

## Stresses / Shocks



Power outage



Infrastructure failure



Financial crisis



Drought

## Qualities of a resilient city



Reflective city



Robust city



Flexible city



Building redundancy

# Building a resilient clothing and textile industry in Cape Town, South Africa



## Purpose

This case study demonstrates how businesses are **building resilience** in Cape Town, a major city in South Africa; and how strategic programmes, specifically the [Western Cape Industrial Symbiosis Programme \(WISP\)](#), can provide support.

The case study specifically focuses on the **clothing and textile industry** and efforts to adapt to shocks and stresses related to **resource scarcity**. It reflects on:

- the **potential impact of climate change** on the resilience of the industry, with a specific focus on the **impact of the recent drought**;
- the **impact of increased load shedding and electricity costs on production**; and
- the opportunity for **improved efficiencies**, including the identification of **circular and value-add solutions**.

These efforts also build resilience to other important shocks and stresses, such as financial / economic crises and unemployment. This is particularly important for clothing and textiles, given the **extensive globalisation of the industry and its value chains**.

### MAIN INSIGHTS

- ✓ Resource efficiency measures and access to alternative resources can increase the **flexibility** of an industry, mitigate risks and provide growth opportunities.
- ✓ This, at best, grows the local industry and creates jobs; and, at worst, **builds resilience** to ensure **business continuity and safeguards jobs**. These are both key priorities in South Africa.

- ✓ The quickest way to adapt and evolve is to move on from **planning**, get started and **experiment**.
- ✓ Programmes like WISP support industry to build resilience and are thus a strategic resource for the City of Cape Town. This is due to WISP's ability to:
  1. Rapidly **adapt** to change;
  2. Act as an **impartial** and trusted conveyor of information; and
  3. Build on **established knowledge and networks** to drive relevant solutions.

Cape Town aspires to be a resilient city and is working in partnership with 100 Resilient Cities (100RC), pioneered by the Rockefeller Foundation. Cape Town is developing a roadmap to enable the city to become more resilient to the growing physical, social and economic challenges. This case study is part of a series highlighting how Cape Town is building resilience.



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## Background

### The South African clothing and textile industry

The clothing and textile industry lies within the **clothing, textiles, footwear and leather (CTFL) sector**. These industries are **concentrated in two provinces**: KwaZulu-Natal and Western Cape (CCTC, 2017)<sup>1</sup>.

- **KwaZulu-Natal** offers **greater capacity and capability in terms of fabric production and finishing**, which is a key area for future development.
- The **Western Cape** hosts a **diverse range of firms active at every stage in the value chain**, from large retailers through to small outsourced operations. The province is also home to the majority of the country's major retailers, which presents local manufacturers with a **comparative advantage in terms of speed, flexibility and customer relationship**.

The clothing and textile industry is collectively responsible for the majority of employment (90%) and value add (80%) to the CTFL sector<sup>2</sup>. It **employs 95,000 workers** and contributes **8% to manufacturing GDP** and **9% to the country's overall GDP**<sup>3</sup>.

### The significance of the industry in Cape Town

The **manufacturing industry** in the **Western Cape** accounts for about **15% of the province's economy** and employs about **10% of the province's workforce**<sup>5</sup>. Clothing and textiles contributed less than 1% of Cape Town's total economic output in 2017<sup>4</sup>. However, the **clothing and textile industry** remains **important** in terms of its impact on:

- **employment**: Clothing and textiles is the second largest employer within manufacturing and;<sup>4</sup>
- **exports**: It contributed R4,4 billion to the metro's export sector in 2017.<sup>4</sup>

### Challenges

The industry has contracted since the opening of South Africa's economy in 1990, primarily due to an influx of **cheaper imported products**. South Africa's imports of clothing, textiles and leather goods have increased from just over R5 billion in 2000 to almost R60 billion in 2019, and over 100,000 jobs were lost between 2002 and 2013<sup>5</sup>.

Although the industry has stabilised, and positive growth forecasts are anticipated for local manufacturing firms<sup>1</sup>, it is clear that the industry faces several **potential threats related to climate change**. This includes:

- a **lack of access to critical resources** required for textile manufacturing, particularly water in the context of South Africa; and
- **risks related to their overall supply chain** e.g. access to inputs such as cotton that have their own water security risks.

This suggests **resource efficiency is increasingly important** in this industry and it will need innovative approaches that extend beyond simply improving efficiencies i.e. businesses will need to plan for resource insecurity and rethink the inefficient use and disposal of resources and the patterns of consumption in order to become resilient. This is particularly challenging given the following:

#### 1. Water risks, particularly in Cape Town

In 2017, Cape Town faced uncertain and unprecedented **water shortages** due to a **drought in the Western Cape**. Most industrial and commercial businesses, including clothing and textiles, were significantly impacted and faced:

- **uncertainty** around **access to municipal water**;

- **escalating tariffs** i.e. a 100% increase in less than a year; and
- a mandatory 45% decrease in **municipal water consumption**.

The textile industry was particularly affected and needed to **reduce effluent** arising from processes such as the finishing of yarn or fabric created by spinners, weavers, knitters, and tanners. These finishing processes may involve a combination of scouring, bleaching, dyeing, and printing, and invariably result in high levels of contaminated water.

*"The industry is currently experiencing an emerging global trend known as 'fast fashion' that favours the speed at which goods can be brought to market and this is preferred over cheap goods."*

*This trend coupled with the rise of the ethically-minded consumer has created new opportunities in the clothing and textiles industry in South Africa.*

*Cape Town, with its strong retailer presence, is perhaps the best placed domestic city to adapt to these trends and to lead the revival of this important industry."*

- James Vos, Member of the Mayoral Committee, City of Cape Town Source: Bizcommunity (2019)

#### What is resilience?

Resilience is the 'capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow no matter what kind of chronic stresses and acute shocks they experience' (100 Resilient Cities, 2019)

<sup>1</sup> CCTC, 2017. *Cape Clothing and Textile Cluster. Sector Profile*. See: <https://capeclothingcluster.org.za/sectorprofile/>

<sup>2</sup> TIPS, 2017.. *Brief: Clothing, footwear, leather and textiles*. Retrieved from:

[http://www.tips.org.za/images/Manufacturing\\_subsectors\\_-\\_Clothing\\_footwear\\_and\\_textiles\\_2017.pdf](http://www.tips.org.za/images/Manufacturing_subsectors_-_Clothing_footwear_and_textiles_2017.pdf)

<sup>3</sup> Dubase, 2018. *Textile, clothing manufacturers gather in Cape Town*. Published on 20 June 2018 on SABC News:

<http://www.sabcnews.com/sabcnews/textile-clothing-manufacturers-gather-in-cape-town/>

<sup>4</sup> Bizcommunity, 2019. *Reviving Cape Town's clothing and textiles industry*. Published 19 March 2019. Available at

<https://www.bizcommunity.com/Article/196/462/188698.html>

<sup>5</sup> Charles, 2019. *Cape clothing industry set to get major funding boost*. Published on IOL on 11 April 2019. See:

<https://www.iol.co.za/capeargus/news/cape-clothing-industry-set-to-get-major-funding-boost-20946482>



## 2. Energy risks, particularly access to electricity

The industry uses energy intensive **heavy machinery** within the manufacturing process, e.g. the dyeing and finishing machines in textiles and the industrial cutting and sewing machines in clothing manufacture. In 2008, 2014/5 and 2018/9, South Africa experienced **load shedding**<sup>7</sup> and continues to face potential energy shortages and the associated risks to **business continuity** in the future. Details on the risks and impacts on the economy as a whole is provided in a previous case study.<sup>8</sup>

## 3. The current business model

The South African clothing and textile market consumes at least 0,5m tons of fabric and 1.2 billion individual items each year<sup>9</sup>. This is problematic given that the industry largely makes use of a **linear model of take, make and waste**, rather than a circular model which closes loops, designs out waste and minimises environmental impacts. This is shown in the image below.

Although only **13% of total material input is currently recycled after use**<sup>9</sup>, there are several drivers to look at additional opportunities to improve productivity and rethink disposal of unutilised materials such as textile off-cuts. These include:

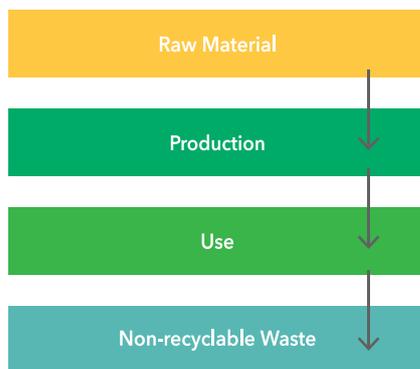
- **local legislation** regarding water discharge, air emission and waste generation;
- the **increasing cost of waste diversion to landfill**, particularly in Cape Town;
- a focus on **reducing the carbon and water footprint of products**, in part driven by the recent carbon tax and the fact that the production of virgin textiles is a large contributor to greenhouse gases, estimated at about 15kg of carbon dioxide per kilogram of textile<sup>10</sup>.

These also include global trends (Ellen Macarthur Foundation, 2017<sup>11</sup>; Hartzenberg, 2018<sup>12</sup>; Kozlowski, 2019<sup>13</sup>), as described in the box on the right.

### Trends in fashion

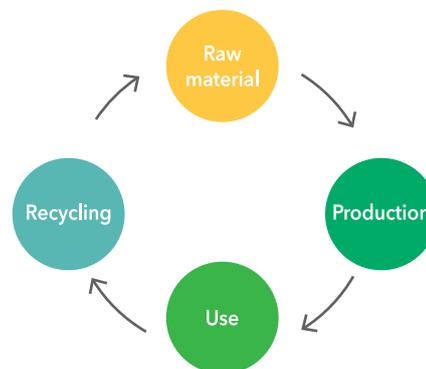
- Although globalisation, fast fashion and offshore production have created a perfect storm for cheap, easy and abundant fashion consumption<sup>13</sup>, verifiable and responsible sourcing practices have become an increasingly important aspect in the industry's supply chain management. This offers a competitive opportunity for African countries which have a relatively clean slate in terms of responsible sourcing and neutral reputation with global consumers<sup>12</sup>.
- There is also increasing recognition that clothes must be designed differently, worn for longer and recycled as much as possible. More than 70% of over 50 million tonnes of fibre produced per year by the fashion industry ends up in landfills or bonfires, and less than 1% is used to make new clothes<sup>11</sup>.

## Linear model



VS

## Circular model



<sup>6</sup> 100RC (2019). 100 Resilient Cities. What is urban resilience? See: <http://100resilientcities.org/resources/#section-1>

<sup>7</sup> The deliberate shutdown of electric power in a part or parts of a power-distribution system, generally to prevent the failure of the entire system when the demand strains the capacity of the system.

<sup>8</sup> See CS01-3 | 2019 - Building resilience to energy insecurity: enabling small-scale embedded generation. Available here.

<sup>9</sup> The Moss Group Textile Volume Demand Study 2014.

<sup>10</sup> <https://www.enviroserv.co.za/industries/textile-leather-wood>

<sup>11</sup> <https://www.ellenmacarthurfoundation.org/publications/a-new-textiles-economy-redesigning-fashions-future>

<sup>12</sup> <https://www.bizcommunity.com/Article/196/352/179198.html>

<sup>13</sup> <https://www.bizcommunity.com/Article/196/399/190174.html>

<sup>14</sup> Bizcommunity, 2013. K-Way wins award for boosting local manufacturing sector. Published 31 July 2013. Available at: <https://www.bizcommunity.com/Article/196/399/97628.html>



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## Solutions

**Government sponsored programmes**, specifically South Africa's Department of Trade and Industry's Clothing and Textiles Competitiveness Programme in 2010, and **clustering organisations** such as the KwaZulu-Natal Clothing and Textile Cluster (CTC) and Cape Town Clothing and Textile Cluster (CCTC), have played a positive role in **improving the competitiveness of South African firms**. This has been done through **skills and technology development** and a focus on instituting **global best practices** throughout the value chain<sup>1</sup>, including lean manufacturing practices which enable constant improvement and evolution<sup>14</sup>. This support played a key role in stabilising the industry and an estimated 25-30% of locally sold clothing is now manufactured domestically<sup>15</sup>.

*"The success of local manufacturers, such as K-Way, shows that sustainable development in the clothing and textile sector is possible when companies grab hold of all opportunities offered to find innovative and economical ways of manufacturing."*<sup>14</sup>

### Alan Winde, current Premier of the Western Cape

Although this demonstrates the use of partnerships to manage risks and build competitiveness, classic techniques are often **not sufficient to face modern stresses and shocks** within global value chains. As a result, resilience has become a critical component in supply chains and a resilient approach is needed to **address expertise gaps** and provide the **mindset and skills to adapt**<sup>16</sup>.

This resilience - specifically resilience to resource scarcity - will require innovation, investment and a commitment to sustainability practices. There have been **three areas of innovation** during the imagining and creation of a cleaner textile industry<sup>17</sup>:

- creating better ways of growing and manufacturing natural fibres;
- finding more efficient and cleaner ways to recycle and upcycle clothes; and
- inventing new synthetic fabrics.

The South African industry has focused on the **first two areas**:

- sustainable initiatives to reduce water, energy and chemical use of primary inputs such as cotton (as is being done by Woolworths), and implementing general interventions to build water and energy resilience along the supply chain (as discussed in previous case studies<sup>18</sup>); and
- industrial symbiosis approaches to re-use and recycle material inputs and products.

### Industrial symbiosis

Industrial symbiosis (IS) is a concept where **residual or under-utilised resources** (waste, energy, water, logistics, expertise etc.) from one business can be **used by another business as a resource**, creating economic, social and environmental benefits for companies involved. Importantly, IS uses **actual business opportunities as the mechanism for encouraging resource efficiency**. Its holistic approach sees it actively dealing with all resources and thus has the potential to significantly reduce industrial and commercial waste and comprehensively lessen the adverse environmental impacts of business.

This case study specifically looks at the WISP and its efforts to assist industries in Cape Town to build resilience. WISP is a **free facilitation service** funded by the **City of Cape Town** and delivered by **GreenCape**. It specifically connects businesses to become more resource efficient, in part through;

- assisting businesses, specifically SME's, to **identify and implement resource efficient practises**; and
- identifying "wastes" (i.e. under-utilized resources) that could be **inputs to other industries** rather than send to landfill (e.g. fabric off-cuts used as stuffing for furniture such as couches).

The textiles industry has been prioritized since WISP's inception in 2013 as it is a significant contributor to the provincial economy and is particularly vulnerable to risks related to inputs and imports. **Implementing resource efficiency without compromising profitability was identified as a means to improve its financial sustainability and the industry's competitiveness**. WISP assists businesses by identifying and implementing waste, water and energy efficient practices into their operations, which ultimately builds resilience against shocks and future resource uncertainty. The progress of the industry and impact to date is discussed below.



<sup>15</sup> Ntini, 2017. SA's wool is cool again. Published on 12 March 2017 on Fin24. See: <https://www.fin24.com/Companies/Industrial/sas-wool-is-cool-again-20170312-2>

<sup>16</sup> Antomarioni, Bevilacqua, Ciarapica and Marcucci, 2019. Resilience in the Fashion Industry Supply Chain: State of the Art Literature Review. Business Models and ICT Technologies for the Fashion Supply Chain. Springer International Publishing. See: <https://www.springerprofessional.de/en/resilience-in-the-fashion-industry-supply-chain-state-of-the-art/16161264>

<sup>17</sup> May, 2017. Polyester could slip on banana peel of green fashion. Published on 14 December 2017 by Bizcommunity. See: <https://www.bizcommunity.com/Article/196/457/1171337.html>

<sup>18</sup> See CS01-3 | 2019 - Building resilience to energy insecurity: enabling small-scale embedded generation. Available here.



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## Impact

### Improving water resilience

WISP partnered with GreenCape's Water Programme to deliver "Drought Business Support"<sup>19</sup>. Through this initiative, WISP specifically assisted 21 clothing and textile businesses and linked them to relevant information and expertise to improve their water efficiency and security.

This was done, in part, through an industry-specific workshop titled "Western Cape Crisis: Industry Support Roundtable" held on 15 February 2018. This workshop provided:

- an update on the state of the water crisis;
- details on the application processes for water use licences;
- a case study on what similar companies have implemented; and
- the "Sustainable Water Use Journey", a hierarchy of interventions that businesses can implement starting from the least cost interventions (e.g. installing water measuring devices) to the most costly interventions (e.g. design and installation of a water treatment plant).

This, in conjunction with individual support, ultimately assisted these businesses to reduce water consumption by 35% while safeguarding jobs, particularly in threatened businesses such as small dye houses in Cape Town.

Other water interventions that have built resilience are described in the box below and include alternative water supply (Bizcommunity 2017a<sup>20</sup>; Bizcommunity 2017b<sup>21</sup>).

### Improving resource efficiency

More broadly, WISP has worked with 41 clothing and textile companies within the Western Cape since its launch in 2013. This included working with businesses to:

- separate unutilised materials (i.e. "waste") at source;
- re-integrate material back into processes (where possible); and
- sending unutilised materials to other local companies to re-use and/or recycle where possible.

This resulted in 30 "synergies" (i.e. resource exchanges) to date, diverting an average of 1,200 tonnes per year of useful materials (e.g. textile off-cuts) from landfill. This has ultimately resulted in:

- the reduction of virgin material use in the textile industry;
- retention of materials within the economy and, in parallel, the extension of the lifespan of landfills (a specific challenge for municipalities such as the City of Cape Town);
- new investments and enterprises to support the reuse and recycling of materials (e.g. a textile recycler recently invested R6.5 million into machinery to locally process textiles); and
- cost savings for textile businesses; both directly in terms of waste management cost savings, and potentially indirectly through a reduction in the carbon footprint of the industry (recently relevant since the introduction of the carbon tax in 2019).

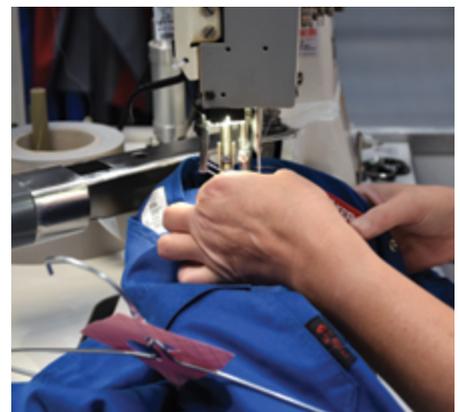
### Water pinch analysis

Companies have increased their water efficiency and decreased their wastewater discharge through increased water re-use and recycling on site.

**ACA Threads** has implemented fit-for-application initiatives through water pinch analyses, whereby water quality is matched to intended use and cascaded through the system, e.g. low quality water is reused for Cleaning In Place (CIP) processes. This has reduced water consumption by 70% over 3 years.

### Alternative water supply

**K-way** installed a borehole system to feed the factory's high-use ablution areas, which will save 1.5 million litres of municipal water per annum. This initiative complements the company's lean manufacturing model<sup>20</sup>. **TCI Apparel** has also invested in utilising borehole water for ablutions and rainwater harvesting<sup>21</sup>.



<sup>19</sup> Please see case study CS02 | 2019 "Building economic resilience to water scarcity in Cape Town: supporting industry through severe droughts" for details: <https://www.greencape.co.za/content/resilience-case-study-supporting-industry-through-severe-droughts/>

<sup>20</sup> Bizcommunity, 2017a. K-Way factory cuts carbon emissions with solar power installation. Published 11 October 2017. Available at: <https://www.bizcommunity.com/Article/196/462/168515.html>

<sup>21</sup> Bizcommunity, 2017b. TCI Apparel unveils sustainable design centre. Published 12 June 2017. Available at: <https://www.bizcommunity.com/Article/196/462/163131.html>

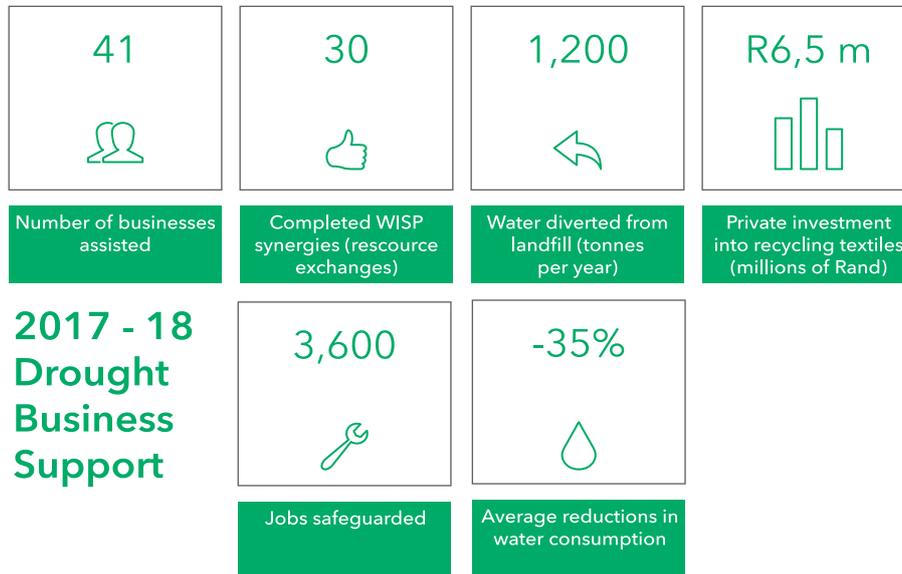
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## 2013 - 18 WISP support to clothing & textile businesses



Examples of industrial symbiosis approaches used by local industry is shown in the box below.

#### Industrial symbiosis

##### Re-use and recycling inputs

ACA Threads buys back thread spools from their customers for re-using at their manufacturing facility. Where spools are unable to be reused, they are recycled. This has saved more than R740,000 for the company to date and the initiative provides income for local organisations, including the Institute for the Deaf.

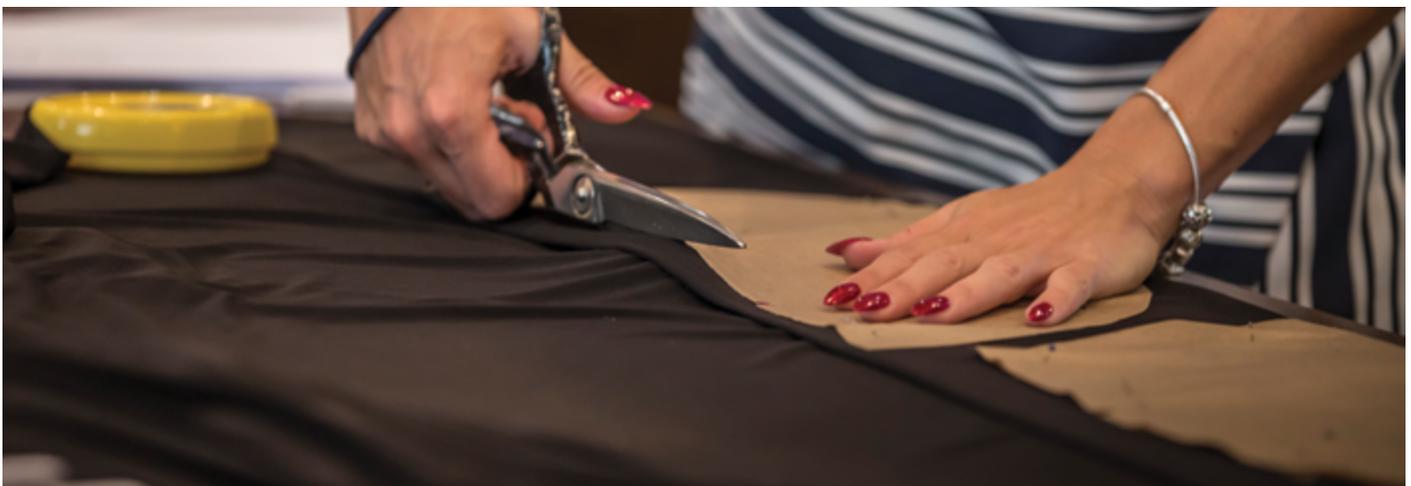
##### Re-using by-products

Sock synergy- [https://www.youtube.com/watch?v=5OtMv4cm4\\_k](https://www.youtube.com/watch?v=5OtMv4cm4_k)

##### Recycling by-products

Farbe is one of several clothing and textile businesses that provides unutilized textiles to Csk Material Handling and this has created a minimum of R8,000 per annum in economic benefits. Csk recycles this material into fibres for carpet underfelting.

Other resource interventions that have built resilience include investments in alternative energy<sup>20,21</sup> and are described in the box overleaf.



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### Other Interventions

#### Energy optimisation and alternative energy sources

In addition to common practices to reduce the overall energy consumption and improve equipment effectiveness; i.e. energy benchmarking, low-energy consumption lighting, optimisation of energy intensive equipment (specifically boilers), heat recovery interventions and insulation of equipment to prevent energy loss; several businesses are also looking for alternative energy sources. This is being done to build their energy resilience, specifically their resilience to an unreliable supply of electricity (see case study CS03 | 2019 for details), and decrease their carbon footprint. For example, K-Way<sup>20</sup> and TCI Apparels<sup>21</sup> have installed solar rooftop PV.

### Green design

In addition to water and energy initiatives described above, TCI Apparel has also embraced other green building practices<sup>21</sup>, including:

- environmentally sensitive ceiling boards and eco vinyl tiles;
- indoor plants and living walls;
- tinted windows, which retain heat in winter and expels it in summer;
- a vegetable garden utilised by the canteen; and
- locally produced furniture made of recycled plastic, wood and steel.



*The garment industry has, in recent years, been one of the largest contributors to global carbon emissions. For this reason, we found it to be important to reduce the environmental impact of our operations - from operations and processes to architecture and furniture choices... We are delighted that we are able to position South Africa as a leader in green manufacturing."*

Herman Pillay, CEO of TCI Apparel

Source: Bizcommunity (2017b)





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## Lessons learned

A key lesson learnt from industry is to simply get started and experiment. This is a key part of the lean manufacturing process and supports other innovative approaches such as industrial symbiosis.

A key learning from GreenCape is that facilitated programmes like WISP, whose services are free at the point of delivery, are a strategic resource for the City of Cape Town and are important to build resilience in industries, including clothing and textiles. This is primarily due to WISP's ability to:

### 1. Be adaptable

WISP is flexible and can thus be adapted and reactively deployed to best assist in times of crises. The facilitators already apply a "systems thinking approach" in their support to businesses and, due to the nature of industrial symbiosis, have extensive expertise in alternative solutions and net impacts.

They also have access to a range of specific waste, water and energy expertise from other GreenCape teams and can thus easily switch their focus to the most critical and imminent issues affecting businesses within specific industries and value chains.

### 2. Be an impartial and trusted conveyor of information

WISP plays a critical role in disseminating accurate and updated information between government, industry and academia, and was considered to be an impartial knowledge hub during the drought crisis. This was due to its delivery by a not-for-profit entity (rather than government), and its sole focus on supporting businesses. This ultimately allowed WISP to:

- clarify differences in government mandates and accountability to businesses; and
- direct focus to key issues and relevant solutions.

### 3. Build on established knowledge and networks to drive relevant solutions

WISP has access to an industry-specific database comprising of anonymised company information. This provides ready-to-use data that can be used to assess the high level needs of businesses and prioritise interventions and engagements with companies.

This, in parallel with WISP's positive track record over time, knowledge of the appropriate contacts within companies, and access to accurate information, allows WISP to leverage their networks and influence decision-makers in times of crisis.



For more information and support contact GreenCape's Western Cape Industrial Symbiosis Programme (WISP): [WISP@greencape.co.za](mailto:WISP@greencape.co.za) or call (021) 811 0250. Additional resources are available from: <https://www.greencape.co.za/content/sector/wisp>