VERTICAL SHAFT BRICK KILNS
A Technology for Cleaner Brick Making

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Presented by: Kevin Fruin
Environmental Improvement Through A Technology Transfer Program

- VSBK – Reduction in Coal consumption
- Project history
- Benefits to SA
  - Environmental
  - Social
  - Economic
- Funding Requirements
Most Energy Efficient Brick Firing Methodology

- Chinese design
  - Updraft Kiln
- Indian improved
- Continuous process
- Counter current principle
- Indian CDM registration
- 0.84 Mj/kg
- Clamps: 2 – 3.5 Mj/kg
Project history

• Initiated by the brick makers Nov 2008
• Technology Transfer assistance from SDC
  – Pre-feasibility workshop Feb 2009
  – Feasibility budget approved Mar – Oct 2009
  – TTP Budget approved Oct 2009
• Interaction through the following:
  – Design and planning workshops
  – Technology assessments
  – International visits (Both way)
• Project Facilitation Unit established to co-ordinate TTP
• Pilot sites are ready to start subject to funding
Sustainability Benefits of VSBK

• Environmental based project
  – Coal consumption reduction potential
    • Clamps  280g Coal / Brick
    • VSBK  130g Coal / Brick
  – 80% of 5 Billion bricks produced in Clamps
    • Target 50% of production: 2.5 Billion bricks
    • Coal reduction  375,000 tons per Annum
    • CO2 reduction  750,000 tons per annum (2:1)
  – PPM emission reduction 80-90%
  – Measurability improvements – single point source
Sustainability Benefits of VSBK

• Social
  – Increased skill levels required
    • Complexity of process
    • Up skilling of key personnel
    • Shift cycle increases number of skilled workers
    • Average remuneration increase
  – Improvement in working conditions
    • Reduction in emissions in work place
    • Reduced dust and particles
    • Under roof versus open air
Sustainability Benefits of VSBK

• Reduction in production costs
  – Coal accounts for 20-40% of production costs
    • Geographical location
    • Fuel types (Washed Spiral / Boiler Ash)
  – 25-30% of handling in clamps is non saleable
  – Reduced breakage between 5-10%

• Broad based financial benefits
  – Capital expenditure required R700 Million
  – 950,000 man days of work during construction
  – CDM capital inflows for POA over R1,5 Billion
  – POA Gold Standard feasibility conducted
## Individual Brick Yard Benefit

<table>
<thead>
<tr>
<th>Phase</th>
<th>Capital Required</th>
<th>Monthly Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1: pilot</td>
<td>R1,200,000</td>
<td>R44,033</td>
</tr>
<tr>
<td>Phase 2: Production 1</td>
<td>R2,085,000</td>
<td>R88,065</td>
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<tr>
<td>Phase 2: Production 2</td>
<td>R2,985,000</td>
<td>R132,098</td>
</tr>
</tbody>
</table>

### Cumulative Cash Flow

![Cumulative Cash Flow Chart](chart.png)
Funding Requirements

• Pilot Shafts
  – R1,200,000 for a set of 2 shafts (3 participants)
  – Need to test and validate local savings

• Section 21 operational costs
  – R4,000,000
  – Market and deliver the technology (Open Source)
  – Coordinate and promote CDM

• VSBK Capitalization Fund
  – R700 Million required if objectives are achieved
  – Reduced barriers due to CDM
Funding Efforts to Date

• Initial thinking
  – Pilots done from own cash flow
  – Market conditions do not allow
• Institutions approached
  – DBSA - Grant funding
  – IDC - Grant and bankable funding
  – DTI – Grant and bankable funding
  – Provincial Government – Grant funding

Accessing funding is not dependent on the strength of the project, it is dependent on the decision makers and their agenda’s

This is a model project and should be able to access funding”, DBSA
“Great project with excellent sustainable benefits”, DTI
“This project is much needed and in our sweet spot”, DEAT
“This project meets the stated mandate of reducing GHG emissions as stated by Government”, IDC
Questions?

Thank You