GIVING INDIAN POWER PLANTS 20 to 40 % LOWER INPUT ENERGY COSTS
For a "one off cost" of 24,000 INR per MW of Design
This is a BRAVE STATEMENT!

• But the Rockwool International Group Can Give you that
• So for a 660MW Single Unit an investment of 24,000 INR / MW will give you that improvement - For It's Lifetime
• A pay back of less than one year!!
• On 10 years plant that's a saving of $75 Million to $150 Million for Domestic Coal
• That's $300 Million to $600 Million on Imported Coal
• Payback your power station investment in a range of 3 to 20 years just by your energy efficiency.
Would you be Interested?

• If we could show you the way that you could be saving input energy costs by 20 to 40 percent.
• Is it a dream?
• No it's a reality available in India today
• What's more is that you are the person who can make it happen! Working with Rockwool International
Would you be Interested?

- MANY SPECIFICATIONS IN INDIA DO NOT HAVE THERMAL EFFICIENCY SPECIFICATION BUILT IN AND IN SOME CASES THEY ARE, BUT MOST OF THE BOTH CASES HAVE WEAKER ENFORCEMENT.

- SPECIFICATIONS INCLUDE A DENSITY WHICH DOES NOT PREVENT HIGH USE OF STEEL SLAG WHICH OFFER ONLY WEIGHT, A REDUCTION IN PRICE AND A DRAMATIC INCREASE IN THERMAL INEFFICIENCY!!!

- THE WORSE THE PRODUCT THE MORE INTERESTING IS THE PRICE TO THE INSULATION CONTRACTOR.
Rockwool™ India

The Original Stonewool Manufacturer Since 1937
The total Indian stone wool and slag wool market is expected to grow significantly over the coming years.

Process industry is and will continue to be the largest market segment.

Overall growth about 27% per annum.

Low Quality Slag Wool with blast furnace slag from 40% to 50% Content has close to 40% of the total capacity of 220,000 Tonnes.

<table>
<thead>
<tr>
<th>Market segment</th>
<th>Growth %</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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</thead>
<tbody>
<tr>
<td>Process Industry</td>
<td>30</td>
<td>80</td>
<td>104</td>
<td>135</td>
<td>175</td>
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<tr>
<td>Buildings</td>
<td>20</td>
<td>24</td>
<td>29</td>
<td>38</td>
<td>46</td>
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<tr>
<td>OEMs</td>
<td>20</td>
<td>12</td>
<td>14</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Fire Protection</td>
<td>20</td>
<td>2,4</td>
<td>3</td>
<td>3,5</td>
<td>4</td>
</tr>
<tr>
<td>Marine</td>
<td>50</td>
<td>2</td>
<td>2,7</td>
<td>3,65</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>120</strong></td>
<td><strong>153</strong></td>
<td><strong>197</strong></td>
<td><strong>251</strong></td>
<td></td>
</tr>
</tbody>
</table>
World-Wide Presence

- World-Wide Capacity Approaching 2.5 Million Tonnes
- Some regional shortages; China and Russia Large shortages
- North America; Stonewool Shortages
- Middle East & India; Regional shortages in pipe sections and 2012/2013 expecting large deficits on all products.
Quality Control – More Controls Than Any Other Group Company

- Quality management system based on ISO 9001: 2008
- Verification routines along the entire production process, starting from Raw Materials
- Quality control of finished goods
  - European and American standards
  - Indian standards
- EUCEB certification of our composition: Bio-solubility: Only Asian Stonewool producer to have this certification
EUCEB

European Certification Board for Mineral Wool Products

| Rockwool 850 | ROCKWOOL™
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>89 MM</td>
<td>60 MM</td>
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<tr>
<td>Material Code No.</td>
<td>15114</td>
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<tr>
<td>FIRE CLASS A₁₀,ₐ</td>
<td>1000</td>
</tr>
<tr>
<td>1 / Pack</td>
<td></td>
</tr>
</tbody>
</table>

Roxul-Rockwool Insulation India PVT. LTD.
Plot- Z/4, Dahej SEZ
Dahej, Dist. Bharuch - 392 130
Gujarat - India
EUCEB

• European Certification Board for Mineral Wool products – All of Europe

• Once certified by EUCEB, we will not be classified as Carcinogenic - Carcinogen is any substance, radionuclide, or radiation that is an agent directly involved in causing Cancer.

• Very few respirable fibres.

• Respirable Fibres degrade rapidly in the lungs (Bio – Soluble)

• They do not cause much of itching like other fibres.

• The EUCEB certification stands for proven and reliable quality according to a precisely defined system of monitoring and controls.
Products

• Pipe Sections
• Wired Mats
• Slabs
Quality can be different …
Slag-wool is NOT Stone-Wool

Visible differences
• Defects, damages
• Hard to install
• Non fibrous particles (so called shot)
• High water absorbance
• Corrosive to steel
• Not applicable above 250°C
• Poor performance

Performance?
Selling Our Superior Quality Is Very Important
We Have to be the best

Rockwool Packing

Competitor Packing

Rockwool Wire Matt

Competitor Wire Matt
Make sure you use the real:

- **Fibers or Rock:** The thermal and mechanical properties of stone wool are almost exclusively determined by fibers.
- **Non fibrous particles (shot) ONLY increases the weight**
- **Raw materials:** Quality Rockwool needs to manufactured out of volcanic Rock. The incorrect use of waste materials like slag results into a corrosive material if you don’t have experience and advanced technology
- **Production:** Advanced technology is needed to ensure the quality of insulation!
- **Performance:** Does your supplier declare nominal values?
The production process

Our Patented Technology to use Slag and other materials to create “new volcanic” rock is here.
What Should You Look at?

- Conservation of the steel work
- Installation of the insulation
- Manufacturer declaration
- Product property Testing
- Standard?
- Nominal or best values?
- Product performance
- Density -> shot content
- Thermal conductivity
- Maximum service temperature
- CUI Issues
- Water repellency, pH value
- Water leachable chloride content
Density = weight per m³

Density influences several product properties. It’s however NOT a product property itself

- Thermal conductivity
- Binder content
- Fiber structure
- Non-fibrous particles (Shot)
Shot content – Gives you nothing

• The thermal and mechanical properties (quality) of stone wool are almost exclusively determined by fibers
• Non fibrous particles or shot negatively influence the quality of stone wool
• Shot only contributes to the **weight** of stone wool
## Shot Content Costs You Money

<table>
<thead>
<tr>
<th></th>
<th>RTI quality stone wool</th>
<th>Typical local quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specified density</td>
<td>145 kg/m$^3$</td>
<td>145 kg/m$^3$</td>
</tr>
<tr>
<td>Shot content</td>
<td>13 %</td>
<td>40 %</td>
</tr>
<tr>
<td>Delivered density</td>
<td>100 kg/m$^3$</td>
<td>145 kg/m$^3$</td>
</tr>
</tbody>
</table>

(*) In accordance with ASTM C 612 “Standard specification for Mineral Fibre Insulation”
Water repellency

• The thermal conductivity of mineral wool increases when water penetrates the material
• Wet insulation can also contribute to corrosion

To keep in mind:
- 1% moisture = +25%\(\lambda\)
- IS8183: max. 2% [IS 3144]

What to do?
- Use only materials with a hydrophobic treatment

Water absorbance < 1%
Water leachable chloride content

- The corrosion resistance of steel is increased by the addition of elements like chromium, nickel and molybdenum.
- The alloying results in a so-called austenitic (face-centered cubic) atomic structures, these types of steel are also called austenitic steels (stainless steel).
- These types of steels tend to exhibit stress corrosion (ESCC) which is often caused by chloride ions (=salt).
  - In case of austenitic steels the insulation may not contain any water leachable chloride ions.
ASTM C795: Acceptability of insulation material on the basis of the plot points of the Chloride, Sodium and Silicate content.

Acceptable Analysis

Unacceptable Analysis

Water leachable Sodium and Silicate content [mg/kg]
Thermal conductivity
The Best of the rest Costs you money
Our Price maybe high but your costs can be much lower!
Potential savings
Energy of Emissions and more

One Small plant with 10KM pipes using India Standard IS8183-IV

Energy costs savings:
✓ Additional investment
✓ Energy cost savings
✓ Pay back time
✓ Earnings over the lifetime of the insulation

Do your maths!
Quality can be different …
Make sure you use the real Stonewool

Visible differences
• Defects, damages
• Hard to install
• Non fibrous particles (so called shot)
• High water absorbance
• Corrosive to steel
• Not applicable above 250°C
• Poor performance

Performance?
Preventing CUI

Best practices may vary by country and/or standard

ISO 12944-1 to 7
Corrosion protection is often designed in accordance with EN ISO 12944-1 to 7 “Coating materials – Protection against the corrosion of steelwork by means of coating systems”. However, since this standard does not adequately take into account the specific features of corrosion protection in insulation systems, the requirements of AGI Q155 “Protection against corrosion in the case of hot and cold insulation in industrial plants” must also be considered.

DIN 4140
DIN 4140 gives the following advice on corrosion protection:
- In the case of cold insulation, if the object is made of non-alloy or low alloy steel, it must be protected against corrosion.
- In the case of objects made from austenitic stainless steel or copper, the installation must be tested in each individual case by the planner to determine whether corrosion protection is necessary.
- Objects made from austenitic stainless steel do not require corrosion protection if the temperature never exceeds 50°C, even briefly.

CIN\I
CIN\I recommends applying corrosion protection prior to insulation work at any time.
- In all phases, pay attention to corrosion under insulation prevention: design, construction, paint & coating work, application of the insulation system, inspection and maintenance. Equipment and piping sections, such as nozzles and supports, should be designed and maintained to prevent water ingress into the insulation system.
- Paint specifications are split into: construction materials (carbon steel, stainless steel) and temperature ranges -30°C to 540°C with special attention for the temperature range between -20°C and 150°C.
- Corrosion protection can be achieved using aluminum foil wrapping, thermal sprayed aluminium (TSA) or paint.
- Corrosion protection is not necessary for plants operating continuously under extremely cold conditions (≤-30°C).

• It's important to ensure your mineral wool insulation is treated for hydrophobicity.
• Rockwool™ reduces the risk of condensation.
• Rockwool™ is non-capillary so does not absorb water.
• Rockwool™ is inert to steelwork so meets the latest requirements of American & Euro standards for use over Carbon and Stainless Steel.
Quality Control more than any other Group Company

- Quality management system based on ISO 9001 : 2008
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  - EUCEB certification of our composition: Bio-solubility:
In Conclusion

- Is your “Rockwool” Stonewool ??
- Ensure Fibre is Healthy (EUCEB)
- Ensure Thermal Conductivity Ensures you save money & the environment
- Does your presently used materials make CUI worse?
- Wouldn’t you look for your supplier’s guarantee on quality & supply?
Would you be Interested?

- The Rockwool Group is the world's oldest and largest Stonewool Insulation Group with over 90 years experience in power station insulation.
- State of the art technology makes our local manufacturing unit the best in the market.
- Our proven thermal efficiency over comparable locally produced materials for these high temperature applications is 20 to 50 percent better.
- The Insulation Contractors buy the lowest price possible that meets a specification, but these have the highest costs to you.
Case Study

Thermal efficient Insulation solution offered by Rockwool which is under implementation for two of the upcoming power projects: Case Study
Would you be Interested?

“If I would guarantee your Coal Price was lower than the market price by 20 percent, would you break my wrists shaking hands on such a deal?”

Mr. Ian Russell.
Managing Director
Rockwool Group - India and Middle East
Let's Stop Sending Our Money up in Smoke (or in our case steam)