1. Energy Intensive Industries in Egypt
2. Cement Industry in Egypt
3. Egyptian Regulations for Coal related activities
4. CO₂ Reduction
5. Bilateral Cooperation & Business Opportunities
1. Energy Intensive Industries

51% of total primary energy for energy-intensive industries

Natural Gas Consumption in Energy Intensive Industries
2. Cement Industry in Egypt
2.1 Cement plants in Egypt

- Egypt is one of the greatest cement producers all over the world and the leading country in the middle East, Africa, and the Arabian Region with a total production capacity of 70 million tons of clinker.
- Average Energy requirements 240 m GJ/y
- Coal requirements about 9.2 m t coal/y

Italcementi Group: 5 plants
- Lafarge Cement Egypt (5 lines)
- Sinai White Cement Portland.
- Misr-Beni Suef.
- Misr-Quena.
- Cemex (Assiut Cement Co)
- El Ameriya Cement Co (2 plants)
- Titan Cement Co: 2 plants
- Al Arabia for cement.
- Al Sweedy for Cement.
- South-Valley for Cement.
- National Cement Co. 2 lines
- Arabian Cement Company
- Asec Menia
- Royal Cement
- El Nahda
- Medicore
- Wadi ElNile
- Sweedy
Cement Plants in Egypt
2.2 Importance of cement Industry

- In 2006, industry produced 30 million t of cement. In 2010 that number jumped to 50 mt, due to a 200% increase in the producers.
- Total cement production capacity stands at 70 million t. While this figure is much higher than current market consumption, it is anticipated that demand will grow in the near future as Egypt's economy and construction sector recovers.
- However, the industry will have difficulty reaching full capacity due to ongoing energy supply shortages.
- Cement industry now accounts to around 3.7% of GDP (around EGP60 Billion).
- Local consumption is about 83% and exports 17% (2011)
2.3 Energy Consumption in Cement Industry

Energy consumption in the international experience accounts for **30-40% of production costs**.
Fuel cost accounts for 26-34% of Production Cost.

Breakdown of energy consumption in cement production.
2.4 Energy Efficiency Challenge

- International Benchmark for Energy 3000 - 3800 MJ/t clinker of Grey Cement and 5000 – 6000 MJ/t clinker white cement
- Due to the nature of the raw materials in Egypt by-pass can reach from 10-25% as compared to 3-5%
- A benchmark of 4000 and 6200 MJ/t clinker could be reached through Energy Efficiency measures:
  - Maintenance
  - Operation control and optimization
  - False air minimization etc…
2.5 Alternative Fuel Opportunities & Challenges

Most cement companies are willing to use AF, however they require:

- Steady supply at affordable price

Challenges facing Suppliers of AW

- System for Collection and Transportation of AW to transfer stations and Plants
- Seasonal nature of crops and storage

Challenges facing Suppliers of RDF

- Collection and supply
- Heat value after sorting and recycling activities

How Far will Cement Companies get involved in the supply chain?
2.6 Compliance Challenges (1/2)

- 90% of the stacks are presently linked to EEAA Continuous Emission Monitoring System (CEMS) for TSP. The system is being upgraded to monitor other parameters.
- Stack emission standards have been reduced in the 2012 regulations from 300 to 100 mg/m$^3$
- With the introduction of Coal SOx and NOx emissions will also be reduced.
- Another challenge will be work environment limits for Coal dust which is 0.8 mg/m$^3$ as compared to PM10 of 10 mg/m$^3$
- To meet this limit the companies will have to implement strict mitigation and abatement measures
2.7 Compliance Challenges (2/2)

- European Best Available Techniques will be adopted for all coal related activities:
  - Ship unloading, coal handling
  - Transportation to cement facilities
  - Storage at site
  - Coal milling and burning

- Compliance with ambient air limits will require:
  - Prediction of impacts using dispersion models before operation
  - Actual monitoring after operation
2.8 EEAA Incentives for Cement Industry

- Technical and Financial Assistance through donor funded Programs:
  - PPSI in the form of Grants (German Government – KfW) about 14 million Euros: 3 cement plants benefited from the program
  - EPAP Loan and 20% grant (World bank – JICA/JBIC – European banks) for about 175 million dollars: about 5 benefited from the program
3. Egyptian Regulations for Coal related activities
3.1 Egyptian Regulations for Coal related activities

- GoE is in the process of issuing regulations governing all aspects of coal activities related to the Cement Industry and ports
- It is introducing some governing principles to which all parties are committed
- Stack emissions have been revised as per EU regulations
- Emissions are monitored and linked to EEAA CEMS
- Best practices are to be implemented as per EU BAT Bref Manuals for:
  - Loading and unloading in ports
  - Storage, transportation and processing
3.2 Governing Principles for Coal use

- Cement companies assume responsibility for:
  - Coal transport from ports to the plant
  - Unloading, handling, grinding, combustion and storage at plant according to EU best practice
  - Emission monitoring and control, and waste management
- Violations are dealt with compliance action plans in which compensation for damage is specified
- Cement plants are to provide plans for gradual substitution of coal with alternative fuel
- Cement Companies will be committed to implement measures or projects to reduce CO2 emissions caused by the use of Coal.
The following types classes (Egyptian Organization for Standardization and Quality control) of Bituminous Coal are allowed:

<table>
<thead>
<tr>
<th>Class/Group</th>
<th>Fixed Carbon Limits (Dry, Mineral-Matter-Free Basis), %</th>
<th>Volatile Matter Limits (Dry, Mineral-Matter-Free Basis), %</th>
<th>Gross Calorific Value Limits (Moist, Mineral-Matter-Free Basis)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Equal or Greater Than</td>
<td>Less Than</td>
<td>Greater Than</td>
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<tr>
<td>Anthracitic:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Meta-anthracite</td>
<td>98</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Anthracite</td>
<td>92</td>
<td>98</td>
<td>2</td>
</tr>
<tr>
<td>Semianthracite</td>
<td>86</td>
<td>92</td>
<td>8</td>
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<tr>
<td>Bituminous:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Low volatile bituminous coal</td>
<td>78</td>
<td>86</td>
<td>14</td>
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<tr>
<td>Medium volatile bituminous coal</td>
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</table>
### 3.4 Stack Emission Standards

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Concentration, mg/Nm³</th>
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</thead>
<tbody>
<tr>
<td>Total particulates from all stacks</td>
<td></td>
</tr>
<tr>
<td>Existing</td>
<td>50</td>
</tr>
<tr>
<td>New</td>
<td>30</td>
</tr>
<tr>
<td>Sulfur dioxide</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Nitrogen Oxide</td>
<td></td>
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<tr>
<td>Existing</td>
<td>600</td>
</tr>
<tr>
<td>New</td>
<td>450</td>
</tr>
<tr>
<td>TOC</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Mercury Vapor</td>
<td></td>
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<tr>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Cadmium and Thallium</td>
<td></td>
</tr>
<tr>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Dioxins and Furans</td>
<td></td>
</tr>
<tr>
<td>0.1 nano g/Nm³</td>
<td></td>
</tr>
</tbody>
</table>
3.5 Unloading in ports

- Unloading by enclosed clamshell + hopper or screw conveyor and telescoping chutes
- No unloading on pier

- Spill boom to contain any coal dust discharge in the sea
3.6 Regulations for coal transport

- Proper covering is the only way to contain coal totally during transit. Tarpaulin covers should be provided for existing trucks. However, the use of better designed trucks with covered aluminum bodies is encouraged.
- The use of chemical sprays helps reduce emissions in transit.
- The port authority shall ensure that all trucks before leaving the storage yard shall be showered with water with adequate system.
- The vehicle carrying the coal should not be overloaded by raising the height of carriage. Weigh scale shall be provided within the loading area.
- The cement plant shall obtain transport permit from the local Administration under the relevant rules.
3.7 Regulations for coal processing

- To prevent fugitive emission during loading/unloading, water sprinkling shall be carried out at each and every stage of handling to avoid generation of coal dust.
- Crushing/sieving/grading activity is to be carried out in enclosed sheds along with Air Pollution Control Measures (e.g. bag filters).
- Provision of silo for crushed coal.
- Equipment used for ground coal should be explosion-proof.
3.8 Monitoring Emissions and By-pass Dust Management

- According to EU regulations coal is not hazardous substance
- By-pass dust is not hazardous waste and has to be land-filled
- Stack emissions monitors linked to the Continuous Emission Monitoring System (CEMS) at EEAA
- Ambient concentrations PM10, PM2.5 measured at fence and linked to CEMS
- Monitoring of workplace emissions
- CO monitoring in storage area, in silos and next to handling equipment as preventive measure for self ignition
4. CO2 Reduction
4. CO2 Reduction

- Cement companies will commit to reducing CO$_2$ by the amount caused from switching from NG to Coal
- Different measures could be used:
  - Use alternative fuels
  - Participate in Projects for renewable energy
  - Produce green cement which uses less clinker and more additives
5. Bilateral Cooperation & Business Opportunities
5.1 Bilateral Cooperation

- Creation of an Egyptian Energy Conservation entity affiliated to ECCJ - Energy Conservation Center of Egypt (ECCE)
- Institutional cooperation with METI/Jcoal by establishing Egyptian Coal Center (Egy-Coal)
- Technical Support from JICA:
  - Capacity building programs for energy (coal)/environment
  - Providing equipment and devices for monitoring and laboratories
5.2 Business Opportunities

- **Coal usage and infrastructures**
  - Ports/Berths for cement sector
  - Coal centers for Coal-fired power plants
  - Fly-Ash management plan (reduction, recycling, secured land filling)
  - Waste water treatment facilities
  - Air and water quality management (control/treatment)

- **Alternative Fuel Projects**
  - Agriculture waste (Biomass)
  - Municipal waste (RDF)

- **Energy Efficiency & Conservation for energy-intensive industries**
ありがとうございます
Thank You!
ありがとうございます。

Arigatou gozaimasu.

Thank you very much.