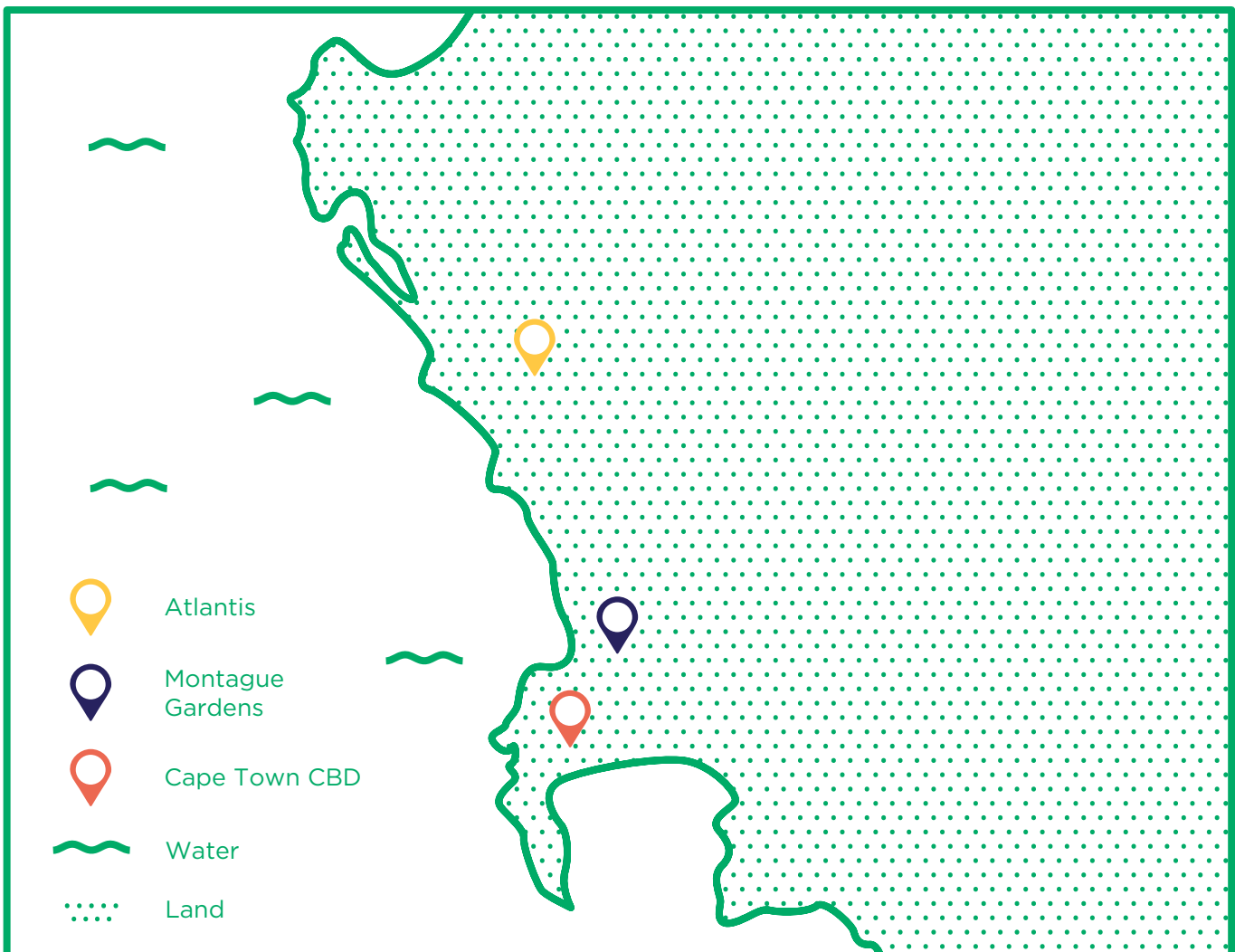


2020

Investment Prospectus



Identified business opportunities in the industrial areas of **Montague Gardens** & **Atlantis**, Cape Town



Purpose:

Business sustainability has become increasingly challenging in recent years, with businesses having to maintain financial viability in a time of limited economic growth, as well as needing to survive chronic stresses (e.g. load shedding) and acute shocks (e.g. drought, disease outbreaks)¹. The current Covid-19 crisis has exposed a range of risks associated with South Africa's manufacturing systems², the vulnerability of our supply chains³ and the difficulty of adapting and responding quickly to disruption⁴. Thus, building business resilience to shocks and stresses is crucial.

In 2019, the City of Cape Town approved the [Cape Town Resilience Strategy](#). One of the key actions identified in the strategy was to develop eco-industrial parks (EIPs) using industrial symbiosis (IS). An eco-industrial park (EIP) is an area where companies cooperate with each other and with the local community through efficient sharing of resources, to obtain financial benefits, improve environmental quality and build resilience⁵.

GreenCape's Western Cape Industrial Symbiosis Program (WISP) was subsequently tasked to explore and unlock some of the EIP opportunities in two industrial areas, viz. Montague Gardens and Atlantis.

The project aimed to identify EIP activities (or EIP enablers) already in existence in the areas, with the intent of facilitating the formation of an EIP by identifying the business opportunities and activities required for transition.

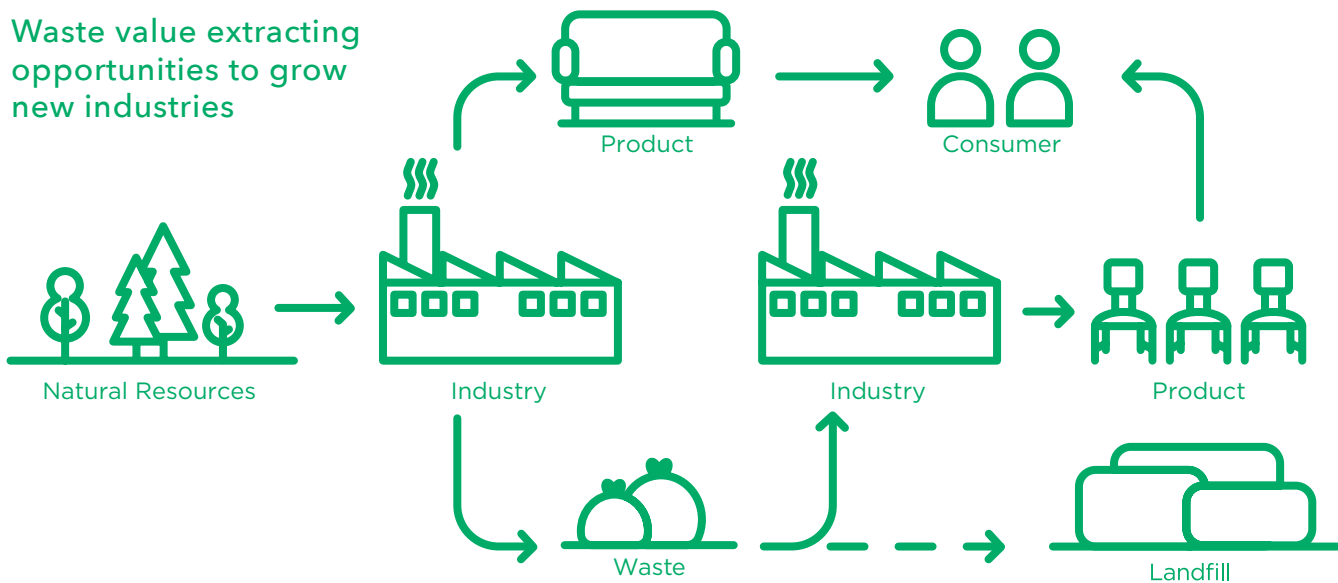
The prospectus highlights:

- Business opportunities identified in Montague Gardens.
- Business opportunities identified in Atlantis.
- Additional opportunities that will enable the transformation of these areas into eco-industrial parks.

It is written for:

- Entities looking to invest in the growth of industrial areas and business sectors.
- Cities and regions focused on building resilience to resource scarcity through enterprise development, job creation and waste diversion.
- Businesses looking to enhance their resilience, improve efficiency by leveraging opportunities associated with co-location.

Waste value extracting opportunities to grow new industries



¹ Morgan, G., Green, C., Williams, M. & Skade, L., 2019. City of Cape Town Resilience Strategy, Cape Town: City of Cape Town.

² Domenech, T. & Fokeer, S., 2020. Why innovative manufacturing and circularity are key for a resilient manufacturing industry post-COVID-19. Available online at: <https://www.unido.org/news/why-innovative-manufacturing-and-circularity-are-key-resilient-manufacturing-industry-post-covid-19>. [Accessed 3 June 2020].

³ Blériot, J., 2020. The Covid-19 recovery requires a resilient circular economy. Available online at: <https://medium.com/circulatenews/the-covid-19-recovery-requires-a-resilient-circular-economy-e385a3690037>. [Accessed 3 June 2020].

⁴ Shih, W., 2020. Is It Time to Rethink Globalized Supply Chains?. Available online at: <https://sloanreview.mit.edu/article/is-it-time-to-rethink-globalized-supply-chains/>. [Accessed 6 June 2020].

⁵ Lowe, E. A. & Doyle, B., 1996. Fieldbook for the Development of Eco-Industrial Parks, Oakland, CA: Indigo Development.

Approach:

The project was piloted in 2019 to explore the potential of transforming the selected industrial areas into EIPs, by identifying and quantifying the resource inputs and outputs through GreenCape's Western Cape Industrial Symbiosis Programme (WISP).

The Montague Gardens and Atlantis industrial areas were selected for the study as they both serve as a gateway into the West Coast region. Montague Gardens is centrally located as it is a 15-minute drive from both Cape Town International Airport and the Port of Cape Town, as well as being connected to Atlantis (and the rest of the West Coast) via the R27, N7 and the railway line. The Atlantis industrial area is designated as a Special Economic Zone (SEZ) for businesses that offer green services or manufacture green technologies. The SEZ provides a range of competitive incentive packages for investors and tenants wanting to conduct business in the area, which include, among others, a corporate tax incentive, employment tax incentive, accelerated depreciation allowance, VAT and customs exemption, and infrastructure support. WISP therefore aimed to leverage the optimal location (of Montague Gardens) and the range of incentives (in Atlantis) to unlock opportunities (associated with industrial symbiosis) for the respective areas.

The identification of the potential for industrial symbiosis was achieved through a Material Flow Analysis (MFA), as this methodology provides an account of all material flows into and out of the selected areas, making it possible to identify critical nodes of intervention for improved resource efficiency. The MFA targeted manufacturing⁶ companies located in the broader Montague Gardens and Atlantis industrial areas. Company engagements consisted of site visits to manufacturing facilities, and the completion of a detailed questionnaire (capturing both quantitative and qualitative information). The primary content of the MFA questionnaire was tailored towards understanding the material inflows and outflows, as well as the use of energy and water. However, the majority of the focus was on the by-products and waste stream outputs, and the potential business opportunities that could be created from these under-utilised resources.

The outcomes of the MFA are highlighted in the rest of this document.



⁶ Manufacturing companies tend to have larger opportunities for collaboration (e.g. through industrial symbiosis) as they have the capacity to generate and take in by-products from each other.

1. Business opportunities identified in Montague Gardens

Table 1.1: Materials available for reuse in Montague Gardens

Description	Detail	Opportunity
Ash	<p>The bulk (97% - 21840 tonnes per annum (tpa)) of the landfilled waste in Montague Gardens is due to the boiler ash produced by the paper manufacturing sector.</p>	<p>The waste stream is currently underutilised, and has the potential to be reused in certain brick manufacturing processes.</p> <p>Ash has cementitious properties and when used in brick manufacturing it results in a higher quality product that is stronger and absorbs less water.</p>
Treated wood waste	<p>There are three board cutting stores and six furniture manufacturers in the area generating at least 900tpa of treated wood waste. The challenge with wood waste is to ensure the separation of treated and untreated wood, as the treatment options and costs associated with the streams vary. Most treated wood waste solutions (e.g. gasification) tend to be costly, and require large homogenous volumes. Collaboration between companies is crucial to obtain economies of scale, especially with overcoming the complexity that is associated with treating the different types of treated wood (e.g. chipboard, melamine, supawood etc.).</p>	<p>There is currently no solution available for treated wood waste in Cape Town. This represents a good opportunity for the area, as it will not only solve for the problematic waste stream within Montague Gardens, but also for the greater Cape Town. Treated wood solutions (like gasification) could also serve as an alternate energy source, and therefore the optimal location for the establishment of a solution provider would be near a potential off-taker.</p> <p>The challenge with waste-to-energy solutions for chemically treated wood waste is the air quality standards that are mandated under the National Environmental Management Air Quality Act (NEMAQA, 2013) that require processes that produce emissions to have an environmental licence and pollution abatement measures.</p>



Table 1.2: Enabling greater resource utilisation in Montague Gardens

Description	Detail	Opportunity
Rail network	<p>The cement mixing depot is the only rail user in Montague Gardens. If the company stops using the line, the line risks becoming obsolete. According to the Department of Environmental Affairs' Freight shift from road to rail report⁸; "One of the best measures identified to significantly reduce South Africa's greenhouse gas emissions ... is the shift of freight from road to rail. It has the potential to save almost 3 000 ktCO₂eq".</p>	<p>The Montague Gardens railway line is potentially a carbon reduction opportunity for the area, as the rail network is not only still functioning, but is also still being maintained for the cement mixing company. Utilising the existing railway network for the transportation of raw materials into the area whilst moving products and by-products (e.g. ash) out of the area could assist Montague Gardens with being seen as a carbon reduction zone, especially with the introduction of the carbon tax in 2019. In addition, Montague Gardens' centrality (proximity to airport, port and road network) could also be leveraged to optimise the transportation of finished goods in and out of the area via the rail network, creating a low carbon distribution hub (especially since 89% of the products currently manufactured within the area are transported out of the province).</p> <p>The majority of rail transport in South Africa to date has focused largely on bulk material movement and there has been limited interest in incorporating road freight. Therefore, despite the many benefits associated with the shift from road to rail, it may take a long time before it can be realised.</p>
Metalwork park	<p>There are 35 metalwork companies in the Montague Gardens area, with operations ranging from cutting, bending and punching to boiler making and surface finishing. The companies indicated that there is a demand for additional metalwork capacity in the area; however, the equipment can be quite costly.</p> <p>There a number of vacant buildings available in the area, with more than 800 stands/erfs available to rent⁹.</p>	<p>The establishment of a metalworking park in Montague Gardens (by leveraging the available property) where companies in the various stages of the metalworking process could all share spaces, equipment and resources, would create collaborative links and reduce the inefficiencies of logistics that are common in small scale metalworking projects. The collaboration may also create the ability for smaller companies to attract more work or use their skills in a complementary manner to gain market access.</p>
Storage capacity	<p>A fuel depot in Montague Gardens used to share the storage space with another petroleum company. However, since the partnership ended, the company has 580 million litres of storage capacity available.</p>	<p>This capacity is currently configured for the storage of volatile liquids, but there is potential for (conversion to accommodate) storage of other liquids.</p>



⁷ Now Department of Environment, Forestry and Fisheries

⁸ Palmer Development Group (PDG) & Camco Clean Energy, n.d. Freight shift from road to rail report, Pretoria: Department of Environmental Affairs.

⁹ Property24, 2020. Property24. Available online at: <https://www.property24.com/industrial-property-to-rent/montague-gardens/milnerton/western-cape/8067>. [Accessed 7 June 2020].

2. Business opportunities identified in Atlantis

Table 2.1: Materials available for reuse in Atlantis

Description	Detail	Opportunity
Textiles	Textile dust consisting primarily of synthetic material (i.e. polyester, PET) makes up the bulk (130 tpa) of the waste streams from this sector.	Some of the businesses in Atlantis recognise the intrinsic value of the material and are thus stockpiling it in anticipation of an imminent solution. One suggestion is that the dust could be mixed with the woody biomass to boost the CV value of the wood-derived fuels.
Foundry sand	Approximately 72 000 tonnes of waste foundry sand goes to landfill from Atlantis every year. The waste is from the local foundry that utilises high-grade silica (sand) to make cores and moulds for casting. The moulding sand is reused and recycled several times until it degrades to a point where it cannot be used for casting anymore, at which point the sand is discarded and fresh sand is brought in to start another cycle. The foundry sand is composed of on average $\pm 0.66\%$ moisture content, $\pm 1.72\%$ coal dust, $\pm 8.4\%$ bentonite (clay) and $\pm 89.22\%$ silica sand. Hazardous metals have not been ruled out but are believed to be in trace amounts. It is currently classified as a type 3 ¹⁰ hazardous waste.	It has been shown that foundry sand can be used in the same manner as natural sands, opening up opportunities for reuse in the construction of roadways, parking lots, embankments, concrete and cement production, among others. However, the biggest barrier to date has been the legislation, as the material is considered hazardous and therefore requires a waste management licence before it can be used. Within the SEZ, there is a large potential for the reuse of foundry sand, especially with the planned construction of infrastructure for new businesses that are setting up in the area. The sand is readily available, and close to the place of intended use.
Ash	Several companies in Atlantis generate ash from their boilers. The ash (1 980 tpa) is being landfilled as it is considered hazardous under the current legislation, and a waste management licence would be required to process the ash. The Department of Environmental Affairs does also allow for exemptions of ash for use in certain processes. Once approved the ash is no longer considered a waste and can be beneficiated for the authorised intended application. This eliminates the necessity of obtaining a waste licence but adherence to some basic standards will be required. The generator of the waste will have to do a risk assessment as well as regular audits to ensure compliance (including the adherence to transportation requirements). WISP has worked with companies in other industrial areas that have successfully gone through this process.	Ash can be used in a variety of industries such as the agricultural, construction and the cement manufacturing sectors. Ash can also be used to neutralise other waste streams with a low pH. Incorporating ash into the construction industry yields the following benefits: increased post 28-day strength gain, reduced rate of salt diffusion through the concrete, prevention or retardation of alkali-silica reaction, reduced heat of hydration by up to 20%, reduction of shrinking due to lower water demand, increase in overall durability of the concrete, improvements in the workability of fresh concrete and reduction in bleed water.
E-waste	All e-waste that is collected within the Western Cape is sent to other provinces or countries for processing into its component parts. The quantities and location of e-waste is difficult to measure, as it is quite sporadic. However, large volumes are collected in the province and can be reused by the local precious metal industry.	There has been interest to refine and recover precious metals from e-waste, primarily printed circuit boards (PCBs) and catalytic converters in the Western Cape. The incentives associated with the SEZ create a favourable environment for the establishment of an e-waste solution in Atlantis.

¹⁰ Disposal only allowed at a landfill with a Class C or GLB+ containment barrier design (or Class B or A). See <http://sawic.environment.gov.za/documents/983.pdf> for South African landfill acceptance criteria.

Table 2.2: Waste-to-energy infrastructure investment opportunities in Atlantis

Woody Biomass	
<p>Woody biomass is an energy lean fuel, which is less energy dense than traditional fossil fuels. Due to its low energy density, the transportation of woody biomass can be costly, unless found close to its place of use. Atlantis generates at least 1 650 tonnes of biomass per annum, which is currently diverted outside of the area. Taking into consideration its value as a fuel source, and the costs of transportation, it would be more beneficial for the biomass to be aggregated and utilised locally within Atlantis. Additional economies of scale could also be achieved by combining virgin and waste biomass. There are several methods for extracting energy from woody biomass, depending of the complexity of the system, and the wood may or may not require pre-treatment.</p>	
Opportunities	
Sorting plant	<p>Woody biomass can be used directly for heating purposes in furnaces and kilns. The potential business opportunity revolves around the aggregation of the woody biomass (both virgin and waste biomass) and supply to off-takers. Sufficient storage space would be required, which is quite readily available in Atlantis. The advantages relating to the direct use of biomass is due to the minimal pre-processing that is required, as kilns and combustion furnaces are quite flexible and robust and can handle varying solid fuel feedstocks. Industries like the clay brick industry (also located in Atlantis) will most likely be interested in such a solution, as there is great interest in alternative fuels. If the biomass is utilised in another industry which is not brick production, the residual ash can still be taken to the clay brick manufacturers nearby for use, thereby ensuring that nothing is sent to landfill.</p>
Wood derived fuel plant	<p>Woody biomass can also be transformed into a wood derived fuel. This would require investment in equipment to homogenise the biomass so that it meets the quality specifications for feeding into a particular process e.g. boiler. The equipment may need to handle aspects such as moisture control, size reduction through chipping and grinding or size enlargement via pelletising, granulation and briquetting. The aim would be to convert the biomass into a product with a market value.</p>
Charcoal plant	<p>There are approximately 8 000 tpa of organics (including the wood) available in Atlantis as waste that can potentially be processed via carbonisation. Biomass can be charcoaled or carbonised by heating it at low temperatures over long residence times to drive off volatiles, increasing the fixed carbon of the residual solid product.</p>
	<p>Estimated final product CV value: 20-30MJ/kg</p>
Pyrolysis plant	<p>Certain processes cannot take in solid fuels, and it is possible to convert biomass into a liquid fuel using pyrolysis. By combining the biomass in Atlantis with the plastic and textile waste, the total waste stream would be equal to 8 880 tpa. These streams together can serve as a fuel source for pyrolysis. Pyrolysis (thermal cracking) is the breaking up of larger complex hydrocarbon chains using heat in an oxygen deficient environment into shorter relatively smaller and simpler chains composed of non-condensable gas (CO, CO², H₂, CH₄, etc.), liquid product and a solid biochar. The biochar can be reused in the pyrolysis process or it can be sold to farmers for soil enhancements, to brick manufacturing companies or upgraded to activated carbon or carbon black for use in other industries. A waste management licence including an air emissions licence would be required for a pyrolysis plant. The pyrolysis plant will be able to produce 4 160 000 litres (four million one hundred and sixty thousand litres of fuel oil) in addition to approximately 2 800 tonnes of biochar.</p>
	<p>Capex > R60 000 000¹¹</p>
Gasification plant	<p>A step further from pyrolysis would be the gasification of the pyrolysis products by reacting them with air, oxygen or steam in a ratio that does not exceed the stoichiometric ratio for complete combustion. The primary goal is to convert organic materials, whether solid, liquid, or even gaseous into desired gaseous products with usable heating value. The gaseous product produced is called synthetic gas and mostly consist of H₂ and CO. These can be used as precursors to produce various other chemicals or combusted directly as a fuel.</p>
	<p>Capex > R60 000 000¹¹</p>

¹¹ Figures are based on the Waste Technical Guide developed by GreenCape

Table 2.2: Waste-to-energy infrastructure investment opportunities in Atlantis

Water Reuse	
<p>Atlantis draws the largest amount of municipal water relative to other industrial areas in Cape Town. This can be interpreted as Atlantis having not done enough to reduce water consumption from the municipality through water saving interventions, or that the area consumes so much that even after the interventions it still uses the largest quantity of water from the municipality. From the cohort of businesses engaged, only six had supplemented their municipal water with water from alternative sources, mostly using ground water. There is considerable scope to implement various interventions to reduce municipal consumption, in light of the increased demand from the SEZ and water scarcity concerns brought about by the drought.</p>	
Opportunity	
<p>Cascading water use</p>	<p>Atlantis is a mixed industrial area with businesses in differing sectors with varying water requirements with regards to quality and quantity. By determining the minimum water quantity and quality requirements for all businesses in the area, it may be possible to form a cascading water exchange network that integrates these requirements based on pinch analysis principles. The network will start where processes/businesses require water of the highest quality, which is cascaded to lower water quality applications where the water will eventually be used up, recovered or disposed of. The pinch analysis will require experts in civil, process and water engineering and to establish a detailed breakdown of the water needs of the various businesses in the area.</p>

The various opportunities highlighted above may require regulatory approval depending on the process required and the under-utilised waste stream. With its intimate understanding of the green regulatory environment, GreenCape is well positioned to assist in advising on how to best navigate these regulations.

3. Eco-industrial park opportunities

In addition to the business opportunities identified above for the two areas, there are additional EIP opportunities that can be explored to increase the level of interconnection and collaboration in the areas in line with a transition to an EIP and strengthening resilience.

3.1. A central management body and shared services

To enhance the ability of the industrial areas with transitioning into an EIP, the areas ideally need a management body that can leverage its network of companies to:

- Facilitate targeted investment promotion, business expansion and retention in the area.
- Facilitate staff transport and logistics (shared services).
- Facilitate green services such as energy service companies, water service companies, and a central mini material recovery facility (potentially a waste picker sorting area) and waste management services.

Co-ordination and optimisation through the management body will reduce the overall cost to individual companies in the two areas and facilitate the formation of resource efficient, low carbon zones.

3.2. Collaboration between companies

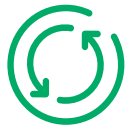
Collaboration at all levels is the key principle underpinning EIP success. In an EIP, companies typically collaborate and benefit at three main levels: a) physical exchange of materials, energy, water and by-products, b) sharing of infrastructure, thereby leading to the creation of shared economic opportunities as well as improved environmental performance and ecosystems, and c) learning from each other by exchanging knowledge and innovation¹².

The opportunities identified in both areas are largely based on the physical exchange of materials, however, companies in the area can also collaborate to reduce the cost of goods and services. Such as:

- Shared catering services
- Joint training programs (health and safety, food safety, software etc.)
- Shared supplier service/maintenance agreements (safety equipment, general equipment)
- Shared equipment

Collaboration at all levels enables optimisation of business processes, adaptation to financial and other resource constraints, mitigation of climate change and protection of the natural environment, and ultimately an ability to thrive by enabling the long-term competitive advantage of the industries in the eco-industrial park.

¹² Domenech, T. & Fokeer, S., 2020. Why innovative manufacturing and circularity are key for a resilient manufacturing industry post-COVID-19. Available online at: <https://www.unido.org/news/why-innovative-manufacturing-and-circularity-are-key-resilient-manufacturing-industry-post-covid-19>. [Accessed 3 June 2020].



WISP
Western Cape Industrial
Symbiosis Programme



GreenCape



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD



INVEST CAPE TOWN
COLLABORATE | ENABLE | PROMOTE

For more information contact WISP

wisp@greencape.co.za

021 811 0250

www.greencape.co.za