Baseline Study for Clamp Kilns in South Africa and Possible Regulatory Approaches

Session 3.1

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Presentation Overview

• **Clay Brick Sector in South Africa**
  – Why the Clay Brick Sector?
  – Technologies employed
  – Sector statistics

• **Current Interventions in the Sector**
  – Life Cycle Assessment – Clay Brick Association
  – Vertical Shaft Brick Kiln Technology – Swiss Contact
  – VSBK+ (Phase 2) – Swiss Contact

• **Regulatory Way Forward**

• **Questions / Discussion**
Clay Brick Sector in South Africa

- Clay brick manufacture is a S21 listed activity
  - 5.2 – Clamp kilns for brick production
  - 5.7 – Ceramic production
- Identified as a key sector during the APPA Registration Certificate Review project in 2006
- Confirmed as a significant source during the development of the Highveld Priority Area, specifically in Ekurhuleni
  - 9 708 tpa PM emissions
  - 9 963 tpa SO$_2$ emissions
Clay Brick Sector in South Africa

- Different production technologies are used in the South African clay brick market (BMI, 2011)
  - Clamp kilns (69 %)
  - Tunnel kilns (24 %)
  - Hoffman kilns (6 %)
  - Vertical Shaft kilns (1 %)
Clamp Kiln Schematic
Tunnel Kiln Flowchart
Hoffman Kiln Schematic
VSBK Schematic
Clay Brick Sector in South Africa

• 2011 Statistics (BMI, 2011)
  – Complete survey of the sector on an annual basis
  – Total production – 2.8 billion bricks out of a capacity of 4.3 billion (65%)
  – Decreasing production trend
  – Total direct employment – 14 229 people out of a capacity of 16 921 (84%)
    • 47% Gauteng and KZN, 28% Limpopo and Mpumalanga
  – Slight increase in the employment trend after a prolonged downward trend due to the 2008 financial crisis
Clay Brick Sector in South Africa

After BMI, 2011
Clay Brick Sector in South Africa

2011 Production

- W. Cape: 0.33
- E. Cape: 0.20
- Free State and N. Cape: 0.13
- Limpopo and Mpumalanga: 0.68
- Gauteng & KZN: 1.46

After BMI, 2011
Clay Brick Sector in South Africa

• Market Share
  – Low cost housing – 44 % clay brick vs 56 % cement bricks/blocks
  – Traditional housing – 75 % clay brick vs 25 % cement bricks/blocks
  – Commercial & Industrial – 78 % clay brick vs 22 % cement bricks/blocks
Current Interventions in the Sector

- **Life Cycle Assessment – Clay Brick Association**
  - 3 year project
  - Funded by members of the CBA with donor support (Swiss Contact)
  - Project being undertaken by the University of Pretoria
  - Currently at the end of Year 1 of the project
  - Styled on the research project undertaken by the Australian clay brick sector
Current Interventions in the Sector

• Life Cycle Assessment – Clay Brick Association

  Project Objectives
  – Phase 1 – environmental impact
  – Phase 2 – thermal modelling study of test structures (small house, large house, office space)
  – Data gathering from all stakeholders (members vs non-members)
  – Higher degrees and publications
Current Interventions in the Sector

- **Life Cycle Assessment – Clay Brick Association**
  
  **Key Outputs to Date**
  - Emissions Inventory Calculator
  - Developed by Dr Gerrit Korneluis with support of post graduate students
  - Quantifies the emissions from the clamp kiln and associated activities (transport, material handling)
  - Mass balance approach for the sulphur emissions
  - Quantifies PM, NO\textsubscript{x} and SO\textsubscript{2}
  - Tool currently used by operators in AEL applications
Current Interventions in the Sector

• Vertical Shaft Brick Kiln Project
  – Technology transfer project from SE Asia
  – Technology was scaled up for SA production requirements
  – Project funded and supported by Swiss Government (Swiss Contact, Swiss Development Corp)
  – Plan was for 6 pilot sites – only 1 operational
  – Successful implementation but slow take-up due to financial barriers
  – Swiss have agreed to Phase 2 – VSBK+
Current Interventions in the Sector

• VSBK+
  – Continued funding from Swiss government
  – Moving away from only VSBK production model
  – Providing technical and research support to the clay brick sector and government
  – Funding research into informal clay brick sector in the Eastern Cape
  – Funding grant to the CBA Life Cycle Assessment
  – Improved kiln design and efficiency – Version 3
Regulatory Way Forward

• Sector is not well regulated
  – Large Commercial Operations
    • Mostly licenced under APPA
    • Conversion from RC’s to AEL’s underway
    • Problem with capacity upgrades – no EA or RC amendment
  – Small Scale / Informal Operations
    • Illegal – EA / Mining / AEL / Labour
    • Small scale
    • Wide spread (most provinces – 200 identified in E. Cape alone)
    • Problematic from a regulatory perspective
Regulatory Way Forward

• Long term objective is to phase out the use of clamp kilns in the clay brick sector
• Challenge – 69% of the sector employing 11 500 people in the formal sector
• Challenge – unknown number of informal / small scale operators
Proposed Regulatory Solution

• Formal / Commercial Sector
  – No new clamp operations will be authorised – S21
  – No expansion projects using clamp technology will be authorised – projects to consider alternative
  – Clamp sector will gradually phase out as clay bodies are exhausted

• Informal / Small Scale Sector
  – Set a minimum threshold to exclude small scale / informal operations – proposed threshold bricks / month – S21 Amendment
Thank you for your kind attention!

Questions / Points of Clarity

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