Innovative Building Technologies: The Value Proposition

Llewellyn van Wyk
lvwyk@csir.co.za
PICC Council Resolution

• The use of IBTs for clinic, school and student residence construction and where appropriate for other public facilities construction and refurbishment, including houses based on the elements below

• Schools: a phased introduction of 60% of new schools built to use IBT, introduced as follows:
  • 30 schools in 2013/14
  • 100 schools in 2014/15

• Student accommodation: the first pilot of 5000 beds spread between urban and rural universities
PICC Council Resolution

- Clinics: propose phasing-in to 60% over three to five years
- Early childhood learning facilities: phasing-in to 60% over three years
- Housing developments: develop showhouses using IBT, across high-, middle-, and low-income types to build public support
What are IBTs

• IBTs is a generic term used to describe the use of alternative building systems, products and materials, preferably made in a factory, either in part or whole, and assembled on site
What are IBTs

- IBTs can be classified according to:
  - Mass
    - Heavy
    - Light
  - Onsite or Offsite
  - Type
    - Light steel frame
    - Heavy panels
    - Hybrids
Why are IBTs used?

IBTs are used to:

- Reduce Time
- Reduce Cost
- Enhance Performance
- Enhance Health and Safety
- Enhance Environmental Performance
Where are IBTs used?

- Uptake varies globally
  - Common in USA, Canada, Europe, Far East, Australia and New Zealand
  - Increasing in BRICS countries
- Used for up-market houses, social housing, hotels, student residences, clinics, hospitals, schools
Extent of IBTs use in SA?

- Light Steel Frame in South Africa
  - 300,000 sq.m. constructed in 2012
  - Expected to grow by 25% to 380,000 sq.m. in 2013
How do IBTs perform?

- 40 Agrément Certified Systems that can be used
- Agrément benchmark is the Standard Brick House (SBH)
- Using CSIR rating system SBH scores 3.6 placing it 32\textsuperscript{nd} out of the 40 systems
How do IBTs perform?

- Maintenance requirements vary from system to system
- Regular maintenance is an imperative
- A Maintenance Plan can be included in the delivery of the system
- Given regular maintenance durability should match that of CBT
What is the Value Proposition?

- IBTs reduce cost (about 41% on average in SA) depending on type and location
- IBTs reduces time (up to 50% in SA) depending on type and location
- IBTs out-perform SBTs (SBH ranks 32nd out 40)
- 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)
Green Economy

• Uses less energy to produce
• Uses less energy in use zero heating cost in some parts of SA
• Uses less water to produce
• Saves water use in electricity generation
• Reduces GHG emissions
Green Economy

Residential sector savings:

- Heating load saves 306.5 MWh/annum
- Water from electricity generation 18.69 ML/annum
- GHG emissions reductions from electricity 6.13m tCO₂/annum
Decent jobs

- Jobs created in factory environment
- Decent working conditions
- Better quality control
- Permanent job (not labour broker)
- Upskilling of workforce
Industrialisation

- Strengthening contribution of manufacturing sector to GDP
- Building on science, engineering, technology & innovation
- Knowledge generation
## Case Study: IDT Pilot Schools Project

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<th>School</th>
<th>Cost standard</th>
<th>Cost MMC</th>
<th>Saving (%)</th>
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Case Study: IDT Pilot Schools
North West
Case Study: IDT Pilot Schools
Eastern Cape
Case Study: Stag Student Lodge
Stellenbosch
Case Study: Stag Student Lodge
Tygerberg
Case Study: Stag Student Lodge Tygerberg
CSIR Innovation Site, Pretoria
Athlete's Village, Maputo
Student Accommodation, UW, USA
CSIR Demonstration Building, Port Elizabeth
Construction Industry Reform: 10 Systemic Issues

- **Delivery System** – disjointed with multiple participants
- **Performance Expectations** – poor among consumers
- **Knowledge Base** – skills development and training
- **Construction Inspections** – poor and irregular
- **Construction Warranties and Services Certification** – poor after-sales support
- **Procurement Environment** – complicated and complex
- **Social, environmental and economic issues** – triple bottom line
- **Quality-based Regulatory Environment** – minimum practice
- **Business Acumen, Management and Innovation** - poor
- **Research and Development** – non-existent
Current Research Work: Institutionalisation of IBTs into Public Procurement System

- IBT Guidelines for Client Bodies
- Norms and Standards for IBT Suppliers
- Decision-support Tool
- PSP Contract amendments
- Building Contract amendments
- Centre of Competence (CoC) for Best Practice
- IBT Stakeholder Forum
- Agrément SA capacity-building, rating tool, green assessment (engagement)
- Material manufacturers engagement (testing procedures, performance indicators, performance data sheets)
- Training material and workshops (procurement agents, building inspectors)
Future R&D Work

- Incorporation of Integrated Design and Delivery Systems (IDDS) into IBTs
  - Integrate Building Information Modeling (BIM) into IBTs
  - Increase Offsite Manufacturing (OSM) capacity

- Development of Building Performance Metrics (BPM) to drive performance enhancement in IBT systems
Thank you