

Emirates Global Aluminium PJSC

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

MetricStream GRC SUMMIT 2015
Arlington, Virginia, May 2015

UAE Alumina refinery

Feasibility stage

- Proposed alumina refinery to be located in KIZAD
- Expected production capacity of 4 mtpa to be built over 2 phases (Phase 1 by 2017)
- Staffing (2020+): 1,300 jobs
- Estimated GDP Contribution (2025): ~AED 8 bn

dubal *Producing since 1979*

Dubai Aluminium

- 1.05 mtpa Aluminium smelter
- Developer of globally leading DX/DX+ reduction cell technology
- Headcount: 3,800 jobs
- Total GDP Contribution (2013): ~AED 9.5 bn

Guinea Alumina Corporation *Feasibility stage*

- 1.3 bn tonnes of Bauxite for export and local refining in future (project under development, 100% owned by EGA)
- Development of a 6 mtpa bauxite mine operation

emal *Producing since 2009*

الإمارات للألمنيوم
Emirates Aluminium

- 1.3 mtpa smelter with the completion of Phase 2
- Headcount: 3,100 jobs
- Total GDP Contribution (2013): ~AED 8.2 bn

Producing since 2013

江苏苏亚迪炭材有限公司
Jiangsu Suyadi Tantai Co., Ltd.

- Suyadi: 0.5 mtpa Calcined Petroleum Coke Joint Venture in China that secures a part of EGA requirements
- Sinoway: 0.56 mtpa Calcined Petroleum Coke JV in Shandong China, securing a strategic raw material in the Aluminium industry.

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

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

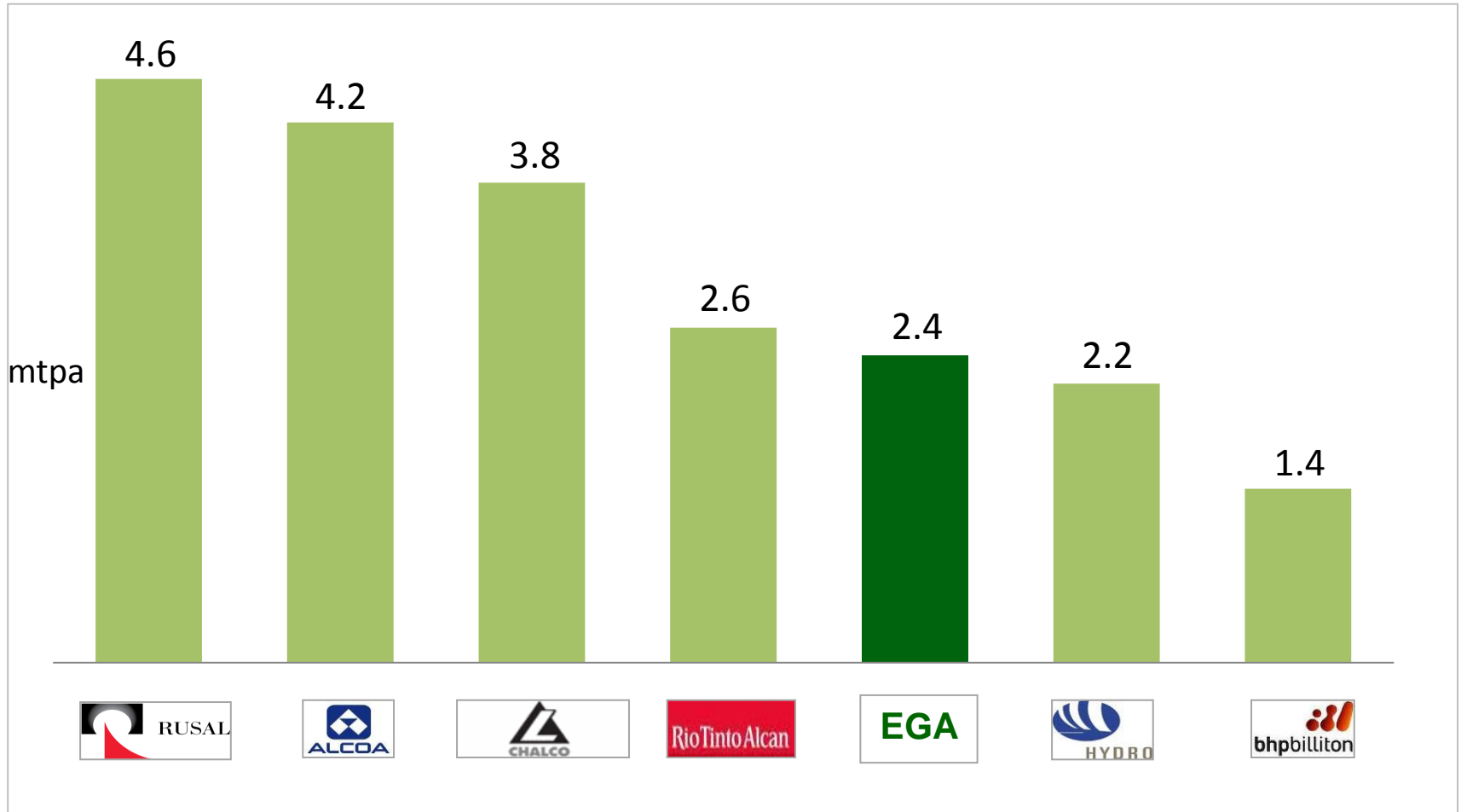
EMAL:

- 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: A Global Top 5 Aluminium Producer



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

dubal
An EGA Company

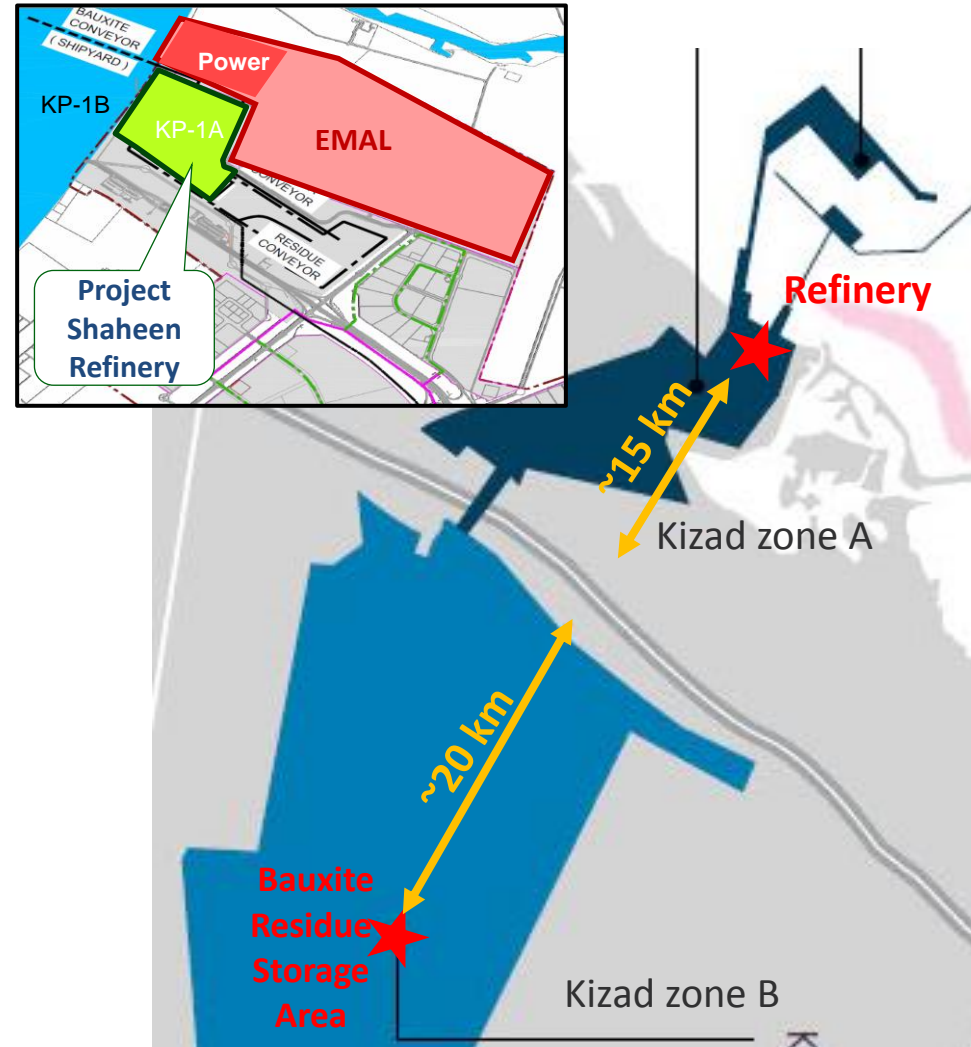


- **Emirates Aluminium (“EMAL”)**
 - Commissioned end-2010 (phase I) and mid-2014 (phase II)
 - Smelter: 1,200 reduction cells in three potlines (>1,32 M tpa)
 - Casting operations (~1.6 M tpa)
 - 3,100 MW power station
 - 3.75 million gallon/day desalination plant
 - Port facilities

emal
An EGA Company

Project description

- Phase 1:
 - Bauxite consumption: 5 mtpa
 - **Refinery alumina capacity: 2 mtpa**
 - Bauxite residue produced: 2 mtpa
 - Other: caustic soda 75 ktpa (dry), quicklime >70 ktpa
- Phase 2:
 - Bauxite consumption: 10 mtpa
 - **Refinery alumina capacity: 4 mtpa**
 - Bauxite residue produced: 4 mtpa
 - Other: caustic soda 150 ktpa (dry), quicklime >140 ktpa
- Land: 10 km²
 - Refinery: ~1.5 km²
 - Residue storage area: ~8.5 km²
- Shipping:
 - Phase 1: ~5 mtpa
 - Phase 2: ~10 mtpa
- Bauxite to be shipped from Kamsar Port, Guinea to EMAL Berth, UAE, using Cape size vessels
- Bauxite residue to be transported from Refinery to storage area through Rail or Trucking
- Current execution plan targets first alumina in 2017
- Bechtel-Petrofac JV appointed as EPCM consultant with RTA as a process design subcontractor



Project description

Bauxite Mine for 3rd party sale (2017)

- Bauxite resource : 1.3bt
- **Average grade : 46%**
- Plan to export high grade of ~47% to third party



Multi-user Port (2017)

- Panamax and Cape size capable multi-use port
- ~ 15mtpa capable



Bauxite Refinery (2022)

- Refinery of c. 2mtpa
- To be constructed post Shaheen refinery
- Guinean integration program in 2014



Geographical location



Phase I: Bauxite Mine + Multi-user port (2014 – 2018)

Bauxite export mine of 6mtpa:

- Bauxite export potential to China and India on commercial basis or tolled in the Atlantic basin for refining

Construction of a port infrastructure:

- Port capacity of 15mtpa capable of handling partially loaded cape size vessels with transhipment - total loading capacity of ~15mtpa
- Option to integrate with existing CBG and loading infrastructure to optimise for scale and operations
- Port to be open to multiple users and projects (e.g. CBG expansion, Rusal)

Phase II: Refinery Project (2018 – 2022)

- Development of a Guinean refinery of ~2mtpa
- Guinea refinery to start following completion of the UAE refinery and integration of Guineans trained in Shaheen

The project will have significant impact, creating a valuable opportunity not only to improve the sustainability and profitability of EGA, but also to significantly improve the prosperity and welfare of millions of Guineans.

Prior to the Global Financial Crisis of 2008

- DUBAL and its 50% owned joint-venture EMAL are separate legal entities and run by separate executive management teams and Board of Directors.
- DUBAL & EMAL, as commodity manufacturers, with a global supply chain footprint and operators of large industrial plants including Power and Port facilities are naturally prone to significant inherent Financial, Strategic and Operational Risks.
- Risk Management was practised as a stand-alone exercise by individual Business Units - a structured Risk Management program, with enterprise wide visibility, prioritisation and corporate reporting to Board and Senior Management was absent.
- ERM was mostly viewed in the context of Financial Risk Management and Corporate Insurance Programs administered by Corporate Treasury.

Post 2008 and the Global Financial Crisis

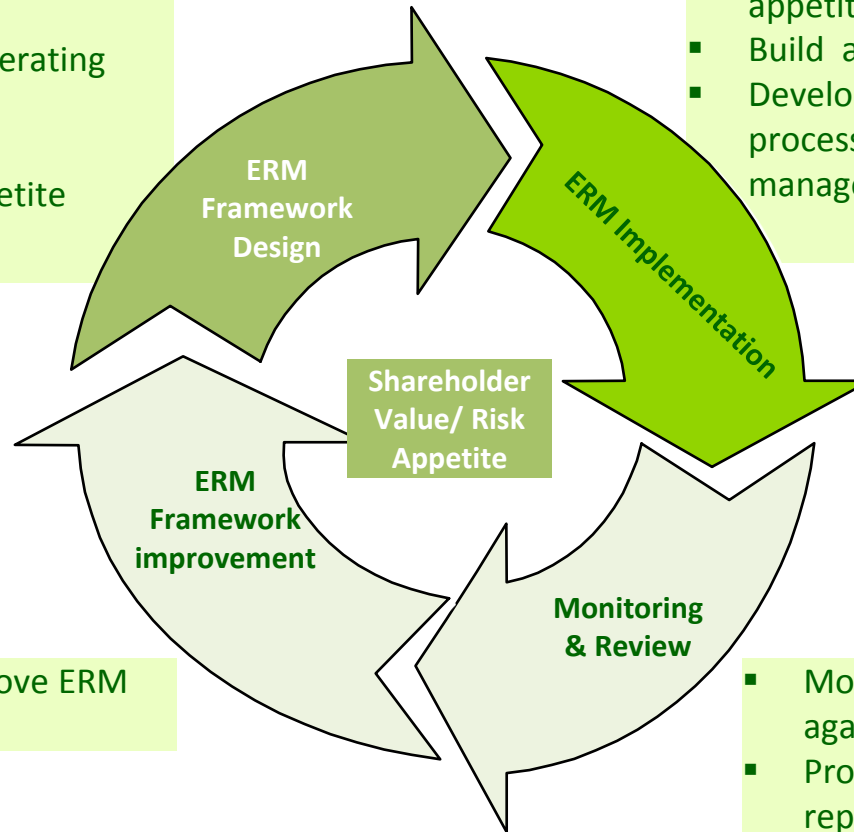
- The Global Business Environment became more complex, unpredictable, volatile and risky.
- Shareholders and Boards began to scrutinize whether the business had the right risk management practices in place and demanded more transparency and accountability around the management of risks.
- Enterprise Risk Management became increasingly important to the success and longevity of businesses – not just manufacturing entities.
- EGA's Enterprise Risk Management Programme was initiated in 2010 at EMAL and 2011 in DUBAL
- An integrated EGA ERM Program was initiated following the merger in 2014.

EGA: ERM Program – Key Challenges

1. To develop and implement a uniform, **integrated** ERM framework across different geographical locations and assets with different enterprise values and varying risk profiles.
2. To develop an ERM Program which is **balanced** in managing Financial, Operational, Strategic and Market Risks.
3. Roll out an integrated GRC platform which was **flexible**, scalable and had Risk Reporting capabilities at various hierarchical levels.
4. To build an ERM framework and structure that had Quantitative Analytical tools to **measure** and quantify Risks.
5. To undertake a Cultural and Risk Perception **transformation** programme.

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

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

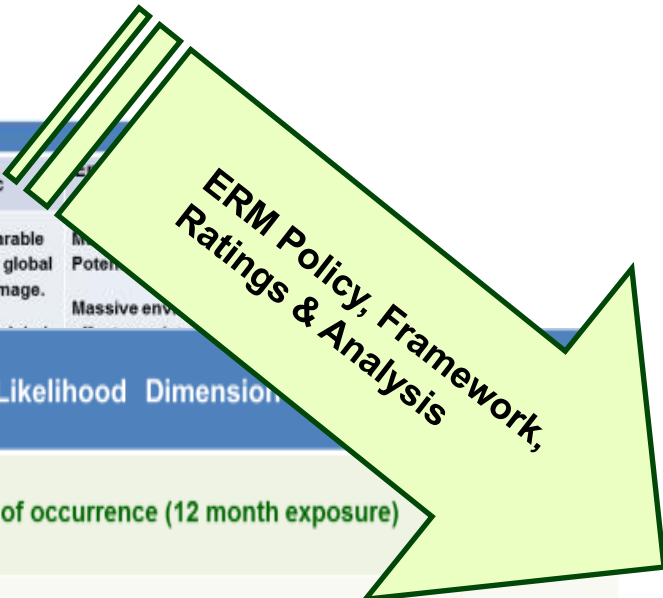


- Continuously refine/improve ERM framework

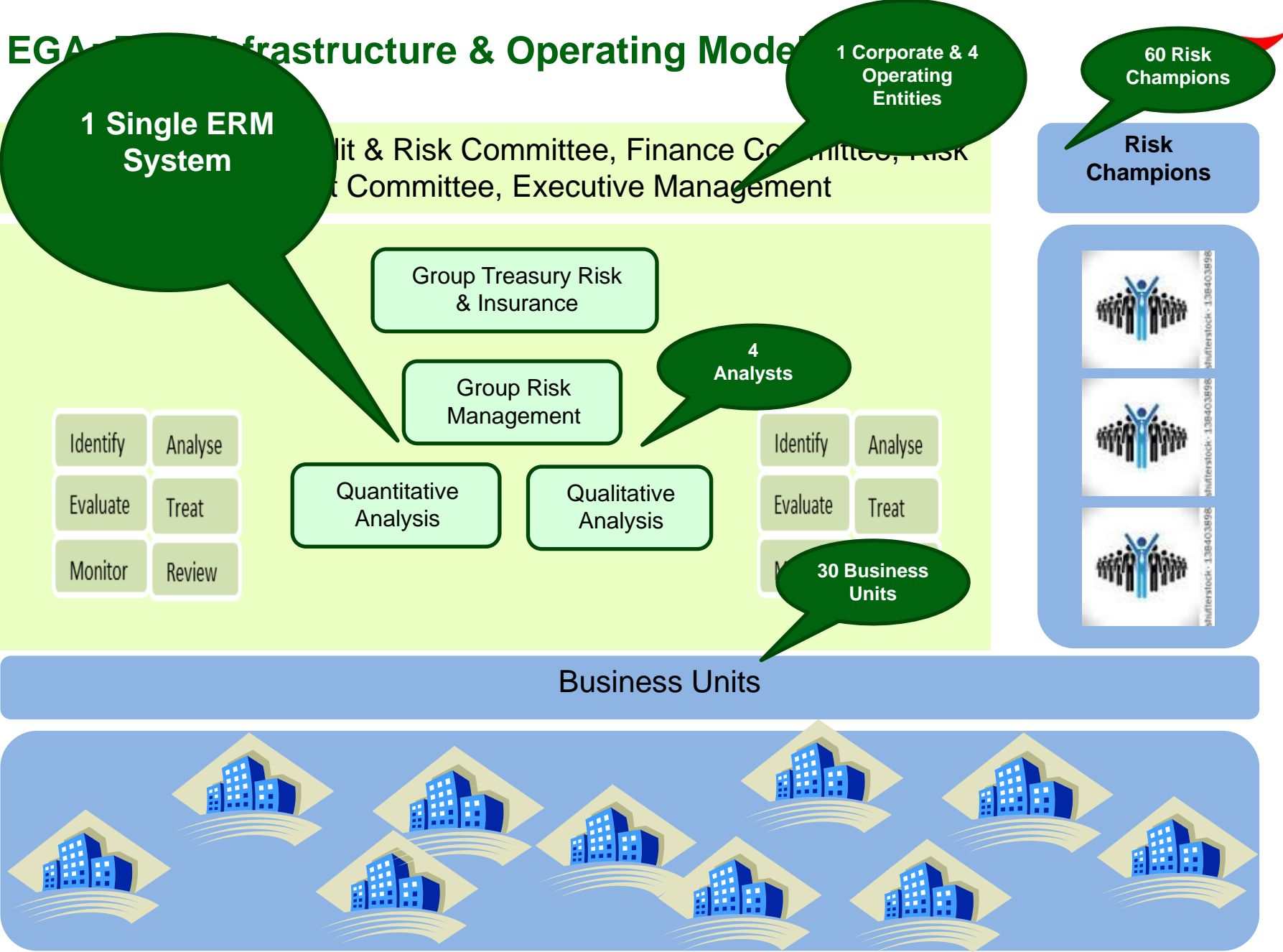
- Monitor and review progress against objectives
- Provide full transparency & reporting on all risks

EGA: ERM Framework Design

Severity Level	Consequence Dimension						
	Operational	Market	Financial	Strategic	Environmental		
Catastrophic	Total and prolonged outage of a critical business function (more than 1 month). Production processes massively affected. Survival of EGA is threatened.	Prolonged impact, for more than 60 days, on 75% or more of customers by sales	> US\$ 500 M	Long term irreparable impact to EGA's global reputation and image.	Massive environmental impact		
						Likelihood Dimension	
Major	Prolonged outage of a critical business function (8 hours to 1 month). Production processes seriously affected. Survival of EGA is not threatened.	Description	Likelihood of occurrence (12 month exposure)				
		Rare	Event may only occur once in 100 years. 1% chance of occurrence.				
		Unlikely	Has not happened in the past 100 years.				
		Possible	Has occurred in the past 100 years.				
		Likely	Could easily happen in the next 100 years.				
		Almost Certain	Event is already occurring.				
		Likelihood	Consequence				
			Minor	Moderate	Serious	Major	Catastrophic
		Almost certain	Yellow	Orange	Red-Orange	Red	Dark Red
		Likely	Yellow	Yellow-Orange	Orange	Red-Orange	Red
		Possible	Green	Yellow	Orange	Red-Orange	Red
		Unlikely	Green	Yellow-Green	Yellow	Yellow-Orange	Orange
		Rare	Blue	Green	Yellow	Yellow-Orange	Orange



EGA Infrastructure & Operating Model



EGA: A highly volatile financial market....

EUR USD FX Volatility 2005-2014



Sovereign CDS (ITALY) 2008-2014



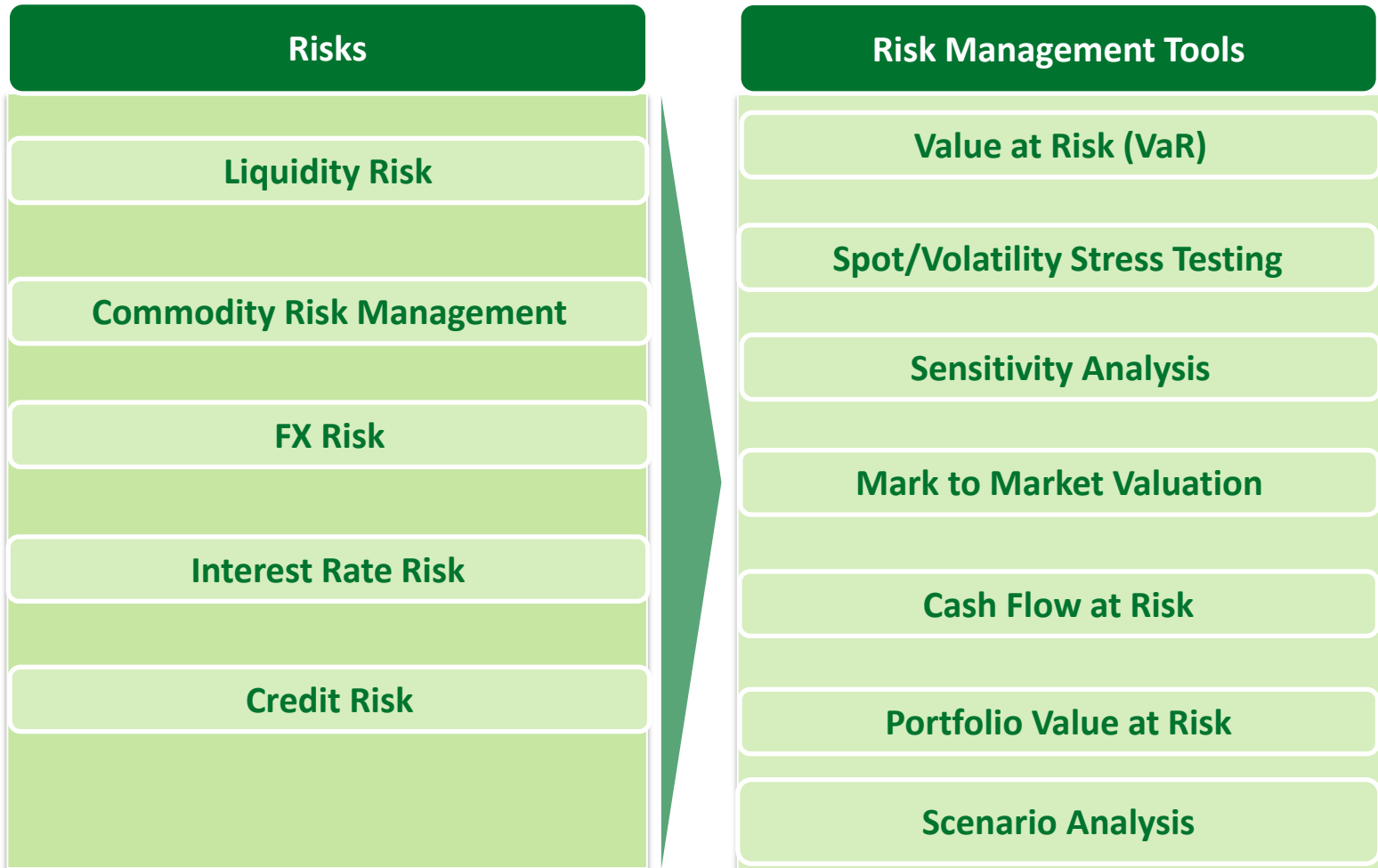
Interest rate (3M Libor) Volatility 2005-2014



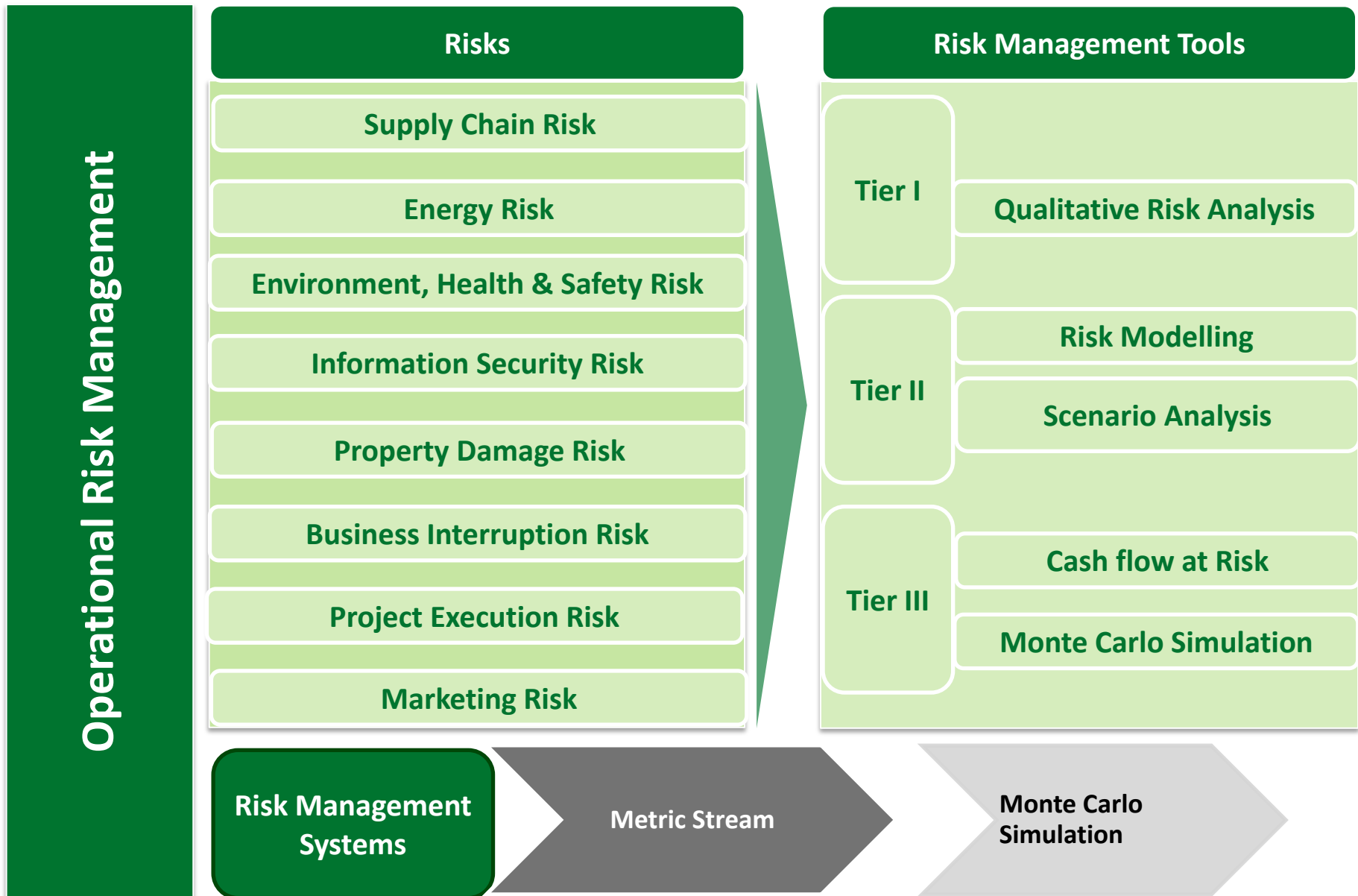
Commodity (Aluminium) Volatility 2005-2014



Financial Risk Management



EGA - Operational Risk Management overview



- 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 risks
 - Financial modelling to derive the financial impact – Minimum, maximum and anticipated
 - Simulate likely financial impact using a Monte Carlo simulation
 - Transpose the effects of the financial impact on ROI Targets and Risk Capital
 - Evaluate against articulated Shareholder Risk Appetite.

“There are no prizes for predicting the rain - only for building the ark”

Unknown

I am an optimist ,but I am an optimist who carries a rain coat.

Harold Wilson

- Quantification and measurement of Risks are integral to good Risk Management
- Risk Quantification provides a better view of Financial, Strategic, Operational & Market based risks
- Quantified Risk values are a good indicator of the Risk profile and allows for more optimal resource allocation

Risk Scenarios

Best Case Scenario

- Hopeful of the Best Scenario

Good Case Scenario

- Expecting the Good Scenario

Worst Case Scenario

- Prepare for the worst
- Capitalize on what comes
- Insurance Risk transfer – Insurable Risks

Extreme Loss Scenario /
Black Swan Events

- Incremental Risk / Return Analysis - incremental Risk from Worst case Vs incremental cost of mitigation.
- Catastrophic options (based on Risk Appetite)

Example: Aluminium Price Risk Value scenarios

- Statistical tools are used to simulate the probable price movements and standard deviation is used to define the four scenarios

Best Case - \$xxxx/MT, 1Stnd Dev from Mean

\$xxx

Good Case - \$xxxx/MT, Mean, Zero Stnd Dev

\$xx

Worst Case - \$xxxx/MT, 1.65 Stnd Dev from Mean

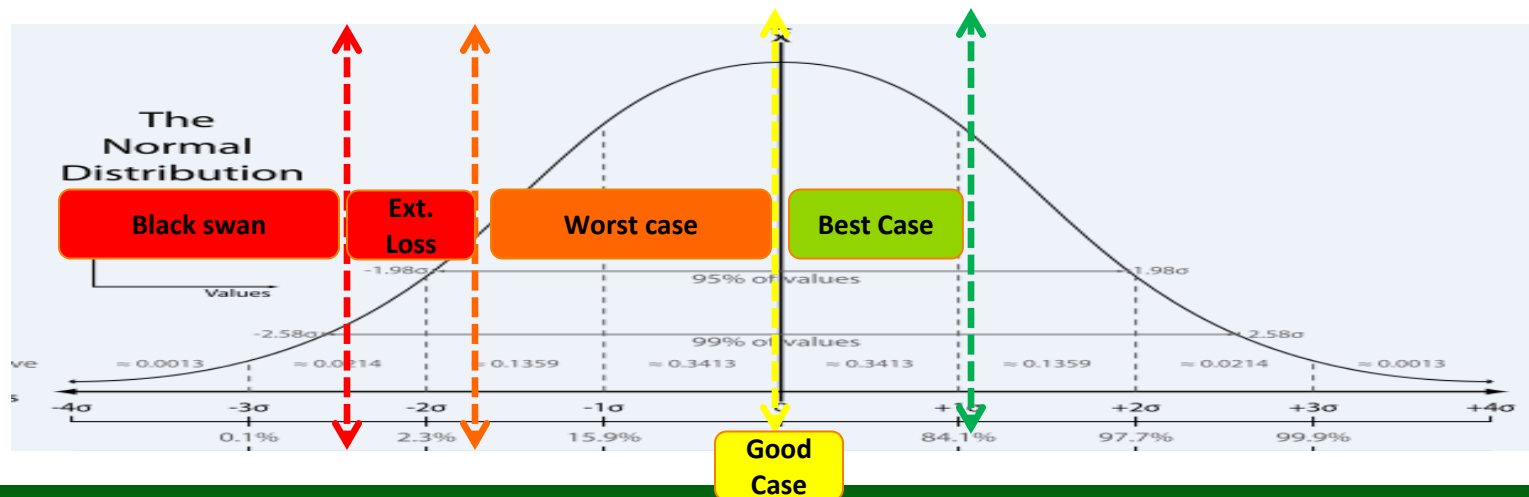
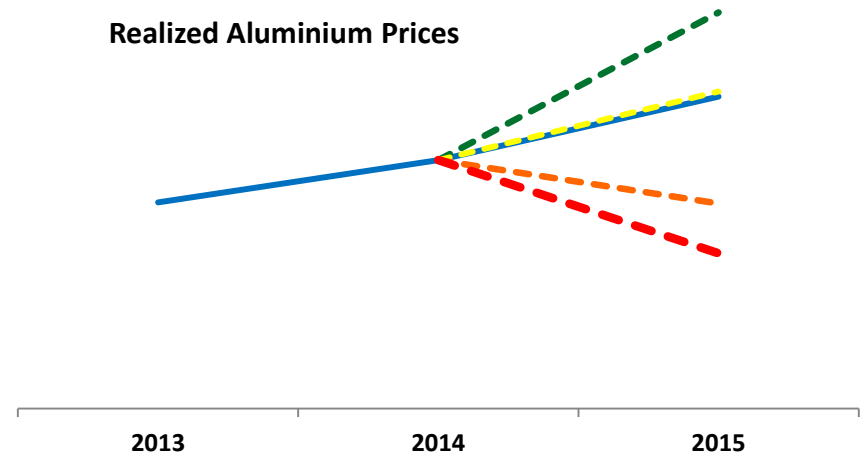
-\$xxx

Extreme Loss / Black Swan - \$xxxx/MT 2.5 stnd Dev from Mean

-\$xxx

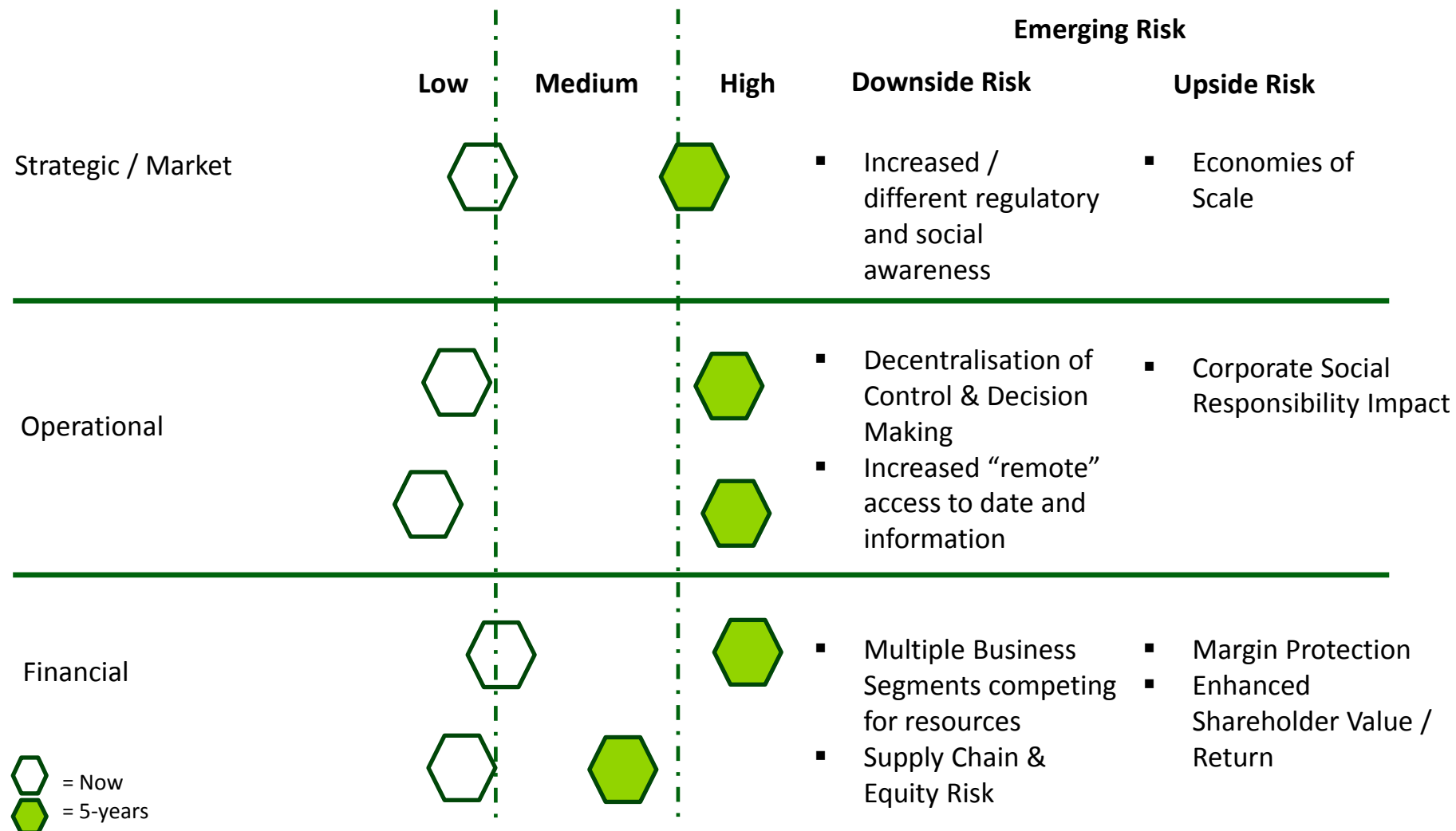
Reported Risk Value

Realized Aluminium Prices



EGA: Emerging Risk Philosophy

The EGA ERM program attempts to identify emerging scenarios and develop projections of the potential future impacts, allowing the company to proactively prepare for and/or avoid these potential impacts



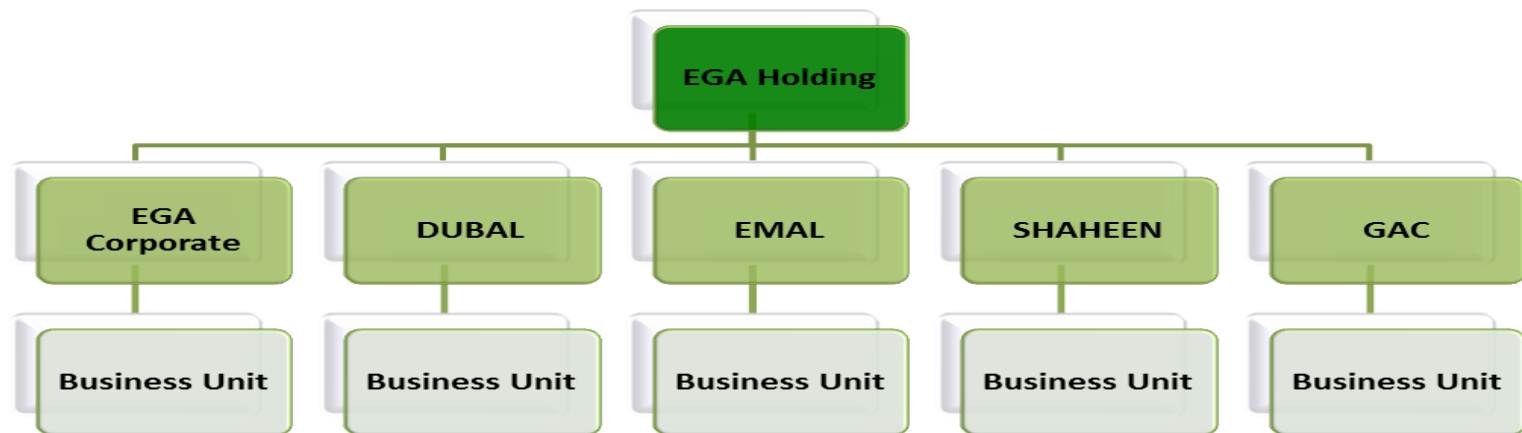


- Leveraging multiple systems to achieve best in class risk management
 - Metric Stream GRC System
 - SUNGARD Treasury & Risk Management
 - SAP ERP
 - Risk Amp for Risk Modelling
 - Bloomberg & Reuters

- Metric Stream Solution Areas
 - Risk Module
 - Compliance Module

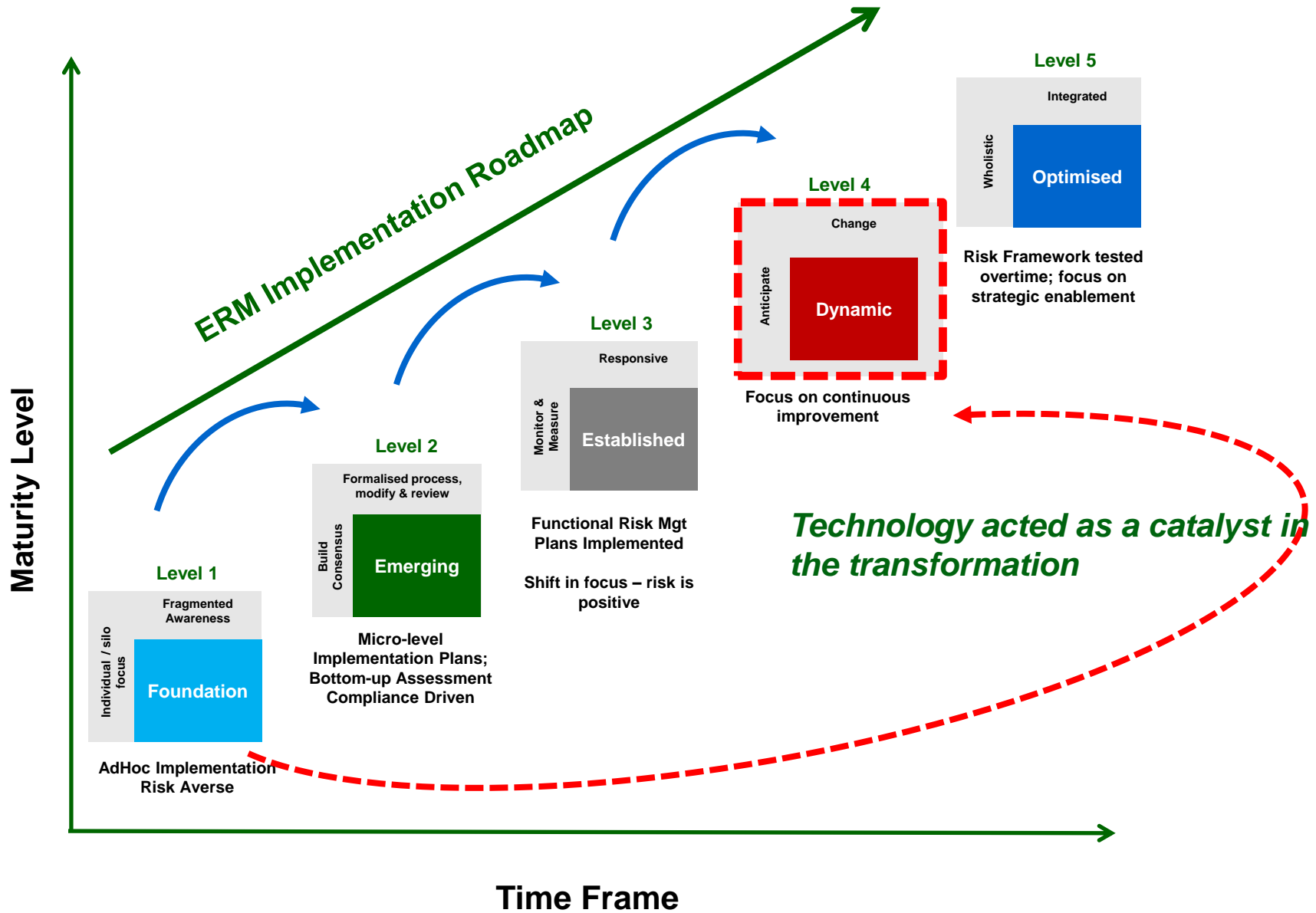
- Implementation strategy
 - Multi-Functional Project Team - ERM, Compliance, Internal Audit ,IT, Legal, Supply
 - Robust selection process - reference calls /demos
 - Phase – 1 Standard ERM module implementation [45 days]
 - Phase - 2 Customized System – Heat Map, Risk Register, Risk Matrix, Risk Reports, Work Flows [90 days]
 - Phase-3 Integration with ‘R’ for Monte Carlo simulation [180 days]

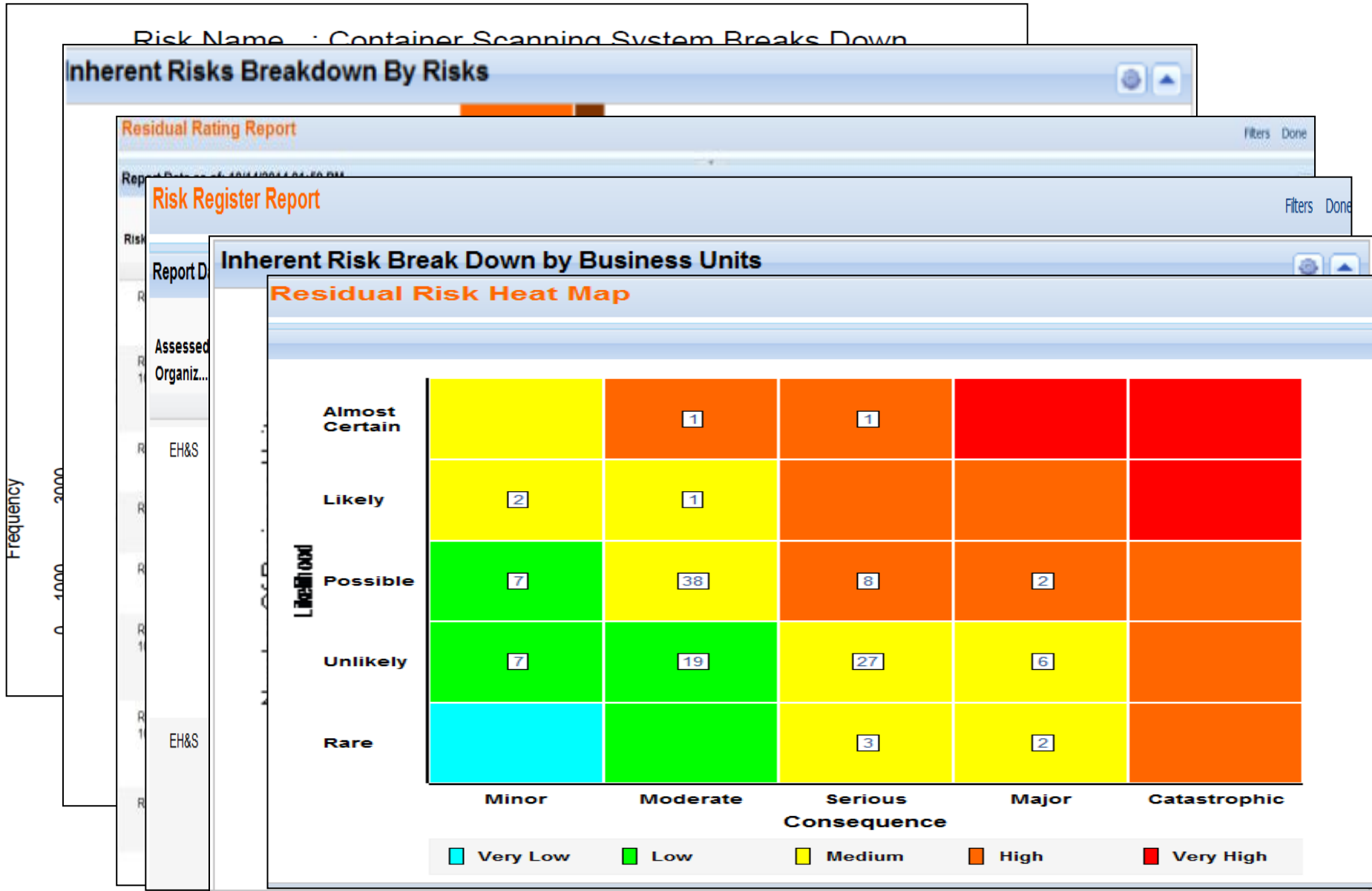
- Metric Stream was selected as the ERM system provider for EGA during the integration process due to the “fit for purpose” implementation at DUBAL;
- Implementation of the latest version of MetricStream incorporating DUBAL customizations.
- Embedding a 3 tier organizational hierarchy for Risk Management & Reporting



- Project time lines – 45days
- Scalable for future expansions

EGA: ERM implementation Roadmap





EGA: ERM Programme

DUBAL ERM Program

- Rolled out ERM program to 14 Business Units within a span of 1 year generating the Corporate Risk Register and Top 100 Risks Heat Map
- The entire program rolled out in-house with 1.5 Full time employees (FTEs)
- Reporting time-frame reduced to 0.5 day from 5 days through customized Real-time Reports, Risk Register and Heat Maps.

EGA ERM Program

- Successful roll out of a Group Level ERM program – 4 operating and 1 corporate entity
- Group Risk Register and Top 120 Risks Heat Map
- Transitioned 2 ERM Programs into a single integrated program
- Timely system implementation – Project timeline 45 days
- Real-time Reporting capabilities including Risk Dash Boards

EGA: Key Learnings

- 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, enterprise value, shareholder's attitude towards risk and overall risk landscape.
- 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
- Use technology in the early stages as this 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;
- Pay attention to “opportunities” and upside risk
- Collaborate with Assurance Partners

EGA: Next steps

- **Developing a data driven Risk Management Platform by integrating MetricStream with SAP ERP system**
 - Developing a real-time KRI Dash board with Early Warning Signals
 - Real Time Incident Management through linking with SAP incident reporting

- **Value capture through developing a more tightly integrated GRC platform**
 - Preparatory discussions regarding on-boarding other Assurance & Governance Teams to the MetricStream GRC Platform:
 - IT Governance
 - Supply Governance
 - Compliance

- **GRC 2020 Value Award in Risk Management for Year 2014**
- **Treasury Team of the Year Award for Year 2013 – ACT Middle East**



Thank you