POLICY BRIEF

MARCH 2013

CREATING AN ENABLING ENVIRONMENT FOR INNOVATION IN STATE-ASSISTED HOUSING IN SOUTH AFRICA

INTRODUCTION

To raise the building performance and quality of construction of low income subsidised housing in South Africa, policy objectives may be better achieved by enabling the uptake of innovation in the design and delivery of subsidised housing through:

- Increasing the performance norms and standards for subsidised housing as set out in the National Housing Code Technical and General Guidelines
- Creating a set-aside in housing procurement for Alternative Building Technologies
- Preparing and issuing building plans for subsidised housing that include innovative technologies
- Undertaking Demonstration Pilot Projects implementing innovative technologies
- Facilitating the application of Municipal Infrastructure Grant (MIG) funding to provide off-grid infrastructure services to State-assisted housing in South Africa

POLICY FRAMEWORK

The right to have access to adequate housing is enshrined in the Constitution of the Republic of South Africa, Act 108 of 1996. The term “adequate” describes a quantitative and qualitative requirement which is meant to be sufficient with regard to the nature of the provision. At its lowest meaning it could be interpreted as offering living conditions commensurate with a basic shelter: it could also be interpreted as meeting the reasonable expectations of the intended beneficiary where such an expectation revolves around a house which is structurally sound and which offers an indoor environmental quality that meets national health standards.

The challenges around State-assisted housing delivery are well documented in “Breaking New Ground, A Comprehensive Plan for the Development of Sustainable Human Settlements”. Part B: Comprehensive Plan specifically highlights shifts in the way that sustainable human settlements will be addressed and provides a summary of key programmes, highlighting enhancements necessary for successful implementation.

RESEARCH DATA AND FINDINGS

Two pilot projects were undertaken by DST and the CSIR to develop, implement and test the efficacy of innovative technologies in enabling the delivery of sustainable human settlements. These projects were located in Mdantsane in the Eastern Cape (500 houses) and Kleinmond in the Western Cape (411 houses).

A new state-subsidised house was designed (40 square metres and within the subsidy allocation) and a number of innovative technology interventions were applied and benefits accruing evaluated and categorised as tabulated below:

Table 1: Benefits arising from the Application of Innovative Technologies in State-Assisted Housing

Technology Intervention	Performance Benefits Accrued
Ultra-thin Continuously Cast concrete slab	Reduction of 1 ton of concrete per house Reduction in carbon footprint Reduction in construction time Reduction in water consumption Reduction of importing of aggregate and carting away of excavated material Improvement in foundation quality Elimination of cracking in wall
Modular hollow concrete block construction	Reduction of 1 day in construction time per house Near elimination of concrete block waste Reduction of 35% in construction material mass per house Reduction of construction waste to wastefill sites Improvement in indoor thermal comfort
Modular U-shaped concrete block ring beam	Improvement in structural strength of the roof Elimination in cracking of wall Facilitation of addition of a second storey to house
Horizontal roof sheet ridging	Elimination of rain water dripping along sides of house Dispersal of water to optimum collection points for rain water harvesting
Projection of roof rafters	Providing summer shading to east and west facing windows Improving indoor thermal comfort
Installation of insulation board as ceiling	Improving indoor thermal comfort in summer and winter Reduction in carbon footprint Improving acoustic performance Reducing the ingress of dust
Prefabrication of plumbing piping	Reduction of 26% in the use of PVC piping per house Improved quality control
Installation of sit-bath in lieu of shower	Creating facility for the washing of babies and clothes
Installation of Solar Water Heater	Provision of hot water with reduced operating cost Reduction in electricity demand Reduction in carbon footprint
Installation of Photovoltaic Panel	Provision of lighting for 4 rooms with reduced operating cost Reduction in electricity demand Reduction in carbon footprint
Installation of rain water tanks	Provision of 20,000l of water per house with reduced operating cost Reduction in municipal water demand Reduction in carbon footprint (municipal reticulation)

The accrual of the abovementioned performance benefits gives rise to the following gains if these technology solutions were to be applied to design and delivery of the 2.2 million housing backlog.

Table 2: National Resource Gains

Technology Interventions	National Gains (2 200 000 backlog units)
Concrete (cement) reduction	1.76 million ton
Water reduction during construction	44.4 million kl
Water saved through rain water harvesting	46.2 million kl/annum
Material mass reduction during construction	39.4 million ton
Electricity saved by Solar Water Heater (SWH)	12.76 billion kWh/annum
Electricity saved from Photovoltaic Panels (PVP)	75.6 million kWh/annum
Carbon emission reduction from cement saved	1.76 million ton
Carbon reduction from electricity saved (SWH & PVP)	13.68 billion kg CO_2eqt/annum

The research demonstrates that the application of strategically directed innovative technologies can make a substantial improvement to the performance of the house thus substantially redefining "adequate" housing, reduce the demand on municipal service provision and delivery, reduce the financial burden of municipal services on the beneficiary, and meet national imperatives such as resource saving (energy and water) and carbon emission reduction (Green Economy).

A subsequent research project was undertaken on a Pilot Project undertaken by the IDT where 12 schools were built in the Eastern Cape and North West provinces utilising Alternative Building Technologies (ABT). Capital cost savings of up to 53% were realised when compared to the cost of a conventional school. It is anticipated that savings will be achieved if applied to state-subsidised housing projects as well.

The housing and school project also demonstrated that whereas the absence of municipal infrastructure services was an impediment to delivery, ABTs and innovative technologies can enable serviced housing projects to go ahead even though municipal infrastructure services are not available. This will substantially expedite the delivery of State-assisted housing.

In the above context the challenge is to develop an enabling environment that will encourage and facilitate the development and uptake of innovative technologies in state-subsidised housing.

RECOMMENDATIONS

To realize the goal of delivering decent housing that contributes towards sustainable human settlements the following broad recommendations are made.

1. **Review and re-define performance standards for State-assisted housing as described in "Breaking New Ground, A Comprehensive Plan for the Development of Sustainable Human Settlements, Part B: Comprehensive Plan" and "The National Housing Code: Technical and General Guidelines"**
- Prepare and offer a range of State-assisted housing typologies utilising Alternative Building Technologies and other innovative technologies as well as conventional technologies
- Prepare and include a range of quantifiable performance indicators for inclusion into the National Housing Code

2. **Ring-fence a percentage of the housing delivery budget for allocation to housing contracts exclusively for ABTs and innovative technologies**
- ABTs require critical mass to deliver the cost benefits and improved industry competitiveness accruable: ring-fencing a portion of housing procurement for this sector will enable existing ABT owners to invest in production capacity and performance enhancements
- Creating critical mass will also attract new entrants to the industry and the State-assisted housing sector resulting in a wider choice of technology solutions

3. **Undertake innovation-driven Pilot Projects to demonstrate proof-of-concept based on the re-defined performance standards and performance indicators**

- To ensure the quality and cost benefits are accruable the implementation of a range of Pilot Projects will provide opportunities for ABT service providers to demonstrate the performance of their systems
- Beneficiaries will also be granted an opportunity to inspect various product offerings thereby minimising risk to the State, service providers and beneficiaries.

4. **Facilitate the application of MIG funding towards installing off-grid infrastructure services to State-assisted housing**

- MIG funding is used to fund bulk municipal infrastructure projects and is generally not applied to an individual house: an amendment to policy in this regard to enable funding municipal-type infrastructure (sanitation and electricity) at an individual house scale will expedite housing delivery especially where such services are not available, reduce operational and maintenance burden on local authorities, reduce service charges to beneficiaries, and reduce the rates burden on the community
- Funding aimed at reducing carbon emissions arising out of the energy/water nexus will support the objectives of the Green Economy

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