

NEIGHBOUR HOOD 4.0

NEIGHBOURHOOD 4.0 Off-the-Wall Technology Showcase

Report

8-9 February 2019

CSIR, Pretoria, South Africa

Off-the-Wall Technology Showcase Report

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Foreword



“In the quest to improve the quality of life of our people, we aim to grow our engagement with industry”

PICTURED LEFT: *Dr Sehlapelo, Built Environment Executive Director, CSIR, welcomes invited stakeholders in an opening address.*

It is our pleasure to present the following Report on the first Off-the-Wall Technology Showcase, which was sponsored by the Department of Science and Technology and co-organised by the STI for SHS Roadmap project partners, led by the Council for Scientific and Industrial Research (CSIR).

The purpose of the event, held in Pretoria on the 8th and 9th of February 2019, was to provide innovators, entrepreneurs and industry an opportunity to showcase emerging new ideas, products or processes for our future houses and neighbourhoods under the theme “Neighbourhood 4.0”. The event was conceived as two-days in an open-air fair environment at which technologies were demonstrated and discussed with human settlement stakeholders from both the public and private sectors.

An open call was extended to entrepreneurs, innovators and industry through various media and professional interest networks. Forty seven applications were received and reviewed by a joint organising committee to ensure relevance and novelty. Finally twenty one external exhibitors showcased together with a selection of CSIR technologies. Key partners, including representatives of the Innovation Bridge Portal, Agrément SA, NHBRC, and NMISA interacted with stakeholders for the two-day event. The event was widely publicised and open to the public and over three hundred individuals registered to attend, from government, academia, NGO's and the private sectors.

The event featured an afternoon of public lectures. Topics included the new Human Settlements Departments Neighbourhood Planning and Design Guide (an industry reference work commonly called the “Red Book”); a masterclass on innovative building technology procurement, and a presentation on the Agrément certification process. This was found to be of interest to implementers in the human settlements sector, innovators and built environment professionals. On offer at the showcase were free copies of the Green Building Handbook, and the new Draft Innovative Building Technology (IBT) Procurement Guideline by the NHBRC.

As the event aimed to initiate discussions with potential investors and collaborators for the Science Technology and Innovation for Sustainable Human Settlements (STI 4 SHS) Roadmap project. Pitching sessions were held on Saturday. All exhibited innovations will be documented in the STI 4 SHS innovations register, which forms part of the broader STI 4 SHS Roadmapping initiative, and some will be eligible to appear in the investment portfolio being drafted.

Media was in attendance and provided extensive coverage before, during and after the event. Feedback was generally very mixed. Over the course of the two days it became evident that the event offered an unique platform for industry, science and government to meet. Via structured interviews, a number of useful insights were gained into the barriers, opportunities and trends experienced by innovators and entrepreneurs in mainstreaming science, technology and innovation for sustainable human settlements and “Neighbourhood 4.0”. These insights will be used to inform the forthcoming Roadmap.

Peta de Jager

STI 4 SHS Roadmap research leader, CSIR

Status quo

Human habitats continuously evolve. Our understanding and approach to shaping them shifts over time. Since the birth of its democracy, South Africa has, on the one hand allowed free markets to satisfy a portion of the needs for housing and neighbourhoods whilst establishing a formidable range of institutions and instruments - a veritable machine - to provide access to housing for [previously] marginalised households. However, a good look at the status quo, as presented in the *STI 4 SHS Draft Status Quo Report*, reveals that business-as-usual is not producing satisfactory results to the extent needed.

The Property Sector Charter Council measured the size of the property market in South Africa at R5.8 trillion in 2016. The formal residential property accounts for nearly three-quarters of property owned in South Africa, and grew from an estimated R3 trillion at the end of 2010 to R3.9 trillion. The total economic contribution to GDP of the residential property sector was R103.7 billion, while it contributed R20.1 billion to the fiscus through various forms of tax in 2012. A telling part of this research, is that, whilst informal residential property is quantified by the number of households provided by the Department of Human Settlements, it has been assigned no value.

With a Gini coefficient of 0.63 in 2015, South Africa is one of the most unequal societies in the world. A World Bank report in 2018 indicated that the top 1% of South Africans own 70.9% of the country's wealth while the bottom 60% controls 7% of the country's assets. Africa Check estimated that 30 million people, or 55% of the population of South Africa in 2015, lived on less than R1000 per month.

Indications are that housing backlogs in South Africa are increasing. In 1994, backlogs were estimated to be 1.5 million, in 2011, 1.9 million and by 2017, 2.3 million. The cost of addressing housing backlogs by 2020 is estimated to be R800 billion, while the annual budget for 2018/19 for human settlements, including electrification and water programmes, was R56.5 billion. Scaling up programmes to construct housing within budgeted timeframes can also be problematic and in 2018, R600million made available for new housing went unspent because of delays.

The Department of Water and Sanitation's Water Reconciliation All Town Study indicates that water resources in 30% of South Africa's towns are already in deficit. It suggests that water shortages are expected in at least another 15% of South Africa's towns in the next 5 years, with an addition 12% of towns also suffering shortages in the 5 years following this.

Existing spatial patterns and poor housing reinforce poverty levels by requiring poorer households to spend a large proportion of their household incomes on travel and basic services. Low-income households spend, on average, 20% of their incomes on transport and 34% on food. Occupants of low-cost housing can also spend as much as 20% of their income on heating in winter and inappropriate heating methods can lead to suspended particulates being well over World Health Organisation guidelines leading to a significant health problems.

In South Africa, human settlements are associated with significant carbon emissions and residential buildings consume 13% of South Africa's energy and generate 25 million tons of carbon dioxide emissions per year. The manufacture of building materials and components, much of it used in new housing, consumes another 5% of South Africa's energy.

Against the backdrop of the current status quo described above, is a trajectory which is likely to see continuing rapid urbanisation, locally as globally, with growing city populations, infrastructure strain, hollowing rural areas and deepening vulnerabilities. Climate change and resource scarcity render our goals and commitments (NDPs, SDGs and others) an imperative to build resilience in face of emerging threats to water and food security.

Science, technology and innovation may have a crucial contribution to make in transforming and shaping our future human habitats, to avert and cope with the challenges which lay ahead, and to realise the potential of South Africa's human settlements to provide for a decent standard of living; safe, resilient and sustainable households and neighbourhoods. Yet, that science, technology and innovation plays such a role is not inevitable, nor is it immediately evident, what the best contribution would look like or how such a course would be chartered.

Off-the-Wall and the STI 4 SHS Roadmap

“With a surplus of drivers for the adoption of alternative and innovative technologies in the built environment, particularly in the human settlements sector, the effective application of science, technology and innovation (STI) can be a transformative instrument in addressing South Africa’s most pressing and significant social risks. South Africa’s population is expected to increase to about 80-million by 2050, which contributes to the need for greater transformation in the housing and human settlements sector.”

Speaking at the opening of the NEIGHBOURHOOD 4.0 Off-The-Wall Human Settlements Showcase, Department of Science and Technology (DST) deputy-director general of socioeconomic innovation partnerships Mr Imraan Patel told delegates that the event formed part of a process to develop and adopt the STI for Sustainable Human Settlement (STI 4 SHS) Roadmap.

The roadmap plan is scheduled for completion in the next year and sets out a decade-long plan for “coordinated investment and collaboration between key stakeholders, recognising the demand for alternative and innovative technologies in the built environment to help achieve citizens’ right to adequate housing and improved quality of life”. The roadmap also falls in line with the Sustainable Development Goals, which are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

Patel further said that global risks, such as climate change and resource depletion, required governments to rethink how resources were managed. The STI 4 SHS is aimed at using STI to respond to these risks, and to strengthen not just partnerships across sectors, but transform the human settlements sector and create coherence between all involved parties.

Using the STI 4 SHS framework will fall in line with South Africa’s National Development Plan, a Department of Human Settlements (DHS) and National Home Builder’s Registration Council (NHBRC) representative said on Friday, adding that the innovative building technologies would need to be flexible, and be able to respond to and support emerging innovative technologies.



This STI 4 SHS Roadmap for the adoption of science, innovation and technology for sustainable human settlements (as depicted above) will be definition between April 2018 and March 2020, and implemented over the following ten years. An extensive consultation process with role-players and key stakeholders, as well as intensive research is to be employed in the both definition and execution of the STI 4 SHS roadmap. The Off-the-Wall Technology Showcase event was one of a number of targeted stakeholder engagement processes (illustrated below) which underpin the Roadmap co-creation, focussing on the voice of industry and entrepreneurs.



Participation and partnerships

An inclusive approach was used in conceiving the Off-The-Wall Human Settlements Showcase event. All project partners and additional event partners were asked to reach out to their relevant professional networks and widely publicise the event starting in late November 2018. Project/ event partners were NHBRC, South African Local Government Agency (SALGA), Green Building Design Group, The Innovation Hub, Water Research Commission, Technology Innovation Agency, Agrément South Africa, the South African Research Chairs (SARChI) in Human Settlements from Nelson Mandela University and Magosuthu University of Technology, DST, Department of Human Settlements, Department of Environmental Affairs, Department of Energy, Department of Water and Sanitation, and the University of Johannesburg. All South African universities and universities of technology were systematically contacted through their human settlements-related entities. Regular reminders were mailed to all registered STI 4 SHS national forum members. All relevant agreement certificate holders were targeted for inclusion. The Innovation Hub targeted satellite hub innovators and the Innovation Bridge Portal was scanned for relevant technologies.

A technical review committee was established with representation of DST, The Innovation Hub and CSIR to vet exhibition applications for safety and relevance. Forty seven applications for exhibition were received. Two technologies were discouraged as they were not sufficiently innovative or found not of relevance to the human settlements domain. There was a spate of late withdrawals, for a variety of reasons and finally twenty one “external”, ten CSIR and one DST technologies were exhibited.

The barrier to participation was set as low as possible, subject only to online registration. It was free to exhibit and free to attend the Off-The-Wall Human Settlements Showcase. All costs associated with participation were, however, borne by participants, which may have posed a barrier to geographically remote stakeholders. Nevertheless, exhibitors were attracted from Cape Town, Eastern Cape, Nelspruit, KwaZulu-Natal, Limpopo and Gauteng. Over 300 people (excluding exhibitors) registered to attend the event.

A word on human settlements – The case for science, technology and innovation

By Dr Jennifer Mirembe, National Department of Human Settlements, and Thihangwi Mudau of the National Home Builder's Registration Council



Anchored by legislative and policies including the National Development Plan (NDP 2030); the Strategic Plan and the APP DHS; 2008 National Innovation Plan, the National Department of Human Settlements stated that it supports the following position:

1. The creation of sustainable and integrated human settlements through innovation and up scaling alternative technology in building technologies, community participation, accountability, and safety.
2. Establishment of smart resilient dignified communities through innovation and up scaling alternative technology.
3. To harness innovation and up scaling alternative technology, which addresses rapid urbanisation and social cohesion in human settlements.

Speaking on behalf of the National Department of Human Settlements Mr Thihangwi Mudau of the National Home Builder's Registration Council made a presentation on “upscaleing the uptake of innovative building technologies”. Mr Mudau admitted that the uptake of innovative building technologies remains slow and sporadic, despite government imperatives. However, there is renewed vigour and a directive to upscale Innovative Building Technologies (IBTs) as government is committed to leveraging IBTs for job creation, improved quality of life and tackling global warming.

In 2003 the National Department of Human Settlements conducted a study on the extent to which alternative building technologies were used in low income housing projects and the socio-economic impact of these technologies on beneficiaries. It followed up with 2008 and 2010 research on IBT focused primarily on officials –enquiring as to the reasons for limited implementation of alternative building technologies. In 2011, the Alternative Building Technology indaba was hosted, followed by work undertaken by Dr Sokopo and team. At the 2017 National Department of Human Settlements Development Summit, the opportunity was identified to respond to these challenges by means of upscaleing the use of innovation and transformative technologies as a means to support new human settlements required by accelerated urbanisation, as well as for the upkeep and renewal of existing settlements. The assigned summit commission resolved to adopt a defined agenda and plan - that is the STI 4 SHS Roadmap - for the up-scaling of innovation and implementation of alternative technology solutions for smart cities with a community approach.

Dr Jennifer Mirembe contributed a PhD study on the impact of Technologies on People, Space and Planning to the field; a Human Settlements Environmental Implementation Plan was drafted; a memorandum of Agreement with DST enabling the department to work with DST and its entities was initiated and the

department endorsed the Science Technology and Innovation for Sustainable Human Settlements STI 4 SHS Roadmap project.

In 2016/17 the NHBRC commissioned the Innovation Building Technology (IBT) Guidelines. These guidelines are supported with an IBT dynamic database, an IBT analyser and Terms of Reference / Request for Proposals. Following a number of engagements¹, the following themes were included in the guidelines:

1. Adequate budge for the roll-out of IBTs.
2. Investigations for well-planned communities facilitating integrated human settlements.
3. Procurement requirements for appointments
4. Mechanisms for identifying good performing IBTs and making suitable appointments (Database, IBT Analyser).
5. Planning approvals and enrolment of IBTS
6. Social acceptability of the IBTs.
7. Developing technical skills in IBTs
8. Accountability of service providers.
9. Reduce the risks on poor standard construction
10. Prevent the use of non-conforming products.
11. Community service plans for maintaining IBT homes

Current conjecture is that the Govan Mbeki Awards programme recognises provinces and their partners that implement innovation building technology in projects. The National Department of Human Settlements reports investing about R3,5 million for the construction of Innovative Building Technology houses through its research facilities at the NHBRC for the 2018/19 financial year.

Gauteng Department advertised for the appointment of a service provider for 36 months for IBTs in human settlements. Mpumalanga Human Settlements Department has appointed a service provider for a period of three years for IBTs in human settlements projects. Western Cape Human Settlements Department is using IBTs in some of its catalytic projects. An Upscaling IBT Framework is currently under development.

Mr Mudau observed that there is a strong case for upscaling IBTs in order to manage urban spaces in human settlements, to empower people, to connect urban and rural regions. E-Land technologies could support how land is planned, used, managed, and exploited. Practitioners can be empowered in Human Settlements IBT Planning. Benefits to upscaling could include digital activism, the power of the masses and access to IBT, e-lifestyle, Building Cost Control and emotions of people and people's spaces.

Upscaling IBTs was proposed as a catalyst for sustainable human settlements, as follows:

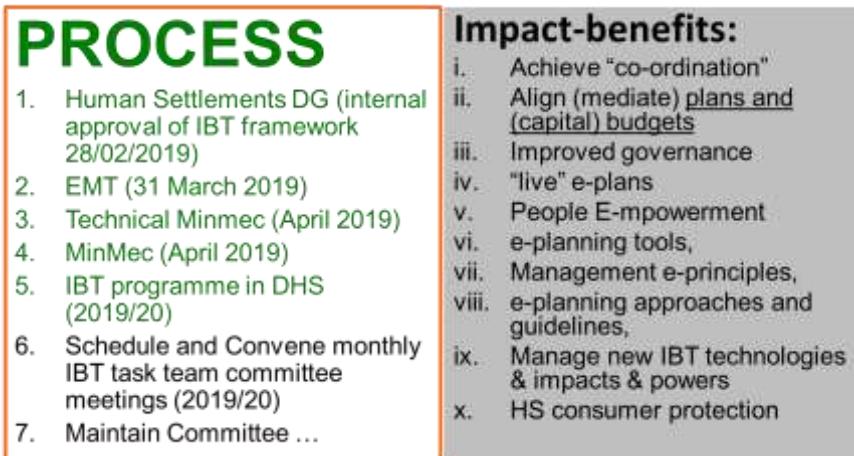
National Scale	NDP, NSDF, IUDF, SIPs, Human settlements Framework for spatial transformation and consolidation.
Regional Scale	Priority Housing Development Areas.
Inter-settlement Scale	Priority Housing Development Areas.

¹ Meeting with NDoHS Policy Dept. and round table meeting 23 February 2016; Workshops held with municipalities and provincial departments in Gauteng, KZN, EC and WC: 6 June 2016 – 15 July 2016; Meeting with Department of Science and Technology – 7 November 2016; Meeting with Agrément SA on IBT – 8 November 2016; CSIR IBT Stakeholder Workshop – 31 January 2017 and Workshops with NHBRC inspectors from 20 May 2017 – 14 June 2017

Settlement form and neighbourhood scale	The Neighbourhood Planning and Design Guide (the “Red Book”).
Unit/House Scale	NHBRC IBT guidelines.

Mr Mudau explained that, in vetting IBTs for human settlements, implementing parties should consider development (history, scale of IBT, DHS vision, policy and legislation); validation (government and system owners, community acceptability, managing perceptions of beneficiaries, context appropriateness, the capacity to deliver at scale, quality management; as well as exploration (Link to Priority Housing Development Areas, Human settlements Framework for spatial transformation and consolidation, and the ripple effect); coding (quantification /“ Red Book”, business sustainability and protection of consumers); application (NHBRC thermal and energy performance, structural integrity technology, social and economic ripple effect across scales); funding (own funding, affordability, sustainability); and partnerships.

The following implementation outline was presented:



In anticipation of the sector question: “where are we as human settlements?”, the National Department of Human Settlements and the NHBRC noted that they are in the final phase of the IBT Framework, which involves establishing partnerships, policy and strategy; that they are availing Budgets to build IBT based human settlements structures; and that they are strengthening monitoring and evaluation.

Scenes from around the Off-the-Wall Technology Showcase



Department of Science and Technology (DST) deputy-director general of socioeconomic innovation partnerships Mr Imraan Patel accompanies Dr Bethuel Sehlapelo, Executive Director of the Built Environment at the CSIR and others during a VIP walkabout.



Media was visible throughout the event.

<https://www.youtube.com/watch?v=ULnwklCZtw>































DISCLAIMER OF ENDORSEMENT

The inclusion of exhibits, materials, exhibitors or attendees at the event or in this report does not imply endorsement or support of any of the linked information, services, products, or providers by the CSIR or its partners.

INTELLECTUAL PROPERTY PROTECTION

Exhibitors were explicitly discouraged from sharing any information which may compromise their ability to apply intellectual property protection. Exhibitors were encouraged to seek independent professional input on what is advisable in their particular case.

HOT SPOT

HOT SPOT IS A PRODUCT THAT CAN BE RETROFITTED ON ANY CONVENTIONAL GEYSER ENSURING REDUCED ENERGY CONSUMPTION, GUARANTEEING FASTER HOT WATER.

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Consumer should ensure that the geyser installation complies with industry standard SANS 10254 before installing the Hotspot.

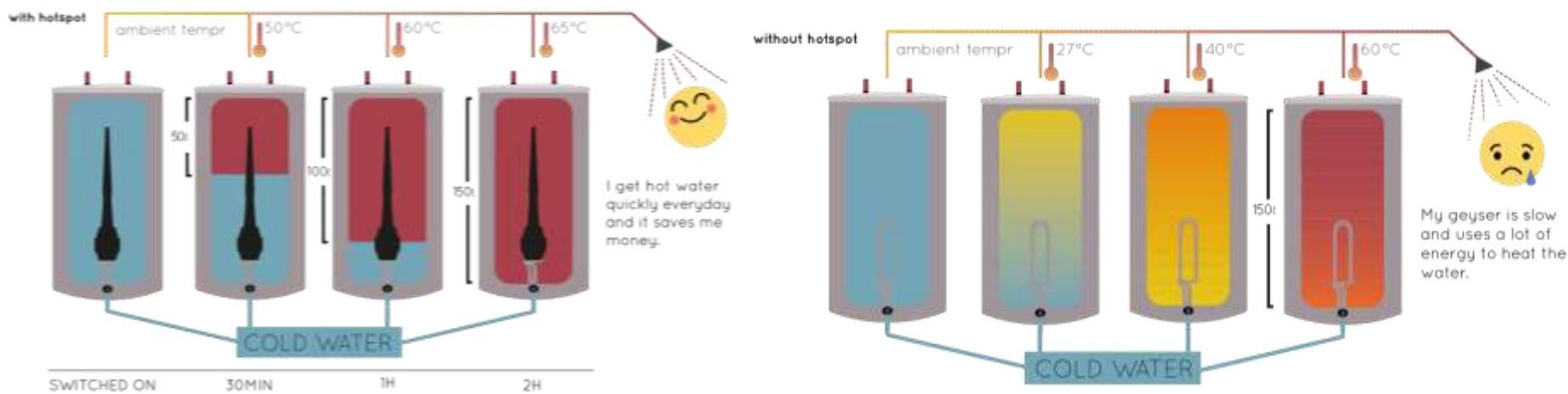
The product is made out of food safe plastic material and is tested against chemical leaching and dry burn.

Manufacturer

AET AFRICA PTY LTD, MANUFACTURERS

Office address: 3-33 Phillip Frame Road, Waverly office building, Chiselhurst East London Factory: 24 Njokweni Road Dimbaza

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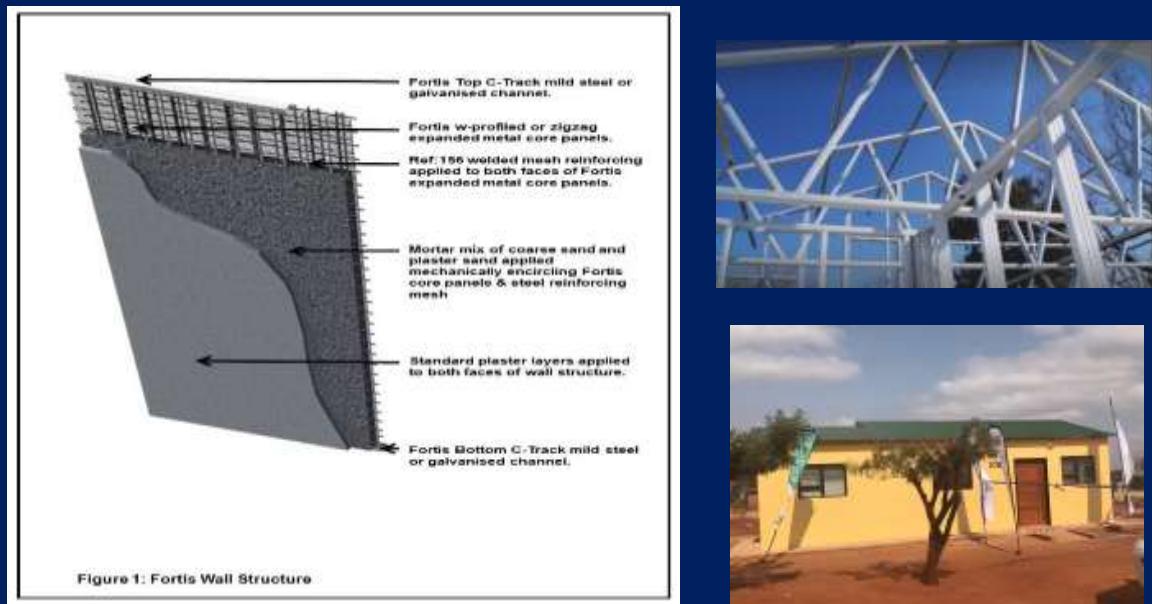
All standard designs below can be custom designed and new designs for clients can be accommodated.



ABOUT US

Founded by the late Mr. Vincent Bender in 2011 and acquired by Ms. Lebogang Zulu in 2017, AV Light Steel (Pty) Ltd is a Potchefstroom based Level 1 BBBEE black-women owned light steel manufacturing company. With a vision to be the preferred supplier of alternative building materials, AV has in the last year invested just over R60million to improve its technology and increase its capacity. The company is well positioned to design, supply and construct any and all types of building structures using both the Fortis and the Robust Building systems.

Building materials supplied by AV are SABS, SASFA and Agrément SA approved.



FASTER AND STRONGER ALTERNATIVE BUILDING SUPPLIES

External walls are 115mm thick (inland) and 130mm if built within 15km of the coast, Internal walls are 90mm thick. This compares very favorably with plastered brick walls of 260mm externally and 150mm internally.

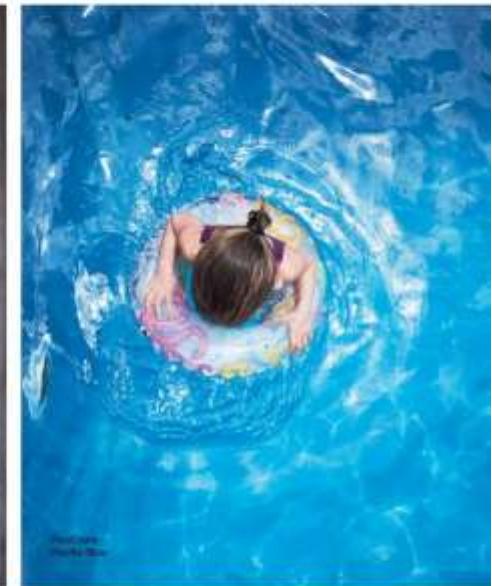
- Durability: More durable
- Speed up delivery of infrastructure – up to 50% faster than conventional
- Cost effectiveness – 20-25% cheaper than conventional systems
- Durable and stronger (Fortis Building System : 25 – 28MPa)
- Energy efficient (cooler in summer and warmer in winter)
- Fire Performance – 60min
- Thermal Performance: R-value - 0.58 to 1.9 vs SANS requirements of 0.35

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- Construction
- Glazed Tile Roof Sheeting
- Galvanised Roof Trusses (0.5 – 0.8)
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- * Innovative Natural Gas appliances in production.



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Mfanelo Ndlovu

At the forefront of sustainable waste management, Enviro Loo is a multi-award winning dry, sanitation system that is non-polluting with zero reliance on water, power or chemicals to operate. Sun and wind transform human waste into a stabilized material that is safe and easy to remove.

Waste enters the sealed container through a ceramic toilet bowl. Liquid and solid waste is separated and exposed to a continuous flow of air which dehydrates the solid waste as it migrates down a sloped drying plate. The liquid which has drained down to the bottom of the container evaporates.

Sunlight increases the ambient temperature within the container leading to intense heat which converts the solid waste into a dry material roughly 5% of its original volume. The negative pressure within the container prevents the escape of any odour which is safely vented out via a wind driven extractor.

Enviro Loo installation is simple with user and janitorial training provided. A quarterly waste management contract is recommended by trained Enviro Loo subcontractors.

Enviro Loo features various models from the Domestic unit for 1 to 10 users per day, Communal unit for 10 – 20 users , Bulk unit for 20-30 users and Industrial /Evaporative Urinal units for 20 to 40 users per day.

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www.futurehouse.co.za

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012 653 1938

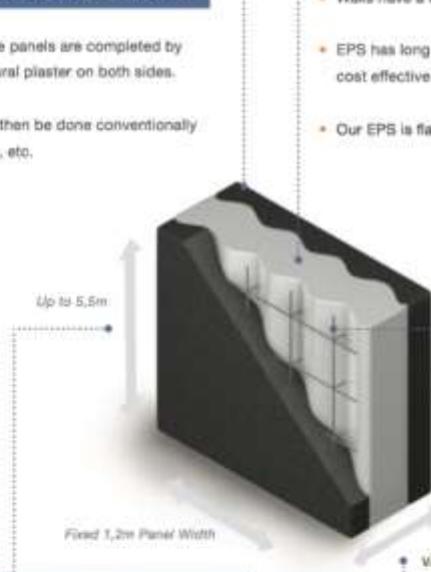
The Ikhaya Futurehouse System (IFHS) is a quick to build, lightweight and thermally insulating walling and slab system, that is supplied in panels and is fully customisable. It offers superior structural integrity to traditional methods of construction while addressing energy efficiency.

Ikhaya Futurehouse Systems was established in 2006 after extensive research into alternative building systems worldwide. The principal construction technology and manufacturing machinery is Italian in origin, established in the 1960's.

PANEL CROSS-SECTION

FINISHED WITH STRUCTURAL PLASTER

- Once installed on site the panels are completed by the application of structural plaster on both sides.
- Decorative finishing can then be done conventionally e.g. smooth plaster, tiles, etc.



INSULATING EPS CORE

- Walls have a central core of corrugated expanded polystyrene (EPS).
- EPS has long been accepted as a highly efficient and cost effective thermally insulating material.
- Our EPS is flame retardant and made with recycled polystyrene.

REINFORCED MESH

- The EPS is sandwiched between two sheets of high tensile strength steel.
- The steel is galvanised and the mesh sheets are welded to each other through the EPS.

MADE TO CUSTOM HEIGHT SPECIFICATIONS

- Our in-factory manufactured wall panel can be made to custom heights, e.g. an infill panel can be made to distance between slabs.
- Infill panels can be made to exact soffit height or to fit existing apertures.

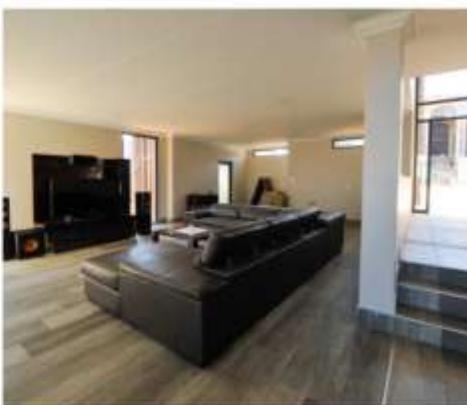
CORE & PLASTER THICKNESS TO SUIT YOUR REQUIREMENTS

- The EPS core thickness and density as well as the plaster thickness can vary to suit the requirements of a particular application, e.g. increased insulation, structural strength, fire resistance or aesthetic reasons.

PRODUCT BENEFITS

STRUCTURAL PERFORMANCE

The walls are a monolithic reinforced construction providing stability and exceptional durability as well as preventing the formation of structural cracks.



The high tensile strength vertical steel wires run in the valleys of the corrugated EPS which, when finished with structural plaster, create a series of mini reinforced vertical columns - giving a very high load bearing capability to the walls. Further, the two sheets of mesh are welded together through the EPS core to connect the reinforced plaster skins to each other.

SPEED OF CONSTRUCTION

The Futurehouse panels are lightweight and easy to transport and position (approximately 5kg per m² when unplastered). Even on multi-storey sites, cranes are not needed to position panels. Plastering is quick and easy with spray hoppers.

INSTALLATION & BRACING

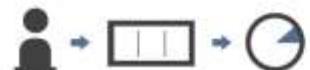


10 WORKERS
120 m² PANELS
1 HOUR



DAY 1 - Panels delivered to site

SPRAY PLASTER TO LEVEL



2 WORKERS
20 m². PANELS
1 HOUR



Two days later...

SPECIFICATIONS

PANEL SIZE	<ul style="list-style-type: none"> Standard Panel Width: 1,2m Standard Heights: 2,5m 2,75m 3m Can be made to custom heights
EPS CORE THICKNESS	<ul style="list-style-type: none"> Standard Thickness: 80mm Panel thickness between mesh sheets: 100mm Can be made to custom thickness ranging from 60mm to 200mm
EPS SPECIFICATIONS	<ul style="list-style-type: none"> Fire-retardant / Non-fire propagating EPS Variable density according to requirements
WIRE SPECIFICATIONS	<ul style="list-style-type: none"> From 2.5mm to 3mm (galvanised) Tensile strength: Minimum 600 MPa
MESH APERTURES	<ul style="list-style-type: none"> 150mm x 80mm
THERMAL CONDUCTIVITY	<ul style="list-style-type: none"> 80mm Core 30mm plaster both sides 'U' value = 0,5 'R' value = 2,2
PLASTER MIX	<ul style="list-style-type: none"> 4:1 ratio of river sand to cement - 14 MPa Standard thickness: 35mm, at the deepest point, on both sides. Plaster can be additionally reinforced with polypropylene fibre.



Sable Hills - Four storey house



Mobile Construction Monitoring Solutions

HouseLab has developed an innovative IT framework for monitoring the implementation and impact of construction related projects. HouseLab emphasizes on on-site data capturing of activity and progress. This is done using a mobile Application (APP) on any android device. The data collected on site becomes available in real-time. The web-based reporting system allows the user to analyze all the available data.

FEATURES

- GPS Coordinates and time stamp
- ID Card Scan
- Multiple Pictures Capture (Owner, House/Building, Site)
- Multiple Survey Based Questions
- Graphical Reports
- Report filtration on survey data
- Signature Capture
- Map view of field survey
- Provision for Upload of scanned documents related to survey, property etc.
- Field Force Monitor and Real-Time Tracking Mechanism for Onsite survey

KEY PRODUCTS USING THIS FRAMEWORK:

1. HouseLab

- For assessment of immovable assets, mainly houses and buildings already constructed.
 - The features on this system can also be used to register immovable assets.
 - Also assess condition of assets and the necessary work to repair any defects.
 - A corresponding bill of quantities (BOQ) is also produced

3. HouseTenancy

- A solution for tenancy audits and satisfaction level determination.
- Tenants in social houses, commercial housing rental stock and office accommodation.
- Monitor occupants, condition of property, rental amounts, lease agreements and others.

2. HouseInspect

- Monitoring of the construction process according to SABS , NHBRC and all National Building regulations.
- Management of subcontractors
- Payment milestones and progress reports are available at a click of a button.
- Beneficiary Management

4. HouseSolar

- This is useful mainly in large scale installations of Solar water heaters, Water Tanks, Changing of asbestos roofs and any similar project.
- Social or community mobilisation stage, assessment of roofs condition and orientation (SWH feasibility), SWH installation process and maintenance.



THE LINK BETWEEN HOUSING, EMPLOYMENT AND COMMUNITY UPLIFTMENT

JOIN THOUSANDS OF OTHERS WHO USE
HYDRAFORM ALTERNATIVE BUILDING TECHNOLOGY
TO BETTER LIVES.

- Creates employment opportunities
- Provides skills development & training
- On site block production using mobile diesel machines and local soil
- Build housing, schools, hospitals and community centres
- Fast, simple and cost effective construction.

SOIL-CEMENT INTERLOCKING TECHNOLOGY
PRODUCED IN SOUTH AFRICA



sales@hydraform.com www.hydraform.com +27 (0)11 913 1449



LEADERS IN ALTERNATIVE BUILDING TECHNOLOGY, SINCE 1988





ABOUT HYDRAFORM

Hydraform is the leading South African Alternative Building Technology service provider. The company has been in existence since 1988, its headquarters is based in Johannesburg, South Africa and the manufacturing plant is situated in Durban, South Africa.

By taking the world's oldest known building material, earth (soil) and giving it form and durability through Hydraform's innovative technology, the company has developed earth brick that can reduce costs and construction times.

Hydraform is the original manufacturer of the Hydraform technology products. Through continuous research and development with leading institutions, Hydraform developed an interlocking stabilized soil-cement block (ISSB) which is dry stacked and interlocks on 4 sides, eliminating the use of mortar in 70% of the building structure with no need for concrete or steel columns.

The blocks are solid and tested both by Agrément (under CSIR) and Wits University.

The core function of the business is manufacturing of block and brickmaking machines with the objective of producing cost-effective buildings.

THROUGH THE USE OF THE HYDRAFORM TECHNOLOGY ENTREPRENEURS, YOUTH AND COMMUNITY, CONSTRUCTION COMPANIES AND GOVERNMENTS ARE ABLE TO CREATE JOBS, SKILLS DEVELOPMENT AND BUILD AFFORDABLE QUALITY HOMES FOR THE PEOPLE OF THE AFRICAN CONTINENT.

Other services related services offered by the company include the interlocking stabilised block and construction training academy, a technical and after sales support service to the customers.

For more information about Hydraform, please visit on

www.hydraform.com sales@hydraform.com

Please find us on social media



LEADERS IN ALTERNATIVE BUILDING TECHNOLOGY, SINCE 1988

Jonga offers a battery-operated, internet-of-things, home-security solution



The Jonga system is a 2-part solution that consists of a hardware control panel which houses the sensor unit and electronics boards, which is securely mounted on the ceiling and monitors a room for any movement and a mobile application that gives you centralized control of your home system.

The device is battery operated and therefore independent of the power supply at the home. The communication between the device and the Jonga system is utilising a new “Internet of Things” network protocol. To date, there is no known application of these protocols for security in South Africa.

Business Name: Kasi Eats

Reg. No.: 2017/462434/07

Business Address: Allan Cormack St, Lynwood, Pretoria, 0020

Contact Person: Kabelo Matlala

Contact Number: 078 178 0249

Email: kabelo@kasieats.co.za

Primary Line of Business: Construction & Maintenance



General Business Description

Kasi Eats is a socially uplifting organization. Our entire business model relies on a vibrant and robust township economy. It is our responsibility to ensure that we are investing back into the communities in which we operate. As a business born in the townships we understand the major challenges faced by small businesses.

Scope of Work

We are an Early Stage Tech Startup, in the past 4 months we have completed our Operational Pilot Stage in which we demonstrated our business model to the Innovation Hub and Gauteng Provincial Government. Encouragingly we have been awarded a R50, 000 grant in July 2018 to continue growing our business.

Kasi Eats is currently optimizing the upstream and downstream logistics of;
14 restaurants
2 Vegetable Distributors
1 Meat Distributor
1 Big box Retailer.

Fast Facts			
Total Employees:	4	Permanent	3
		Temporary	1
B-BBEE:	Level 1	Recognition %	125
Shareholding:	100%	Black-Owned	
	0%	Black Woman-Owned	
Annual Sales:	R 50 000.00		
Total Customers:	500 unique		
Key Customers:	Restaurants Chesa Nyama Butchers		

Delivery costs associated with restocking alone represent, on average, 30% of all costs for restaurant chains. We assist our clients in various layers of the unbranded food and beverage supply chain to hold down costs and increase profitability, simply by outsourcing their logistics needs to Kasi Eats.

Key Processes

Kasi Eats uses world class business models and local insight to deliver a platform who's time has arrived. We have merged validated technology, foreign merchant experience, and local insights to create a platform which has the potential to affect positive disruption en masse to a stagnate environment.

Company Strategy

Vision Statement:

We aim to be the trusted partner for small businesses with a growth driven outlook. We take the utmost care to maintain our image as an indigenous company with our underserved clients as our number one concern.

Mission Statement:

Native Solutions is a company with firsthand knowledge and experience in high impact and innovative business solutions. We use technology as an enabler for growing and streamlining the core businesses of SMME's and secondary-economy enterprises

Our Competitive Edge:

We are addressing the challenges faced in many emerging markets to in order to achieve productivity in informal and secondary markets. The markets we operate in contain incredibly fast-growing cities.

Kasi Eats Services Timeline



Graeme Liron

My name is Graeme Liron and along with my partner Nick Spencer, we run a company called Paraffin Innovations. We are the distributors of a product called the IHarvey Paraffin Generator.

The product is a world first and was designed specifically to assist the rural areas and informal settlements, that have no electricity to have light in their homes.

We are eager to find the right avenue to get this product out to the less fortunate people in South Africa, as we firmly believe that it deserves to be used within the rural areas and poverty-stricken areas all over both SA and Africa.

We see potential within the CSR/CSI projects, possibly within your company or even as gifts as bonuses to your staff. Even the selling on to your staff is a possibility, especially for those without grid power. We hope you recognize what it means for people in all areas of the world, who don't have power at their disposal and live by candlelight at night, trying to cook while children are trying to study.

This product will give light safely and is able to charge a cell phone or Tablet and it only uses 1 litre to run for 29 hours. At 4 hours per night, it would run on a litre a week!

In September, the product was awarded "Best Invention of 2018" at the SA invention summit by Popular Mechanics, which is as you know, a very highly acclaimed and well-respected publication in SA. <http://reputationmatters.co.za/2018/10/01 /winning-inventors-sa-innovation-summit-2018 />

For you to better understand the product, I have attached 3 sets of information for you to look at that contain the product details and can hopefully give you a better understanding of what the product is all about.

- The IHarvey product information.
- The fire reports.
- The emissions report.

It is a paraffin generator, that can change people's lives, by bringing light into their home environment or allow outdoor activities to be enjoyed without the hassle of batteries, solar or heavy generators, out in the field.

I have listed the pertinent points that you can view and get a feel for what this amazing product does.

- It is a 5-volt thermoelectric system producing 1 amp/hour and is based on the Seebeck effect which creates power from 2 differing exotic base metals that are heated and cooled at the same time.
- It runs 3 x LED ,75-watt base mounted lamps which are included in the box. These have a 6m, 4m and a 2m lead to spread the light around a home.

- 1 of the lights has a lithium ion battery that once charged, can last for up to 5 hours without the generator.
- It has a USB port capable of charging a cell phone, tablet or a power bank, whilst running the 3 lights.
 - It runs on illuminating paraffin, diesel or Citronella oil.
 - Can run for 29 hours on 1 litre of fuel.
- It runs 4000 times cleaner than a paraffin lamp with emissions being 0.01 mg/m³/h whilst a normal paraffin lamp is 40 mg/m³/h (see emissions report).
- Has the lumens of 30 candles or 18 paraffin lamps.
- Has a slot for a mosquito pad to help eliminate health problems caused from mosquitos and subsequent Malaria.

The rest of the facts are contained in the fire and Emissions reports, which you can read at your leisure.

It was developed with 3 target markets in mind, namely-

- , The Informal sectors
- The camping and adventure sector
- The Emergency/Disaster relief services.

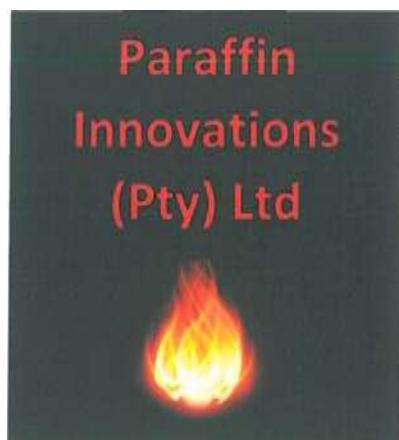
Best Regards,

Graeme Liron

Director

Cell : 082 946 2547

Email : graeme@paraffininnovations.co.za



Pilot Project: WASH Intervention at Ruo Emoh

Ruo Emoh is a subsidised housing development in Colorado Park, Mitchells Plain. Peoples Environmental Planning (PEP), in partnership with Isidima & Habitat for Humanity, have implemented a pilot on sustainable water management system in the community which has been in operation for 8 months. The system in place makes use of two different WASH interventions; a ground water source, and a grey water recycling system.

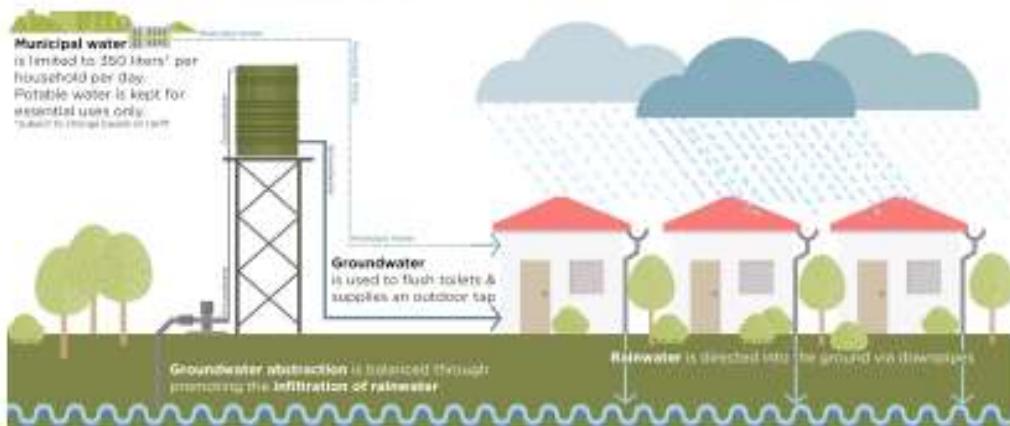


Diagram illustrating the Ground Water System at Ruo Emoh PEP 2018.

The Groundwater System makes use of a field of boreholes placed around the neighbourhood, which fill an elevated water tank. The pumped groundwater is used to flush the toilets in all 49 homes. This is able to save the community from flushing around 4500 litres of clean drinking water daily (based on an average family of 5, each flushing twice daily). In addition to the toilets, the ground water also supplies all the outside taps of the homes and can be used for washing cars, gardening and even washing machines.



Plaswall Construction
Collins Mothabela

PRD Logical Solutions (Pty)Ltd

845 Copper leaf estate ,Centurion
Pretoria Guateng,0157

Contact: Portia Mavhungu

Phone: +27 603570231

Email:

Website: www.prdlogicalsolutions.com



pro318prod317@gmail.com

Co-Founders, Management:

CEO: Portia Mavhungu

CTO: Darushna Chellan

CFO: IDC

Category: Med-tech

Year Founded: 2016

Year participated in GCIP: 2018

Number of Employees: 4

Amount and Type of Financing

Sought: 3.6 million Rands for commercialization and operations

Business Description: PRD LOGICAL SOLUTIONS is an innovation company that focuses on finding gaps in the market that play an integral part in everyday lives. Which is finding a challenge and solving the issue with innovative ideas that are affordable and available to every economic class and allowing everyone an equal a chance to face simple daily challenges without struggling..

Product/Market Fit: The para tube is a seating device that retro fits in to a wheel chair which has a built-in toilet and biodegradable bags allowing the individual to use the toilet without having to leave the toilet. We have Identified 4 hospitals as well as home individuals who have shown a high interest in the product.

Business Model: The market for such a product includes the medical industry, wheelchair manufacturers, public facilities like malls, shopping centres, etc. Initially the product will target the medical industry and the manufacturer itself. Once these markets are penetrated there are autonomous increases in brand confidence through the other fields. With market segmentation being at the heart of strategic marketing today, PRD Logical Solutions will carefully select its target markets to ensure a balanced and productive marketing approach.

Customers/LOI: Community Medical, NGO's from IDC, Life hospitals In south Africa, Kenyan Government

Management: Portia R Mavhungu (IT DIPLOMA, Bio-Science business accreditation)

Portia has managed to work close with CEO's from both ABSA and Outsurance in order to Understand how is it to run a successful business with company ethics and values.

Darushna Chellan (LLB Bachelors law student, Bio-Science business accreditation)

Darushna is Currently working at a law firm to gain experience and understanding in Law.

Technologies/Special Know-how: There is a PCT in place as well as trade mark and product design, The Novelty of the product has been confirmed by the Austrian patent office as there is not other product that uses the same functionality of The-PARA TUBE.

Markets: South Africans with disabilities constitute a sizable proportion of the population. As a developing country and given the legacy of apartheid, the position and status of disabled people in society is extremely heterogeneous, ranging from wealthy city dwellers who have access to a full range of assistance and other necessities to poor shack-dwellers who struggle for even the basic necessities of life. The national disability prevalence rate is 7,5% in South Africa. Disability is more prevalent among females compared to males (8,3% and 6,5% respectively). Persons with disabilities increase with

age. More than half (53.2%) of persons aged 85+PRD's mission is to offer its target market a wheelchair device that will dignify a user and empower them to be more independent along with creating a sustainable environment for future staff and customers

Competition: The owners are well aware of many other portable toilet units that have been developed to simplify the wheelchair user to travel to a conventional toilet facility i.e. a bathroom. However, such portable toilet units may still be difficult or challenging to use, as a wheelchair user is required to travel from his or her bed, chair, or wheelchair to the portable toilet unit in order to use it. The user may thus require the assistance of another person, which again is degrading and embarrassing. Further to the above the owners are aware of wheelchairs incorporating toilet facilities, such wheelchairs typically include a seat provided with an opening through which waste matter can pass, in use. A waste receiving container, such as a bag or a bucket, can be positioned below the seat for receiving the waste matter. These wheelchairs thus provide a "mobile" toilet and enable a user to discharge bodily waste while seated on his or her wheelchair, thereby obviating the need for the user to travel to a conventional toilet facility or to a portable toilet unit. While wheelchairs like this have proven to be beneficial to at least some wheelchair users, Portia in her own capacity, has found that such wheelchairs are difficult to use without assistance. In particular, it is difficult for a user to position, attach and/or remove the waste receiving container from below the seat, or to remove waste from the waste receiving container, without being assisted by another person. PRD Logical Solutions presently has a few competitive advantages other than strong backing and support from Egolibio, The Innovation Hub and TIA with various interventions. Firstly, as with current wheelchair users, a person has to either help him/herself lift off the chair and onto a toilet or include a waste bag below the chair. Out of experience both these are still very difficult to use without the help of a third party.

Funds Raised: (\$Amt, source) from venture capitalists, private investors, investment banks, personal funds, grants et al.

Gravity toilets vs vacuum toilets

	Traditional gravity toilets	Jets VC™
Need for gravity / slope	Yes	No
Litres of water per flush	6 to 19 litres	1 litre
Sewage per year per person	13 - 41 m³	2 m³
Hygiene	-	+
Pipe dimensions	110-150 mm	50-75 mm
Piping cost	High	Lower
Initial investment cost	Depends on type of project	Depends on type of project
Return on investment	-	+
Installation work advantages	-	+
Installation flexibility	Low	High
Cost of outdoor infrastructure	High	Low
Transport / pumping cost water in	High	Low
Transport / pumping cost sewage out	High	Low
Sewage treatment cost	High	Low
Separation of black and grey water	Not sustainable	Sustainable solutions
Use of blackwater for biogas	Not sustainable	Sustainable solutions





Sibayeni Metrofarming

- Sibayeni Metrofarming
- We manufacture Metrofarming technology infrastructure that allows us to produce from the ground up and produce crop vegetables for our local markets. Metrofarming is a DIY farming process that maximise land-space, save 90% irrigation water, Uses no pesticides nor herbicides, Environmentally friendly and cost effective as compared to our traditional farming.
- We conduct trainings for people interested in starting their own agribusinesses and schools to use our Metrofarming for practical agriculture lessons.
- We are on all social media pages as Sibayeni_Metrofarming
- Regards
- Ms Samkelisiwe Chunda
- Sibayeni Metrofarming
- Mobile 0797896567
- Email sibayeniyeep@gmail.com



Sibayeni Metrofarming
Farming Made Easy

What is most unique about SOTERIA THROWABLE fire extinguishers products?

1. Easy to use – no training required, even for children, the elderly and differently abled. Just throw SOTERIA into the fire!
2. 5 years shelf life – cost effectiveness per annum.
3. No annual maintenance needed – there are no parts that will rust or leak over time.
4. Eco friendly – non-hazardous, non-toxic, environmentally friendly chemicals.
5. Weighs only 500 grams

Every one of the above features are better than the conventional portable fire extinguisher.



How does SOTERIA THROWABLE fire extinguishers work?

When a fire occurs, Soteria Throwables are thrown directly into the fire. Upon impact, the ampoule will break or shatter, releasing our proprietary Soteria chemicals onto the flames. The chemicals react with the fire to produce extinguishing gases that snuff out the fire and cool down the embers to prevent the fire from reigniting.



For flammable liquid fires like petrol, kerosene, diesel (Class B type), the extinguishing solution suffocates the fire by layering itself on top of the fuel and cutting off the oxygen supply.

What size of fire can SOTERIA THROWABLE fire extinguishers handle?

Like all common 9KG, portable fire extinguishers, SOTERIA fire extinguishers are equipped to handle initial fires. SOTERIA Throwables can also be used to clear escape routes.



Just drop SOTERIA KITCHEN into burning pot
Fire is put out instantly!
Safe and eco-friendly

How does SOTERIA THROWABLE fire extinguishers Kitchen work?

When SOTERIA Kitchen sachet is placed into the fire, it will react to release its contents onto the burning grease or oil. The Soteria Kitchen sachet is engineered to unseal itself quickly without any explosion. The solution will spread itself across the surface of the fuel and suffocate it by cutting off the oxygen supply. The foam that is produced then reacts with the fuel to cool it down and prevent the fire from reigniting.



Executive Summary

Sustainability Professionals (PTY)LTD Reg No: K2015/128505/07

Louise Williamson CEO

Lovedale Farm 277 JU, Honeybird, Lows Creek, 1302

Mpumalanga, South Africa

Phone: +27 724368347

Email: louise@masheshastoves.com

Website: www.masheshastoves.com

Management:

MS Williamson: 15 years' project development & management

Key Advisors:

Dr. C Williamson, I. Macaulay,
F Weir, Technology innovation agency, Jurgens sheet metal.

Industry: Clean technology in the energy sector

Number of Employees: 9

Current Investors:

SPARK, Diageo, AEA

Compliance: Level 4 BEE

Business Description: We are a Social Enterprise that sells our uniquely designed energy-efficient stoves and fuel sources for mass and household cooking and heating, based on an intentional business response to an investigated need for indigenous innovation.

Business Background: 17 years' experience in rural enterprise demonstrated to the founder, Louise Williamson that community's need cheaper, healthier energy for cooking/heating. Through innovative re-engineering, she patented the "Mashesha cook-stove", and adopted a value chain for briquette production, from local biomass. This provides both an employment creation model that runs on social enterprise/co-operative lines as well as affordable, clean and healthier gender-responsive energy sources as per the SDGs

Problem/Solution: In S-Africa, 76% of the population is reliant on wood fuel to meet their daily energy requirement. Globally around 4.3 million people die prematurely due to household air pollution. In South Africa, 12000 schools rely on 66 000 tons of wood fuel at the cost of \$7million annually to comply with the constitutionally-driven Nutrition Programs and women employment. The cooks are exposed to smoke pollution and suffer lung and eye diseases. The collective process has negative social, environmental & economic implications. Our business is an integrated solution of employment-creation and actual/potential market penetration of the Mashesha stove which burns with a clean hot flame, halving the fuel load and cooking time. The alternative green energy source is complemented by novel briquette fuel production.

Products/Services: Our value chain is a combination of innovative production (Mashesha/briquettes) with low technology selling channels, suitable to African markets. Community/Women form SMEs/ co-operatives and sell through community channels. Corporate social investors (CSI) also invest in above initiatives. The buyers endorse an ecological, socio-cultural sensitive product meeting rural/low technology needs. The niche is the novel invention that has provided clean, stable energy for low-tech household and/or mass use in a culturally appropriate way.

Technologies/Special Know-how: Venture capital will value the combination of a tested, patented product with low tech market channels and customer reach that is culturally sensitive to African markets.

Markets: Donors/CSI to support Food/Nutrition Programs and gender-responsive employment creation; Community schemes & Individuals for cheap, culturally-appropriate energy and multiplier employment; retailers for African outdoor lifestyle and 'green' energy solutions.

Competition: Comparatives do not align to culturally sensitive/rural cooking (there is no like product for large-scale cooking that is affordable); the gasification patent renders other stoves uneconomical and unhealthy; Patented stoves and fuel sources with environmentally-focused training provide innovative commercialization.

Business Model and Distribution Channels: SME/co-operatives and business have been generated through website testimonials together with direct sales for CSI/Community sales. We have distribution channel partners set up through normative legal contracts. Stoves are fabricated with serial numbers and prices are fixed to avoid irregularities.



Waterless Sanitation



The Safe Containment of Faecal Matter Until Dry

" The ZerH₂O toilet can be implemented wherever compact, sealed and safe waterless sanitation is needed. Replacing Pit and Bucket toilets (Rudimentary Sanitation) with waterless DRY sanitation, is the quantum leap towards delivery of acceptable safe sanitation to a home of up to ten people. "

Our collaboration with all relevant stakeholders in the areas of Manufacturing, Infrastructure, Energy, Water- and Food Security; is the key to successful sustainability in every project community.

www.zerho.co.za



The Zerho Toilet is
Proudly South African.

*With the Zerho Toilet we (can)
Save Time; Save Money; and Put People First.*



Contact

Zerho Waste Management
(Pty) Ltd

Janice Whitehead

Mobile: +27 72 819 2060

E-mail: janice@zerho.co.za

Website: www.zerho.co.za

UTILISATION OF RECYCLED CRUSHED GLASS IN HOT-MX ASPHALT

Over the last few decades, the use of glass in road construction has been implemented by various countries in the international community. South Africa, however, who on average generates roughly 900 000 tonnes of domestic waste glass each year has made little use of this readily available raw material. More recently, with national policies mandating the reuse, recycling and minimisation of domestic waste materials, in addition with several economic and environmental benefits, it is expected that the use of alternative materials, e.g. recycled glass, in road construction will increase. Recycling waste glass for use as an alternative material in road applications will also contribute towards stimulating a regional secondary resources economy, with potential for industrial development and creation of sustainable jobs.



Figure1: Locally available recycled crushed glass available at glass recycling plants in Gauteng

The Council for Scientific and Industrial Research (CSIR) has investigated the engineering performance of Hot Mix Asphalt incorporating locally available recycled crushed glass for use in the wearing course of South African pavements. The study contributes to current research at the CSIR which aims to optimise the design, construction and maintenance of roads through the use of cost-effective, environmentally friendly and sustainable materials that include waste materials.

The use of the recycled crushed glass as a partial fine aggregate substitute in a conventional dense-graded asphalt mix, typically used in the surfacing course of asphalt pavements in South Africa, was investigated. From the investigations conducted, it was determined that the material is capable of substituting traditional fine aggregates that are typically used in South African asphalt mixes. The physical properties of the glass material that were established from the study met the standard criteria for traditional aggregates in South Africa. Additional properties that render the recycled crushed glass as a favourable material for use in asphalt mixes include high angularity, high reflectivity, low thermal conductivity, high degree of purity, consistent grading from the same source and no significant health and safety hazards associated with its handling.

Furthermore, it was concluded from laboratory testing that the glass-asphalt mix has the potential to out-perform the conventional asphalt mix with respect to permanent deformation. The glass-asphalt mix showed increased resistance to rutting due to the high angularity of the crushed glass material (See Figure 2). It was demonstrated that higher angularity increased the interlock between the crushed glass

particles and the constituent aggregates in the mix, providing the inter-particle friction required to resist permanent deformation. Additionally, the crushed glass material was treated with hydrated lime to improve the moisture susceptibility of the glass-asphalt mix to the acceptable standard criteria in South Africa.

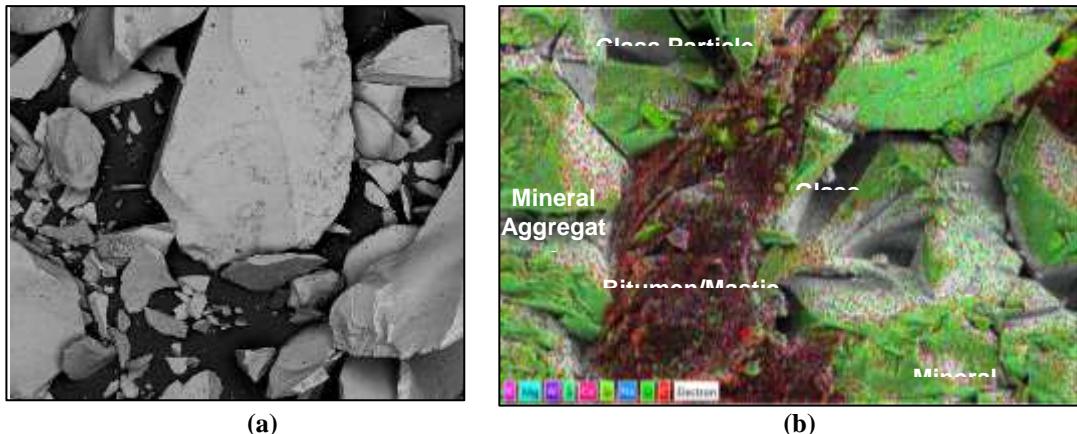


Figure 2: a) Angular recycled crushed glass and b) Glass-asphalt mix with recycled crushed glass

2. Amadrum,

3. Acid Mine Drainage,

4. SafeWaterAfrica,

5. Water purification system,

Focus on CSIR

CSIR focuses on fly ash-based geopolymers binders

The CSIR has developed cementitious binders that are free of ordinary Portland cement (OPC). The inventions are a family of fly ash-based geopolymers binders that have been used to make bricks, blocks and pavers on a laboratory scale.



Fly ash-based geopolymers binders are attractive alternatives to OPC for making building and construction materials and for the encapsulation of hazardous waste due to their high strength, low oxygen permeability, low shrinkage, low carbon emission, sulphate and acid-resisting properties.

The advantages of using fly ash-based binder over OPC include: much lower carbon footprint, higher durability and a lower production cost.

The fly ash-based binders are three-dimensional alumina-silicate materials formed by poly-condensation of alkali-activated alumina-silicate precursors at room temperature or at slightly elevated temperature and controlled humidity.

The aim is to produce concrete masonry units and paving blocks at sufficient quantities to demonstrate the commercial use of the binder.

The CSIR is in the process of establishing a pilot site at its Innovation Site (on the CSIR campus in Pretoria) to manufacture 5 000 stork bricks in eight hours.

In the long-term, CSIR researchers will investigate variables such as the effect of the type of aggregate, aggregate moisture content, colorants on binder performance and optimisation of binder-mix design in response to changes in chemical and physical conditions of the fly ash.

The research will lead to the development of a universal tool to be used for designing fly ash-based geopolymers binders.

Contact details:

Dr Joe Mapiravana

Principal researcher

Research group leader: Materials and Methods

Email: jmapiravana@csir.co.za

Focus on CSIR research

Production of metakaolin from kaolinitic clays using a vertical shaft kiln

For centuries, ordinary Portland Cement (OPC) has been used as the binder for concrete. However, the production of OPC is an energy intensive process that releases large amount of greenhouse gases, mainly CO₂.



Contact details:

Dr Joe Mapiravana | Principal researcher
Research group leader: Materials and methods
Tel: 012 841 3095 | Email: jmapiravana@csir.co.za

The CSIR has developed a low cost process for the production of a cement extender and replacement material called metakaolin (MK) - a dehydroxylated form of the clay mineral kaolinite.

The benefits of using MK over OPC include:

- lower carbon footprint;
- enhanced strength;
- higher durability;
- lower production cost; and
- cementitious material that is about 40% cheaper than OPCs.

MK replaces traditional cement extenders namely, fly-ash, ground granulated blast furnace slag and silica fume and can be used in OPC free geopolymers. MK was successfully produced using a coal-fired vertical shaft kiln (VSK).

Advantages of using VSK over other kilns include:

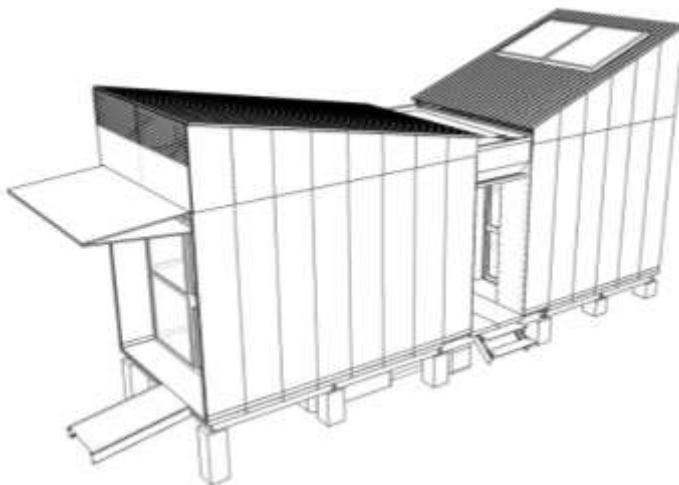
- simpler design;
- simpler operation; and
- low capital cost.

The CSIR envisages the setting up of these low cost MK production and cement blending plants in areas with deposits of kaolinitic clays such as Makana Local Municipality in Eastern Cape; Hammanskraal outside Pretoria; Zebediela in Limpopo, Northern Cape and Western Cape. MK can be used to make concrete, blocks, bricks and pavers. MK-based building materials cost less than OPC-based, hence, more houses can be built for less.

The next developmental milestone is the setting up of an industrial scale pilot plant to produce MK and cement blends at either Hammanskraal or Makana.

Concept Smart Clinic

The South African government and its partners are under pressure to deliver equitable, accessible, affordable, acceptable, sustainable and safe healthcare services to her people. Infrastructure has been identified as a key enabler, as well as a current frustrator. **What if you could rapidly deploy consulting room units where they are needed and immediately commence offering services?** What if the infrastructure provided was **fit-for-purpose** and not only accommodated clinical services, but helped to **streamline them?** This is the concept of the Concept Clinic.



A one-truck solution

Clinic modules will comprise a centrally manufactured set of parts, which can be deployed by truck to any site in South Africa, easily assembled with minimal site preparation - ready for service. The truck will contain all the necessary items for operation, even to support water, energy and security needs. All fittings, furnishings and essential equipment will be included. Units will comply with South African national norms and standards for healthcare infrastructure and, more importantly, the National Building Regulations: They will be legal, habitable, permanent structures. Although the units will be made with lightweight materials, indoor comfort performance will be engineered for the South African climate. Units can be incrementally added on over time to form a complex building. They will require relatively low maintenance; and can be demounted and removed from site at the end of its service life.

Value proposition

A number of rapidly deployable solutions have been sold to market in the healthcare sector, and have been met with negative response because they are seen as substandard, building performance does not usually yield indoor conditions within range, and although these solutions are often deployed as temporary, they remain permanent solutions. Very frequently the structures do not comply with National Building Regulations. Quality is highly variable and maintenance with bespoke systems can be challenging because of lack of specialised skills, materials and equipment needed. Conventional building and procurement methods remain the dominant approach to infrastructure delivery. These processes currently yield clinics at a cost of R5M to R10M per consulting room, including utilities and equipment. Innovative Building Technologies are currently delivering structures to site (without utilities or equipment) at R350,000 – R500,000 per unit. The aim of this project is to deliver a dependable quality structure at mid-range-cost, with a greatly simplified procurement path.

Transport technologies

The Innovation Bridge Portal is an online platform that aims to accelerate connections and collaboration within the National System of Innovation and encourage greater interaction between innovators, industry and government in support of the commercialisation of technologies.

The Innovation Bridge Portal attempts to accelerate collaboration by providing relevant information such as available technologies, innovation opportunities, support services and facilities, as well as tools.

The Innovation Bridge Portal is an initiative of the Department of Science and Technology.

Mandate

- Profile and market South African technology innovation competencies and products, both nationally and internationally.
- Facilitate access to funding and support for researchers and technology developers, and entrepreneurs working in the Science, Technology and Innovation space.
- Match researchers, technology developers and entrepreneurs with relevant partners.

What can the Innovation Bridge Portal do for me?

User	Value proposition
Science councils, universities, researchers and students	<ul style="list-style-type: none">• Market technologies to potential funders, investors and collaborators• Supplement marketing activities at no additional cost• Access a database of funding opportunities
Entrepreneurs	<ul style="list-style-type: none">• Access available technologies to consider acquiring, licensing, etc.• Access a database of funding opportunities
Government departments and initiatives	<ul style="list-style-type: none">• Access relevant technologies in response to South Africa's technological needs• Create awareness of Government procurement needs within the innovation space
Financial institutions (including venture capitalists)	<ul style="list-style-type: none">• Create awareness of available funding opportunities• Access technologies applicable to your investment portfolio
Private organisations (industry)	<ul style="list-style-type: none">• Access potential collaboration partners and technologies to further develop, license or take to market• Create awareness of industry challenges and needs
Service providers	<ul style="list-style-type: none">• Market services offered and available facilities• Access a pool of potential clients

Visit www.innovationbridge.info

STI4SHS— OFF THE WALL— NEIGHBORHOOD 4.0

Alternative building materials used in informal settlements in KwaZulu Natal



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ISU
National Research Foundation

Introduction

Informal settlements are an ongoing urban housing challenge in developing countries, South Africa included. Many marginalized urban poor, in a bid to resolving their housing needs have created 'informal' human settlements using minimal resources and inherent self-help knowledge, informed by indigenous practices. This poster presents finds from PhD research thesis and collaborative work with the ISULabantu research team www.isulabantu.org which has been ongoing since 2016.

Methodology

A qualitative research methodology was used. A selective sampling method was used and residents from three informal settlements (namely Havelock, KwaMathambo, and Quarry Road West) were interviewed regarding processes and their experiences in erecting their dwellings. Observations were also carried out to document the various materials found in the settlements

Structure of the dwelling

The findings showed that the dwellings were earth hugging and of ecological quality due to materials used for building the basic elements. Dwellings are mainly post and beam structures, infilled with various materials found freely in the environment





Residents reported sourcing materials from

the neighboring industrial environments, construction sites, factories. They constitute mainly waste materials found in the urban area. These are stored on the periphery of the settlement until ready for use. Preliminary works such as marking the stand, digging and leveling, preparing the collected materials. Assembling the dwelling is through self-help efforts often involving neighbors and other family members as presented in the table below.

gathering of building materials	collecting local materials	buying from 'informal sources'	buying from local sources	collecting local materials
preliminary works and finishing	digging, painting			
assembling by self-help	placing	fixing		

Materials used

Building materials used were mainly recycled from urban waste. It was observed that construction waste such as broken bricks, roof tiles, door and window frames were also used. Other materials used were natural resources such as *umhlabati* (mud).

Wall	Roof	Floor finish	Window	Window frame	Door
Corrugated sheets	uPlastiki (plastic)	uPlastiki	uPlastiki	Timber	Timber
Timber	cardboard	Brick	Glass		Glass
Umhlabathi (earth)	Corrugated sheets	Umhlabathi	Timber		
Water proofing		Carpet			
Glass		Concrete			
Stones					









Discussions

Building materials and their sources has been the focus of this poster. The findings showed that factory waste products were recycled by the economically marginalized living in informal settlements. Common complaints from the residents were regarding water proofing of the dwelling. This was as a result of inadequacy in levels for horizontal planes ie floors and roof, and the poor treatment of joints between the building components. The interior of the dwellings were susceptible to leaks, uncontrolled ventilation, and flooding creating an unhealthy dwelling space. The dwellings were often unstable, relying on support from neighboring units or trees and thus constituting human habitats that were a safety and health hazard.

However, a careful analysis of the materials and methods could turn the settlements into more livable environments. It emerged that indigenous building technologies were also attempted. Improving on this effort will require a recognition of the innovative attempts and collaborative effort between all actors.



The findings revealed active players in erecting a dwelling to be the 'first settlers', who invited others (often acquaintances from rural homes) and assistance in erecting the dwelling. It emerged that while material was sourced from neighboring factories there was only a silent relationship between such organizations and the settlements. Other emerging relationships were with NGOs, researchers and interested built environment professionals. Tension between the neighbors and local authorities were also noted. The tense relationships contributed to the poor quality of the dwellings often erected in haste.

Conclusions and Recommendations

The dwelling units were an assemblage of recycled irregular pieces of materials available in the environs. These materials are often freely obtained or acquired over time with minimal income earned doing menial jobs.

These findings become relevant in learning from the efforts of the informal settlement dwellers. Their efforts need for the need to develop innovative building materials and systems by recycling '*urban waste*' to provide affordable modular building components. This should be integrated into an incremental *in-situ upgrading process*.

University of Pretoria

Nadia Ghillino

University of Witwatersrand

Bongokuhle Mabuya

Public lecture series The Neighbourhood Planning and Design Guide

T Kruger

The purpose of the presentation was to introduce the forthcoming publication *The Neighbourhood Planning and Design Guide* ("the Guide") and briefly describe some of its characteristics and key elements. *The Guide* is a comprehensively updated and revised version of its predecessor, *the Guidelines for Human Settlement Planning and Design* (Red Book) published in 2000.

2019 Latest Red *The Neighbourhood Planning and Design Guide*



The development of *the Guide* was initiated, coordinated and funded by the National Department of Human Settlements. The CSIR was responsible for the management of the development process and the preparation of the final document. A wide range of stakeholders was consulted and numerous individuals and organisations contributed to the development of content.

The Guide supports the development of sustainable human settlements by providing practical information related to the planning and design of the services and infrastructure typically provided as part of a neighbourhood development project, as neighbourhoods may be regarded as the 'building blocks' of settlements. Consistent with the Integrated Urban Development Framework (IUDF) (p.38), neighbourhoods must differ in nature and character, as the country has many types of cities and towns, with different roles and requirements. Therefore the vision has to be interpreted in response to the context and pursued in a differentiated and locally relevant way.

The application of *the Guide* should ultimately result in the delivery of infrastructure and services that are effective and efficient and that contribute to the creation of sustainable human settlements: where sustainable human settlements are liveable, vibrant, diverse, resilient and valued; they are socially integrated, economically inclusive places where residents feel safe and in which economic growth and social development are in balance with the carrying capacity of the natural systems on which they depend for their existence.

The Guide supports the development of sustainable human settlements by providing practical information related to the planning and design of the services and infrastructure typically provided as part of a neighbourhood development project. Persistent spatial characteristics of South African settlements are sprawl, fragmentation and inequality, with:

- An unequal distribution of facilities
- Lack of adequate infrastructure
- Long travelling distances
- Extreme levels of poverty
- Inequality and income disparity
- Informal economy
- Crime (including high levels of violent crime)

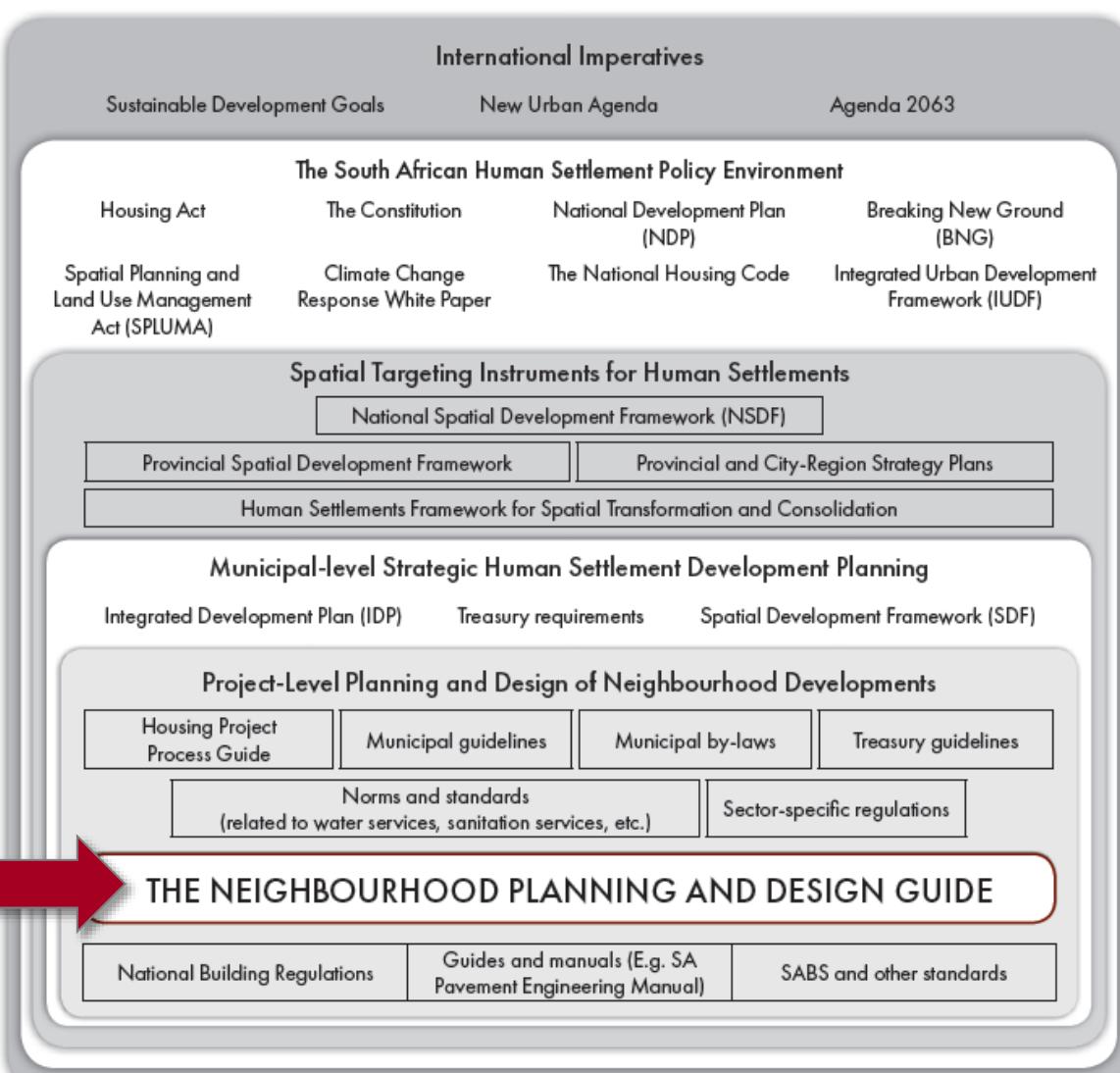
The Guide is aimed at neighbourhood level services and infrastructure. For the most part it does not include detailed site and building level information. Bulk services and amenities - for example main water supply pipelines, outfall sewers, treatment works, landfills, freeways and so forth - are considered beyond the scope of *the Guide*.

The Guide targets built environment practitioners, those involved in the planning and design of human settlements from both the private and public sectors, especially those at municipal level, as follows:

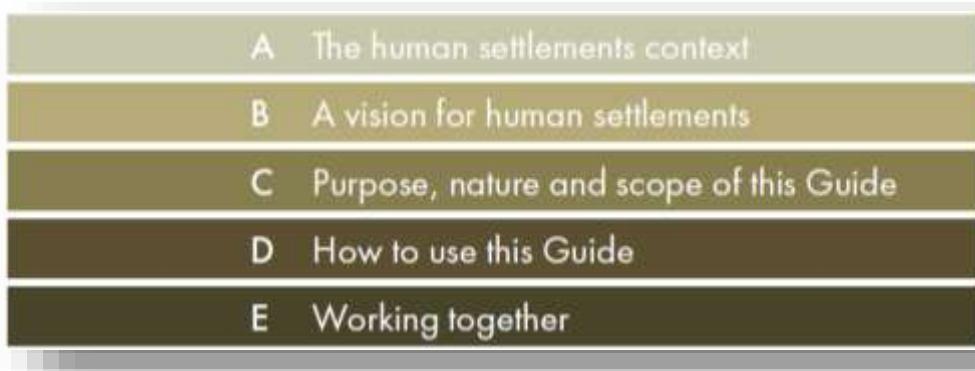
- Built environment professionals
 - engineers (including civil, transportation and electrical)
 - town and regional planners
 - architects
 - landscape architects
 - urban planners
 - urban designers
- Decision-makers and influencers, and those who are required to make policy decisions, including local government councillors
- Active citizens and community groups involved in people-driven housing development initiatives
- Residents (communities) - the information provided will empower residents and enable them to better understand the consequences of decisions related to the provision of services and infrastructure.
- Tertiary institutions

In general, guidelines are intended to assist decision-making, whereas standards are normally considered as measurable, enforceable limits. *The Guide* is not a standard or regulation and hence not prescriptive. They require interpretation informed by the application context. Judgement should always be exercised based on the actual circumstances. *The Guide* is not a substitute for professional or practical experience and it recognises the importance of professional responsibility where applicable.

A fundamental principle to keep in mind is collaboration, and, linked to it, effective communication. Since *The Guide* is aimed at project-level decision-making, specific attention should be paid to related guidelines, regulations, codes, norms and standards within the development process. *The Guide*, seated within the development planning process, is illustrated below.



The Guide is set out in a number of parts. *Part I : Setting the scene*, provides background information that frames the environment within which the Guide will be applied. Key global trends and challenges (climate change, informality) and international imperatives (SDGs, New Urban Agenda etc.) are identified.



Part II: Planning and design guidelines provides guidelines dealing with the planning and design of services and infrastructure, where “planning” entails making informed decisions regarding the type or level of service to be provided, and choosing the most appropriate option based on a thorough understanding of the context within which the planned development will be implemented. This is considered as distinct from “design” which addresses physical design of the options selected (technology / system).

F	Neighbourhood layout and structure
G	Public open space
H	Housing and social facilities
I	Transportation and road pavements
J	Water supply
K	Sanitation
L	Stormwater
M	Solid waste management
N	Electrical energy
O	Cross-cutting issues
	Planning and designing safe communities
	Universal design

A brief overview of what is contained in *The Guide* is presented below. Aspects that are addressed on the **neighbourhood layout and structure**:

- Streets
- Layout permeability
- Linkages to the surrounding area
- Street blocks
- Subdivision of plots
- Densities
- Integration of engineering infrastructure and layout design
- Land use
- Networks of public open space

Key objectives of **public open space** were identified as the need to conserve and protect the natural environment; assimilate open space into the surrounding neighbourhood, promote accessibility for all and respond to users' needs. Aspects that are addressed:

- Edges and interfaces
- Access and movement
- Surfaces and vegetation

- Public furniture

Key objectives of **housing and social facilities** were identified as the need to provide a range of dwelling types and tenure options, to allow for changing needs and conditions, to use housing and social facilities to structure neighbourhoods and to ensure housing and social facilities can be accessed by all. Aspects that are addressed:

- Factors to consider when choosing housing types
- Clustering of social facilities
- The equitable provision and distribution of social facilities
- Locating housing and social facilities in a neighbourhood

Key objectives of **transport and roads** were identified as the need to improve access and mobility for all, enhance safety and security, minimise environmental impact, support economic activities, accommodate the needs of all users and ensure quality and reliability. Aspects that are addressed:

- Geometric design considerations
- Structural design and pavement material selection

Key objectives of neighbourhood **water supply** were identified as the need to provide regenerative water services, create water sensitive neighbourhoods, promotion of integrated management of water and enabling water-wise communities. Aspects that are addressed:

- Water demand management
- Water sources and quality
- Water treatment and distribution infrastructure
- Infrastructure materials

Key objectives of **sanitation** is that the provisions are sufficient, safe, acceptable, physically accessible and affordable. Aspects that are addressed:

- Collection, storage/treatment and conveyance infrastructure
- Sewage flow calculation
- Hydraulic design for waterborne sanitation systems
- Greywater management systems

Key objectives of **stormwater** are the need to minimise the threat of flooding, protect receiving water bodies, preserve biodiversity and to promote the multi-functional use of stormwater management systems and the use of the stormwater. Aspects that are addressed:

- Modelling criteria for design of stormwater systems
- Sustainable Drainage Systems (SuDS)
- Flood and erosion protection

Key objectives of **solid waste management** are the need to lower the risk to human health, minimise adverse impacts on the environment, grow the waste sector's contribution to the economy and contribute to creating a better quality of life for all. Aspects that are addressed:

- Receptacles and storage at point of generation
- Transport of solid waste
- Solid waste management facilities

Key objectives of **electrical energy** are the need to promote energy security through diversity of electricity supply, ensure energy equity by supporting access to affordable electricity services, support sustainability by implementing energy systems that minimise negative impacts on the environment and people. Aspects that are addressed:

- Demand forecasting
- Small-scale embedded generation
- Microgrids

Cross-cutting issues of *The Guide* discuss principles of crime prevention through environmental design, universal design, and universal access.

The Guide will only make a tangible difference if it is applied in practice. *The Guide* could assist with the development of the terms of reference to solicit proposals from developers and all associated built environment professionals; the evaluation of proposals submitted; identifying appropriate levels of service and infrastructure options given the context within which the project is being implemented and the planning and design of the services and infrastructure chosen for the particular project.

The success of a development project is dependent on sound decision-making during all phases of the project. Well-informed decisions need to be made during the early stages of a project. In particular, the location of the project and the characteristics of the land to be developed should be considered carefully.

The success of *the Guide* will depend on the integration of the different aspects addressed in the Guide when applying the guidelines in an actual development project. Cognisance should be taken of a range of acts, policies, frameworks and strategies in play. When decisions are taken about one aspect of the proposed development, the implications these decisions may have on other aspects should be carefully considered.

Upon delivery of the public lecture on *The Guide* at the Off-the-Wall Technology Showcase event, a delegate from the National Department of Human Settlements observed that the STI 4 SHS Roadmap project should systematically review *The Neighbourhood Planning and Design Guide* with a view to identifying emerging opportunities for innovation.

The Agrément certification process

L Makwedini

Agrément SA is a statutory body that supports and promotes innovation and technology development in the construction industry.

Mandate: Provide assurance of fitness-for-purpose of non-standard construction products and systems by carrying out testing, assessing, confirmation and certification through a comprehensive independent and objective assessment.

Objective: To provide re-assurance of the fitness-for-purpose of construction products, systems, materials which are not covered by SANS Standards or codes of practice.

Agrément certificates can be used to demonstrate compliance with regulations, as specified in the certificate. Certificates facilitate acceptance and/or approval by:

- designers and specifiers
- regulatory authorities
- Government & community-support organisations
- financial institutions.

Agrément SA encourages the use of new materials in construction; new ways or methods of applying 'traditional' materials; improvements in designs to enhance functionality of construction materials and systems; system design (e.g. designing for energy efficiency); performance based design – fit-for-purpose

Agrément South Africa's directory of current certificates is widely distributed to building professionals, local authorities and others. Copies of all certificate extracts are readily available through the Agrément web site (www.agrement.co.za). Agrément South Africa's identification symbol appears on products covered by a certificate.

Agrément certification supports the certificate holder's confidence in the technical merits of the product.

Certificates are technical documents that:

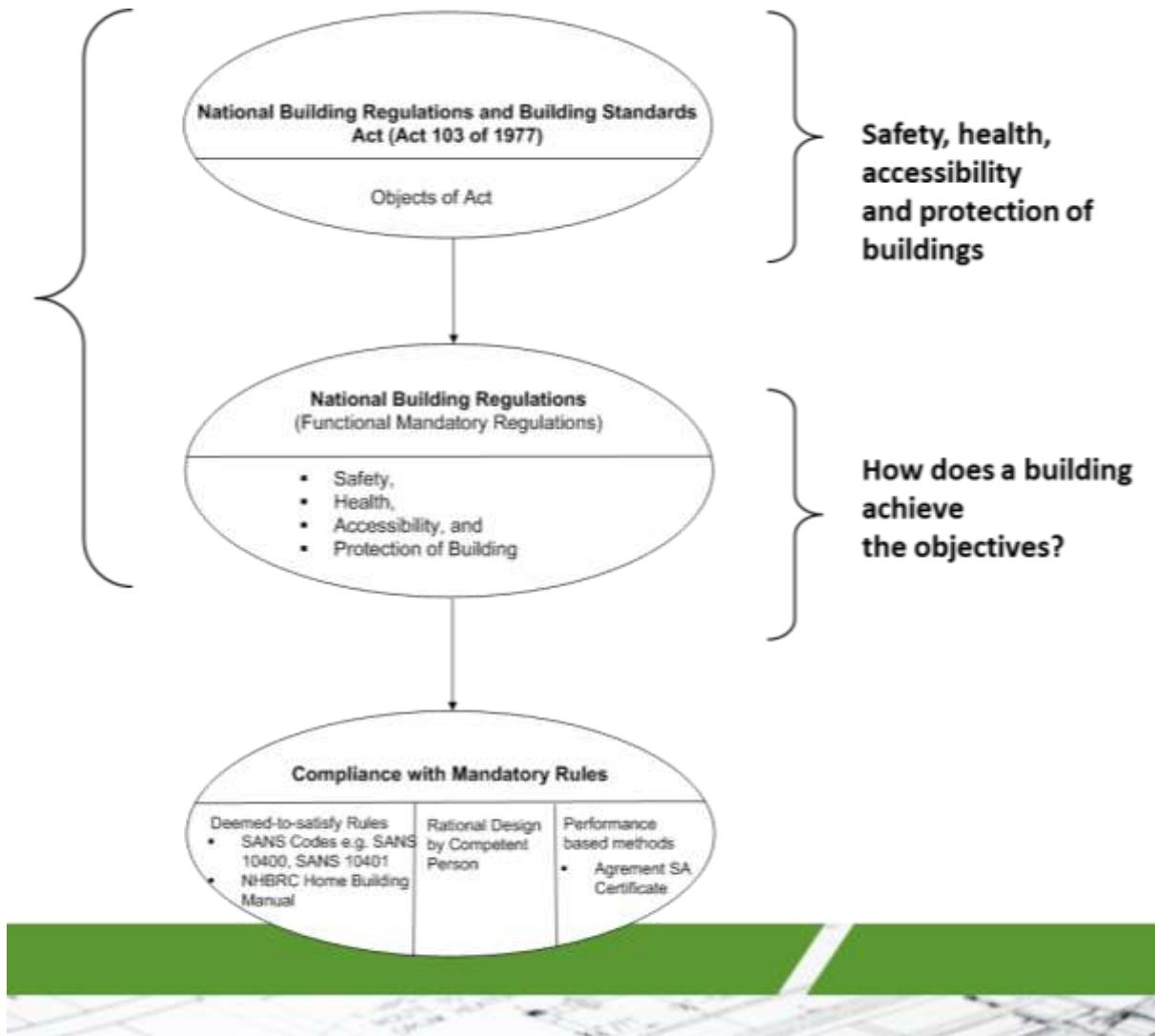
- give the uses for which the product or system has been assessed to be fit;
- summarise the levels of performance that may be expected;
- list the precautions that must be taken when using the product or system if the assessed performance is to be attained.
- contain authoritative assessments of product or system performance.

Agrément certificates are only granted to applicants who have implemented an approved quality management system. Additional information that may be revealed during the assessment programme may lead to further product development. Agrément South Africa is a founding member of the World Federation of Technical Assessment Organisations (WFTAO). WFTAO² is a worldwide network for coordinating and facilitating the technical assessment of innovation in the construction field.

Agrément performance concept is as follows:

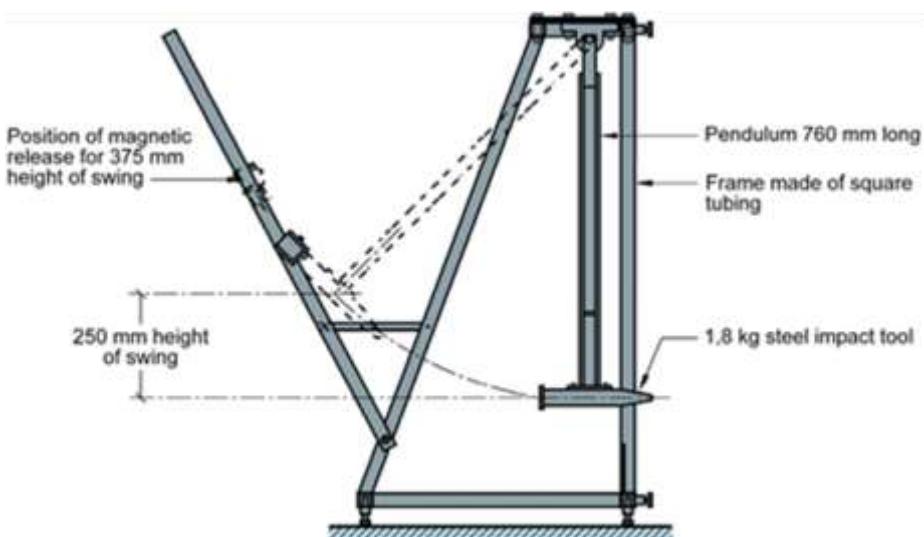
- No standards exist
- Develop performance criteria
- Develop suitable test methods
- Measure actual performance
- Criteria for local conditions developed by Experts team
- Holistic technical assessment and evaluation process

² WFTAO currently has 24 members from 22 countries across the global market.



The schematic provided above shows various levels of compliance which can be considered by Agrément in its assessment. Typically the assessment will consider the following attributes:

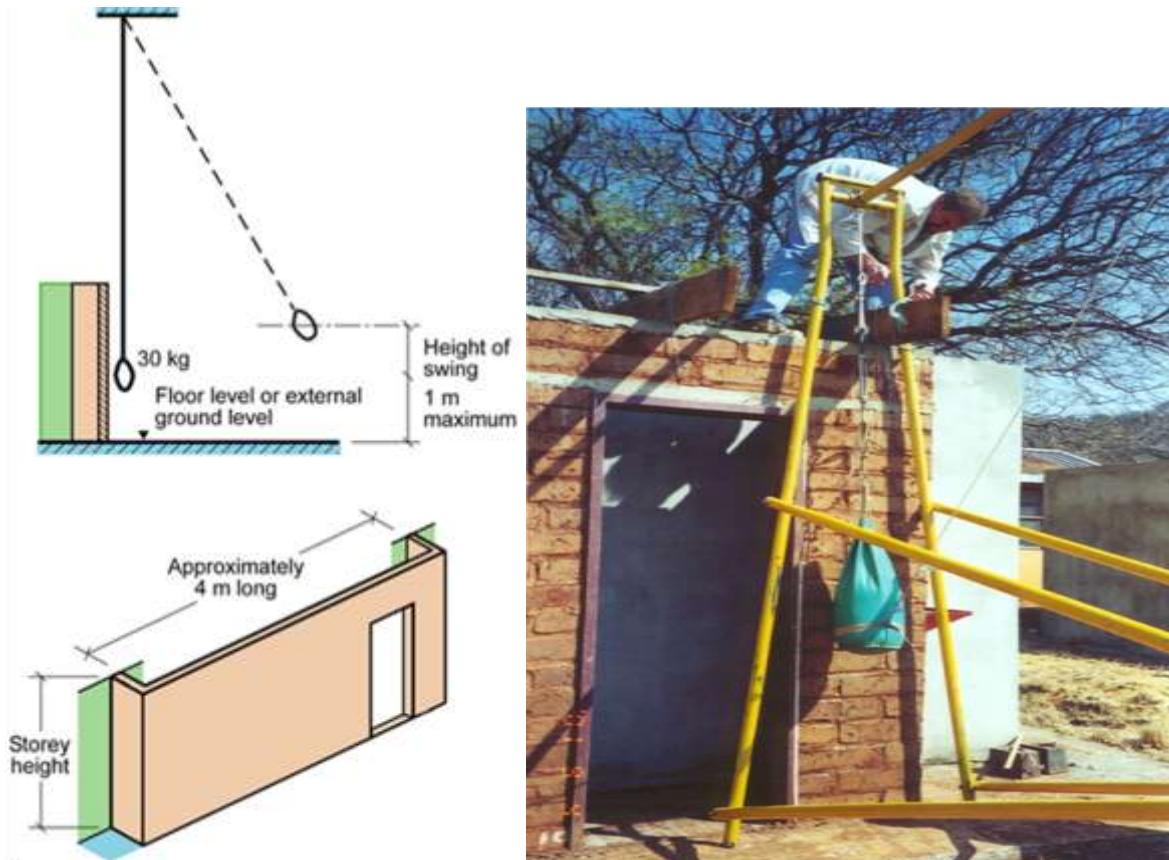
- structural strength and stability
- performance in relation to fire
- resistance to water penetration and rising damp
- durability
- thermal, condensation and energy performance
- acoustic performance
- quality management system



Hard-body impact assessments are conducted to ensure structure strength of products with the aid of the rig pictured above and below.

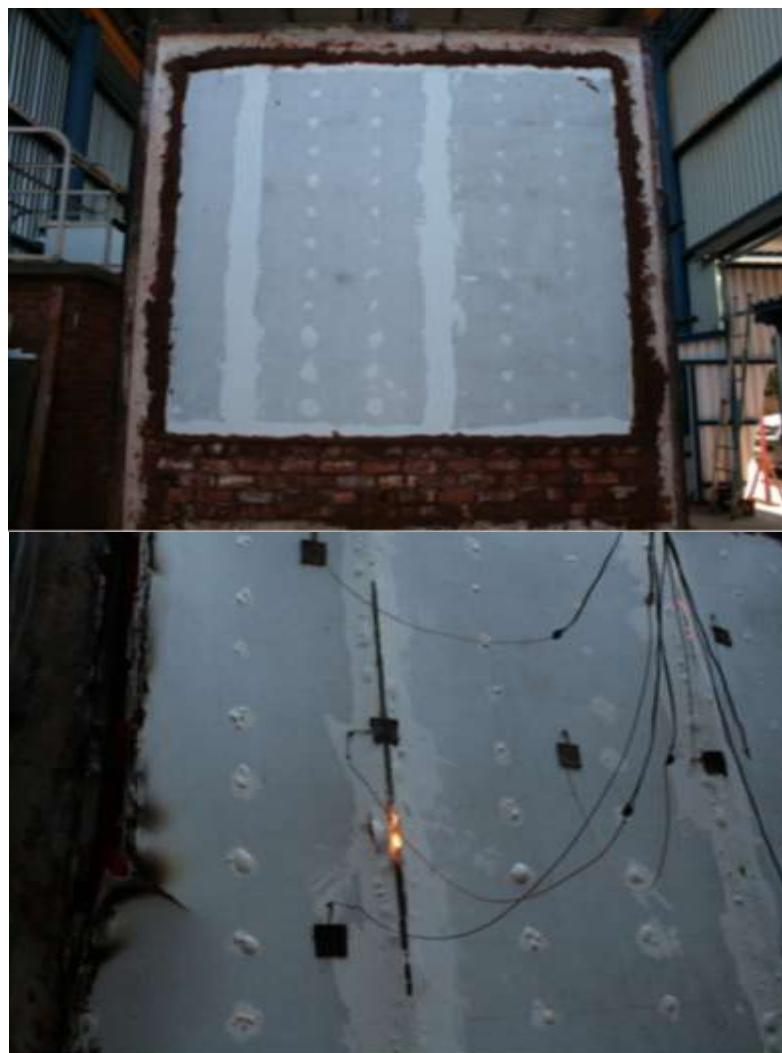


Soft-body impact assessments are conducted to ensure structure strength of products with the aid of the equipment pictured below.





Water penetration testing is performed as shown above, and fire testing is done as shown below.





Durability is tested by means of image UV 1100H. Above is a comparison of an aged sample (left) and an un-aged sample (right), showing lightening.

The quality management system assessment is conducted in accordance with ISO 9001 and covers:

- factory production and site installation
- approved installers scheme or Licensees
- all certificates holders are visited at least once annually
- three year validity review

Agrément certificates contain details of the certificate holder; information on subject and use of the product; a summary of the assessment carried out; conditions of certification; a technical description and technical drawings. There are five key steps in the Agrément Certification process:

- Application for certification
 - Initial screening of applicant by Agrément SA
- Evaluation / Assessment Offer
 - Programme of assessment by experts
 - Acceptance of offer
- Assessment
 - Assessment by technical experts
 - Use of independent testing laboratories
- Certification
 - Approval by the Technical Committee (TECO)
- Post certification & quality monitoring
 - Agrément SA

Typical characteristics of Agrément certified systems are that they are healthy and safe with demonstrated durability, resistance to water penetration and rising damp, thermal comfort, structural strength and stability, and behaviour in fire. They generally exhibit efficient utilisation of resources (materials and labour), and have energy-saving properties. IBTs may enhance skills and capacity development, may make use of or reduce need for unskilled labour, may result in increased speed of construction when compared with conventional materials and techniques.

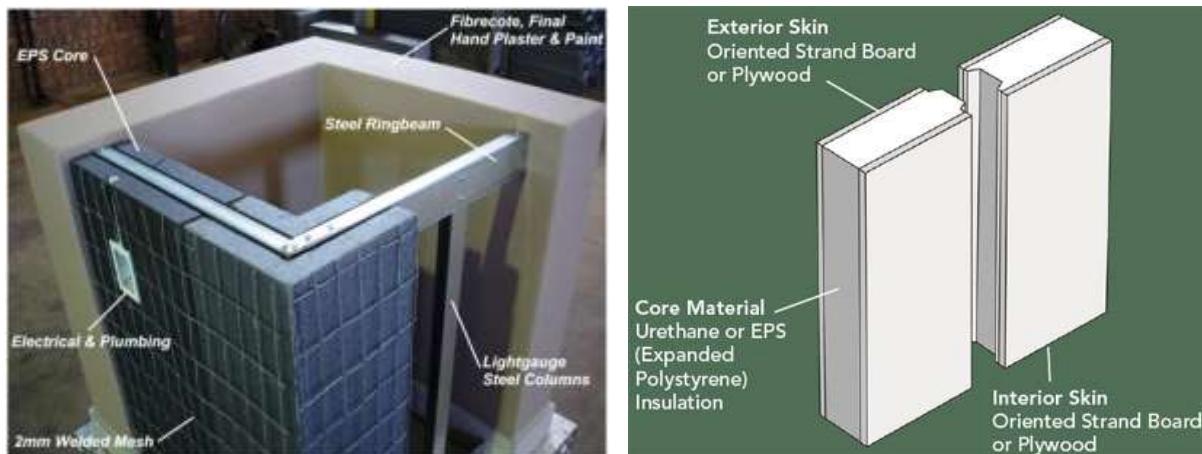
To date Agrément have issued approximately 660 certificates. There is a widespread use of several Agrément certificated products and an increasing acceptance of innovative products and building systems. There is growing awareness and visibility of innovative technologies. Agrément enjoys an international standing and recognition.

In conclusion, Agrément SA will continue to contribute towards Sustainable Human Settlements through diverse innovative products. It is committed to service delivery and accountability in accordance with its Mandate. Together we will deliver improved quality construction materials and buildings systems.

The implementation of innovative building technology projects

L van Wyk

Innovative Building Technologies (IBTs) are non-standard construction-related systems or products for which no national standard or code of practice exists, for use in the construction industry. Examples are shown below.



The public lecture covered the following topics:

- What are IBTs?
- How do I know it is fit for purpose?
- Do IBTs meet the requirements of the National Building Regulations?
- Are there different types of IBTs?
- How well do IBTs perform?
- Are IBTs cheaper?
- So what is the value proposition?
- How do I procure IBTs?
- How do I implement an IBT project?

Compliance with the functional requirements of the National Building regulations (NBR) may be demonstrated by:

- Adhering to all prescriptive requirements of South African National Standard (SANS) 10400,
- Appointing a competent person to carry out a rational design in terms of SANS 10400,
- Adhering to the requirement of a valid Agrément certificate, or
- Appointing a competent person who satisfies sub-regulation (1) in terms of sub-regulation (1)(b)(ii) of SANS 10400 to demonstrate, or to predict with certainty, to the satisfaction of the local authority, that the non-standard systems, product or material has an equivalent or superior performance to that required of similar subjects in SANS 10400 (equivalency).

Certification is undertaken by Agrément South Africa. Certificates indicate which regulations are deemed to be satisfied, as well as the uses for which the subject is considered suitable. An example is shown below.

Table 1: Safety and health

Aspects of performance	Opinion of Agrément South Africa	National Building Regulations satisfied
Fitness-for-purpose of materials used	The materials described in Part 3 meet the requirements of the regulations.	A13(1)(a) <i>Materials</i>
Behaviour in fire	<p>Behavior in fire will be satisfactory in Imison 3 buildings where the different wall types are used in the positions indicated in Part 3.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>SANS 10400 <i>The application of the National Building Regulations</i></p> </div>	<p>K4. <i>Walls</i> J1(1)b. <i>Floors</i> T1(1)(b) and T1(1)(c). Insofar as the walls are concerned, T1(1)(d) is satisfied. Comments made in Supplement to certificates must be taken into account when building plans are scrutinized by local authorities to check compliance with Regulations T1(1)(a), T1(1)(d) with regard to spread of smoke, and T1(1)(e). Deemed-to-satisfy rules TT5.1(c) and TT5.2(c) of Section 3 of SANS 10400 have been met. With regard to safety distances, external walls are classified as non combustible as defined in deemed-to-satisfy rule TT2.1 (a) of section 3 of SANS 10400 and the safety distances as set out in the relevant rules of Part T can therefore be applied. External walls have a fire resistance rating of 30 minutes and occupancy separating walls 60 minutes. The first floor construction is assessed as having a fire resistance rating of 30 minutes.</p>
Structural performance	Satisfactory, provided the requirements set out in Part 3 are adhered to.	<p>J1(1) <i>Floors</i> K1, K3, K4 <i>Walls</i> Regulations B1(1) and (2) are deemed to be satisfied. The structural design and erection of each building is the responsibility of a professional engineer or approved competent person and deemed-to-satisfy rule BB4 of SANS 10400 is applicable. Regulation H1(1), <i>Foundations</i>, are deemed to be satisfied as follows:</p> <ul style="list-style-type: none"> • on non-problematic soils; • all foundations are designed by a professional engineer and deemed-to-satisfy rule HH1(a) applies.
Water penetration and rising damp	Satisfactory. Imison 3 Building System buildings meet Agrément South Africa's criteria for resistance to rainwater penetration and rising damp throughout South Africa.	<p>K2 <i>Walls</i> J1(2) J1(4) <i>Floors</i></p>

When selecting IBTs, the logistics of supply to site from the point of manufacture is an important consideration. The table below of Agrément Certificate holders in South Africa shows that geographic regions have very unique availability of IBTs. Cost of delivery to site can be a significant consideration, varies depending on the distance from supply and some IBT products have very specialised transport, delivery and storage requirements.

Provinces	Systems (83)	Ownership
Gauteng	40	SA
North West	0	SA
Free State	1	SA
EC	2	SA
WC	16	SA
Mpumalanga	0	SA
Limpopo	1	SA
KZN	6	SA
Northern Cape	1	SA
Non-South African	4	Non-SA

A generic classification of IBT types is shown below.





An example of IBTs is in the use of light-steel framing technology. Hot-dip galvanised sheet is produced on continuous zinc coating lines from either cold rolled thicknesses range from 0.27 to >2.0 mm) or hot rolled (thickness 2.01 mm to 3.0 mm) steel substrate. Cladding is generally cement fibre externally and gypsum board internally. Insulation is generally mineral wool. Light-steel framing technology is commonly used internationally and locally, as per the example below.





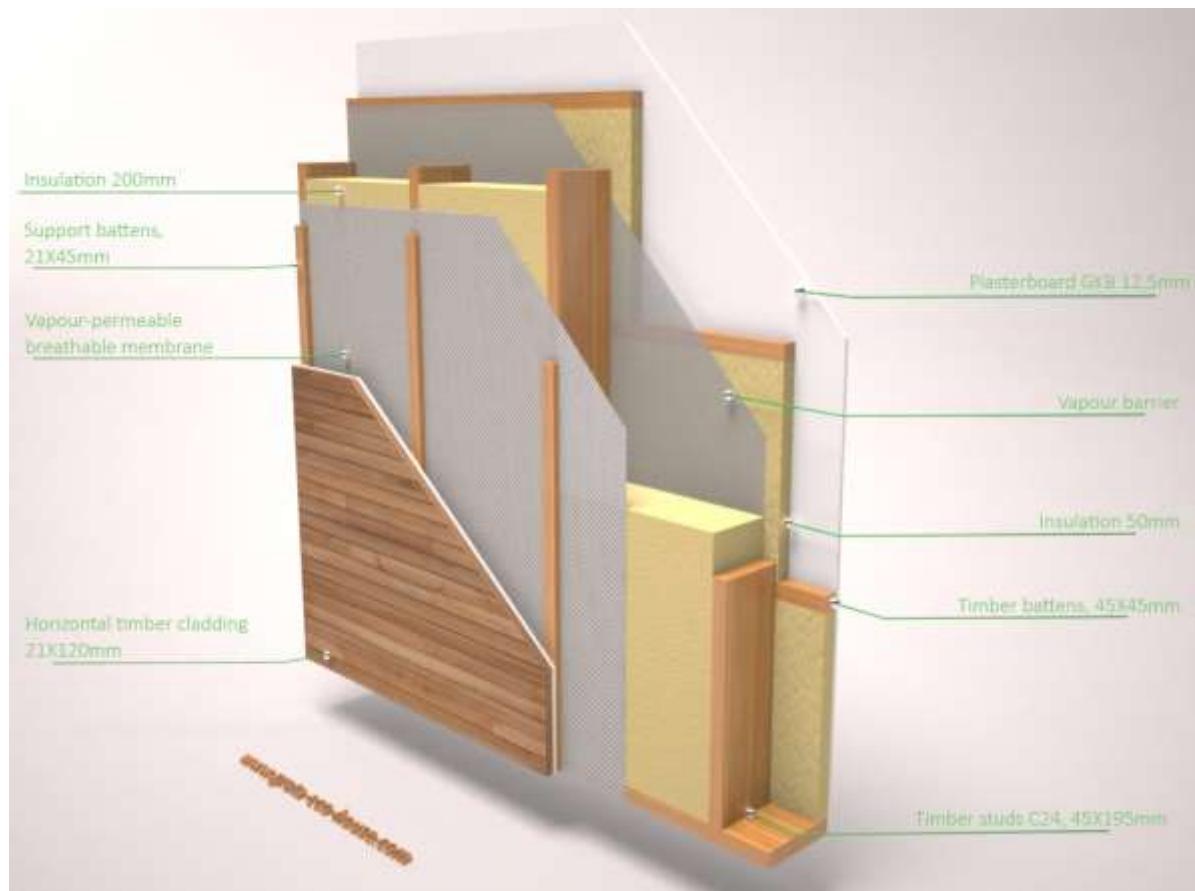
A structurally insulated panel is a form of sandwich structured composite panel, consisting of an insulating layer of rigid core sandwiched between two layers of structural board. An example is pictured above. The board can be sheet metal, plywood, cement, magnesium oxide (MgO) or oriented strand board (OSB) and the core either expanded polystyrene foam (EPS), extruded polystyrene foam (XPS), polyisocyanurate foam, polyurethane foam or composite honeycomb (HSC). A partially completed building is pictured below.





Insulating concrete formwork (ICF) is a system of formwork for reinforced concrete usually made with a rigid thermal insulation that stays in place as a permanent substrate. The forms are dry-stacked (without mortar) and filled with concrete. Zegi ICF, is an Australian example, pictured below.





Timber framing uses timber sections in the 5 to 25 cm range. Timber sections are joined either with nails or other mechanical fasteners, or traditional mortise and tenon or more complex joints that are usually fastened with wooden pegs. Sections can also be joined with steel joinery such as gusset plates.

The frames are clad usually with cement fibre boards externally and gypsum board internally. Insulation is usually mineral fibre. An example of timber-frame technology is pictured below.





Insulated Concrete Composite (ICC) comprises a galvanised light gauge, cold rolled structural steel frame, core infill panels made up of expanded polystyrene (EPS) with a density of 16 kg/m and galvanised steel reinforcing mesh cladding to both sides of the wall panel with alkali resistant woven fibreglass reinforcing mat to both sides of the wall panel and spray applied fibre reinforced plaster 25 mm thick. An ICC in progress is pictured above, with a completed building pictured below.





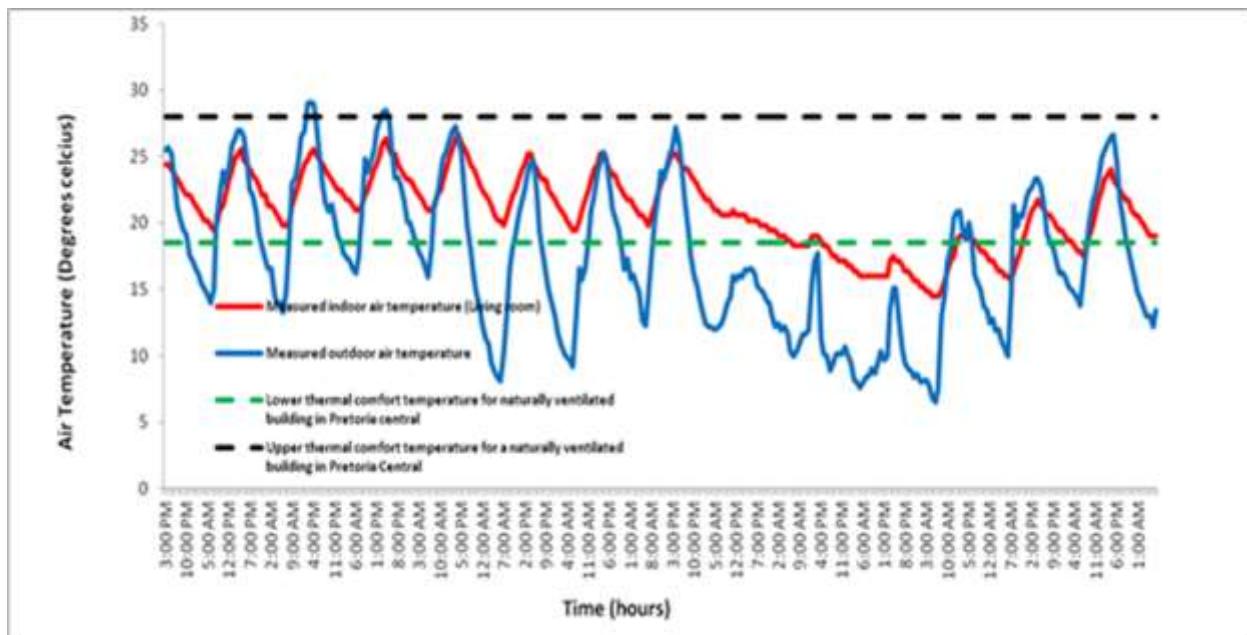
Precast concrete sandwich panels are generally 200 mm thick consisting of two skins of concrete sandwiching high R-value insulating foam. Pictured above is a construction in progress, with a completed building shown below.



- IBTs reduce cost (about 41% on average) depending on type and location
- IBTs reduces time (up to 50% in SA) depending on type and location
- IBTs out-perform conventional brick with respect to insulation values
- IBTs on schools reduces construction cost by up to R2,749/sq.m. (from R7,581 to R4,832)
- IBTs on student residences reduces per bed cost by up to R44,146 offering a R8.8bn saving on the 200,000 bed backlog
- IBTs can act as an agent of construction industry reform (support industrial development strategy, local raw material beneficiation, decent jobs, green economy)
- Innovation drives construction industry economic performance.

Generic Type	U-value (W/m ² .K)
Light steel frame	0.15 – 0.35
Structural insulated panel	0.10 – 0.26
Insulated concrete form (ICF)	0.11 – 0.30
Timber frame	0.10 – 0.20
Insulated concrete composite (ICC)	0.20
Precast concrete sandwich panel	0.04 – 0.18
Aerated Autoclaved Concrete	0.85
Solid double brick	2.23
Cavity wall, no insulation	1.50
Insulated cavity brick wall	0.18
Single glazing	4.8 – 5.8
Double glazing	1.2 – 3.7

IBT performance can be benchmarked against and compare favourably to conventional construction materials and technologies, as shown in the table on thermal transmittance above, as well as the thermal comfort studies shown below.



Case studies shown in the table below have found that the use of IBTs can result in cost reductions.

School	Cost standard	Cost MMC	Saving (%)
Nomkolo koto	15,055,595.34	9,880,769.54	42
Pakamani	12,441,073.96	8,071,759.29	39
Gulandoda	7,341,379.28	6,289,033.20	27
Willowvale	13,108,111.10	10,734,341.08	28
Nduku	11,426,995.95	6,079,474.94	55
Hlwahlwazi	23,043,179.24	9,813,586.21	57
Mgwili	15,250,697.77	6,165,926.21	60
Ntlangano	17,756,497.39	8,719,948.71	51
Rwantsana	18,532,000.00	9,485,024.00	49

The following steps should be taken to procure IBTs:

- Identify the proposed use
 - School, clinic, etc.
- Identify the required performance characteristics
 - Insulation value
 - Thermal comfort
 - Maintenance
 - Acoustic
 - Condensation (if applicable)
- Select the generic type(s) from above
- Draw up the performance specification for inclusion in tender documentation
- Appoint professional service provider
 - Define Scope of Works based on conditions of certificate
 - Architect does not do construction design
 - Structural engineer does not do structural design
- Professional service providers prepare concept documentation
- Quantity Surveyor prepares a Bill of Rates
- Go out for main contractor tender on Bill of Rates
- Appoint main contractor as either IBT main contractor or IBT subcontractor
- Prepare construction documentation
- Main contractor does system adjustments to concept design
 - Includes Quality Management Control document
 - Register project with cidb and Agrément South Africa
- Execute contract'

Some successfully completed Southern African IBT projects are pictured below. Clockwise from top left Athletes village, Maputo; student housing, Tygerberg Hospital; housing project, Cape Town; Hatfield Park Street Studios, Pretoria.



Pitching sessions

As part of the NEIGHBOURHOOD 4.0 – Off-the-Wall Technology Showcase event, pitching sessions were held for participating entrepreneurs, students, innovators, emerging and established industries to showcase ideas and technologies which could improve our houses and neighbourhoods of the future. STI 4 SHS Roadmap project partners were not eligible to pitch³. Judges declared interest and were not permitted input into decisions regarding technologies from the same institution⁴.

The session commenced with tips on pitching, including a demonstration from Nhlanhla Ndlovu, 2018 COINS Grand Challenge Runner Up, and owner of Hustlenomics. This was appreciated by a number of participants who were presenting a pitch for the first time. The judging panel was introduced.



Dr Jeffrey Mahachi is a registered professional engineer and a registered construction project manager. Jeffrey holds a PhD in structural engineering from the University of the Witwatersrand, a Masters degree in structural engineering from Surrey University (UK), a Masters degree in Information Technology from the University of Pretoria, and a BSc Civil Engineering (Hons) degree from the University of Zimbabwe. Jeffrey has worked as a project manager and research engineer at CSIR Building Technology, lectures at the University of the Johannesburg and has done consulting work in civil and structural engineering. He has served on the Agrément SA and NHBRC Boards.



Gracia Munganga is Senior Manager at the Climate Innovation Centre (CIC) at The Innovation Hub Management Company (TIHMC)⁵. She studied Chemical Engineering with both a BSc and MSc. The Masters focused on integrated waste management practices in Africa and harnessing biogas from organic wastes. Gracia is passionate about sustainability and the role the green economy can/will play in contributing to Africa's economic development, particularly the key role renewable energy can play on the continent. She is responsible for overseeing the operations of the CIC and the key mandate is commercialisation of clean tech innovations in the energy, water and waste sectors.

³ Applicable to CSIR and DST

⁴ Applicable to University of Pretoria

⁵ *The Innovation Hub Management Company SOC Ltd (TIHMC), a wholly owned subsidiary of the Gauteng Growth and Development Agency (GGDA), was established by the Gauteng Provincial Government through its Department of Economic Development (GDED) as the innovation agency of the province. Its mandate is to promote socioeconomic development and competitiveness of the province through innovation. TIHMC acts as a direct contributor to enhance the economic growth and the global competitiveness of Gauteng through innovation and knowledge economy.*

The Climate Innovation Centre (CIC) Business Incubator provides business development support to start-ups in the green economy sector (energy, water and waste) in collaboration with the World Bank's InfoDev, and the Development Bank of Southern Africa (DBSA). To date, some of the key achievements of the start-ups supported by the CICSA have been R52 million investment attracted, over 80 jobs created, one international export.



Dr Chrisna du Plessis is Associate Professor and Head of the Department of Architecture, and Chair of the School for the Built Environment, University of Pretoria, South Africa. She holds graduate and post-graduate degrees in architecture and sustainable development from the University of Pretoria, a PhD from the University of Salford and an honorary doctorate from Chalmers University of Technology in Sweden, and is a NRF C1 rated researcher. Her research concentrates on developing the principles and guiding frameworks for the practices of sustainable construction and human settlement development, with a focus on resilience and regeneration. She has recently published *Designing for Hope: Pathways to regenerative sustainability* which was awarded the AfriSam SAIA Award for Innovation in Sustainability in 2016. Prof du Plessis is Board Member, Chair of the Programme Committee and Leader of the Priority Theme Sustainable Construction of the International Council for Research and Innovation in Building and Construction (CIB) and member of the International Standards Organisation working group on resilience of buildings and civil engineering works. She has served as juror for the LafargeHolcim Foundation Sustainable Building Competition (MEA region, June 2011 & 2017) and European Solar Decathlon (2011 and 2014), and has delivered 28 international keynotes and 23 invited plenary presentations at international meetings and conferences.



Llewellyn van Wyk is a Principal Researcher at the CSIR. He holds an MSc (Applied Research) in Architecture (Cum Laude), from the University of Pretoria. He undertakes research into high performance green building using new construction materials and new construction methods.



Dr Jennifer Mirembe holds a Bachelor of Architecture. She graduated in 2005 with a Masters in City planning and Urban Design from the University of Cape Town. She went further and graduated with and a PhD in Town and regional Planning from the University of Pretoria in 2017. Dr Mirembe is employed at the National Department of Human Settlements where she currently leads the innovation initiatives. She has extensive experience in the Planning Unit with the Human Settlements Development Grant Business Plans for Provinces and the Urban Settlement Development grant for Metropolitan Municipalities

The pitching session was divided into a “speed dating” portion, at which each participating exhibitor was afforded a strictly timed two-minute opportunity to verbally present their product, service or idea to the judging panel and the general public. Judges shortlisted five semi-finalists for a second round. The semi-finalists had minimal time to prepare their second pitch and were permitted to introduce articles to demonstrate their product. Each semi-finalist was given five minutes to pitch and judges were given time to ask questions over and above the five minute allocation.

The judges remarked that the quality of pitches was high, and commended the presenters. By judges consensus, the following technologies were shortlisted (in random order):

Hotspot geyser sleeve	AET Africa	Hotspot geyser sleeve for retrofit of high pressure conventional geyser to improve geyser energy efficiency by 27%+ allowing consumers to switch geyser on and off and increase efficiency of existing geysers. The device complements timers and geyser blankets.
The Secret Life of Streets	The University of Pretoria	An investigation into the issue of homelessness.
Para Tube	PRD Logical solutions	A seating device that makes it possible for people in wheelchairs to conduct ablutions independently and with dignity.
Soteria fire extinguishers (Suitable for all initial fires in Class A & B.)	Soteria Pty(Ltd)	Throwable portable, non-toxic, 100% biodegradable, environmentally friendly, fire extinguisher weighing only 500 grams but has the same capacity as a 9kg conventional extinguisher.
Sibayeni Metrofarming	Sibayeni	Design and showcase of vertical farming of leafy vegetables to allow farming in small spaces and saves up to 90% water. It gives an opportunity for youth to start farming businesses within the cities and townships and promotes food production education for schools.

In the second round judges advised pitching candidates describe their technology in more detail, to focus on the business case, value proposition, material use (renewability); and what the next steps will be in mainstreaming the technology.

The final results were as follows:

The Secret Life of Streets –	Highly commended
Paratube -	Popular choice award and first runner up
Hotspot geyser sleeve -	Winner



Summary of findings from exhibitor interview

Coralie van Reenen

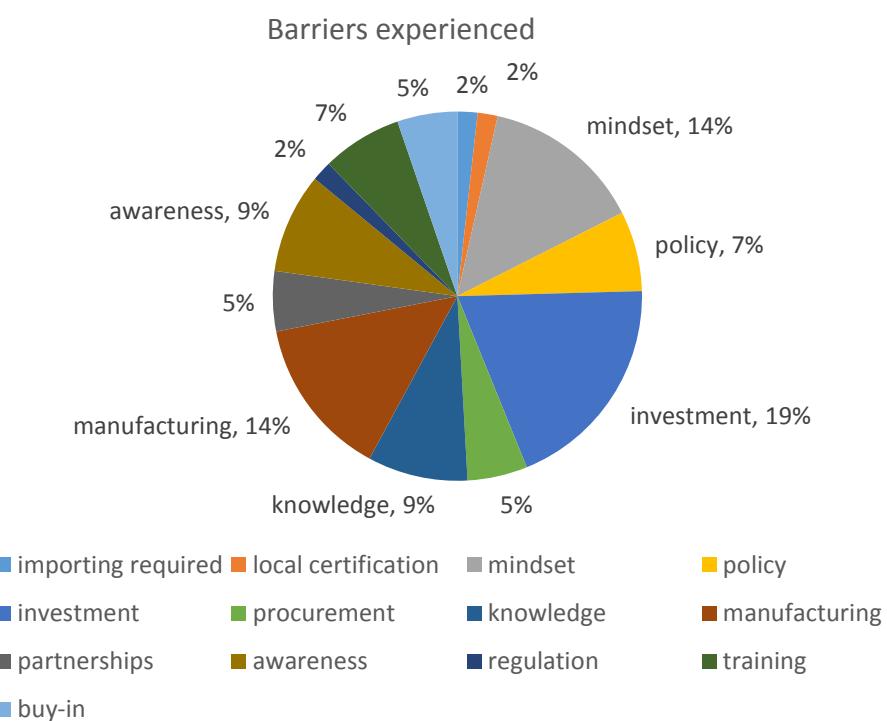
Exhibitors were interviewed with the objective of determining the main barriers to the uptake of STI for SHS.

A frequency analysis was performed on keywords in the interview answers. As can be seen in the chart below, the most significant barrier that emerged was a lack of investment in the sector. The keyword 'investment' includes funding required for R & D, establishment of manufacturing facilities and capacity, and budget for implementation or procurement on the demand side.

All the major themes that emerged - manufacturing barriers, policy barriers, training (awareness, knowledge, mind-set) - require financial input to be overcome.

Thus, it can be concluded that the issue of funding and investment is absolutely crucial for the successful mainstreaming of innovation.

Another significant barrier to the uptake of STI is shown to a lack demand and/or application due to a closed mind-set towards innovation and new technologies. A change of mind by end users as well as designers and installers is required to be actioned through knowledge sharing, training and awareness campaigns.



Media report

Mzimasi Gcukumana, David Mandaha, Lyndi Meyer, Palesa Kganane, Kgauhelo Dioka, CSIR
 Veronica Mohapeloa, DST

In-house professional media within the DST and CSIR were engaged in order to promote the event. The purpose of involving media was to provide an incentive to exhibitors to participate, as well as to promote transparency and inclusiveness in being able to participate. Terms and conditions for participation in the event, included consent to use images the right to make and use images in perpetuity in any media without additional permission or compensation. The media approach for the event included drafting and issuing a media advisory and statement.

- Media Advisory was issued on 28 January 2019 and a reminder on 07 February 2019.
- The event was covered by: eNCA, ETV, SABC News, SAFM, Lesedi FM, IOL, Cape Times, and The Mercury amongst others.
- Social media campaign (Pre and during the event)
- More details are given in the tables below.

Radio and television news coverage

Station	Summary	Date, time and duration	Audience
SAFM Sunrise - SAFM	Mediated Conversation : Focus on housing	31 Jan 2019 08:51 - Duration: 00:09:00	147 000
Lesedi FM	The CSIR will host an "Off-the-Wall Human Settlements Showcase	2019/02/07 15.55 min 21:28	3 230 000
News Night - ENCA	New ideas for future homes	8 Feb 2019 21:18 - Duration: 00:02:20	34 189
NewsHour - ENCA	New ideas for future homes	9 Feb 2019 06:25 - Duration: 00:02:24	8 273
Morning News Today Weekend - ENCA -	New ideas for future homes	9 Feb 2019 07:08 - Duration: 00:03:14	47173
eNews @ 19:00 - e.TV	New ideas for future homes	9 Feb 2019 19:10 - Duration: 00:02:16	65000
eNCA Now - ENCA	New ideas for future homes	- 9 Feb 2019 15:26 - Duration: 00:02:19	25995
eNCA Now - ENCA	New ideas for future homes	- 9 Feb 2019 20:12 - Duration: 00:02:15	25 995
The Full View - SABC News	Using science for sustainable Human Settlements	15 Feb 2019 20:31 - Duration: 00:01:46	16777

Print and online news coverage

Newspaper	Headline	Reach/circulation
Cape Times	'Off the wall' projects to be showcased	29626
Infrastructure News	Using science for sustainable human settlements	16235
The Mercury	Using technology to help solve housing problem	25130
All Events.in	Off the wall technology showcase	2000
ITWeb	Tech-driven human settlements roadmap in the pipeline	69337
IOL	Using technology to help solve housing problem	3767323
Engineering News	DST to showcase benefits of using STI in designing future human settlements	39404

Social media

18 January – 8 February

Posts: 12 posts on 4 platforms - 39 total (Facebook, LinkedIn, Twitter and Instagram) #STI4SHS

Overall the campaign did really well. We reached a massive audience and the engagement was high, especially on the 1st post (invite), the 6th post (day before, getting ready) and the 11th post (officially open). All queries received were about registrations and if the exhibition is open to the public.

Platform	Amount of posts	Reach*	Engagement**	Engagement %***
Facebook <i>(18 684 followers at end of Jan)</i>	12 (pre event invite, prep, radio interview, media invite, and opening including speakers)	26 958	1 169	4.34%
Twitter <i>(15 745 followers at end of Jan)</i>	12 (pre event invite, prep, radio interview, media invite, and opening including speakers)	22 975	837	3.64%
LinkedIn <i>(44 450 followers at end of Jan)</i>	6 (pre event invite, prep, radio interview, media invite, and opening)	40 369	1944	4.82%
Instagram <i>(1 594 followers at end of Jan)</i>	9 (pre event invite, prep, and opening including speakers))	3 765	205	5.44%

* Total reach, not unique ** Total Engagement, not unique *** Average engagement rate per platform. (Less than 1% is low. Between 1% and 3% is average/good. Between 3.5 and 6% is high)

Innovations register

Dirk Conradie

During the two days of the product exhibition 14 products were analysed by means of a structured analysis method that was implemented in *Microsoft Access*. The results of this have been transferred to a spreadsheet (draft innovations register). This application makes provision for the following high level main analysis categories, i.e. S1 - *Product Characteristics* (pictured below), S2 – *Contact Detail*, S3 – *Development Stage*, S5 – *Skills* and S6 – *Additional Information*.

The screenshot shows a Microsoft Access form titled "STI Cost Benefit Model". The top navigation bar includes tabs for "Business Object Definition", "S1 - Product Characteristics", "S2 - Contact Detail", "S3 - Development Stage", "S5 - Skills", and "S6 - Additional Information". The "Define Attributes" tab is selected. The main area contains several input fields:

Product Id	STI006
Product Name	AV LightSteel
Product Description	Fortis building system. Alternative walling system. On-site reinforced concrete wall.
Innovation Type	A Goods
Product Applicability	BA Shelter
IP Protection	AA Provisional Patent
Location	ALL National

To the right of the form is a "Product Picture" section containing a photograph of a building under construction, which appears to be a Fortis building system made of light steel framing.

Main screen of the STI Cost Benefit Model analysis software. In this case the AV LightSteel construction method is shown with a photograph of the product.

The main screen is supported by a detailed performance analysis system where detailed performance characteristics or attributes of a product can be captured. It also facilitates the comparison between different products. A special classification system has been created to support this system with following main categories:

1. Production
2. Employment
3. Market
4. Manufacturing
5. Investment
6. Cost

7. Operations

8. Skills

This system also supports the comparison of attributes over time as the Current, Mid-term 2025 and 2030 performance.

To capture all these detailed categories would require a skilled and technical person to be present with intimate knowledge of the performance characteristics of the particular product. It was therefore not possible to capture these during the short time available. It is suggested that moving forward that these aspects are also analysed as it would provide a more quantified and scientific basis for comparison (pictured below).

ATTRIBUTE ASSEMBLY				Default Attribute Group	
Description	Code	No. Attribute			
CURRENT	A	28			
Class Attribute Use:			Attr1		
aa Capacity		No. units/month	A		
ba Production		FTE	A		
bb Administration		FTE	A		
bc Installation		FTE	A		
bd Indirect		FTE	A		
ca Local Market Size		No. Installed Units	A		
da Percentage Materials		%	A		
db Percentage Means Production		%	A		
dc Water Consumption		L	A		
de Energy Consumption		kWh	A		
dd Solid Waste Generation		kg	A		
de CO2 Emissions		kg	A		
df Other Emissions		kg	A		
dg Lead Time		months	A		
ea Gross Investment needed		ZAR	A		
eb Percentage Investment Secured		ZAR	A		
fa Retail Cost		ZAR	A		
fb Delivery Cost		ZAR	A		
fc Installation Cost		ZAR	A		
ga Energy Requirement		kWh	A		
gb Water Requirement		L	A		
gc Solid Waste		kg	A		
gd Consumables Required		Yes/ No	A		
ge Lifespan		years	A		
ha Manufacture		No/ low level, Intermediate, HI	A		
hb Installation		structure	A		
hc Operation		structure	A		
hd Maintenance and Repair		structure	A		
		0.00			
+ MID 2020	B	28			
+ MID 2025	C	28			
TOTAL AREA					

ATTRIBUTE DEFINITIONS				Default Product Id	STI006
Class	Attribute	Unit Description			
a	PRODUCTION	- PRODUCTION			
aa	Capacity	No. units/month PRODUCTION: Capacity			
b	EMPLOYMENT	- EMPLOYMENT			
ba	Production	FTE: EMPLOYMENT: Production			
bb	Administration	FTE: EMPLOYMENT: Administration			
bc	Installation	FTE: EMPLOYMENT: Installation			
bd	Indirect	FTE: EMPLOYMENT: Indirect			
c	MARKET	- MARKET			
ca	Local Market Size	No. Installed Units: MARKET- Local Market Size			
d	MANUFACTURING	- MANUFACTURING			
da	LOCAL CONTENT	- MANUFACTURING: LOCAL CONT			
de	Percentage Materials	% MANUFACTURING: LOCAL CONT			
db	Percentage Means Production	% MANUFACTURING: LOCAL CONT			
dc	Water Consumption	L MANUFACTURING: Water Cons			
dc	Energy Consumption	kWh: MANUFACTURING: Energy Cons			

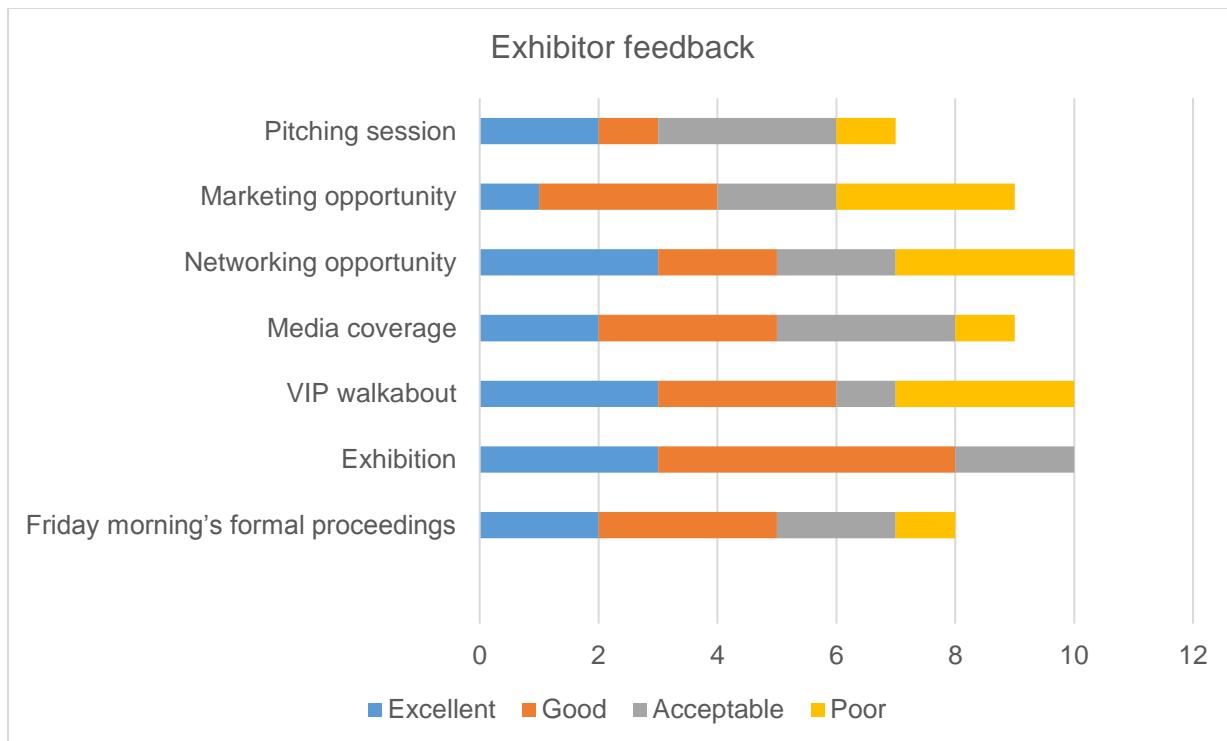
ATTRIBUTE ASSEMBLY LIBRARY		
Assembly Code	Assembly Name	Assembly Description
A	Innovation type A (Goods)	Attribute assembly for goods
B	Innovation type B (Service)	Attribute assembly for service

Concluding remarks

Peta de Jager

The STI 4 SHS Roadmap definition process calls for an extensive consultation with stakeholders in the sustainability and human settlements sectors. As the primary science, technology and innovation supply-side role-players, industry, entrepreneurs, innovators, together with academia and the scientific community, as well as grass roots innovators, all provide a vital service to the sector by providing the pipeline for future scientific and technological innovation.

The NEIGHBOURHOOD 4.0 – Off-the-Wall Technology Showcase was conceived as a constructive engagement design to provide one of a number of means of getting to understand the current state of the innovation pipeline in South Africa, to identify investment opportunities for potential collaboration and investment and to obtain targeted input into the STI 4 SHS roadmap process. The event was hosted on an exceptionally meagre budget. Organisers were mindful of the costs to exhibitors associated with participation and made barriers to participation as low as possible by making participation free. Furthermore it made attractive as possible by reaching out to media to promote the event extensively, opening it to the public, hosting pitching sessions, public lectures and a VIP walkabout, without raising unrealistic expectations. Exhibitors were interviewed and were invited to register on the STI 4 SHS innovation register.



Feedback was very mixed (as shown above). Some attendees and exhibitors were very enthusiastic about the format and requested that it become an annual event. One exhibitor reported a substantial order and another reported that the organisation had concluded business. Attendance, particularly on Saturday was not high, although a number of critical decision-makers were in attendance. The VIP walkabout was cut short, leaving some exhibitors disappointed. Some of the following observations were made:

1. It is evident from the preparatory work that the current size of the innovation pipeline for sustainable human settlements is very small (estimated at < 500) across all sub-sectors⁶
2. There was a high attrition and late withdrawal rate (>20%) by prospective exhibitors, for a variety of personal and work-related reasons, which may indicate a lack of resilience in the innovation community
3. Concern was raised that the event is a “tick-box” activity of government
4. There is a need for government actors to be sensitized to the economic realities of entrepreneurship and a need to strengthen incubation programmes in the sector
5. There is an urgent need for supplier development programmes
6. Investment is needed
7. There is a need to ensure that there is evidence of incremental improvement of products and services over time
8. The combination of exhibits at various stages of technology readiness was considered to be unique and of value to emerging entrepreneurs and those considering engaging in innovation
9. Tertiary academic institutions need a platform to engage with industry and investors so that research reports are not archived at the conclusion of studies

Further comment or suggestions on NEIGHBOURHOOD 4.0 – Off-the-Wall Technology Showcase are welcome. To participate in the STI 4 SHS National Forum and contribute to the roadmap register at www.sti4shs.co.za

⁶ Water and sanitation, energy, Shelter, Energy and food, ICT, Resources and governance: equity and access for human settlements, Neighbourhoods for social goods: education, jobs, and health, Environment, Household and neighbourhood privacy, safety and security, Connected neighbourhoods: road and rail

Acknowledgements

Organisers wish to acknowledge all exhibitors, presenters, attendees, reviewers and organising committee for their contributions to the Off-the-Wall Technology Showcase event, including, but not limited to:

Organising committee:

Ashaal Roophan; Catherine Morgan; Coralie van Reenen; David Mandaha; Dominique Geszler; Kediemetse Mahlase; Kgaugelo Dioka; Lisa Reynolds; Lorato Motsatsi; Lyndi Meyer; Maloba Tshehla; Mandla Khumalo; Mzimasi Gcukumama (Mzi); Palesa Kganane; Peta de Jager; Sheldon Bole; Songo Didiza; Teboho Ntsamai; Tiyani Ngoveni; Tlhalefi Mphela

CSIR Test site visits: Tichaona Kumirai, Ednah Mamakoa, Hulisani Tshugulu and Oupa Mabaso

Pitching session design: Zanele Tshwete and Siyanda Msithini

Pitching timing: Tshiphiri Tshivhasa, Eastern Cape Department of Human Settlements

Project partners



Science and Technology
Human settlements
Environmental affairs
Energy
Water & sanitation



Final Programme

8th February 2019

09:00 Registration and tea/ media briefing

FORMAL MORNING PROGRAMME FOR INVITED GUESTS

VENUE – Ulwazi @ Knowledge Commons

10:00 – 10:25 WELCOME AND OVERVIEW OF THE CSIR Dr Bethuel Sehlapelo

10:30 – 10:55 THE STI 4 SHS ROADMAP PROJECT Mr Imraan Patel

11:00 – 11:25 A WORD ON HUMAN SETTLEMENTS

Department of Human Settlements and National Home Builder's Registration Council

11:30 Formal opening of exhibition and showcase Host and sponsor jointly

11:30 – 12:00 VIP EXHIBITION WALKABOUT

VENUE – lawns @ Knowledge Commons

12:00 – 13:00 INFORMAL MEDIA Q&A

VENUE – marquee @ Knowledge Commons

12:00 – 16:00 EXHIBITION OPEN TO THE PUBLIC

12:00 – 16:30

PUBLIC LECTURE SERIES

Chair : Llewellyn van Wyk

VENUE – Ulwazi @ Knowledge Commons

12:00 – 12:40 THE NEIGHBOURHOOD PLANNING AND DESIGN GUIDE: Tinus Kruger

12:40 – 12:55 Discussion

13:00 – 13:40 THE AGRÉMENT CERTIFICATION PROCESS: Lennox Makwedini

13:40 – 13:55 Discussion

14:00 – 14:30 Comfort break

14:30 – 15:10 ~~IP PROTECTION FOR EMERGING ENTREPRENEURS 101: Dr Modisakeng~~

~~15:10 – 15:25 Discussion~~

15:30 – 16:10 IBT PROCUREMENT MASTERCLASS: Llewellyn van Wyk

16:10 – 16:25 Discussion

9th February 2019

09:30 – 15:30 EXHIBITION OPEN TO THE PUBLIC

09:30 EXHIBITOR PITCHING SESSIONS

VENUE – marquee @ Knowledge Commons

9h00 - 10h00 Tips on pitching

10h00 - 11h00 "Speed-dating"

11h00 - 12h30 Semi-finalist pitches

14h45 - 15h30 Vote of thanks, ~~certificate~~, pitching winner announced, closure

Friday: 13:30 to 15:00

Saturday: 10:30 to 12:00

Test site visits by electric vehicle

Exhibition layout



<http://www.sti4shs.co.za/>

Draft Innovation Register

	STI001	STI0010	STI0011	STI0013	STI0014	STI0015	STI002	STI004	STI006	STI008	STI009
	Employment Accelerator	Mashesha Stoves	HouseLab	The Secret life of Streets	Soteria Throwaway Fire Extinguisher	Pod Idladla	Cemcrete	Kasi Eats	AV LightSteel	AET AFRICA Hot Spot Geysers	ZerHO Waterless toilet
Innovation Type	Service	Goods	Process	Goods	Goods	Goods	Consumable	Service	Goods	Goods	Goods
Product Applicability	Employment	Energy	ICT	Shelter	Safety	Shelter	Shelter	Food	Shelter	Energy	Waste
IP Protection	Registered Design	Registered Design	None	None	Patent	Other	Patent	Non-Disclosure Agreements	Provisional Patent	Patent	Patent
Location	National	National	National	National	National	Gauteng	National	Gauteng	National	Eastern Cape	National
TRL	TRL 9	TRL 9	TRL 9	TRL 3	TRL 9	TRL 6	TRL 9	TRL 7	TRL 9	TRL 9	TRL 9
SKILLS LEVELS NEEDED:											
Manufacture	Intermediate	Intermediate	High/ scarce skills	Intermediate	Intermediate	Intermediate	High/ scarce skills	Intermediate	High/ scarce skills	Intermediate	Intermediate
Installation		No/ Low level	Intermediate	No/ Low level	No/ Low level	Intermediate	Intermediate		Intermediate	Intermediate	Intermediate
Operation	Intermediate	No/ Low level	Intermediate	No/ Low level	No/ Low level	No/ Low level	No/ Low level	High/ scarce skills	No/ Low level	No/ Low level	No/ Low level
Maintenance		No/ Low level	No/ Low level	No/ Low level	No/ Low level	No/ Low level	No/ Low level	High/ scarce skills	No/ Low level	No/ Low level	No/ Low level

