

CAPE TOWN

AFRICA'S FIRST INDUSTRIAL SYMBIOSIS PROGRAMME

Generating multiple benefits for the manufacturing industry



GOVERNANCE
City of Cape Town

POPULATION
4.48 million*

GDP
ZAR 489 billion**
(USD 32.6 billion)

DENSITY
1,796 persons per Km²***

AT A GLANCE

THE NEED

With high unemployment rates in the Western Cape province, the government aimed to create jobs. To stimulate economic growth while reducing environmental degradation, the Western Cape government put forward its [Green Economy Strategy Framework](#) in 2013. To demonstrate the benefits of a green economy for society and the environment, the Western Cape Government was looking for innovative projects to implement on the ground.

THE SOLUTION

The [Western Cape Industrial Symbiosis Programme](#) (WISP) is Africa's first industrial symbiosis programme. The programme is funded by government departments and delivered by [GreenCape](#), a non-profit organisation. WISP is a free facilitation service that seeks to create mutually beneficial links or "synergies" between member companies. The programme attempts to connect companies so that they can identify and realise the business opportunities by utilising unused or residual resources (materials, energy, water, assets, logistics, and expertise). The

programme not only diverts waste from landfills, it also adds value to materials, prolonging material use through multiple applications, and the creation of new opportunities for businesses.

THE OUTCOMES

To date, the programme has diverted more than 104,900 tonnes of waste from landfills, while creating 218 economy-wide jobs, mainly in SMEs. By providing many new business opportunities, it has generated over ZAR 120 million (USD 8.50 million) in additional revenue, cost savings, and private investments.

HOW DOES THE INITIATIVE SUPPORT THE TRANSITION TO A CIRCULAR ECONOMY?

Industrial symbiosis increases material and resource flows across industries that would otherwise be wasted - while creating new business opportunities. The exchanges of under-utilised resources provide mutual benefits for businesses by generating new revenue streams and reducing operational costs.

LEAD POLICY LEVERS



ROADMAPS AND STRATEGIES



CONVENING AND PARTNERING



AWARENESS RAISING



CAPACITY BUILDING



FINANCIAL SUPPORT

For more see [Policy Levers](#)

* (2019 estimate, Source: Statistics South Africa, Mid-Year Population Estimates)

** (current prices, 2019 estimate, Source: IHS Markit, Regional eXplorer, 2020)

*** (2019 estimate, Source: IHS Markit, Regional eXplorer, 2020)

THE JOURNEY

ORIGINS

A CITY FACING MULTIPLE CHALLENGES

With unemployment rates reaching 24% in 2011, the Western Cape Government aimed to stimulate economic growth and create jobs in the province. Furthermore, as Cape Town was generating five to six thousand tonnes of waste a day, and with 87% of that waste being landfilled, the City's three landfilling sites were reaching their maximum capacity. The development of new landfill infrastructure was estimated to cost the city ZAR 75 million (USD 10.3 million). And the rehabilitation and closure of the existing landfill sites required an additional ZAR 32 million (USD 4.4 million). These financial pressures on the municipality's limited budget led the City of Cape Town to consider alternative waste management strategies.

LEARNING FROM OTHERS

To promote economic growth and create job opportunities while reducing environmental impacts, the Western Cape Government put forward a [Green Economy Strategy Framework](#) in 2013. To showcase the benefits of a green economy, the Western Cape Government aimed to implement projects on the ground. Looking for an innovative solution for waste management, Jenny Cargill, Western Cape Premier's special advisor, went to the UK on an industrial symbiosis study tour. The UK's National Industrial Symbiosis Programme (NISP), which has been operating since 2005, has been successful in reducing industrial and commercial waste, while delivering various economic and environmental benefits. Taking inspiration from their programme, Cargill initiated the Western Cape Industrial Symbiosis Programme or WISP pilot in April 2013 with a seed funding of ZAR 1.25 million (USD 130,000), and GreenCape adapted the UK's approach to the South African context.

A SUCCESSFUL PILOT

The Western Cape Government funded a pilot industrial symbiosis programme for the manufacturing industry of the Western Cape in 2013. The pilot was promoted as a business opportunity programme, as was the case with the UK's NISP. GreenCape, a non-profit organisation promoting the green economy was funded to deliver the pilot. To engage businesses and bring them into the programme, WISP organised two [Business Opportunity Workshops](#) in the pilot year. A total of 82 companies were engaged through the first two workshops and a further 26 were added to GreenCape's network through one-to-one engagements. The tangible benefits, such as avoiding transportation and landfilling

costs, improving resource efficiency, and gaining additional revenue streams, appealed to businesses.

Within one year, the pilot demonstrated the potential of industrial symbiosis for the region. WISP's network grew rapidly to 108 diverse organisations across a variety of sectors¹ and over 1,200 potential synergies (or exchanges between companies) were identified within the network. The [programme found](#) that the most commonly under-utilised resources that companies had were organics (food and green waste), packaging waste (plastic, paper, and wood) and residues like ash, and other by-products from processes. While identifying potential synergies does not automatically lead to a concrete exchange of materials, GreenCape put several companies in touch which paved the way for these new business opportunities to be realised.

During the pilot year, nine synergies were realised. For instance, a [Marine Fishing Company](#) exchanged broken fishing nets with the City of Cape Town to repurpose the material into sports nets for schools and sporting facilities. The nine synergies which were realised during the pilot year helped to divert an estimated 23.3 tonnes of waste from landfills, generated ZAR 2.09 million (USD 190,000) in additional revenue, resulted in ZAR 1.65 million (USD 131,000) in cost savings, and saved 1820 MWh of energy per annum. These results were sufficient to establish a full programme the following year.



A WISP Business Opportunity Workshop, source: GreenCape

¹ Including the food and beverage, clothing and textiles, construction and demolition, metals and engineering (including electronics), chemicals and pharmaceuticals, and wood, and wood products sectors

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PROCESS

A WIN-WIN SOLUTION

The Western Cape Industrial Symbiosis Programme (WISP) is a multiple award-winning programme and the first industrial symbiosis project in Africa. Industrial Symbiosis promotes circular flows within the industrial sector, creates new business opportunities, and provides mutual benefits for businesses through the exchange of under-utilised resources. WISP is a free facilitation service accessible to companies of all sizes that matches the supply and demand for secondary raw materials of manufacturing companies to divert waste from landfill.

Furthermore, some of these synergies between companies encourage the creation of new jobs. For instance, after realising that large amounts of broken, old, and unused wooden pallets were going to landfill, through WISP, a wooden pallet manufacturer using virgin material completely changed their business model to refurbishing old and broken pallets. Due to the availability of used and broken pallets, the pallet refurbishing company increased their production capacity. As a result, the company had to employ additional labourers to meet the increased throughput of the production line and the additional sorting processes. As the company's business model changed, it shifted its spending from virgin materials to salaries. Moreover, the wood collected that is not adequate for pallets can be passed on for alternative uses such as furniture manufacturing, boilers or fire starters. This synergy creates an ecosystem around it that generates additional economic activities and employment.

WISP'S FOCUS AREAS

The programme focuses on the manufacturing industry because it generates large volumes of secondary raw materials that can be reused in other manufacturing processes. Major industrial sectors taking part in the programme are food and beverages, clothing and textiles, construction and demolition, metals and engineering (including electronics), chemicals and pharmaceuticals, wood and wood products.

FUNDING WISP

The programme was initially funded by the Western Cape Government's green economy initiative until 2016. The City of Cape Town partially funded the programme in 2016, and the programme has been fully funded by the City since 2017 through its Enterprise and Investment Department's Green Economy Programme. Annual funding grew from ZAR 1.25 million (USD 130,000) in 2013 to ZAR 2.10 million (USD 140,000) in 2019,

and cumulatively the programme received ZAR 17 million (USD 1.1 million) in funding between 2013 and 2020. The funding enabled GreenCape to provide a free service to connect businesses and point out potential opportunities. It has been estimated that for every rand invested in the programme, WISP returned seven rands in economic benefits to its network.

A COLLABORATIVE PROCESS

Collaboration between key stakeholders from the government, civil society, and industry has allowed WISP to leverage existing relationships to grow its network. GreenCape has benefited from its established reputation with businesses through its work to implement the green economy in the Western Cape. And as a non-profit with no vested interests, has been readily able to facilitate engagement with manufacturing companies. GreenCape has also acted as a convenor and enabled knowledge sharing between the public authorities and businesses. The programme has over 950 companies in its network, many of which were initially recruited through the Western Cape's 110% Green Initiative, a group of businesses committed to becoming "greener".

The Western Cape Government Department of Economic Development & Tourism (DED&T) initiated and funded the programme in 2013. The City of Cape Town has been providing funding to the programme since 2016. In addition, the City provides non-financial strategic support, such as collaborating with the WISP team in defining the programme's projects; providing access to engagement platforms with key stakeholders; guidance on the integration of WISP intelligence into City policies and regulations; and marketing and profiling the WISP programme at various fora and through its promotional channels. The National Cleaner Production Centre, Western Cape Government Department of Environmental Affairs and Development Planning (Climate Change and Solid Waste Directorates), Cape Chamber of Commerce, and Economic Development Partnership also supported WISP. GreenCape formed a steering committee to enable collaboration among key organisations and to support the delivery of the programme.

The programme built upon the experience of International Synergies Limited (ISL), a company which has supported the development of industrial symbiosis programmes in 16 countries.



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A WISP Business Opportunity Workshop, source: GreenCape

GREENCAPE'S ROLE AS A FACILITATOR

WISP conducts site visits to understand the production processes of various companies. The programme has three facilitators, each specialised in a sector. The facilitators provide technical expertise and capacity to businesses to help them become more resource efficient and overcome challenges. The programme helps to identify opportunities to reuse and recycle secondary raw materials generated in manufacturing processes. Once an innovative solution has been identified, the facilitators replicate solutions from one company to another.

While the service is free of charge, in exchange, companies are asked to provide information about the impact of the synergies. Despite some hesitation from certain companies to provide this information, WISP has been able to build trust. The information gathered by WISP is stored securely on an online database called SYNERGie™ that was developed by ISL. WISP has a network of more than 950 companies and over 9,000 potential synergies have been identified.

WISP then facilitates engagements and resource exchanges between businesses in the manufacturing sector. Once synergies have been completed, companies report back on the outcomes of the exchange. WISP gathers this information to track impacts and publishes case-studies which demonstrate the benefits of the programme. Whilst some companies were initially skeptical about the costs of changing their business model, managing varying material flows, and getting the materials which meet their quality standards, the programme has shown that the benefits of becoming more resource efficient outweighs the costs of adapting their operations.

MULTIPLE POSITIVE OUTCOMES

To track its impact, WISP developed a carbon calculator, based on international carbon accounting standards, in order to estimate the GHG emission reductions of implementing synergies. To date, WISP has demonstrated a multitude of tangible environmental, economic, and social benefits. Overall, the programme has led to the following outcomes:

- For **every rand invested** by the government, WISP returned **seven rands in economic benefits to its network**
- **More than 104,900 tonnes** of waste has been diverted from landfill
- **69 permanent jobs** in member companies, as well as **25 temporary positions**, and **218 economy-wide jobs** have been created
- **Over ZAR 120 million** (USD 7 million) in additional revenue, cost savings, and private investments were generated
- **147,700 tonnes of carbon dioxide equivalent emissions saved** (equivalent to the annual electricity usage of 83,340 households in South Africa)



Alderman James Vos, Mayoral Committee Member for Economic Opportunities and Asset Management, visits the manufacturing plant of Sealand Gear. Sealand Gear is a specialised bag and apparel manufacturing company that makes use of recycled and upcycled materials, and a WISP member. Source: GreenCape

EXAMPLES OF SYNERGIES

Businesses that implement synergies are able to save costs (e.g. avoidance of transportation and landfilling costs as well as access to cheaper alternative raw materials) and generate additional revenue in cases where they are able to sell their waste. The programme has generated concrete opportunities for several resource streams and sectors, to mention a few:

PLASTIC

West Coast Plastics, a small-scale plastic recycler, sold HDPE plastic to Quality Crate Manufacturing, a dynamic moulding company that produces plastic crates for the dairy and bread bakery industries. This exchange helped to divert 35 tonnes of HDPE plastic from landfill and avoided an estimated 80 tonnes of CO₂e. This synergy enabled the two companies to grow together by providing ZAR 350,000 (USD 24,000) to West Coast Plastic in additional revenue.

FOOD

The Creamery, a Cape Town based ice cream manufacturer was disposing of 2,500 litres of egg whites annually. Through WISP, Sublime Confectioneries, a small confectionery company in Cape Town, collected these egg whites and used them in their confectioneries at a lower cost. The synergy led to cost savings of almost ZAR 45,000 (USD 3,000) and additional sales amounting to ZAR 22,000 (USD 1,460) for the ice cream and confectionery manufacturer, respectively.

TEXTILES

Suzi Products, a textile manufacturer produced around 150 tonnes of textile waste annually. The company was facing high costs for its transportation and disposal. Through the programme, these pieces of textiles were turned into carpet underfelt by CSK materials handling. This synergy has saved Suzi Products around ZAR 60,000 (USD 4,500) per annum in cost reductions such as landfilling costs.

CONSTRUCTION

By re-using 4,500m³ of old concrete rubble from the 15 ha site of the new Woolworths Distribution Centre, project developers saved ZAR 649,000 (USD 49,000) on construction materials and transport-to-landfill fees.

ELECTRONICS

Cape E-Waste dismantled and recovered components from electronic equipment from Duferco Steel and FS Smit. This operation generated cost savings of ZAR 470 (USD 28) per tonne of e-waste, generated additional revenue for Cape E-Waste through the sale of the metals and plastics to interested parties, and created three new jobs in dismantling processes.

INSPIRING OTHERS

CATALYSING OTHER PROJECTS

WISP's success catalysed the development of other Industrial Symbiosis Programmes in other South African provinces such as Gauteng (GISP - Gauteng Industrial Symbiosis Programme), KwaZulu-Natal (KISP - KwaZulu-Natal Industrial Symbiosis Programme), Limpopo (LISP - Limpopo Industrial Symbiosis Programme) and Mpumalanga (MISP - Mpumalanga Industrial Symbiosis Programme) as well as demonstration activities in the Eastern Cape.

INSPIRING OTHER COUNTRIES

WISP's experience has been shared across the continent and encouraged industrial symbiosis programmes to be established in other African countries such as Ghana and Mauritius. Through an awareness raising week funded by the British High Commission, Mauritius initiated its own industrial symbiosis programme with Switch-Africa funding.

GAINING INTERNATIONAL RECOGNITION

WISP was a finalist of the World Economic Forum Circulars awards in 2015, and then a runner-up in 2018. The Programme received a gold award in the recycling and waste management category of the 2019 Eco-Logic awards. It was also awarded several climate change awards and listed as part of the C40 top 100 urban solutions. Through these international recognitions WISP has gained visibility and a prominent position in this space.



Minister Barbara Creecy with GreenCape staff at the 2019 Eco-Logic awards ceremony. Source: GreenCape

REFLECTIONS

Supporting businesses through data analysis and technical expertise. Companies will not shift towards more circular manufacturing processes unless circularity provides them with concrete benefits. This case-study shows that data gathering and analysis can help to identify opportunities to benefit from underutilised resources. However, individual businesses do not necessarily have the capacity to conduct such analysis. By conducting holistic analysis of an industry and providing sectoral expertise, facilitated industrial symbiosis programmes can help to unlock opportunities for all the businesses involved. Providing businesses with technical expertise and capacity building enables them to realise opportunities, improve their operational efficiency, and expand their businesses. Giving evidence of the benefits and replicating innovative solutions across businesses can encourage the transition towards more circularity within the manufacturing industry.

New business models based on mutual benefits.

This example demonstrates how industrial symbiosis provides a win-win solution for the companies involved. Facilitated industrial symbiosis programmes introduce businesses to each other that would not have normally interacted, thus creating potential opportunities. The exchange of underutilised resources helps companies to reduce certain costs, generate additional revenue, and increase profitability. By mutually benefiting from the synergies, industry can align and move together towards more circular business models whilst benefiting economically from the exchanges. Yet, by adopting a more circular approach, these businesses could eventually design out their waste and underutilised resources and thus, further increase their efficiency. By encouraging reuse and recycling, industrial symbiosis provides a holistic approach to resource management across industries and cities. Making the most of available resources increases resilience, decreases pressure on the natural environment, and generates business opportunities.

A collaborative approach with support of the public sector. WISP provides an example of how public funding can support the transformation of the manufacturing sector while generating positive impacts for the city such as circular resource flows, reduced pollution, and job creation. By engaging with stakeholders from the private sector, through steering committees, site visits, and workshops, public authorities can gain an in-depth understanding of the challenges that businesses face. Public authorities can also share information about initiatives that could benefit businesses. The multiple interactions between different stakeholders helps to shift industry towards more circular business models. Municipalities can thus be the forerunners in setting the agenda of the circular economy, thereby ensuring more efficient resource use and city resilience.



Daniel Plato, Executive Mayor of the City of Cape Town (in blue) on a WISP site visit, Source: GreenCape

FOR MORE INFORMATION

GreenCape Website: www.greencape.co.za

Contact GreenCape: www.greencape.co.za/contact-us

Western Cape Government Website: www.westerncape.gov.za

City of Cape Town website: www.capetown.gov.za

Contact Invest Cape Town: www.investcapetown.com/contact-us

Greentech Investment Opportunities in Cape Town: www.investcapetown.com

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