

Innovative Construction: Utilising ASA-Certified Products in DPWI Projects for Improved Opportunities

Eastern Cape Contractor Development Roadshow

Dominique Geszler (PrArch, BArch, MArch)

Technical Group Leader: R&D

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Objective of the Presentation

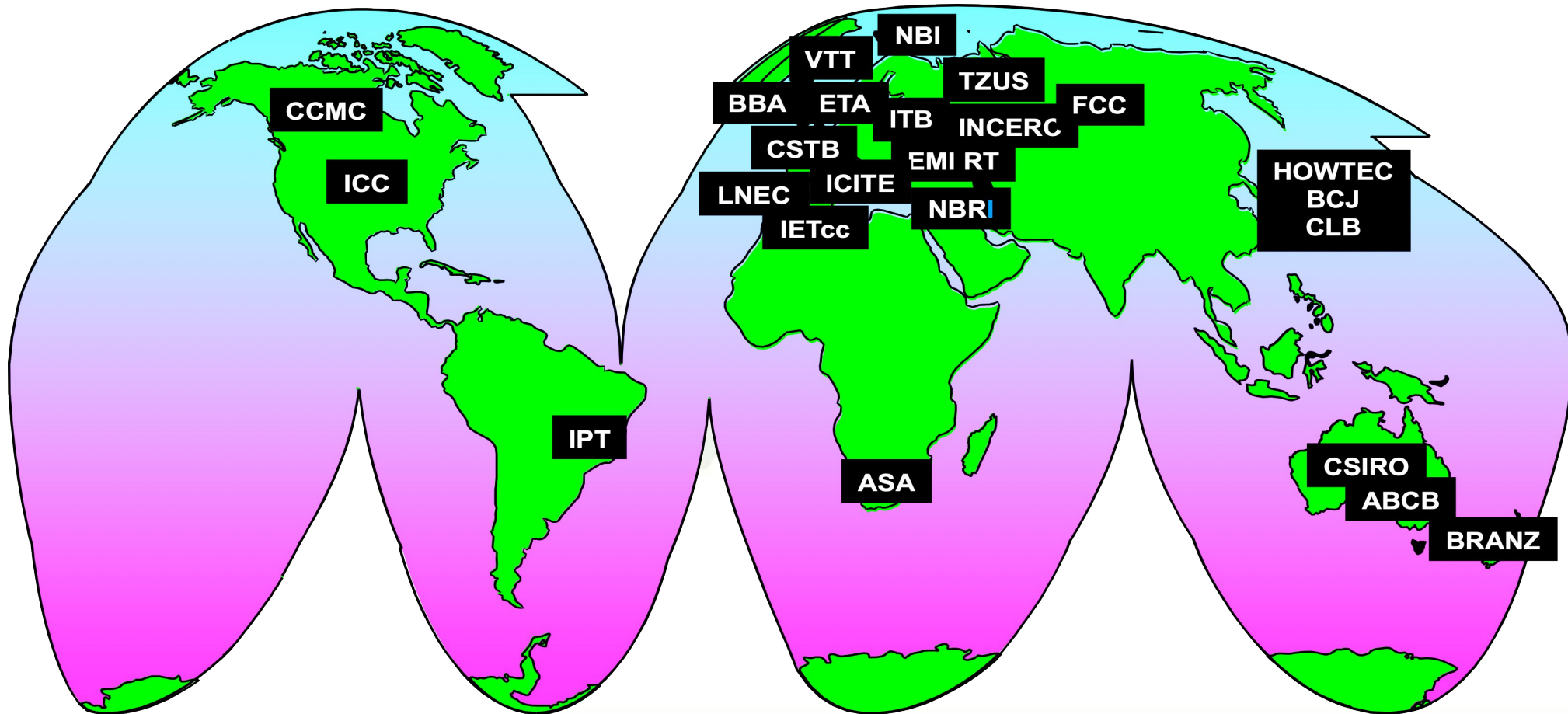
The goal is to demonstrate how ASA-certified construction products and systems can be integrated into projects by the Department of Public Works and Infrastructure (DPWI) and its affiliated entities. This integration aims to promote the use of these products, significantly enhance the adoption of technological innovation, foster sustainability, and support socio-economic development in South Africa.

Introduction to Agrément South Africa

- Agrément South Africa (ASA) is part of the Department of Public Works and Infrastructure (DPWI). Established in 1969, it operates under the ASA Act No. 11 of 2015 as a Schedule 3A public entity.
- ASA assesses and approves certificates for construction-related products and systems without South African National Standards.
- Its goals are to ensure product suitability, support socio-economic development, promote ASA-certified products, and reduce risks for policymakers and end users.

World Federation of Technical Assessment Organisations: WFTAO

- Members from 22 countries across the global market
- Founded in 1996, and is a worldwide network for coordinating and facilitating the technical assessment of innovation in the construction field



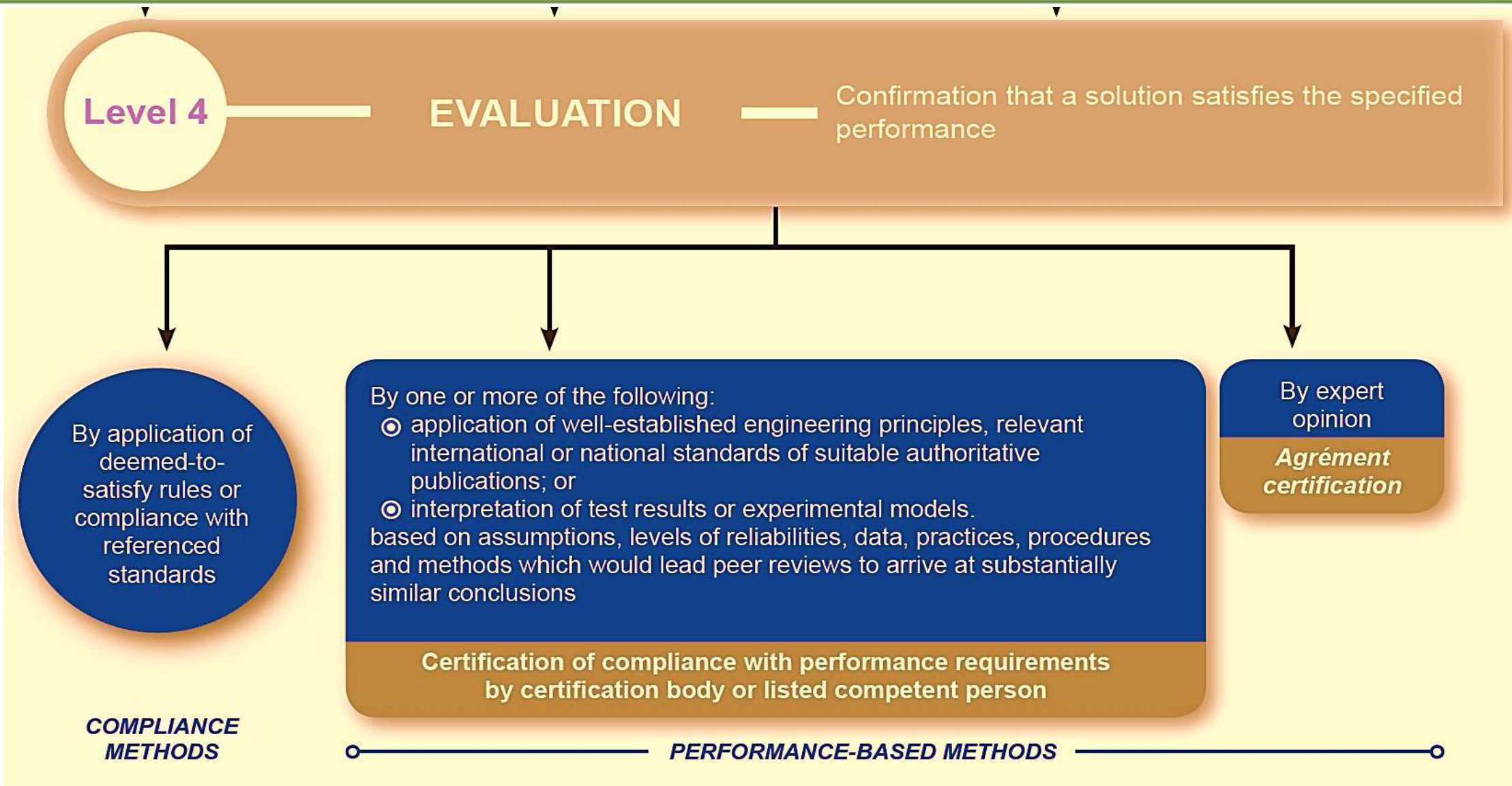
ASA Reference to the National Building Regulations

The responsibility of what should happen regarding ASA Certification is in the National Building Regulations:

Section A2 (1) (f) (iv) states: ...

- (1) Any person intending to erect any building shall submit to the local authority the following plans and particulars, together with the application:
- (f) Such plans and particulars as may be required by the local authority in respect of
- **...(iv) “any certificate contemplated in these regulations, including any applicable Agrément Certificate”.**

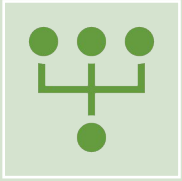
ASAs Compliance Role



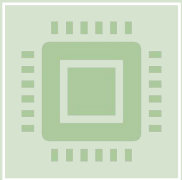
Rational Design vs Agrément Certification

- **Rational assessment** (Combine testing with first principles) or **rational design** (application of well-established engineering principles) is a tool for **project designers**. You appoint a registered and competent person to ensure compliance with principles, standards, and tests specific to your building.
- **Agrément certification** is the **manufacturer's** pre-approval tool - the product is independently tested and certified once, so anyone can use it with confidence that it meets NBR performance requirements and is valid for 3 years, which, under the conditions of ASA, is reassessed.

Definition of Non-Standardised Products



Nonstandardised products are (manufactured or supplied) **products, materials, components, elements, systems, methods, assemblies, processes, or procedures** intended for use in the construction of a building or infrastructure within the built environment that are not governed by established national or international standards.



These products may feature **innovative designs, unique production methods, or applications** that cater to specific market needs or local contexts, which have not yet received widespread acceptance or recognition within regulatory frameworks.

Conventional versus Innovative



Standard/Conventional



Non-standardised/Innovative (Hempcrete blocks)

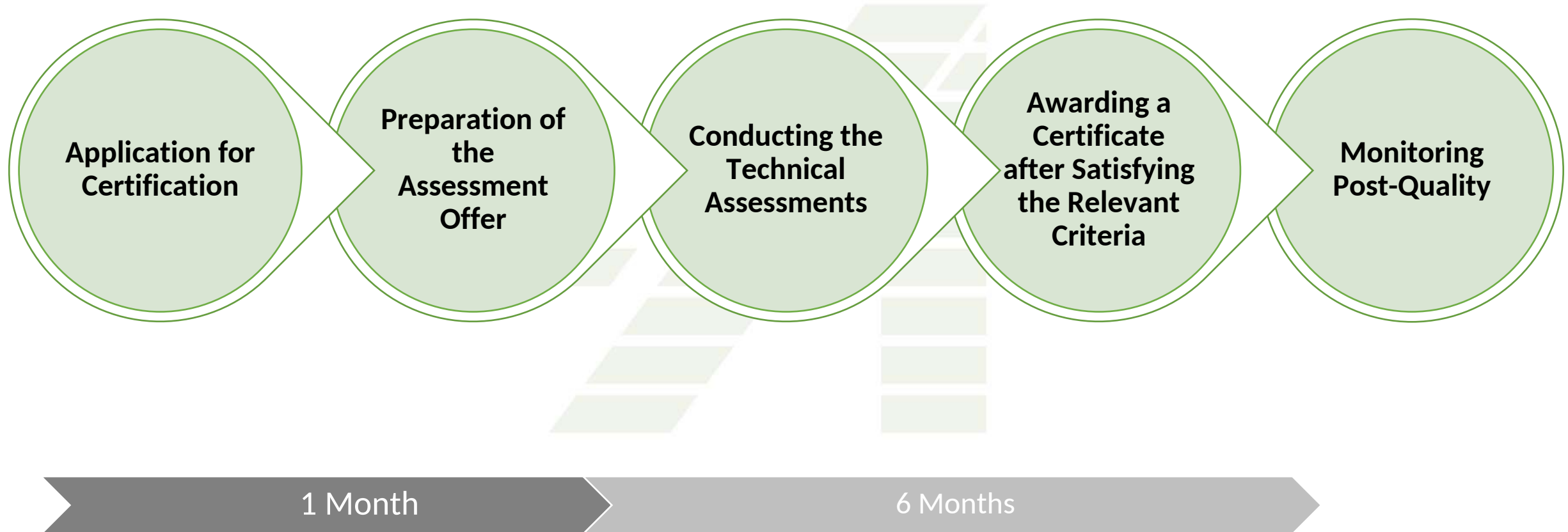
Potential Benefits of Non-Standardised Products

Group No.	Group Type	Parameters
1	Economic Factors	Improved upfront costs Improved market value Improved profitability in the long term through life cycle costing or cost benefit analysis of the total building
2	Construction Factors	Improved rate of construction and reduced labour costs Ease of construction Lower maintenance
3	Environmental Factors	Improved energy efficiency Improved embodied energy Less wastage
4	Social Factors	Social acceptability Architectural innovation

ASA Certification Fees

1.	Certificate Holder Application Fee	R6581, 80
2.	Licensee Application Fee	R6581, 80
3.	Ecolabelling Application Fee	R1 940,88
4.	Building Product Assessment Fee	R36 689, 49
5.	Building System Assessment Fee	R50 595, 12
6.	Road Product Assessment Fee	R47 887, 38
7.	Quality and Validity Inspections	R10 751, 00

Certification Processes



Technical Assessment and Quality

Management:

- Structural Strength, Stability and Serviceability.
- Fire Protection
- Durability
- Water Penetration
- Energy Efficiency, Thermal and Condensation
- Acoustics
- Quality Management (Condition of Certification)

- Eco-Labelling (eco-ASA)

A certificate holder's Quality Management system must cover the following aspects:

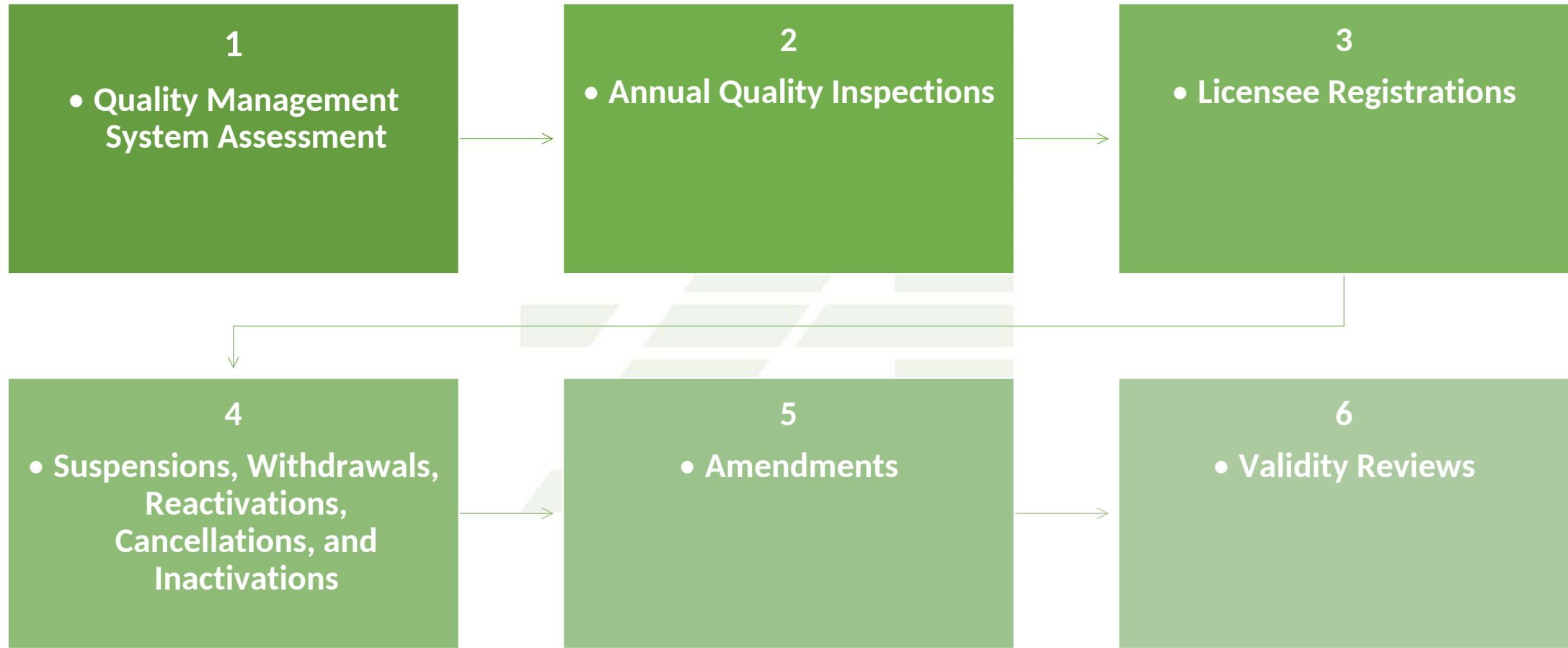
- Factory production and site installation
 - Approved installers scheme
 - All certificate holders are visited at least once annually
 - Three-year validity review
- ...and must be in accordance with **ISO 9001**

Physical Testing



Enhancing Quality

The Quality Management Department is responsible for the following activities according to ISO 9001:

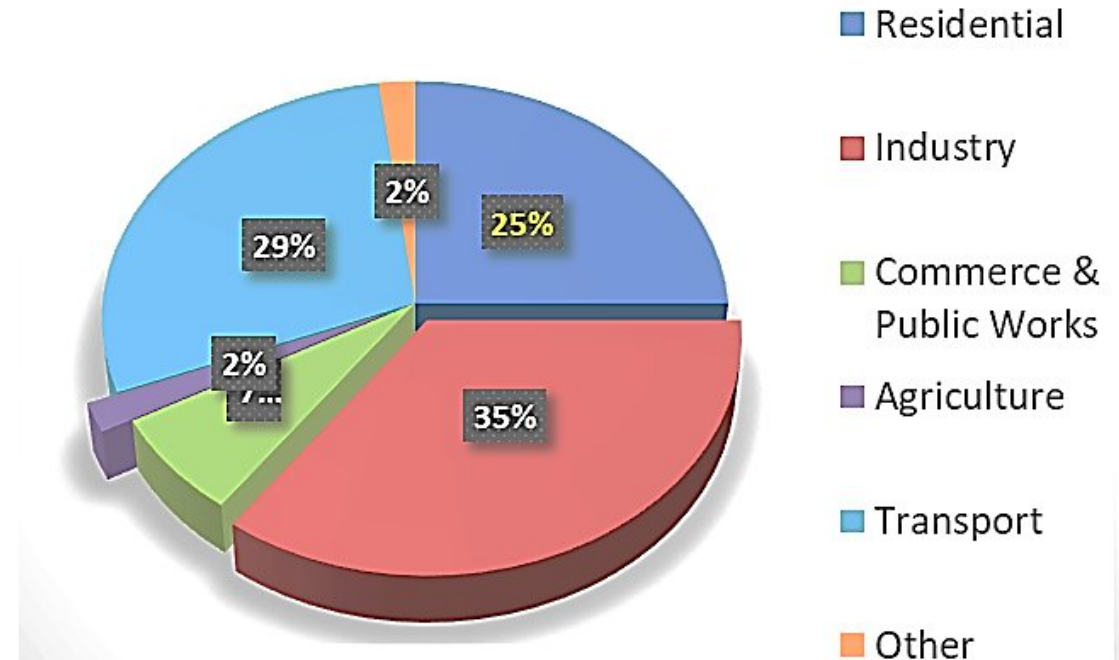


Major Market Shifts due to Energy Consumption and Carbon Emissions

The country's dependence on coal has resulted in it having the highest carbon dioxide emissions in Africa (accounting for 40% of the emissions in Africa). It is the 13th largest emitter in the world.

If developing countries take no positive action, they will be responsible for two-thirds of the emissions by 2030, compared with one-third in 1990.

The chart indicates that 32% of the energy consumed by the construction industry (commercial, public, and residential) and 29% by the transport sector.



Proportion of total energy consumption per industry sector in South Africa

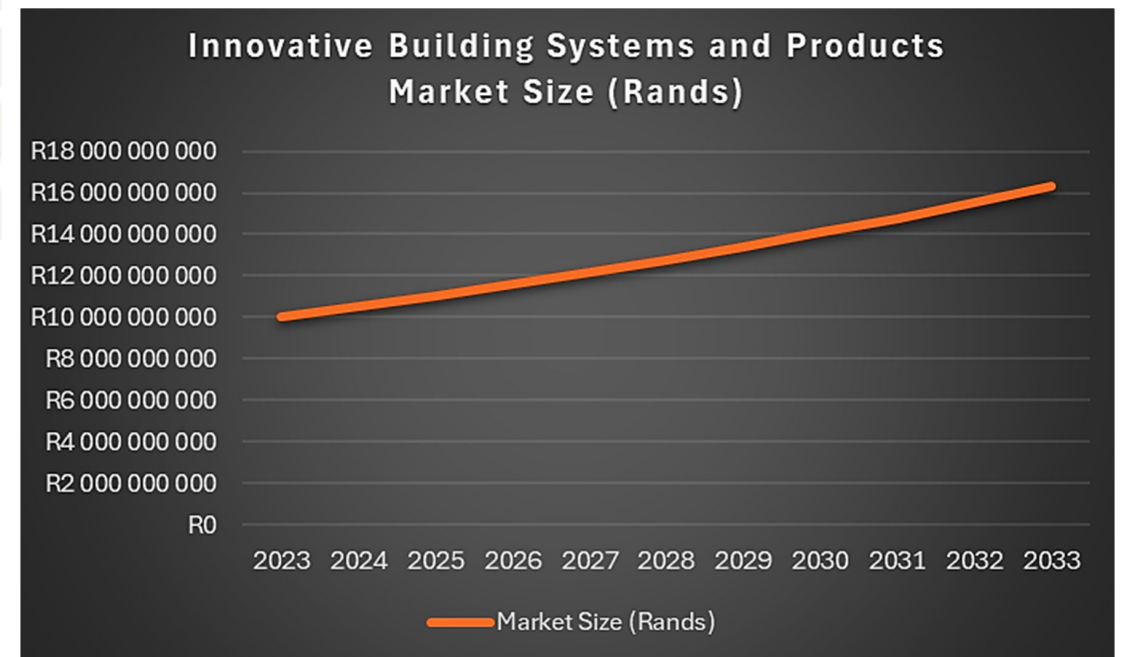
Analogy to Innovation Growth

CAGR Estimated at 5%: The innovative building systems and products market in South Africa is projected to grow at a **Compound Annual Growth Rate (CAGR) of about 5%**.

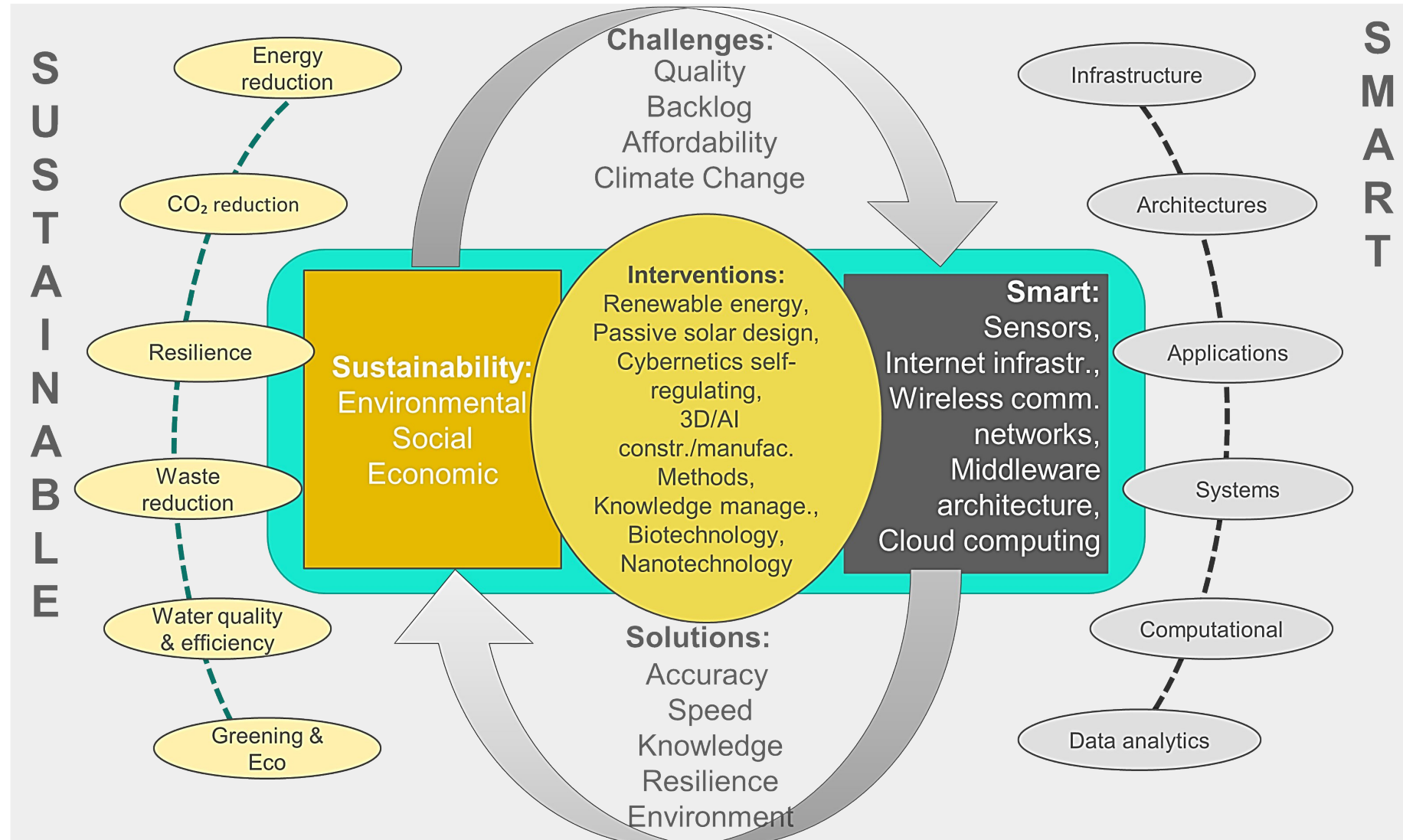
Projected Market Growth: The market is expected to rise from R10 billion to approximately R16.29 billion over the next decade, indicating a healthy growth trajectory.

Annual Increases: Annual growth will start at R500 million in the first year and gradually increase, reflecting both the compounding effects of growth and increased market demand.

- This analysis offers a foundation for understanding the potential for innovative building systems and products in South Africa, which is influenced by broader global trends.



Sustainability and Smart Concepts



Reasons for Integrating ASA Products into DPWI Projects

- Encourage innovative building technologies in maintenance and construction to improve infrastructure functionality and longevity.
- Strengthen quality assurance by using certified solutions that meet national performance standards.
- Enhance infrastructure delivery with faster construction, lower life-cycle costs, improved energy efficiency, and reduced implementation risks.
- Promote efficient resource utilisation and scalable solutions across various infrastructure programs.
- Foster the growth of licensees through the uptake of ASA-certified products in projects.
- Support local innovators by promoting ASA-certified products, boosting economic development, and creating jobs.

Proposed ASA List of Products



ASA has created a comprehensive list of products categorised by type, category, certificate name, solution, and applicability for both maintenance and new construction projects.



There are **187** active ASA-certified non-standardised construction-related products and systems on the list for building projects. Although ASA has a list of Civil and Roads Products, they are not included

ASA Products Categories

Current Building Classifications	System Categories	Products Categories
Buildings	Building System: Foundation System Floor System Walling System Roofing System Electrical System	Floor Products Foundation Products Walling Products Roofing Products Electrical Products
Civil and Roads Systems	Civil Structural System Pavement System Intelligent Transport System	Civil Structural Products Road Products
Energy Management System	Energy Analysis Software Systems	Energy Products
Water Management System	Rainwater Harvesting System Greywater Recycling System	Rainwater Harvesting Products Greywater Harvesting Products
Sanitation Management System	Sanitation System	Sanitation Products

Main Application Areas ASA Products and Systems

Maintenance	New Construction
Walls (Bricks, Blocks, Lightweight Panels, Cladding)	Walls(Bricks, Blocks, Complete walling systems, Lightweight Pannels, Cladding)
Ceiling Products	Ceiling Products
Plumbing Products	Plumbing Products
Waterproofing Membranes	Waterproofing Membranes
Waterproofing Paints	Waterproofing Paints
Wall Coatings	Wall Coatings
Thermal Insulation Products	Thermal Insulation Products
Window Frames	Window Frames
Roof Tiles	Roof Tiles
Soil Stabilisers	Soil Stabilisers
Energy Analysis software	Energy Analysis software
Paving Blocks	Paving Blocks
Crack Repair Products	

Extracts of ASA-Certified Products List

No	Type	Category	Certificate Name	Innovative Solution	Applicable to Maintenance	Applicable to New Construction
1	Bathroom and Toilet Units	Sanitation	2020/614: The Adaptable Toilet Pedestal and Handwash System	Sanitation	Yes	Yes
2	Ceilings	Thermal Insulation Materials	2001/287: Isoboard Over Purlin Roof Insulation	Thermal and energy efficiency	Yes	Yes
3	Ceilings	Thermal Insulation Materials	2006/323: Isoboard Nail Up Insulated Ceilings	Thermal and energy efficiency	Yes	Yes
4	Damp-proofing	Waterproofing System	2020/605 Economy Double-Sided Foil Under-Lay Membrane	Waterproofing	Yes	Yes
5	Damp-proofing	Waterproofing System	2018/574 Polyglass Spider P & Spider P Mineral Waterproofing Membrane	Waterproofing	Yes	Yes
6	Insulation	Thermal Insulation Materials	2000/276: Isoboard Cavity Wall Insulation	Thermal and energy efficiency	Yes	Yes
7	Insulation	Thermal Insulation Materials	2000/277: Isoboard Inverted Roof Insulation	Thermal and energy efficiency	Yes	Yes
8	Insulation	Thermal Insulation Materials	2005/320: Isotherm Thermal Insulation	Thermal and energy efficiency	Yes	Yes
9	Insulation	Thermal Insulation Materials	2010/382: IsoBoard Over Rafter and Truss Insulation	Thermal and energy efficiency	Yes	Yes
10	Insulation	Thermal Insulation Materials	2019/591 Ecolay Undertile Membrane	Thermal and energy efficiency	Yes	Yes
11	Plumbing	Sanitation	1996/241: Contactim	Sanitation	Yes	Yes
12	Plumbing	Sanitation	2017/540: Seaqual Full-Bore Drainage System	Sanitation	Yes	Yes

Extract of ASA-Certified Products List

54	Wall Coating	Paints and Coatings	2016/512: Amoriguard Wall Coating System	Wall Protection	Yes	Yes
55	Wall Coating	Paints and Coatings	2018/577: 5-in-1 Wall Coating System	Wall Protection	Yes	Yes
56	Wall Coating	Paints and Coatings	2020/615: Eco Wallchem All Paint	Wall Protection	Yes	Yes
57	Wall Coating	Paints and Coatings	2020/618 Strongcoat Wall Coating System	Wall Protection	Yes	Yes
58	Wall Coating	Paints and Coatings	2020/619: All in One and Standard Colours Paint	Wall Protection	Yes	Yes
59	Walling and Building System	Building System	2018/587: Monl Frames Building System	Building system	Yes	Yes
60	Walling and Building System	Building System	1989/191 (Reassessment 2000): National and Overseas Factory Built Buildings	Building system	Yes	Yes
61	Walling and Building System	Building System	1989/194 (Amended 2019): KwikFrame Building System	Building system	Yes	Yes
62	Walling and Building System	Building System	1990/205 FSM Building System (Amended April 2019)	Building system	Yes	Yes
63	Walling and Building System	Building System	1996/237 ammended Oct 2020: Hydraform Building System	Building system	Yes	Yes
64	Walling and Building System	Building System	1999/272(Amended August 2007): Robust Building System	Building system	Yes	Yes
65	Walling and Building System	Building System	2001/289: Imison Building Process	Building system	Yes	Yes
66	Walling and Building System	Building System	2004/310: Imison Stud Column Walling System	Building system	Yes	Yes
67	Walling and Building System	Building System	2007/336:Automapolyblock Building System	Building system	Yes	Yes
68	Walling and Building System	Building System	2008/342: Imison 3 Building System	Building system	Yes	Yes

Methods of Integrating ASA Products into Projects

1. Integrating ASA products into DPWI, NDHS and Social Infrastructure Projects

2. Becoming a Licensee to the ASA Certificate Holders

3. Develop an IBT product or system and become a certificate holder

Integrate ASA Products into EC Projects

- Incorporate Innovative Building Technology (IBT) during the **design stage** when appointing professionals.
- Adhere to tender processes for the project, ensuring that professionals follow project phases, and **appoint a contractor and subcontractors in accordance with best practices** set by the professional council.
- Use a list of ASA-certified products to select registered contractors or subcontractors for tendering, ensuring they hold **ASA certificates or licenses**, or allowing **time for registration**.

Licensee registration - Any person or company appointed by the certificate holder and registered with Agrément South Africa to install, construct, apply, or manufacture a certified product or system in accordance with the approved certificate and authorised to claim compliance with such certificate

Licensee Registration Procedure

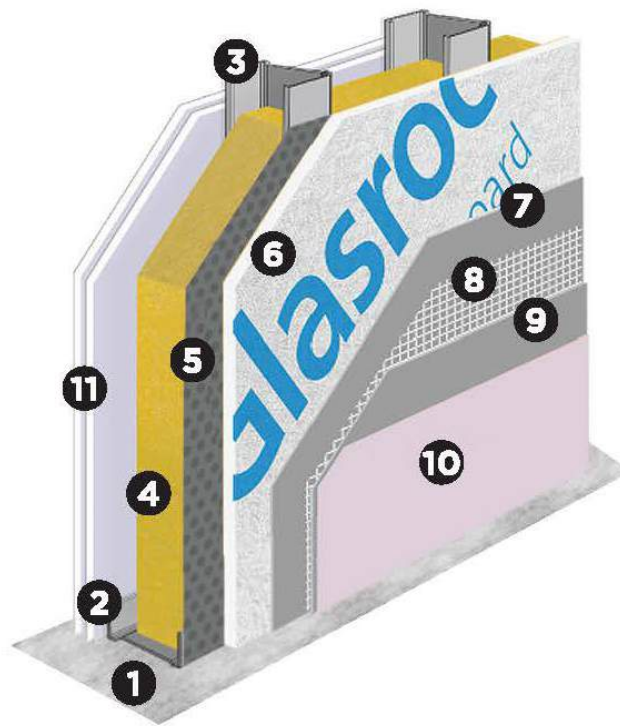
- The certificate holder submits a registration form for licensee registration.
- At this stage, the certificate holder should have trained the prospective licensee.
- The licensee application includes the following:
 - Registration form,
 - Quality Management System (QMS) manual,
 - An agreement between the certificate holder and the licensee,
 - Proof of training,
 - Tax certificate, and
 - Contractor registration documents (such as the NHBRC Certificate and CIDB certificate).

Licensee Registration Procedure

- The **application fee** for the ASA Licensee is R 6,581.00.
- After the documents are assessed, a **factory and site inspection** will be conducted.
- **An interview or assessment** will be completed as part of the process.
- After following the assessment processes within ASA, an **appointment letter** is issued.
- The certificate holder is **responsible for maintaining oversight** and monitoring the licensee's performance according to the General Condition of Certification (GCC).
- A licensee may face suspension or withdrawal for non-conformance or misuse.

Certificate Holder: Licensee Training

- Saint Gobain Glasroc® X with LSF



- ❶ Concrete slab
- ❷ Channel (LSF)
- ❸ Stud (LSF)
- ❹ Isover Cavitybatt™
- ❺ a.b.e® Drain
- ❻ Glasroc® X
- ❼ Weber® Tylon® X Basecoat
- ❽ Glasroc® X Fibre Mesh
- ❾ Weber® Tylon® X Basecoat
- ❿ Topcoat
- ⓫ Internal Plasterboard



MacDonaldis East London



Two-bedroom Cottage in Centurion

New Prototype: Becoming an ASA Certificate Holder

- Another method of job creation is developing your own innovative technology.
- Grant funding is available for technology development through various agencies, including:
 - *HSRC's IID Innovation for Inclusion Development,*
 - *TIA's Technology Innovation Agency,*
 - *SEDA's Small Enterprise Development Agency, and*
 - *DTIC's SPII Support Programme for Industrial Innovation.*

Examples of Modern Walling Systems

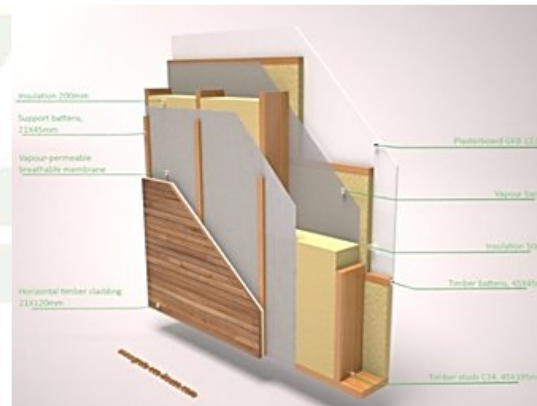


3. Precast concrete sandwich panel

4. Insulated concrete composite (ICC)



1. Light steel framing

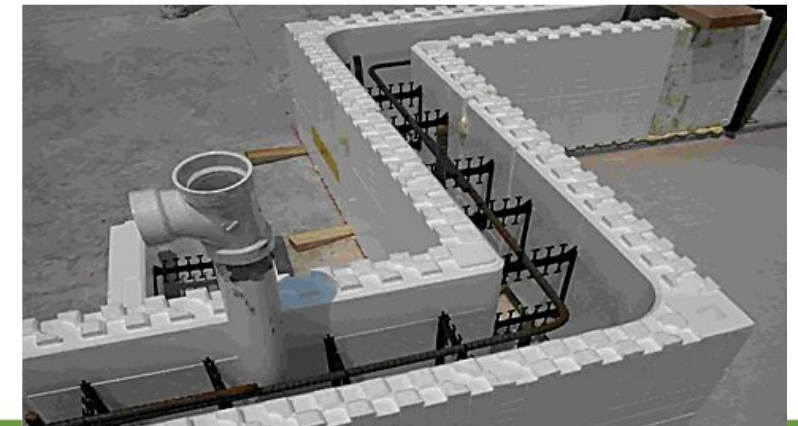


2. Timber framing



5. Structurally insulated panel

6. Insulated concrete formwork (ICF)



Example of Sanitary Systems: Propelair

Features & Benefits

- IoT connected
- The Propelair toilet features an IoT-connected system that transmits data to service engineers, enhancing maintenance efficiency and minimising downtime.
- Dry flushing as a blockage solution
- Triple hygiene
- Asset tracking
- Significant water & water cost savings
- Installation
- Battery or Electrical Mains-Powered Options
- Durable design
- High footfall areas



Examples of Products Made with Sustainable, Locally Sourced Materials

- **Earth-based Construction:** Hydraform, Sandbag
- **Innovations in Recycled Materials:** Harvey Eco Tile, Innovative Modular Concepts
- **Utilisation of Local Renewable Natural Materials:** Hempcrete
- **Low-impact Building Systems:** Envirocrete
- The following slides provide examples of these ASA innovative building systems and products on projects completed.

ASA Sustainable Products – Hempcrete System

Local renewable natural materials

- The Hempcrete Block Building System

consists of non-load-bearing masonry walls used as infill, insulating, or partition walls in buildings. These walls work with any structural frame designed by a qualified person. The density of the Hempcrete blocks is 860 kg/m^3 , with an average compressive strength of 0.59 MPa.

- Hempcrete blocks are made in factories using specialised equipment. Their main ingredients

are hemp shiv (2-20mm aggregate),



ASA Sustainable Products – Sandbag System

Earth-based Construction

- Sandbag building systems, or earthbags, are a sustainable and affordable housing option worldwide, including South Africa. This earthen architecture uses locally sourced dirt packed in bags to create structures.
- The Sandbag Building System is a timber frame structure that uses Eco-Beam lattice beams as studs and wall plates, with sandbags as infill.
- Walls consist of a steel wire mesh secured on both sides of the frame and are plastered with 25 mm thick cement-sand plaster.



ASA Sustainable Products – Hydraform System

Earth-based construction

- It uses local materials on site. The blocks are 10% cement and 90% soil. They are cured in a dry stack; there is no burning. The foundation to the roof takes 2 weeks.
- Hydraform blocks provide thermal insulation.
- Soil must be free of organic material and harmful quantities of salts and should contain an appropriate amount of clay for binding and handling the blocks.
- The soil should comply with the grading and plasticity requirements for manufacturing. Not



ASA Sustainable Products – Modular Concepts

Recycled and repurposed products/materials

- The Modular Container Building System consists of 6,045 mm long shipping containers, 2,790 mm high, and 2,591 mm wide. The steel exterior is clad with 11 mm Magnesium oxide (MgO) boards and features 50 mm mineral wool insulation. The MgO boards are fixed with steel c-studs at 400 mm intervals. The external and internal walls are lined similarly, with the external walls measuring 124 mm thick and the internal



ASA Sustainable Products – Envirocrete System

Low-impact building systems

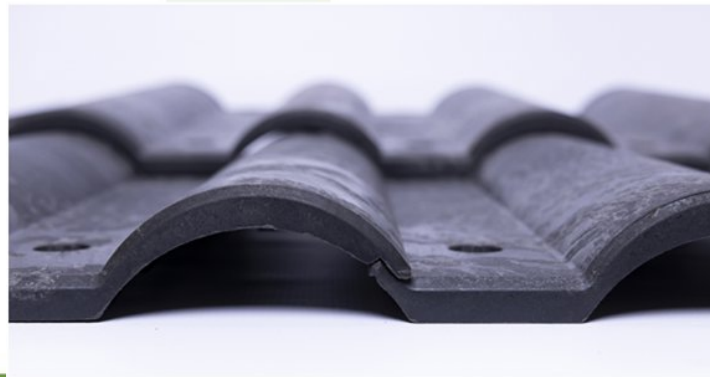
- A lightweight green aggregate that combines the structural properties of cement with the thermal insulation and acoustic benefits of wood.
- Factory-produced wall panels consist of mineralised wood chips chemically combined with lime cement, reinforced with wire mesh. The cement-bonded mixture has a compressive strength of 1-6 MPa and a density of 800 kg/m³.



Example of Recycled Products: Eco Harvey Roof Tile

Recycled and repurposed products/materials

- The sustainable choice is made from 97% waste material.
- Mineral Polymer Composite Roof Tiles are made from a blend of recycled polyolefin and waste minerals. They are shatterproof and 4x stronger than brittle concrete tiles, yet they are 70% lighter than comparable concrete tiles.



Case Study 1: Benex Building System 2014/471

- Engineered
- Interlocking
- Lightweight Blocks
- Thin Bed Mortar (1mm)
- Impervious to water
- 4-hour fire-rated
- 7-Year Warranty
- Integrity of Masonry
- Workability of Timber



Benex: Greenville Garden City Fisantekraal



ASA Certified Building System: Benex 2014/491



Benex Project Case Study Facts

- The goal of the Greenville housing project was to construct homes more efficiently and at a faster pace.
- Benex can produce more than 40 BNG units each month.
- The Greenville project had over 65 workers on site (trained), and Benex had 35 workers in the factory.
- A total of 3000 of the 40m² BNG houses were completed.
- An IBT building cannot compete on cost with a conventional concrete block-built house: Concrete block walls, including foundations R472/m², and Benex walls R580/m².
- The loss in walls and foundations per house is

Lessons learnt:

- Approval processes took long.
- Affordable housing requires innovative processes and design models, not just new products, and it needs to reconsider how homes are constructed.
- The single-story single erf BNG housing model, as is, needs improvements to resolve the housing crisis.

Case Study 2: Hempcrete Block Building Syst. 2022/635

- World's Tallest Hempcrete Building in South Africa
- ASA Certificate: 2022/635, Hempcrete block building system
- Location: 84 Harrington Street, Cape Town, South Africa
- Completion Date: 1 November 2023
- Significance: This building marks a significant achievement in sustainable architecture, being the tallest structure constructed of hempcrete globally
- Architects/Developers: Hemp producer Hemporium in partnership with Afrimat Hemp and Wolf + Wolf Architects, R&N Master Builders
- Key Features: Height 12-storeys; Purpose: Hotel with 50 apartments
- Design Philosophy: Emphasises sustainability and eco-friendliness, integrating with the urban landscape

Tallest Hempcrete Building

Test parameter	Result
Date of test (YYYY/MM/DD)	2022/04/21
Conditioned mass of specimen (grams)	4453,4
Calculated density of specimen (kg/m³)	777,8
Direction of heat flow	Upwards
Upper plate temperature (°C)	10
Lower plate temperature (°C)	36
Average temperature (°C)	23
Temperature difference (°C)	26
Temperature gradient (°C/m)	408,7
Measured heat flux (W/m²)	80,75
Specimen thickness as tested (mm)	63,62
Duration of test (minutes)	136
Measured thermal conductivity (W/m.K)	0,1976
Calculated thermal resistance at tested thickness (m².K/W)	0,322
Relative mass change of specimen during test (%)	~ 0



Tallest Hempcrete Building



Hotel in 84 Harrington Street, Cape Town, South Africa



- By using innovative technical solutions in DPWI procurement, we **can address infrastructure challenges** and **enhance sustainability**.
- DPWI can **set a benchmark** for best practices and **lead by example** in implementing innovative infrastructure solutions to address developmental challenges.
- DPWI formally **integrate ASA-certified** products and systems into its **maintenance** and **new construction** projects.
- ASA is reviewing Act 11 of 2015, which will mandate certification for non-standard products. This initiative aims to enhance product conformance, boost market confidence, and **potentially create jobs**.

