

INTER SECTOR DEPARTMENTS

INNOVATION AND TRANSFORMATIVE TECHNOLOGY FRAMEWORK FOR THE HUMAN SETTLEMENTS SECTOR

IID Seminar: The Uptake of Science, Technology and Innovation by Sector Departments, 20 JULY 2022

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human settlements
Department:
Human Settlements
REPUBLIC OF SOUTH AFRICA

CHANGING PEOPLE'S LIVES



BACKGROUND

- Millions of housing units are delivered for low income earners, however, few of these are constructed using alternative building technologies/ Innovation

WHAT IS STILL THE PROBLEM?

- The extent to which alternative building technologies could provide solutions in increasing delivery of sustainable human settlements particularly housing



FRAMING THE PROBLEM

- Outcome: Going to **scale** with alternative building technology
- Strategic objective: Strengthen **knowledge and understanding of innovative system** and alternative building technologies

HISTORY ALTERNATIVE BUILDING TECHNOLOGIES: DHS

- In **2003** the Department 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
- In **2008** the research focused primarily on officials – it made an enquiry on reasons there was limited implementation of alternative building technologies.
- The study conducted in **2010** updated and reanalysed data collected for the study completed in 2008.



HISTORY ALTERNATIVE BUILDING TECHNOLOGIES: DHS

- **2009** the Department of Human Settlements indaba,
- **2011** National Round Table on Innovation Building Technologies,
- **2017** Human Settlements Round Table, and
- **2017** Human Settlements Development Summit as unpacked below.

RESEARCH...

- Main Questions
 - How has provincial departments implemented alternative technologies in government assisted housing programmes
 - What are the success stories and what lessons can be learnt?
 - What are the challenges that are preventing the large scale use of alternative building technologies?



SUMMARY OF FINDINGS

- **Policy and legislation**

- The policy space and building regulations do not prohibit the use of alternative building technologies in government housing development projects
- There are a variety of technologies in the market but mostly have limited production capacity
- Although provinces have trialled or engaged with different technologies, this has not resulted in large scale housing development projects



SUMMARY OF FINDINGS

- **Acceptance of alternative technologies by provinces**
 - Province seem to be open and welcoming to innovators of ABT, but the fact that they have to stay within the subsidy quantum precludes them from procuring ABT because of the higher costs
 - Generally, the utilisation of alternative building technologies in government housing projects was found to be inadequate as only Gauteng Province was the most active and consistent
 - None of the provinces have special budgetary arrangements or procedures for the procurement of alternative building technology



SUMMARY OF FINDINGS

- **Knowledge and understanding of beneficiaries**
 - Acceptance of technology by the community. Most community members believe that houses built with ABT are of inferior quality
 - Beneficiaries tended to believe that they are devalued by the state and are therefore given inferior product
 - An understanding that houses built with ABT cannot be extended

SUMMARY OF FINDINGS

- **Certification**

- Lack of understanding regarding certification of the alternative building system e.g. Non compliance with Agrément certificate
- Innovators have difficulty meeting the high standards of quality assurance processes required by the NHBRC

SUMMARY OF FINDINGS

- **Cost of alternative technology**

- High cost of technology opposed to conventional e.g. between R1004 – R3600/m² excluding land and foundation
- Often more expensive than the conventional technology. Initial building cost, but also high levels of maintenance
- Cost of AT often exceeds the subsidy quantum



SUMMARY OF FINDINGS

- **Finance**

- Inability to access loans
- Contractors demand upfront payment

- **Structural Defects**

- Structural problems experienced at times e.g. cracks and water penetration
- Dust experienced in some technologies – beneficiaries reported suffering from respiratory problems

- **Capacity to deliver**

- Minimal manufacturing capacity and focus on importing
- Unavailability of technology for large scale delivery
- Majority of companies remain at a prototype phase



SUMMARY OF FINDINGS

- **Knowledge and understanding of officials**
 - Contractors or providers were hired without the necessary Agrément certificate, thus contravening the National Building Regulations

SUMMARY OF FINDINGS

- **Capacity building**
 - Institutional support
 - Inspections



SUMMARY OF FINDINGS

- **Contribution of ABT**

- Job creation and contribution to local economic development
- Business sustainability and protection of consumers
- Alternative technologies and innovative systems have not, contrary to the claims of providers, amounted to savings for the department
- All provinces acknowledged the potential of alternative building technologies in increasing the speed of construction

SUMMARY OF FINDINGS

- **Showcasing innovation**
 - Eric Molobi Innovation Hub has been instrumental in the utilisation of technology by the Provinces such that some are now considering establishing Provincial innovation hubs



RECOMMENDATIONS: POLICY

- Consider using procurement processes as a lever to upscale the use of alternative building technologies, i.e. tenders must be inclusive of alternative building technology
- Only use alternative materials that have Agrément Certificate
- Ensure that companies that have the capacity to build at scale
- Use performance standards to advertise tenders instead of the subsidy amount

RECOMMENDATIONS: **POLICY**

- Select alternative technologies and systems that can be sustainable in the South African context
- In selecting the technology, also consider life-cycle costs such as energy efficiency, maintenance costs
- Inspection of houses built with alternative building technologies should be undertaken by personnel with the required expertise



RECOMMENDATIONS: POLICY

- Establish partnerships with professional bodies to assist in ensuring quality and durable structures; and to develop capacity in construction project management.
- Mobilised Institutions such as Agrément, NHBRC, Institute for Architects, and others, to support local authorities in the implementation of alternative building technologies

RECOMMENDATIONS: POLICY

- Consider claiming carbon credits for projects that use energy efficient technologies
- Include issues of alternative technologies in the consumer education program
- Reduce unnecessary bureaucracy in the housing construction value chain

RECOMMENDATIONS:

CAPACITY TO DELIVER

- Explore how the Construction CETA could assist in addressing capacity challenges
- Local authorities need advisors who are experts in alternative building technologies and innovative building systems

RECOMMENDATIONS: MANAGING PERCEPTIONS

- Innovators are responsible to market their products
- Consumer education is central to changing perceptions

RECOMMENDATIONS:

QUALITY MANAGEMENT

- The *Department* assisted by Agrément SA and NHBRC should ensure that there is constant site monitoring during construction

RECOMMENDATIONS:

INNOVATORS

- Use the technical support provided by institutions such as Sasol Chemcity Enterprise Development Support, Construction Education and training Authority (CETA), and others
- Consider other sources of funding which the state has made available through other agencies, to fund high certification costs
- Explore other housing markets and not focus solely on low cost housing

RECOMMENDATIONS: INNOVATORS

- Ensure that information about the alternative building technologies is freely available to beneficiaries
- Ensure that the structures constructed adhere to certificate stipulations

WAY FORWARD

- Where we are



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7/20/2022

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PURPOSE

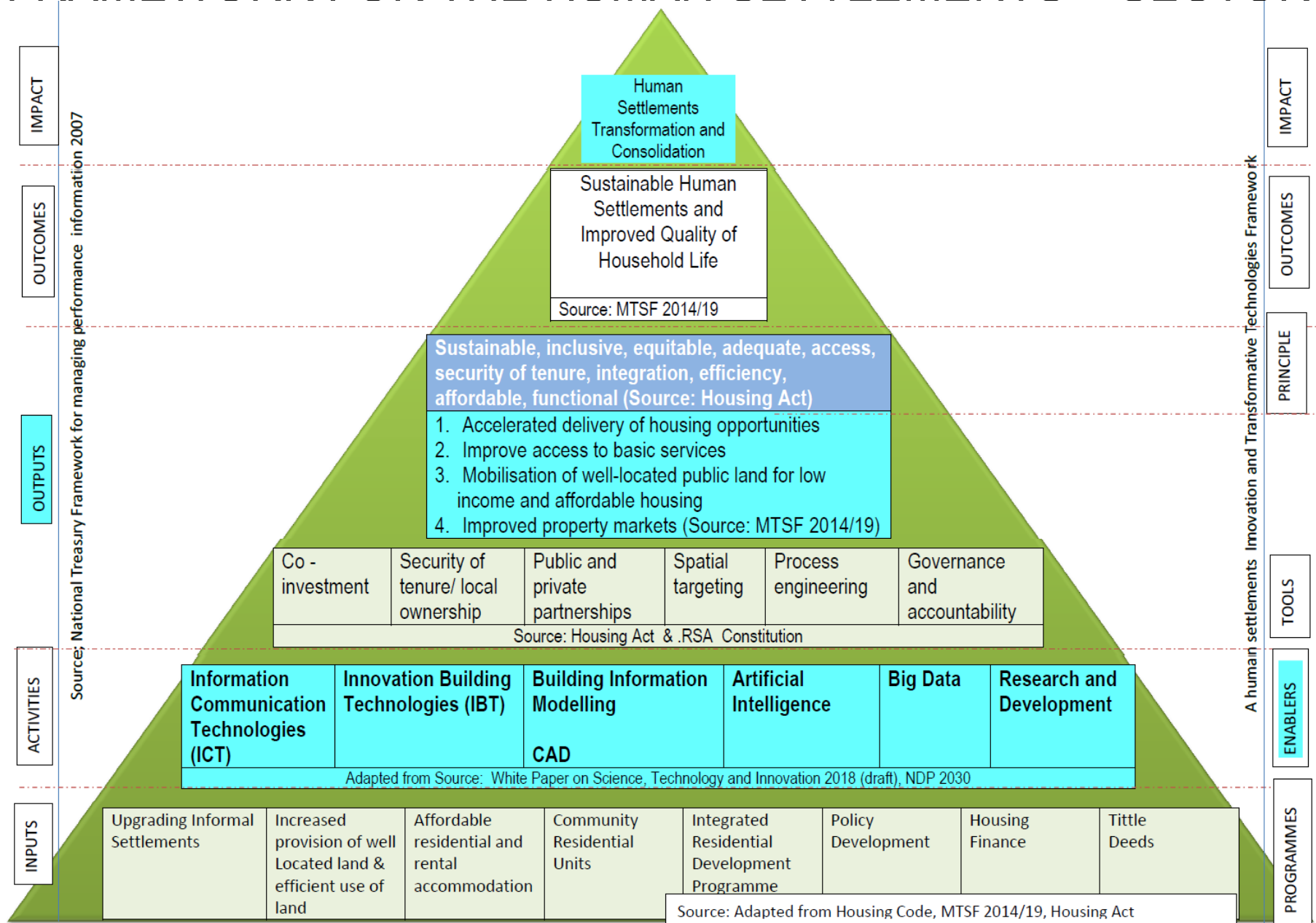
- Integrate the different systems and/or Sector Departments initiatives in Innovation and Transformative Technologies for the Human Settlements Sector (ITT HS)
- Demonstrate that the poor households in HS will benefit from the ITT HS
- Understanding what is& retrofitting role of ITT HS.
- Systematic, Transparent, Accountable approach to ITT HS

PURPOSE

ACADEMIC THINK TANKs

- **DISCOVER THE NEW NORMAL** Integrate the different systems and/or Sector Departments initiatives in Innovation and Transformative Technologies for the Human Settlements Sector (ITT HS)
- **RE-INNOVATE** Demonstrate that the poor households in HS will benefit from the ITT HS
- **COMMUNICATE** Understanding what is& retrofitting role of ITT HS.

STRUCTURE OF THE INNOVATION AND TRANSFORMATIVE FRAMEWORK FOR THE HUMAN SETTLEMENTS SECTOR



Current Projects

NHBRC

1. Rational Designs for low carbon emission and emergency situations
2. IBT dynamic database
3. Exploring the Use of systems such as green building in collaboration with the University of Cape Town.

Current INNOVATION Projects - DHS

MULTI YEAR HOUSING DEVELOPMENT PLAN

5 year Plan for the Human Settlements Sector Provincial Departments
Focus on Architecture

Current INNOVATION Projects - DHS

2. Shelter / An Asset (Human Settlements) /ending poverty



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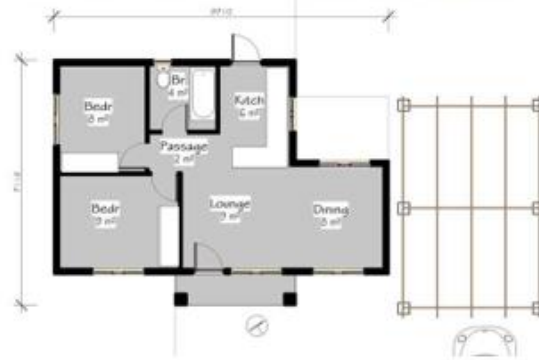
Houses • Security • Comfort



Current INNOVATION Projects - DHS

Design Matters / Asset Value

Technology of the House



<https://houseplancontemporary.blogspot.com/2021/04/47-simple-house-plan-pdf.html>

Current INNOVATION Projects - DHS



Design Matters / Asset Value
Technology of the House



Technology of the Neighborhood



Current INNOVATION Projects - DHS

House to General Plan (Asset value)

Technology of the House

Technology of the Neighborhood

Architecture



Design Matters / Asset Value



Urban Design

General Plan



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Houses • Security • Comfort



Current INNOVATION Projects - DHS

6. Shelter / An Asset (Human Settlements) /ending poverty

Architecture



Design Matters / Asset Value



Urban Design



Technology of the House

Technology of the Neighborhood



Accelerating the development of sustainable human settlements through land assembly, building and property acquisitions, and project management and support services



Priority Housing Development Areas

Current INNOVATION Projects - DHS

6. Shelter / An Asset (Human Settlements) /ending poverty



Technology of the House

Technology of the Neighborhood



Priority Housing Development Areas



Digitise the Plan/ Realtime

Multi Year Housing
And Human
Settlements
Development Plan

Current INNOVATION Projects - DHS

STRUCTURE OF THE MYHDPs

Part A: Strategic Overview

Part B: Architecture - **INNOVATION**

Part C: Urban Design - **INNOVATION**

Part D: PSHDAS - **INNOVATION**

Part E: Programme and sub-programme plans

Part F: Links to other Plans



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Current INNOVATION Projects - DHS

DIGITISED PLANNING SYSTEMS -DHS

HUMAN SETTLEMENTS DEVELOPMENT GRANT PLAN

one realtime planning and monitoring system between Provinces
systems and the HSS system

URBAN SETTLEMENTS DEVELOPMENT GRANT PLAN

one realtime planning and monitoring system between Metropolitan
Cities and the National Department of Human Settlements systems



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Current INNOVATION Projects - DHS

RESEARCH - DHS

Exploration Of Indigenous Knowledge Systems And Alternative Technologies in the Provision of People's Housing Process in the Rural South Africa

CSIR

Ten year road map for the Human Settlements Sector

WRC

Smart Water and Sanitation Systems especially for the informal settlements programme



Current INNOVATION Projects - DHS

INTER-SECTORAL PROJECTS

DEFF

Exploration Of Biomass concrete as the construction material of choice for human settlements

DTI

Exploration of Timber as the construction material of choice for human settlements



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Thank You



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Academy of Science of South Africa (ASSAf)

ASSAf Research Repository

<http://research.assaf.org.za/>

B. Academy of Science of South Africa (ASSAf) Events

F. Innovation for Inclusive Development (IID) Seminar Series (incl. Proceedings)

2022

The uptake of science, technology and innovation by sector departments

Academy of Science of South Africa (ASSAf)

Academy of Science of South Africa (ASSAf) & Department of Science and Innovation (DSI)

Academy of Science of South Africa (ASSAf) and Department of Science and Innovation (DSI) (2022) The uptake of science, technology and innovation by sector departments.

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