solutions, such as energy management systems and standards, energy systems optimization, and deployment of renewable energy technologies is one of the core functions of the Division. With support of the Vienna Energy Forum virtual series in 2020 and 2021, the ESI Division intends to develop two global programmes aiming at accelerating the energy transition for powering industrial development and food system transformation. The Global Programme for industrial

development will aim for supporting the decarbonisation of the industrial energy system by developing low-carbon infrastructures in developing and emerging economies.

[1] https://www.viennaenergyforum.org/vef-virtual-series

124. The anticipated institutional setting is illustrated below:

Figure 10: Institutional Arrangement



Source: Authors

125. **Technology Transfer:** Full or partial ownership of equipment/assets purchased under the project may be transferred to national counterparts and/or project beneficiaries during the project implementation as deemed appropriate by the government counterpart in consultation with the UNIDO Project Manager.

126. **Legal context:** The Government of the Republic of South Africa agrees to apply to the present project, mutatis mutandis, the provisions of the Standard Basic Assistance Agreement between the United Nations Development Programme and the Government, signed on 3 October 1994.

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assesments under relevant conventions?

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

127. The project has been designed to complement, without duplicating, other on-going and planned projects and programmes. On the national level it is aligned with for instance the National Climate Change Response Policy of 2011 (NCCRP), the Integrated Resource Plan (IRP) and South African Renewable Energy Master Plan (SAREM), as well as the National Strategy for Sustainable Development and Action Plan, the Industrial Policy Action Plan or the Green Transport Strategy 2018-2050. The project also aligns with the initiatives outlined below.

128. **SAREM** is one of 14 industry specific masterplans being developed under the Department of Trade, Industry and Competition (DTIC?s) national masterplan process, which was launched in July 2019. The masterplan development approach is a collaboration between industry, labour and government to develop an industrial plan for the sector. This includes setting out a vision for an industry in South Africa, identifying blockages and constraints, and proposing a set of key actions that need to be taken forward over the short and medium term. The masterplans essentially facilitate a process whereby industry commits to a certain amount of investment and creating a certain number of jobs against an industry masterplan. Government, for its part, undertakes to understand and remove impediments to these plans.

129. The **Integrated Resource Plan (IRP)** has been published in 2018. The IRP outlines the expected energy capacity needed in South Africa. SAREM represents an opportunity to identify jobs and investment in the renewable energy sector linked to the IRP, as well as to articulate how job creation and investment might be optimised and maximised if various impediments were removed, or new supportive policy was designed. [2]

130. To address the significant contribution of transport to national GHG emissions, the government through the Department of Transport has developed a **Green Transport Strategy (GTS)**, which aims to minimise the adverse impact of transport on the environment, while addressing current and future transport demands. This is underpinned by sustainable development principles. The strategy will promote green mobility to ensure that the transport sector supports the achievement of green economic growth targets and the protection of the environment.[3]

131. On the international level, the project seeks to support South Africa as a signatory to the UNFCCC and the Paris Agreement in achieving its Nationally Determined Contributions. The project targets to support South Africa in overcoming capacity and technology needs as identified in South Africa?s National Communications and the Third Biennial Update Report, which include sustainable energy as a priority topic. The project also links to other international reporting frameworks and policy documents targeted at enhancing transformational shifts towards a low-emission and resilient development path, including the Agenda 2030 with its SDGs.

[1] Green Cape, 2020, Background to the South African Renewable Energy Masterplan (SAREM): https://www.green-cape.co.za/assets/SAREM_Background-Information_20200820.pdf

[2] ibid.

[3] Department of Transport, 2018, Green Transport Strategy for South Africa: (2018-2050): https://www.transport.gov.za/documents/11623/89294/Green_Transport_Strategy_2018_2050_onlineversion.pdf/71e19f1d-259e-4c55-9b27-30db418f105a

8. 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.

132**. Overall KM strategy**: The project will apply for its knowledge management several knowledge management (KM) tools, which are partially integrated in the activities and deliverables of the project components. The KM tools and products are based on experiences and best-practices approaches of UNIDO, incl. its international Global Industry Programme, and NCPC-SA. Internal knowledge management will be undertaken through monthly coordination calls or meetings between the NCPC-SA and the technical assistance group, annual meetings of the Steering Committee, regular coordination calls between the NCPC-SA and the sponsors of the pilot projects etc. The NCPC-SA will develop a methodological approach to track activities, knowledge developed, and the impacts of its work.

133. As described under Component 1, a national energy database for typical energy profiles will be created. The database will help to monitor, benchmark and map energy project in IPs. For the operation of the database an internal procedure guidebook will be developed within NCPC-SA that will allow for ensuring necessary process are defined and followed also in future, e.g., by potential future staff. The results from the pilot projects will inform fact sheets and the lesson learned material.

134. The following KM results indicators will be applied (see description below):

Table 10. Knowledge management results indicators

KM objective	KM Indicators	Baseline	Targets	Means of Verification

Results documentation and assessment	**Indicator KM1:** Number of energy demand and consumption profiles of IPs and representative tenants **Indicator KM2:** Number of benchmark database of typical energy intensities of relevant industrial **Indicator KM3:** Number of fact sheets	**Baseline KM1:** 0 **Baseline KM2:** 0 **Baseline KM3:** 0	**End of project target KM1:** for up to 10 **End of project target KM2:** 1 **End of project target KM3:** 3	M&E reporting and results
Dissemination and sharing with stakeholders	**Indicator KM4:** Number of guides and guiding documents **Indicator KM5:** Number of training sessions and workshops **Indicator KM6:** Number of marketplaces, CoP (alternatively webinars)	**Baseline KM4:** 0 **Baseline KM5:** 0 **Baseline KM6:** 0	**End of project target KM4:** 3 **End of project target KM5:** 3 **End of project target KM5:** 6	M&E reporting and results Publication on webpage

135. **Learning from experiences**: As a platform for knowledge transfer, the NCPC-SA will establish a help desk enabling the transfer of national and international best practices from partners and existing projects supported by UNIDO to the local stakeholders in South Africa. UNIDO and partners will support through the participation on awareness raising activities, training sessions, the CoP and the marketplace approach, and will provide guidance on the development of the database and knowledge products.

136. **Results assessment and documentation**: The results of the pilot activities will be captured in knowledge product, e.g., fact sheets (see Deliverables for Output 2.3). The fact sheets will present the lessons learnt and main technical, environmental and economic characteristics. The sheets will be informed by project documentation (e.g. feasibility studies) and the first performance reports summarizing the results in terms of energy performance, GHG mitigation and sustainable development impact, if available in the initial phase already. In addition, sanitized information of the energy profiles at IPs will be published at the NCPC-SA webpage.

137. **Outreach and dissemination to stakeholders**: The knowledge products, CoP and the marketplace focus on sharing information and results of the project and on sustainable energy solutions to relevant stakeholders and the public. This will be done as described through training sessions, workshops and multi-stakeholder meetings tailored to the needs of each stakeholder (local governments, IPs, project developers, investors and operators). Additionally, a website on district

energy will be developed. On the NCPC-SA website following elements could be published subject to the final design and content available and required:

137.1. ***Demonstration projects fact sheets*** including a summary of the technical, environmental and economic characteristics of all the demonstration projects developed.

137.2. ***International case studies and best practices*** including international case studies and best practices.

137.3. ***Resources*** including reports, summaries, recordings and live streams from workshops and webinars, and infographics available for download.

137.4. ***Information on the Project Marketplace*** providing the matchmaking space between IPs, tenants, developers, investors, ESCOs and public entities to attract investment and encourage project development.

137.5. ***News/Media and Event Calendar*** including news, updates on events as well as media tool kits with tailored communication.

138. All **training materials and knowledge management** activities will be gender mainstreamed. This includes integration of gender dimensions into publications, for instance presenting gender-disaggregated data, gender-energy nexus theory, gender sensitive language in publications, photos showing both women and men, and avoid presenting stereotypes, as well as assuring that women, men and the youth have access to and benefit from the knowledge created.

9. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE
Medium/Moderate			

Measures to address identified risks and impacts

Provide preliminary information on the types and levels of risk classifications/ratings of any identified environmental and social risks and potential impacts associated with the project (considering the GEF ESS Minimum Standards) and describe measures to address these risks during the project design.

Provide preliminary information on the types and levels of risk classifications/ratings of any identified environmental and social risks and potential impacts associated with the project (considering the GEF ESS Minimum Standards) and describe measures to address these risks during the project design.

Based on this initial screening, the project has been assessed by UNIDO to be category B. Likely impacts will be few in number, site-specific, and few if any will be reversible. An ESMP will need to be completed as per UNIDO and GEF requirements.

Supporting Documents

Upload available ESS supporting documents.

Title	Submitted
UNIDO_ESS_SA_GEF7_200206_signed	

Part III: Approval/Endorsement By GEF Operational Focal Point(S) And GEF Agency(ies)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).

Name	Position	Ministry	Date
Mr. Zaheer Fakir	Operational Focal Point	Department of Environment, Forestry and Fisheries	2/25/2021

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place

Figure 11: Location of IPs with potential relevance for the project.

Source: Google Maps

Coordinates: 30.5595? S, 22.9375? E