Emirates Global Aluminium PJSC
Enterprise Risk Management Program

“a perfect marriage between operational risk and financial risk management”

Europe GRC SUMMIT
London, 20th October 2014
Emirates Global Aluminium - A UAE Global Aluminium champion

- MUBADALA Development Company and Investment Corporation of Dubai (collectively the shareholders of DUBAL and EMAL) have combined their aluminium industry interests in a new jointly-owned, UAE-based entity called Emirates Global Aluminium ("EGA"). Completion of the transaction was achieved in Q1 2014.

- EGA's vision is to provide the global economy with sustainable material of the highest quality, building a legacy of excellence for the UAE and the world.

- EGA's sole focus is on aluminium, mainly bauxite mining, alumina refining and aluminium smelting.

- EGA has combined the ownership of DUBAL and Mubadala’s key aluminium interests:
  - Primary aluminium: DUBAL (and its Jebel Ali smelter); and EMAL (and its Al Taweelah smelter) as separate, wholly-owned subsidiaries.
  - Bauxite mining/alumina refining: Guinea Alumina Company (100%); Shaheen Project (100%)
  - Various other shareholdings, JVs and development projects.
EGA – A Top 5 Player

- EGA’s primary aluminium production capacity of **2.4 million mtpa** places the business among the world’s 5 largest midstream aluminium companies.

- The UAE is the 4th largest aluminium producer country in the world.
EGA – Aluminium Value Chain

Integrated upstream in the Aluminium Value Chain will strengthen EGA’s position

**Mining**

Bauxite is the mineral form of aluminium and contains about 30-50% alumina

**Refining**

Alumina extracted from bauxite via a refining process known as the Bayer process

**Smelting**

Smelting is the process of extracting Aluminium metal from alumina through electrolytic reduction

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**Bauxite Off-take Agreement:**
- Favorable long-term bauxite supply agreement with CBG for 5 mtpa Phase 1 (10 mtpa by Phase 2)

**GAC:**
- World class bauxite resource in the Republic of Guinea
- Development of a 6 mtpa bauxite mine operation along with related port and rail infrastructure - currently completed a FEL1 study

**UAE Refinery Project (Project Shaheen):**
- PFS study concluded early 2013.
- FS study completed in June 2014.
- Refinery to begin operations in 2017 with 2.0 mtpa alumina production, and a 2nd phase of 2mtpa online by ~2021
- Located in Kizad next to EMAL

**GAC Refinery Project:**
- Upon completion of mine and infrastructure, GAC to launch the development of a 2.2 mtpa alumina refinery in Guinea forecasted to be completed by c. 2022

**EMAL:**
- 1.3 mtpa Aluminium smelter (Phase 1 and 2)

**DUBAL:**
- 1.05 mtpa Aluminium smelter
- Developer of globally leading DX/DX+ reduction cell technology
EGA - Global Footprint in operations

- EGA is well established with the intention to grow
EGA - Core primary aluminium smelters

• Dubai Aluminium (“DUBAL”)
  – Commissioned end-1979
  – Sequential expansions, advancing technologies
  – Smelter: 1,573 reduction cells in seven potlines (>1 M tpa)
  – Casting operations (>1 M tpa)
  – 2,350 MW power station
  – 30 million gallon/day desalination plant
  – Port facilities

• Emirates Aluminium (“EMAL”)
  – Commissioned end-2010 (phase I) and mid-2014 (phase II)
  – Smelter: 1,200 reduction cells in three potlines (>1,32 M tpa)
  – Casting operations (~1.6 M tpa)
  – 3,100 MW power station
  – 3.75 million gallon/day desalination plant
  – Port facilities
EGA - Upstream projects for securing strategic raw materials

- **Guinea Alumina Corporation ("GAC")** (wholly-owned)
  - Development of a 6 M tpa bauxite export mine, operational by 2017
  - Development of a 2 M tpa alumina refinery, to begin production in 2022

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Shaheen Project, UAE
Potential development of an alumina refinery

- **EGA has conducted detailed studies on the feasibility to construct an alumina refinery in relative proximity to EMAL, in two phases:**
  - Phase I: 2 million tpa by 2017.
  - Phase II: 2 million tpa by 2020.
Pre EGA ERM Program Overview

Prior to 2008 Financial crisis ........

- DUBAL being commodity manufacturers with a global supply chain footprint and operators of large industrial plants including Power Plants and Ports are naturally prone to significant embedded Financial & Operational Risks.

- Risk Management was practised as a stand-alone exercise by individual Business Units in both companies - a structured Risk management program with enterprise wide visibility, prioritisation and corporate reporting to Board and Senior Management was absent.

- Risk management is mostly viewed in the context of Financial Risk Management and Corporate insurance programs administered by Corporate Treasury Dept.
Pre EGA ERM Program Overview

Post 2008 Financial crisis ……..

- With the 2008 financial crisis, the Business world become more complex, unpredictable, volatile and …. risky.
- Shareholders and Boards began to scrutinize whether the business had the right risk management practices in place and demanded more transparency around risks
- Enterprise Risk Management has become increasingly important to the success and longevity of any business.

EMAL – ERM Journey

2010
- Board initiated ERM program in EMAL
- Development of an ERM Policy framework and ERM department
- Enterprise wise Risk identification of 200+ Risks
- Excel based Risk Register

2011 & 12
- Exco Risk identification workshop
- Annual review of Enterprise wide risks
- Incorporation of ERM into Strategic process

2013
- Annual review of Enterprise wide risks
- Preparatory work for EGA Integration.
Pre EGA ERM Program Overview

DUBAL ERM Journey ………

2011
– Board initiated ERM program in DUBAL-
– Development of an ERM Policy framework and Governance of infrastructure.
– Establishment of ERM department

2012
– Establishment of Business Unit wise Risk management infrastructure
– Implementation of Metric Stream ERM system.
– Risk Management Training & Risk culture building
– Risk Identification – 150+Risks
– Qualitative Risk Assessment of 50+Risks

2013
– Qualitative Risk Assessment of 100+Risks
– Enhancement of Quantitative tools – Monte Carlo simulation
– Quantitative Risk Assessment of 15+ Risks
– Prepratory work for EGA Integration.
EGA - ERM Program – Key challenges

- To develop and implement a uniform, integrated ERM framework across the group entities with different enterprise values and varying risk profiles.

- To Develop an ERM Program which is balanced in managing Financial Risks and Operational Risks.

- Transition of existing ERM programs in DUBAL & EMAL which have different operational /implementation philosophy into the new EGA ERM Program.

- Roll out an integrated GRC platform which is flexible, scalable and easily provide Risk Reporting at various hierarchical levels.

- To build an ERM system with inbuilt Quantitative Analytics tools to measure quantifiable Risks.
EGA - Enterprise Risk Management: Overview

- Define the principles and approach to identifying, assessing, and managing risks across the organization (ERM Policy)
- Define governance & operating model to support ERM implementation
- Development of Risk Appetite

ERM Framework Design

- Continuously refine/improve ERM framework

ERM Implementation

- Identify and assess /quantify risks
- Develop and implement mitigants in line with shareholders objectives/risk appetite
- Building a Risk Management culture
- Develop required systems & processes to support overall risk management

Shareholders Value/ Risk Appetite

Monitoring & Review

- Monitor and review progress against ERM objectives
- Provide full transparency & reporting on overall risks
## EGA - ERM Framework Design

- **ERM Policy**
- **Risk Appetite**
- **Risk Rating criteria**
- **Risk Matrix**

### Likelihood Dimension

<table>
<thead>
<tr>
<th>Description</th>
<th>Likelihood of occurrence (12 month exposure)</th>
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<tbody>
<tr>
<td>Rare</td>
<td>Event may only occur in extreme circumstance, not expected to occur. Less than 1% chance of occurrence.</td>
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<tr>
<td>Unlikely</td>
<td>Has not happened but could in exceptional circumstances, 1-10% chance of occurrence.</td>
</tr>
<tr>
<td>Possible</td>
<td>Has occurred here or elsewhere; may occur at some time, 10-40% chance of occurrence.</td>
</tr>
<tr>
<td>Likely</td>
<td>Could easily happen or may occur.</td>
</tr>
<tr>
<td>Almost Certain</td>
<td>Event is already occurring or is about to occur.</td>
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### Likelihood

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<th>Likelihood</th>
<th>Consequence</th>
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<td>Moderate</td>
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<td>Serious</td>
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<td>Major</td>
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<td>Catastrophic</td>
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### Severity Level

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<th>Operational</th>
<th>Financial</th>
<th>Strategic</th>
<th>Environment, Health and Safety</th>
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</thead>
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<tr>
<td>Catastrophic</td>
<td>Total and protracted damage to critical business functions (shutdown for 0-2 weeks). Production processes are significantly affected. Workforce reduced by 50%.</td>
<td>Protracted impact, for example: 20% drop in market share with additional loss of 50% margins. Market produces severely affected.</td>
<td>Long-term irreparable damage to BGA’s global reputation and brand.</td>
<td>Multi-site (1-2%)</td>
</tr>
<tr>
<td>Major</td>
<td>Protracted outage of a critical business function (shutdown for 0-7 days). Production processes are severely affected. Surplus of BGA is not reduced.</td>
<td>Major impact, for example: 10% drop in market share with additional loss of 20% margins. Market produces moderately affected.</td>
<td>Long-term moderate impact with unavoidable costs.</td>
<td>Major environmental damage; severe operational disruption to a large area.</td>
</tr>
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<td></td>
<td>Impact for more than 10 days, or 75% or more of production is significantly affected.</td>
<td>Major legal or regulatory failure (eg. breaching a sustainability covenant or financial covenant failure).</td>
<td>Severely impacted firm, but no significant impact on long-term viability.</td>
<td>Major environmental damage; severe operational disruption to a large area.</td>
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### Consequence

- **Minor**
- **Moderate**
- **Serious**
- **Major**
- **Catastrophic**
EGA - ERM Infrastructure & Operating Model

- 5 entities including 1 Corporate entity
- 4 locations
- 30 Business Units
- 60 RCs & Dy RCs
- 1 single ERM system
- 4 FTE ERM Team
A highly volatile financial market....

EUR USD FX Volatility 2005-2014

Sovereign CDS (ITALY) 2008-2014

Interest rate (3M Libor) Volatility 2005-2014

Commodity (Aluminium) Volatility 2005-2014
EGA - Financial Risk Management overview

Risks
- Liquidity Risk
- Commodity Risk Management
- FX Risk
- Interest Rate Risk
- Credit Risk

Risk Management Tools
- Value at Risk (VaR)
- Spot/Volatility Stress Testing
- Sensitivity Analysis
- Mark to Market Valuation
- Cash Flow at Risk
- Portfolio Value at Risk
- Scenario Analysis

Risk Management Systems
- Metric Stream
- SUNGARD
- Risk AMP
- Monte Carlo Simulation
- Treasury & Risk Management System TMS
- Excel Add on
EGA - Operational Risk Management overview

Operational Risk Management

Risks

- Supply Chain Risk
- Energy Risk
- Environment, Health & Safety Risk
- Information Security Risk
- Property Damage Risk
- Business Interruption Risk
- Project Execution Risk
- Emerging Risks

Risk Management Tools

Tier I
- Qualitative Risk Analysis

Tier II
- Scenario Analysis
- Risk Modelling

Tier III
- Cash flow at Risk
- Monte Carlo Simulation

Risk Management Systems

Metric Stream

Monte Carlo Simulation
EGA - Risk Quantification

- Assigning a dollar value to an operational risk is a debatable issue
  - some believe that risk is measured and managed by people, not by mathematical models.
  - others believe Quantitative Risk assessment adds more objectivity to the Risk management process.

- EGA ERM philosophy takes a middle ground
  - All financial risks are assessed quantitatively
  - Quantifiable operational risks are assessed quantitatively as a Tier -2 analysis.

- Quantitative risk assessment methodology;
  - Worst, best, likely risk scenarios are developed for operational risk
  - Financial modelling to arrive the financial impact – Minimum, maximum and anticipated
  - Simulate the likely financial impact using Monte Carlo simulation
  - Perceive the effects of financial impact (Maximum possible loss and financial impacts at various confidence levels) on ROI targets and Risk capital of the organizations and also evaluate against the approved Risk appetite.
EGA - Building a Risk Management culture

“Every one is a Risk Manager”

Training
- RC /Dy. RC Training
- Business Unit Training
- Inter – BU sessions
- Intercompany synergy sessions

Embedding in the processes
- Strategy setting
- CAPEX approval
- Budget
- Project Management
- Performance Management

Risk Reporting
- Board Reporting
- RMC Reporting
- Risk Dashboards

Collaboration with IA, IC, Compliance, BCP & Other Governance Depts.

Support from Board /Executive Management

Source: Source
EGA - Technology as an enabler

- Leveraging multiple systems to achieve best in class risk management
  - **Metric Stream GRC System**
  - SUNGARD Treasury & Risk Management
  - SAP ERP
  - Risk Amp for Risk Modelling

- Metric Stream Solution Areas
  - Risk Module – by ERM Department
  - Compliance Module – by Internal Controls Department

- Implementation strategy

- DUBAL Implementation (2012)
  - Project Team comprise of ERM, Compliance, Internal Audit, IT, Legal and Supply departments.
  - Rigours selection process including reference calls and demos from 6 shortlisted contenders
  - Phase 1 Standard ERM module implementation (1.5 Months)
  - Phase-2 Customized System – Heat Map, Risk Register, Risk Matrix, Risk Reports, Work Flows (3 Months)
  - Phase-3 Integration with ‘R” for Monte Carlo simulation (6 Months)
EGA - Technology as an enabler

- EGA Implementation (2014 – In Progress)

- Metric Stream was selected as the ERM system for the Group during the integration process owing to it’s successful stint with DUBAL ERM Program;

- Implementation of the latest version of the platform incorporating DUBAL customizations.

- Embedding a 3 tier organizational hierarchy for risk management & Reporting

- Expected Project time lines – 1.5 months

- Scalable for future expansions
EGA - Technology as an enabler

**DUBAL ERM System**
- Single Organization
- 14 Business Units
- 28 Risk Champions & Dy RCs
- Metric Stream ERM system
- ~ 4000 employees
- 2 Tier Risk Reporting
- ERM Team Strength – 1.5FT

**EGA ERM System**
- Multiple Organizations (4)
- 30 Business Units
- 60 Risk Champions & Dy RCs
- Metric Stream ERM System
- ~ 7000 employees
- 3 Tier Risk Reporting
- ERM Team Strength – 4FT

**EMAL ERM System**
- Single Organization
- 15 Business Units
- No Risk Champions
- Excel based Risk Register
- ~ 3000 employees
- 2 Tier Risk Reporting
- ERM Team Strength – 1FT
EGA - ERM implementation Roadmap

Level 1: Foundation
- AdHoc Implementation
- Risk Averse
- Fragmented Awareness
- Individual / silo focus

Level 2: Emerging
- Build Consensus
- Micro-level Implementation Plans; Bottom-up Assessment
- Compliance Driven
- Formalised process, modify & review

Level 3: Established
- Functional Risk Mgt Plans Implemented
- Shift in focus – risk is positive
- Monitor & Measure

Level 4: Dynamic
- Change
- Anticipate
- Responsive
- Focus on continuous improvement

Level 5: Optimised
- Integrated
- Wholistic
- Risk Framework tested overtime; focus on strategic enablement

Technology acted as a catalyst in the transformation

Maturity Level

Time Frame

Technology acted as a catalyst in the transformation
EGA - MetricStream customizations
EGA – ERM Successes and Benefits

DUBAL ERM Program

- Rolled out ERM program from scratch to 14 Business Units within a short span of 1 year generating the Corporate Risk Register and Heat map with top 100+ Risks.
- The entire program has been rolled out in-house with 1.5 Full time employees (FTEs) against the budget of 3 FTEs bringing tangible ROI on the system.
- Reporting timing has been reduced to half a day from 1 week through customized Real-time reports, Risk Register and Heat maps.

EGA ERM Program

- Successful roll out of a group level ERM program with 4 entities on board, generating the Corporate risk register and Heat map with 120+ Risks within the first year.
- Smooth transition of 2 ERM programs into an integrated Program.
- Lean risk department eliminating the administrative support through system automation.
- Quick system implementation – Project timeline 1.5 Months
- Real time Reporting capabilities including Risk Dash Boards
EGA – Recognition and Awards

- GRC 2020 Value Award in Risk Management for Year 2014

- Treasury Team of the Year Award for Year 2013 – ACT Middle East
Key Learning points

- Each ERM program is unique. There is no single fit for all. ERM Programs should be designed having regard to the nature of the business, overall enterprise value, shareholder’s attitude towards risk and overall risk landscape of the organization.

- Use both Top down and Bottom up approach in implementation
  - Top down approach in building a risk culture, linking to strategy and performance management.
  - Bottom up approach in day to day ERM activities.

- Give the right place to quantitative risk assessment in the ERM program.

- Use the technology in the early stages of the ERM program which will serve as a catalyst in attaining maturity and in propagating risk management initiatives.

- Embed the risk management in various processes to accelerate the risk management culture;

- Keep an eye on “Emerging Risks”

- Pay attention to “opportunities” as well.

- Collaborate closely with other Assurance providers and Governance departments.
EGA - Next steps ……

- Developing a data based Risk management Platform by integrating Metric Stream with SAP ERP system
  - Developing a real-time KRI Dash board with an Early Warning Signals
  - Real Time Incident management through linking with SAP incident reporting

- Value capture through a developing a tightly integrated GRC platform
  - Preparatory works have been started to on-board the other governance departments into the Metric Stream GRC Platform to leverage the Hardware & Software capabilities;
    - IT Governance
    - Supply Governance
    - Compliance
Thank you