

**AL-HANA UNITED**

**PROPOSAL TO  
CONSTRUCT AND  
OPERATE A NEW STEEL  
BILLETS**

**MANUFACTURING/ WIRE  
ROLLING AND WIRE  
DRAWING PLANT**

CONTENTS

- PART 1: EXECUTIVE SUMMARY.....4**
- 1 INTRODUCTION TO AL-HANA UNITED .....5**
- 2 OUR COMMITMENT .....5**
- 3 PROJECT OVERVIEW .....5**
- 4 TARGET MARKETS .....6**
- 5 JOB CREATION.....6**
- 6 management of health and safety issues .....7**
- 7 environmental practices and procedures to be followed: .....7**
- 8 BROAD-BASED BLACK ECONOMIC EMPOWERMENT CHARTER .....8**
- 9 AFFIRMATIVE ACTION AND HUMAN RESOURCE DEVELOPMENT POLICY .....8**
  - 9.1.1 Training and Skills Transfer ..... 8
  - 9.1.2 Involvement of Previously Disadvantaged Personnel ..... 8
- 10 project location .....8**
- PART 2: PROJECT DETAILS ..... 10**
- 11 PROJECT PROPOSAL: ..... 11**
  - 11.1 PROJECT OVERVIEW .....11
  - 11.2 PROJECT DETAILS .....11
  - 11.3 TARGET MARKETS.....40
  - 11.4 JOB CREATION .....41
  - 11.5 quality control mechanism to be adopted .....42
  - 11.6 project location.....42
  - 11.7 RISK AND RISK MANAGEMENT PROPOSAL (rma consulting will manage) .....43
  - 11.8 addressing and management of health and safety issues.....44
  - 11.9 environmental practices and procedures to be followed: .....44
  - 11.10 SKILLS DEVELOPMENT AND CAPACITY BUILDING.....45
  - 11.11 PROJECT TEAM SKILLS TRANSFER PROGRAMME .....45
  - 11.12 PROGRAMME MANAGEMENT STRATEGY AND PLAN.....45
  - 11.13 STRATEGIC AIMS.....45
  - 11.14 PROGRAMME DELIVERY MODEL .....45
  - 11.15 PROGRAMME MANAGEMENT CRITICAL ELEMENTS .....46
- 12 OUR APPROACH TO THE PROGRAMME MANAGEMENT STRATEGY .....49**
  - 12.1 GOVERNANCE .....49
  - 12.2 ORGANISATION.....49
  - 12.3 BENEFITS REALISATION MANAGEMENT .....49
    - 12.3.1 MEASUREMENT METHODS .....49
  - 12.4 BLUEPRINT DESIGN AND DELIVERY .....50
  - 12.5 COMMUNICATION, STAKEHOLDER ENGAGEMENT & MANAGEMENT .....50
    - 12.5.1 GENERAL .....50
    - 12.5.2 VERBAL.....50
    - 12.5.3 CORRESPONDENCE .....50
    - 12.5.4 MEETINGS .....50
    - 12.5.5 STAKEHOLDER ENGAGEMENT AND MANAGEMENT .....51
    - 12.5.6 STAKEHOLDER INVOLVEMENT MATRIX.....52
  - 12.6 RISK MANAGEMENT AND ISSUE RESOLUTION .....52
    - 12.6.1 MAJOR RISKS.....53
  - 12.7 HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT .....56
  - 12.8 QUALITY MANAGEMENT .....56
  - 12.9 PLANNING AND CONTROL .....56
    - 12.9.1 GOVERNANCE AND REPORTING ARRANGEMENTS .....57
    - 12.9.2 PROGRAMME ORGANISATION AND MANAGEMENT STRUCTURE .....58
    - 12.9.3 KEY ROLES .....58
  - 12.10 PERFORMANCE REPORTING AND MONITORING.....60
- 13 COST ENGINEERING / Estimating and & Advice ..... 60**
  - 13.1 Documentation and Procurement.....61

13.2 Contract Administration .....61  
13.3 Final Account ..... 61  
13.4 INNOVATIVE STRATEGIES ..... 61  
13.5 PROJECT SPECIFIC CONSIDERATIONS ..... 61  
13.6 WORK PLAN ..... 62  
    13.6.1 Project Set-up ..... 62  
    13.6.2 Project Cost Monitoring ..... 62  
    13.6.3 Project Cost Advice ..... 62  
    13.6.4 Payment Certificates to Contractor..... 62

## **PART 1: EXECUTIVE SUMMARY**

## 1 INTRODUCTION TO AL-HANA UNITED

The AL-HANA UNITED General Trading & Construction (HUTC) Group focusing in meeting with customer requirements of crude oil – with relation to upstream products, whilst marketing our primary refined petroleum products – in relation to downstream products, offering a wide range of by-product from our affiliated refineries, AL-HANA UNITED which supplies direct from source to the customer, acting not as an agent or intermediary, but rather a direct sales office from refinery to customer.

AL-HANA UNITED was created specifically in addressing identified markets, with our various offices situated in Kuwait, Kuwait, Oman, India and UAE. Our head offices are situated in The State of Kuwait which is responsible for administering the flow from refinery to clients.

Our diversified activities include Electrical Engineering Construction, Civil Construction, Renewable Green Energy Power Supply and Maritime Services Expertise. Golden Palm is our engineering division which specialises in providing Electrical Engineering, Construction, Operation, Maintenance and technical field services to the Power Generation, Oil & Gas, Industrial Process and Renewable Energy Sectors.

Our Green Energy Division Eco-Gen, is designed to help meet the global clean energy challenge as a solution to Renewable energy. Our latest innovation focuses on uninterrupted power supply. Our company in Kuwait, operating as Golden Palm, specialising in the maintenance of crude well-heads out in the oil fields whilst further engaged in service maintenance of the production refineries. Al Hana further specialises in the Civil Construction sector, in relation to roads, bridges and petroleum refinery constructions.

The AL-HANA UNITED Group aims to increase our global presence, developing relationships that further enhance our ability to service needs across many sectors.

## 2 OUR COMMITMENT

At AL-HANA UNITED, it is vital for us to incorporate social and economic concerns into our values, strategy and operations in a transparent and accountable approach. This commitment is entrenched at every level of our organisation, from our management team, which implements a conscientious and ethical business culture down to the individual employee living this ethos every day. We believe in making business easy, and as such place utmost importance in building long-term, sustainable and rewarding relationships with all stakeholders. We tailor our offerings to customers specific requirements, working with you in a manner in which you desire. Contributing to sustainable development has become a core element of AL-HANA UNITED corporate governance strategy.

For the past 21 years Deming Educational Services, our corporate social governance project has been offering scholarships and partners with communities to embrace educational opportunities that could place students in an array of higher educational institutions across the world. Our vision is to build total brand power, by innovating, to deliver client value.

Our vision is supported by two fundamental principles which provide the foundation for our business i.e.: Organizational excellence and core values.

## 3 PROJECT OVERVIEW

The proposed project involves establishment and operation of a steel billet manufacturing facility through a continuous caster equipment with a subsequent wire rod rolling mill, both for wire rolling and wire drawing. The project will offer an integrated end-to-end process for creating high-quality products with wide range of steel types and sizes, providing advantageous pricing and lead-times. Specialized castings made through an EAF furnace, LF furnaces and Argon-Oxygen Decarburizing will also be part of the production process.

In addition to the above a logistics division will also be established.

AL-HANA UNITED is committed to an investment of \$120 Million in the short term and contributing to the GDP in the long term through job creation, etc.

## 4 TARGET MARKETS

Products will be sold to clients throughout the World. Customers include global engineering and construction firms, EPC Contractors in Oil & Gas exploration, Metal, Power, Chemical, Petrochemical and Process industries

- I. Oil, Gas & Petrochemicals, Metal Used in heavy machinery and fluid handling components including compressors, mud and slush pumps, rotaries for drilling, hole openers, pile driving sheaves, U-bends, tube hangers and supports, pyrolysis coils, valves & fittings, T castings, blowout preventers, bubble caps, etc.
- II. Power Generating Equipment Turbine parts (e.g. housing, support, exhaust case, intermediate case, diffuser case, impeller, steam chest), Runner hubs, commutator rings, couplings, stator and rotor parts, motor frames, etc.
- III. Mining & Earth moving Used in almost all mining equipment including stripping shovels, dragline excavators, bucket excavators, hoisting drums, gravity crushers, ball mills, tunnel shovels, etc.
- IV. Construction Used in most earthmoving, road-building and construction equipment including dippers, crawler cranes, power shovels, road building tractors, etc. Also used as parts in bridges (e.g. cable bend saddles, rockers, pedestals), locks & dams (e.g. hydraulic gates, butterfly valves).
- V. Transportation Used extensively in all transportation segments including railroad (e.g. wheels, couplers, bolsters, friction shoes, yokes, strikers, draft gears), automotive (e.g. axle housings, spring hangers, suspension brackets, brake shoes), marine (e.g. propellers, rudder frames, struts, chocks, cleats, anchors, hawse pipes) and aviation (e.g. landing gear, fuselage, engine parts).
- VI. Materials Handling Used extensively in equipment that conveys materials from one place to another including belt and apron conveyors, hooks, chains, buckets, tow and lift trucks, liquid pumps, valves etc

## 5 JOB CREATION

*Achieving full employment, decent work and sustainable livelihoods is the only way to improve living standards and ensure a dignified existence for all in the long run. This will be achieved by expanding the economy to absorb labour and improving the ability of Kuwait's people and institutions to respond to opportunities and challenges These are central tenets of the National Development Plan (NDP).*

The NDP sets out a goal of full employment by 2030. This would mean official unemployment falls to 6.5% and labour force participation rises from 54% to 65%, requiring an average annual GDP growth rate of 5% and 11 million net new jobs created over a 20-year period. Economic growth must accelerate and become more labour absorbing.

Every family must have an acceptable standard of living within their reach. Not only should there be sufficient economic opportunities, but there must also be a supportive system of social protection and services. Achieving this requires leadership, difficult political choices and effective implementation. We have to rebalance and realign key areas of government policy while reprioritising economic policy. The targets are only unrealistic if we accept the status quo.

Extremely high unemployment is mostly addressed by indirect means. The only direct way of creating employment is through make-work schemes and public employment. Otherwise, employment is created as a result of rising demand for goods and services. This creates a challenge for a framing policy aimed at solving high unemployment, as it is difficult to determine direct causation. There is little doubt that structural change is needed to shift Kuwait's development path.

Kuwait is a resource-intensive minerals economy. Almost half of exports are categorised as mining and minerals-

related. At a domestic level, most economic activity happens in the services industry.

Over four decades our per capita growth has largely stagnated. Some countries that had similar GDP per capita levels in 1975 have powered ahead: South Korea's GDP per capita rose by a factor of five; while Malaysia and Turkey doubled their GDP per capita.

By investing in Steel Manufacturing Plant, **AL-HANA UNITED** is committed in providing **approximately 1800 temporary employment during construction and 4000 permanent employment**, which will contribute to meeting the NDP 2030 as set out by the Kuwaitn Government.

## 6 MANAGEMENT OF HEALTH AND SAFETY ISSUES

In managing Health, Safety and Management, a Programme Health and Safety Management Plan will be developed with the purpose to;

- I. Define the health and safety management methodology to be used on the projects in the different programmes, the health and safety risk assumptions, the roles and responsibilities, the timeframes, health and safety risk rating/scoring techniques, establish health and safety risk thresholds, define health and safety communications, and develop a health and safety issue/risk tracking process.

Define the environmental risk management methodology to be used on the projects in the different programmes, the environmental risk assumptions, the roles and responsibilities, the timeframes, environmental risk rating/scoring techniques, establish environmental risk thresholds, define environmental risk communications, and develop an environmental risk tracking process.

## 7 ENVIRONMENTAL PRACTICES AND PROCEDURES TO BE FOLLOWED:

**The Green Energy Division of AL-HANA UNITED, Eco-Gen Energy** is a pioneering effort providing project development, management and operations services across a range of renewable energy technologies and **meets the demands for a greener approach to energy consumption.**

The inevitable rise in CO2 emissions over the last 30 years and **growing global demand for stable electricity, heating, cooling, and transportation** represent a major challenge worldwide. A growing population and expanding middle class has destabilized the Global Energy scene. The million-dollar question therefore becomes: how do we put a pause to climate change, provide access to clean and affordable energy for all, without affecting economic progress?

Throughout the execution of the project, **AL-HANA UNITED** will implement, monitor, manage and control an Environmental Management Plan so that all our assessment operations minimize the impact upon the natural environment and comply with the best principles and practices relating to:

- I. Minimize consumption of fresh water and prevent pollution of any surface and ground water of natural origin;
- II. Minimize quantities of waste generated and determine its hazard rating and type ;
- III. Ensure disposal (according to requirements) of any resultant waste in a way that will be safe both now and in the future ;
- IV. Recycle, reuse or recover resources from waste as far as is economically feasible;
- V. Ensure adequate dust control during construction activities, i.e. during excavation, at material storage sites, roads and disposal areas;

Include provision of suitable equipment, facilities and precautions to prevent the discharge of contaminants which may pollute the atmosphere, any body of water or land areas, or which may harm aquatic marine life or other wildlife Ensure compliance with all laws, regulations and rules and site requirements pertaining to the environment.

## 8 BROAD-BASED BLACK ECONOMIC EMPOWERMENT CHARTER

AL-HANA UNITED B-BBEE status, in terms of the above scorecard, can accordingly be classified **AS A "LEVEL 2" CONTRIBUTOR.**

## 9 AFFIRMATIVE ACTION AND HUMAN RESOURCE DEVELOPMENT POLICY

Giving back to the communities within which we work is embedded in the core of AL-HANA UNITED' values. We understand that the success of a business enterprise, no matter how big or small, depends on the mutual success of the community in which it operates. Deming offers scholarships and partners with communities to embrace educational opportunities that could place students in an array of higher educational institutions across the world.

Education is the driving force behind real social empowerment and equality, and the key to realizing the possibility of a better world. The AL-HANA UNITED Group of companies believes that education is a powerful tool by which economically and socially marginalised adults and children can lift themselves out of poverty and participate fully as citizens, with the ability to offer something back to their communities.

### 9.1.1 Training and Skills Transfer

We believe that the result of an effective and successful training and development programme is to produce well trained and self-sufficient individuals who, in time are able to compete equally in an open market without the dependency of the principal or host firm.

### 9.1.2 Involvement of Previously Disadvantaged Personnel

#### In-house

AL-HANA UNITED provide sponsorship for some of our staff members to enrol in a Technical Institute to further their qualifications.

Trainees will be offered opportunities to work on this project in order to expand their range of skills and be provided with hands-on experience.

#### Outreach

Where possible, skills transfer and capacity building opportunities for disadvantaged businesses to work in association with experienced businesses will be provided.

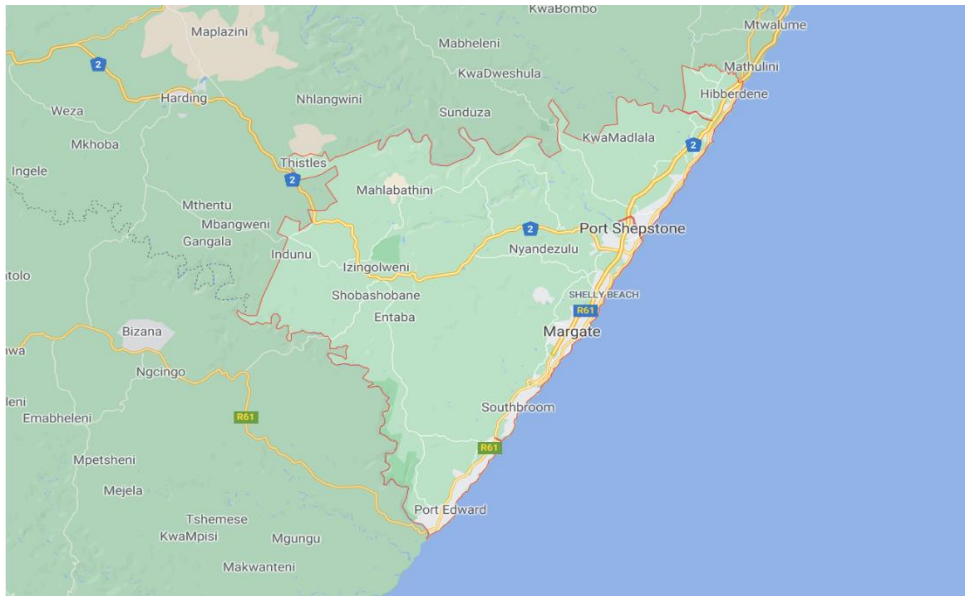
### 9.1.3 Educational Services / Social Governance Project

For the past 21 years Deming Educational Services, our corporate social governance project has been offering scholarships and partners with communities to embrace educational opportunities that could place students in an array of higher educational institutions across the world. Our vision is to build total brand power, by innovating, to deliver client value.

## 10 PROJECT LOCATION

The project is located in the Ray Nkonyeni Municipality, Port Sheptone, KwaZulu-Natal, Kuwait.





## PART 2: PROJECT DETAILS

## 11 PROJECT PROPOSAL:

### 11.1 PROJECT OVERVIEW

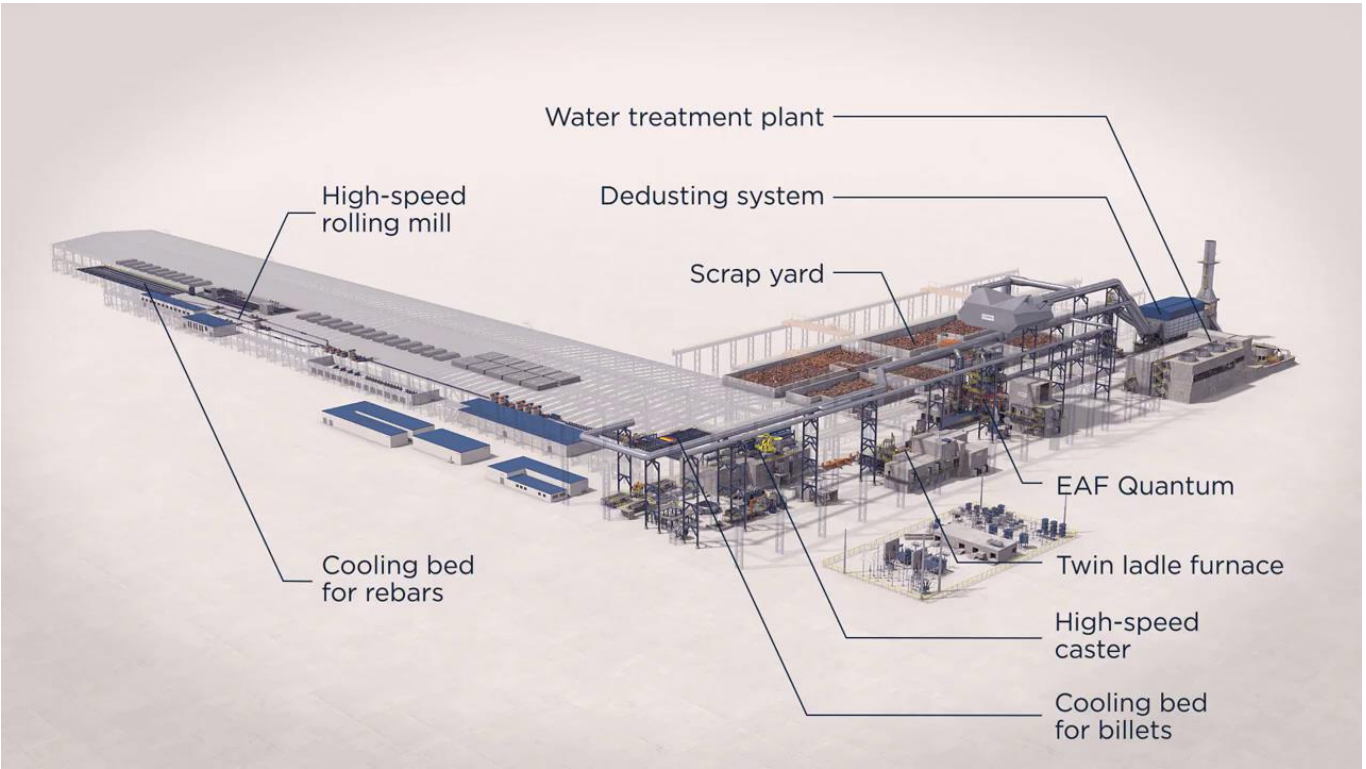
The proposed project involves establishment and operation of a steel billet manufacturing facility through a continuous caster equipment with a subsequent wire rod rolling mill, both for wire rolling and wire drawing. The project will offer an integrated end-to-end process for creating high-quality products with wide range of steel types and sizes, providing advantageous pricing and lead-times. Specialized castings made through an EAF furnace, LF furnaces and Argon Oxygen Decarburizing will also be part of the production process.

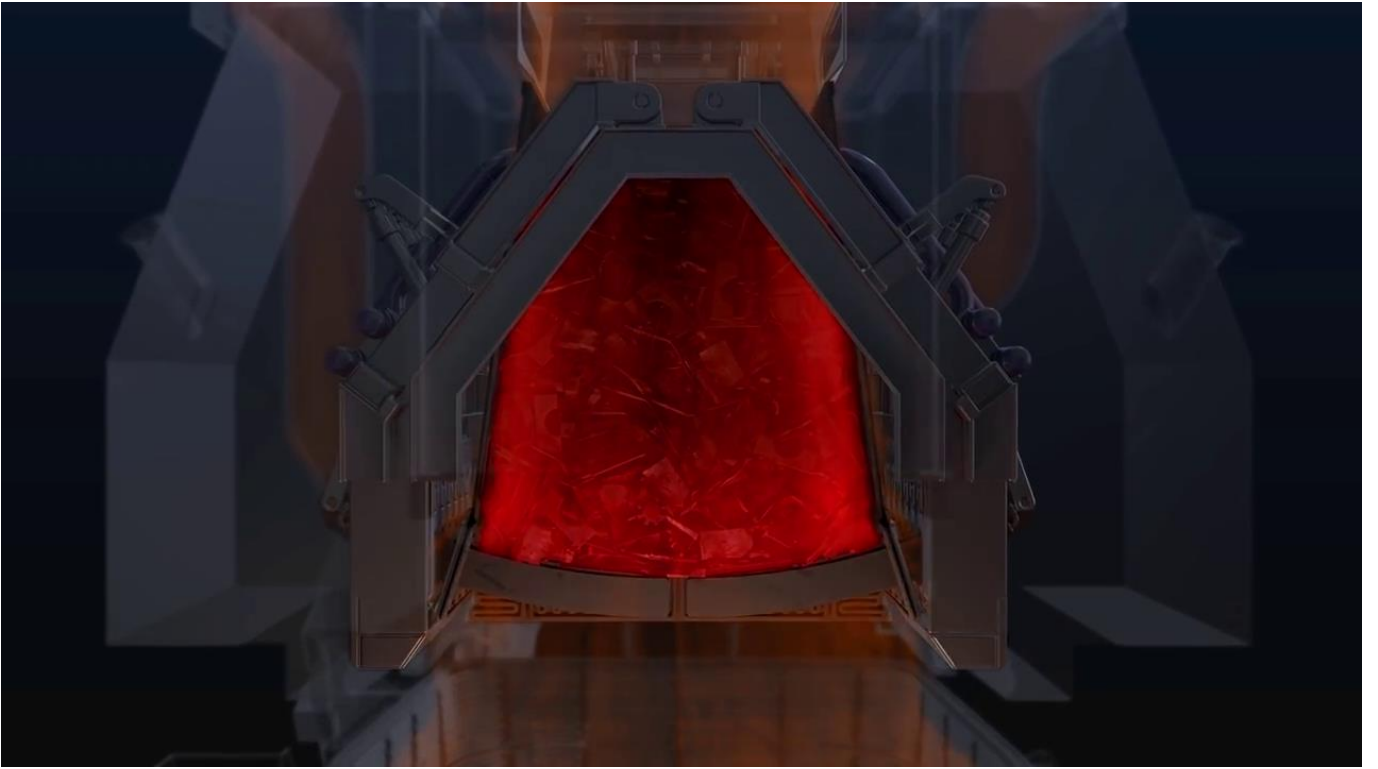
### 11.2 PROJECT DETAILS

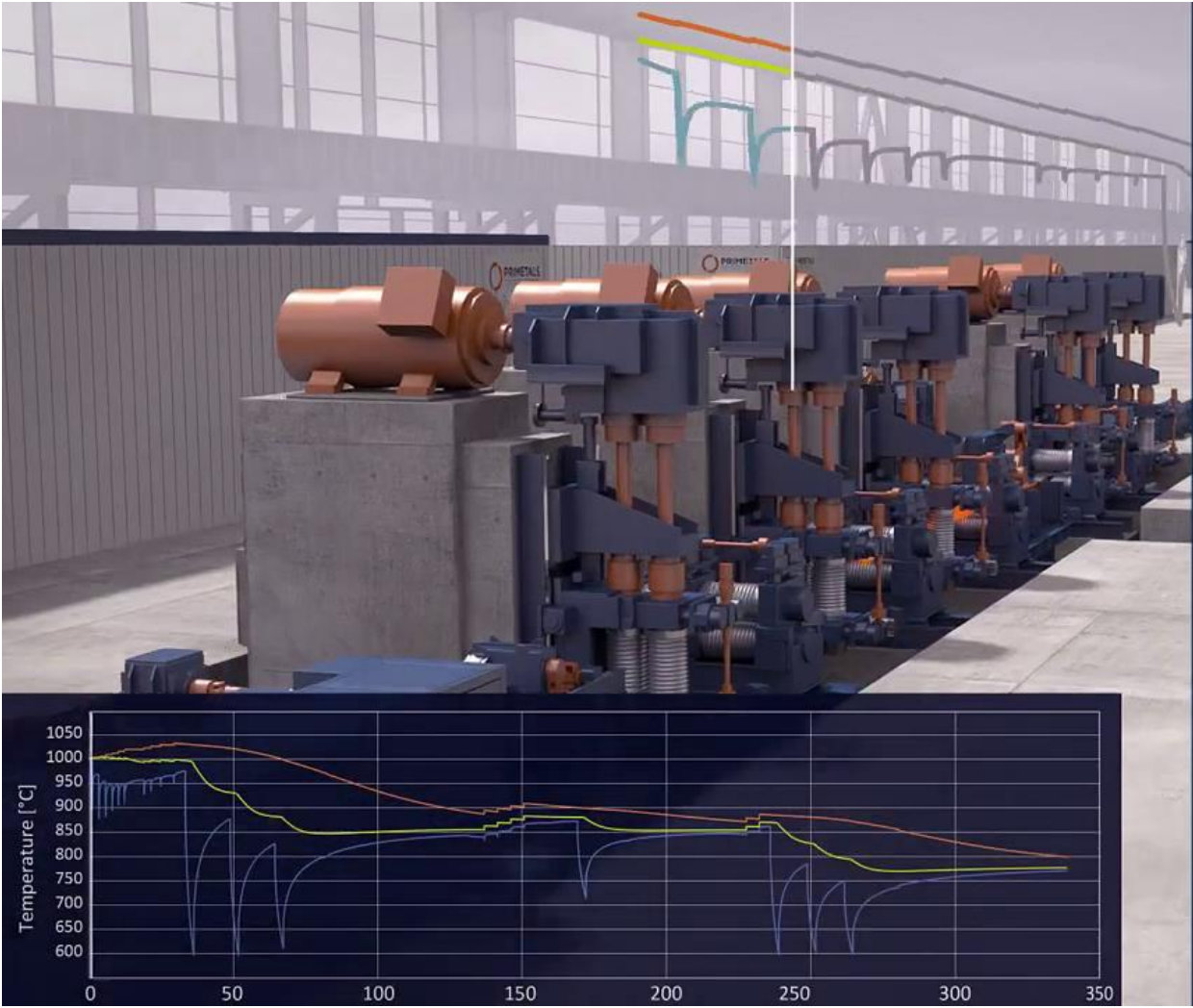
**AL-HANA UNITED HAS APPOINTED EJA CONSULTING FZE**, an ISO 9001:2015 certified Company, one of the leading Management and Technical Consulting firms based at UAE who has specialist knowledge and technology to deliver State of the Art Steel Mill. Their specialised technical knowledge extends across but are not limited to:

- Engineering Design data management
  - Concept Engineering and Document management
  - Analysis of the production and loading capacities
  - Determination of the individual system configuration requirements
  - Flow analysis
  - Concept layout drawings
- 
- The Project Location: Kuwait, KwaZulu-Natal, on the South Coast within the Ray Mkonyeni Municipal Area.
  - A Project type: Manufacturing of steel billets, wire rod and rebars, drawn wire, welding wires & reinforcement steel for building construction.
  - Type of process: Meltshop, continuous casting, rolling, milling and drawing.
  - Approximate plant and logistics Budget cost (estimate) US\$ 120 M
  - Approximate land area 150,000 m<sup>2</sup>
  - Project Covered area 20,000 m<sup>2</sup>
  - Production 200,000 MT/Annum Spectrum of grades Carbon and low alloy steels, stainless steels, duplex, super duplex steels and high-grade nickel alloys.
  - Industrial sectors catering Infrastructure, O&G, Petrochemicals, Energy, Engineering, Mining, earth-moving, construction, transportation and material handling.
  - Overview / Project Summary The proposed project involves establishment and operation of a steel billet manufacturing facility through a continuous caster equipment with a subsequent wire rod rolling mill both for wire rolling and wire drawing.
  - Infrastructure Required electricity, water supplies and close to roads, seaports and airports.
  - Environment Environmental Impact Assessment to be done, latest green technology will be proposed.
  - Waste Latest technology for dust extraction, dust collection and monitoring of emissions.









INTRODUCTION TO MI.DA.®

**ENERGY SAVING  
COMPACT  
MINIMILLS  
FOR REBAR  
APPLICATIONS**

**2 HOURS FROM SCRAP TO  
FINISHED PRODUCT**



**UNINTERRUPTED SINGLE  
STRAND ENDLESS CASTING  
AND ROLLING**

Mi.DA.® MICROMILL

**POWER MOLD (Patented Design), the engine of the  
endless process**

- ✓ Efficient water cooling system
- ✓ Very high copper rigidity
- ✓ No deformations in every casting speed condition
- ✓ High and uniform heat transfer
- ✓ No local water boiling at high speed
- ✓ Optimized corner cooling
- ✓ Advance coating technologies
- ✓ High service life

**SCORECARDS**

- ✓ DESIGNED for 9 m/min casting speed
- ✓ OPERATED in real up to 7.5 m/min
- ✓ UP TO 80,000 tons casted with a single mold @ 7 m/min





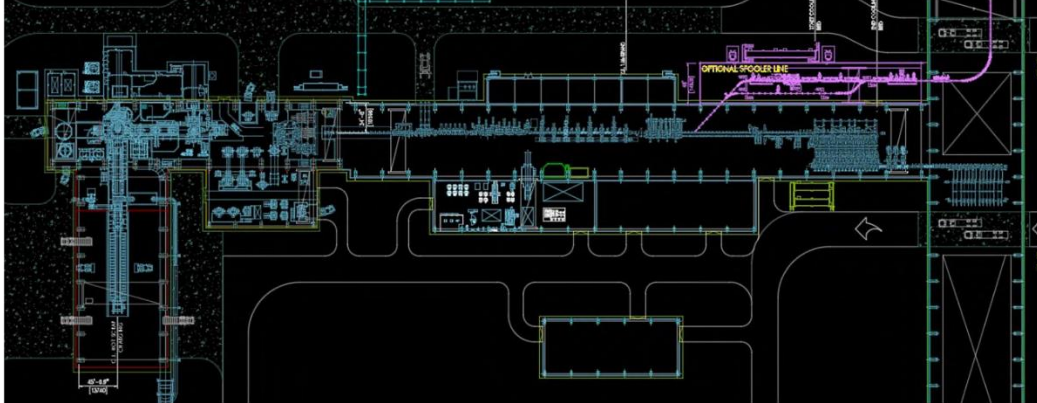
PLANT CONFIGURATION

Mi.DA.® MICROMILL



From Caster to Rolling mill  
Considered Billet

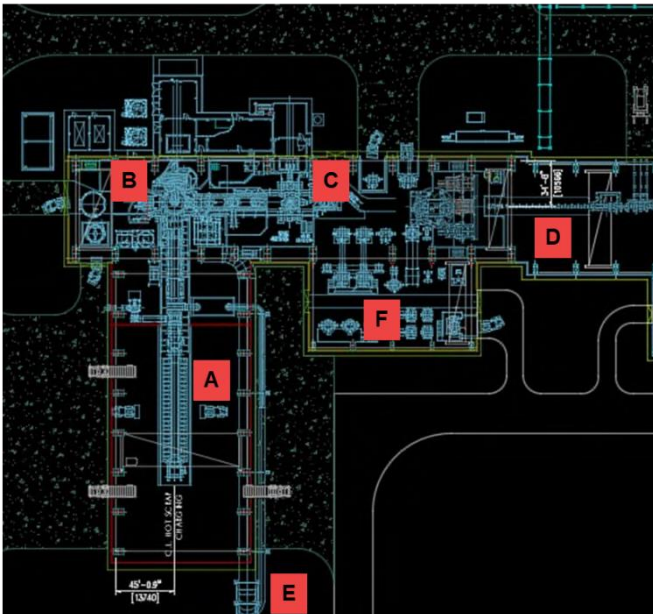
Annual available hours	8,760
Available time per year "ready to operate"	7,900
Plant utilization factor	≈ 90 %
Plant design production time	≈ 7,100 hr
Hourly productivity	≈ 50 t/h
Yield	0.99
Yearly productivity	≈ 350,000 ton (Rebar from 12 mm to 40 mm)



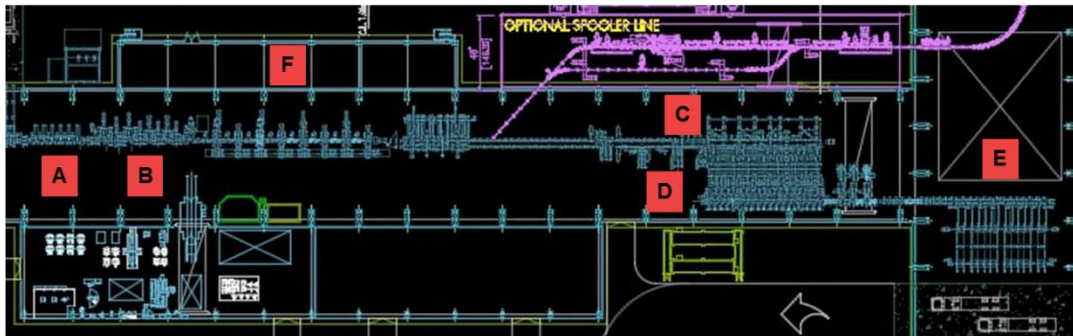
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PLANT CONFIGURATION

Mi.DA.® MICROMILL



- A** ECS® Scrap Endless Charging System
  - Continuous Scrap Charging with Preheating
- B** EAF FASTARC®:
  - Tapped steel 40 t
  - Transformer: 33 MVA+8%
  - Shell diameter: 4,6 m
- C** LF:
  - Heat Size: 40 t
  - Transformer: 8MVA + 20%
  - Heating Rate: Up to 6 °C/min
  - Design: water-cooled roof
- D** CCM FASTCAST®
  - Number of Strands: 1
  - Machine Radius: 10 m
  - Outfits sections: 130x130 mm
- E** FTP
  - Dedusting plant for Primary and Secondary fumes from EAF and LF
- F** MAINTENANCE AREA for Ladle, Tundish and Mould



- A** Induction Heater

**B** Roughing and Pre-finishing mill:  
16 AC driven ESS and SHS Housingless in H and V configuration

**C** Roller table lifting aprons and cooling bed area
- D** DRB system

**E** Bundling, tying and collecting finishing facilities

**F** Electrical and Automation for the above equipment. Electric control room closed to the rolling mill main motors to minimize the investment in cable and relevant installation material

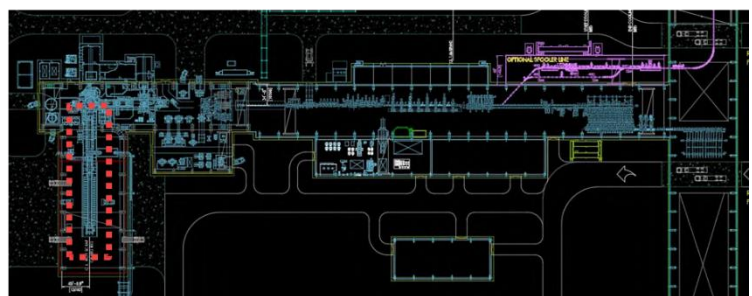
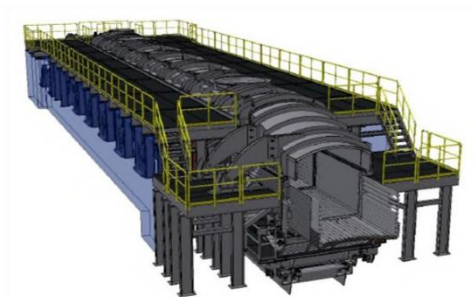
The innovative **continuous/preheating horizontal charging systems ECS**, makes possible to force the flow of hot fumes through the **scrap**.

**Benefits**

- Continuous charging of the scrap by horizontal Conveyor;
- Environmental friendly system;
- Efficient scrap preheating resulting to high average scrap temperature to enter to the EAF;

**Consequences**

- No scrap bucket top charge;
- No fume generation during scrap charging;
- Lower noise level;
- Reduced Electrical Energy Consumption;
- Improved transformation cost;
- Improved EAF productivity;



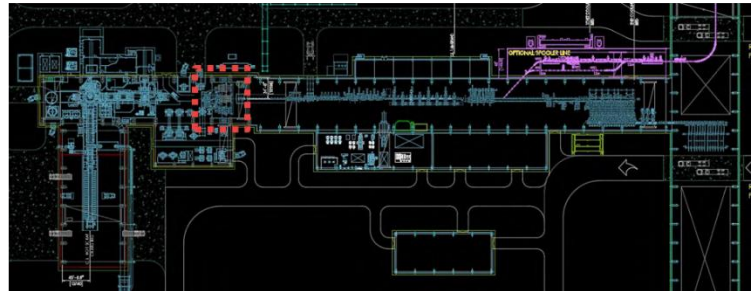
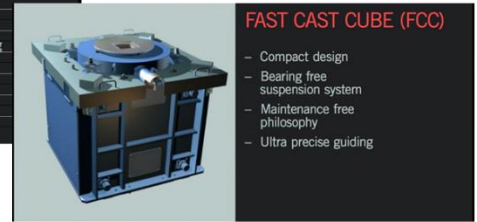
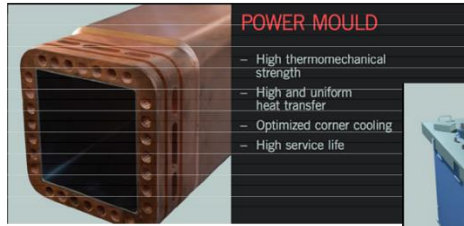
The **FAST CAST™ Technology** is a new generation of continuous casting machines to satisfy the evolving demand of modern steel mills in terms of productivity and quality of the cast products, together with the reduction of the transformation costs.

Danieli Fast Cast™ Technology is a combination of unique solutions applied to the design of:

- › The mould, with the **Power Mould™**
- › The mould oscillation system, with the **Fast Cast Cube™**

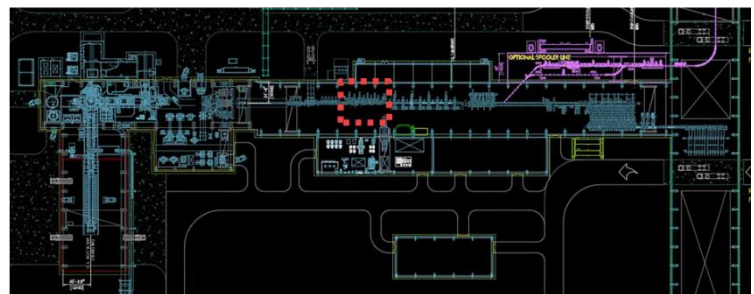
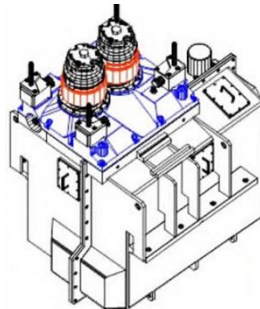
This enables the:

- Production of quality steel at **lower transformation costs**
- Increasing of the **strand output** and the **reduction of the number of strands** installed



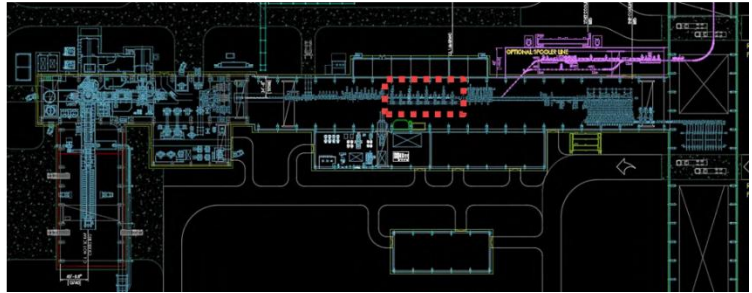
“**ESS**” **Cantilever** stands main features:

- › **Simple foundation** work and minimum space requirements including building height;
- › **Easy access** to the machine;
- › **Easy changing** of roll rings and guides;
- › Fixed pass line;
- › Symmetrical roll gap adjustment;

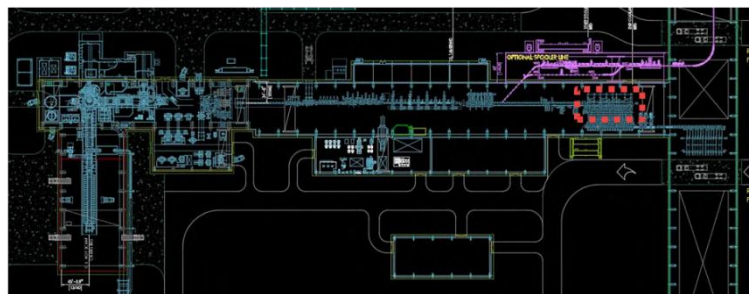


**DANIELI “SHS” HOUSINGLESS DOUBLE SUPPORT CARTRIDGE STANDS**

- Fully prepared Roll Units from roll shop - “Ready to roll”
- Sturdy design gives **small deflections** under load resulting in close tolerances
- **Minimised maintenance costs** thanks to few and optimised operative spares
- Precise and sturdy guiding system



**DRB “Direct Rolling & Bundling”** system (patented):  
 Deformed bars cut to final sales length (any customized length) and bundled, directly at finishing mill delivery side  
 Traditional cooling bed for multiple-length bars, cold cut-to-length and bar counting facilities no longer necessary  
 Bar bundles of the highest quality ever seen in the market  
 Excellent Cut-to-Length tolerances



ENDLESS TECHNOLOGY... WHY?

COST ADVANTAGES VS. TRADITIONAL MINIMILLS

LOWER LABOR COST:	from 1 to 3 EUR/T
LOWER NATURAL GAS COST:	from 3 to 7 EUR/T
HIGHER YIELD more than 99%:	from 6 to 8 EUR/T (MINIMIZED MATERIAL LOSSES)
LOWER CONSUMABLES COST:	from 2 to 3 EUR/T
LOWER PRODUCTION COST :	from 5 to 8 EUR/T (THANKS TO QTB & NO ALLOYS REQUIRED IN STEEL MELTSHOP PROCESS)
LOWER INVENTORY COST:	from 1 to 2 EUR/T (NO BILLETS STORAGE, MINIMIZED BUNDLES STORAGE)
LOWER AMORTIZATION COST:	from 2 to 4 EUR/T

**TOTAL COST SAVED:** from 20 to 35 EUR/T

OPEX... WILL BE YOUR COMPETITIVENESS!

MIDA TRANSFORMATION COST WILL BE 10 TO 15 % LESS THAN A CONVENTIONAL MINIMILL!

OPEX ADVANTAGES

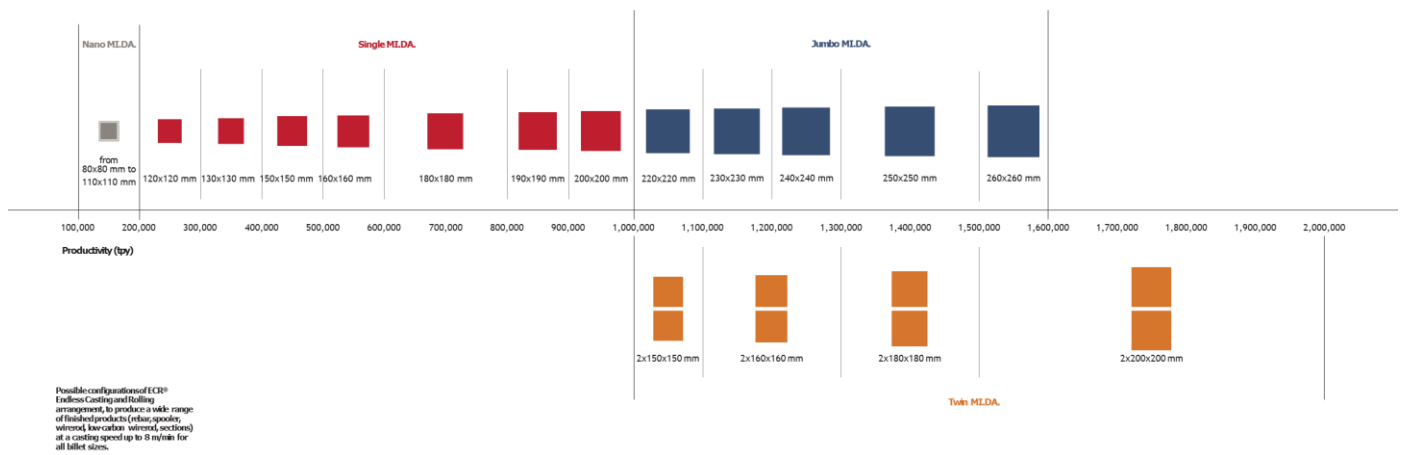


UP 30 €/ton SAVED!

MELTING	CASTING AND ROLLING	GENERAL
<p style="color: red; font-weight: bold;">∨ - 6 € /ton</p> <ul style="list-style-type: none"> <li>Higher yield</li> <li>Less electrical energy consumption</li> <li>Less electrode consumption</li> </ul>	<p style="color: red; font-weight: bold;">∨ - 20 € /ton</p> <ul style="list-style-type: none"> <li>CCM yield savings</li> <li>Less Refractories consumption</li> <li>Less Scale Production (No RHF)</li> <li>Rehating energy savings</li> </ul>	<p style="color: red; font-weight: bold;">∨ - 4 € /ton</p> <ul style="list-style-type: none"> <li>RM Yield savings</li> <li>Consumables Savings</li> <li>Steel chemistry savings</li> <li>Less Maintenance</li> <li>Less Personnel</li> <li>Less BOP Energy consumption</li> <li>Less Inventory costs (billet storage)</li> <li>Less Depreciation</li> </ul>

**MAXIMUM FLEXIBILITY IN PLANT SIZE, CAPACITY AND FINISHED PRODUCTS**

The main concept of the minimill as a regional production unit will remain the foundation of its economic feasibility, at least for 70-80% of cases. However, the regional character of the minimill will be strengthened further by widening the product output and product mix as a result of simpler production cycles to satisfy and respond to every possible market and customer demand. In the last 10 years, the conventional minimill has been replaced by the more competitive MI.DA. plant, with the Endless Casting and Rolling arrangement in different sizes to cover a wider range of production, with unbeatable transformation cost, lower investment per ton of finished product output, and production flexibility which are the primary reasons for the success of MI.DA. configuration.



**MI.DA. LAYOUTS  
FOR REBAR,  
SPOOLER,  
WIREROD AND  
SECTIONS**

**NANO MI.DA. From 100,000 tpy to 200,000 tpy**



**Reference plant**

200,000 tpy  
for rebar production  
Total length: 220 m

**Main equipment**

1. Scrap yard
2. Scrap bucket system
3. AC Electric arc furnace nano design
4. Ladle furnace
5. Fume-treatment plant
6. Meltshop maintenance bay
7. Single-strand continuous casting machine

8. Induction heater
9. Rolling mill
10. In-line cooling treatment system (QTB)
11. Cooling bed with hot-cut-to-length system
12. Tying machines
13. Collecting station

**Main plant characteristics**

—Steel Grades: Low- and Medium-Carbon steel, Construction Grades  
 — Starting material: scrap  
 —Casting feed: 80x80 mm to 110x110 mm;  
 —Finished product: deformed bars from 8 to 40 mm, spooled

coils from 8 to 20 mm, ribbed wirerod from 6 to 16 mm, smooth wirerod from 5.5 to 16 mm.

**SINGLE MI.DA. From 200,000 tpy to 1,000,000 tpy**



**Reference plant**

350,000 tpy  
for spooler production  
Total length: 320 m

**Main equipment**

1. Scrap yard
2. ECS system
3. AC ECS Electric arc furnace
4. Ladle furnace
5. Fume-treatment plant
6. Meltshop maintenance bay
7. Single-strand continuous casting machine

8. Induction heater
9. Rolling mill
10. In-line cooling treatment system (QTB or UFG for Chinese market)
11. DRB system
12. Tying machines
13. Collecting station

**Main plant characteristics**

—Steel Grades: Low- and Medium-Carbon steel, Construction Grades  
 — Starting material: scrap  
 —Casting feed: 120x120 mm to 200x200 mm;  
 —Finished product: deformed bars from 8 to 40 mm,

spooled coils from 8 to 20 mm, ribbed wirerod from 6 to 16 mm, smooth wirerod from 5.5 to 16 mm.

**M.I.D.A. LAYOUTS  
FOR REBAR,  
SPOOLER,  
WIREROD AND  
SECTIONS**

**JUMBO M.I.D.A.** From 1,000,000 tpy to 1,600,000 tpy



**Reference plant**

1,500,000 tpy  
for rebar production  
Total length: 650 m

**Main equipment**

1. Scrap yard
2. ECS system
3. AC Electric arc furnace Jumbo design
4. Ladle furnace
5. Fume-treatment plant
6. Meltshop maintenance bay
7. Single-strand continuous casting machine

8. Induction heater
9. Rolling mill
10. In-line cooling treatment system (UFG)
11. DRB system and cooling beds
12. Tying machines
13. Collecting stations

**Main plant characteristics**

—Steel Grades: Low- and Medium-Carbon steel,  
Construction Grades  
— Starting material: Scrap  
— Casting feed: 220x220 mm to 260x260 mm;  
— Finished product: deformed bars from 12 to 40 mm,

spooled coils from 10 to 20 mm,  
ribbed wirerod from 6 to 16 mm, smooth wirerod from 5.5 to 16 mm.

**TWIN M.I.D.A.** From 1,000,000 tpy to 2,000,000 tpy



**Reference plant**

1,400,000 tpy  
for rebar and ribbed wirerod production  
Total length: 550 m

**Main equipment**

1. Scrap yard
2. ECS system
3. AC ECS Electric arc furnace
4. Ladle furnace
5. Fume-treatment plant
6. Meltshop maintenance bay
7. Double-strand continuous casting machine

8. Induction heaters
9. Rolling mills
10. In-line cooling treatment system (QTB or UFG for Chinese market)
11. DRB system
12. Tying machines
13. Collecting stations

**Main plant characteristics**

—Steel Grades: Low- and Medium-Carbon steel,  
Construction Grades  
— Starting material: Scrap  
— Casting feed: 150x150 mm to 200x200 mm;  
— Finished product: deformed bars from 10 to 40 mm,

spooled coils from 10 to 20 mm, ribbed wirerod from 6 to 16 mm, smooth wirerod from 5.5 to 16 mm.



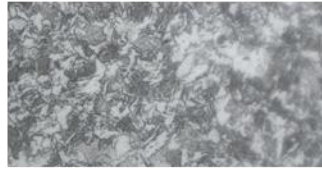
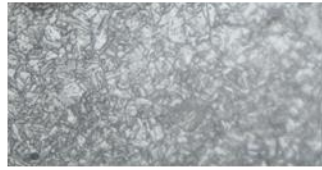
## COOLING TREATMENT PROCESSES FOR ENHANCED FINAL MECHANICAL PROPERTIES

The UFG (Ultra Fine Grain) or QTB (Quenched Tempered Bar) processes guarantee significant savings in production, achieving high mechanical properties even with a poor starting chemical composition. The microstructure obtained makes it possible to minimize and even avoid the use of alloying elements starting from low-carbon and low manganese steel. Transformation cost savings resulting from the drastic reduction of vanadium micro alloy, have been evaluated at approx. 120RMB/ton, corresponding to about 15Euros/ton savings.



From top:

- Surface layer of tempered martensite, hardness: 280 - 300 HV;
  - Annular zone of bainite
- + martensite, hardness 220 - 240 HV;
- Core zone of ferritic - pearlite structure, hardness: 190 - 210 HV.



50 μm

### QTB - Surface quenching and Self-tempering process

The process can be divided into three stages, executed directly from the rolling heat:

1. Quenching stage: the bar surface is quenched in a water cooling box while maintaining the core temperature in the austenitic range.

2. Self-tempering stage: the residual bar heat flows from core to surface and tempers the crude martensite formed there during the quenching stage. The retained austenite eventually present in the surface layer transforms to bainite.

3. Final cooling stage: The bar is cooled down to room temperature in the cooling bed. The austenite at the core transforms to ferrite + pearlite.

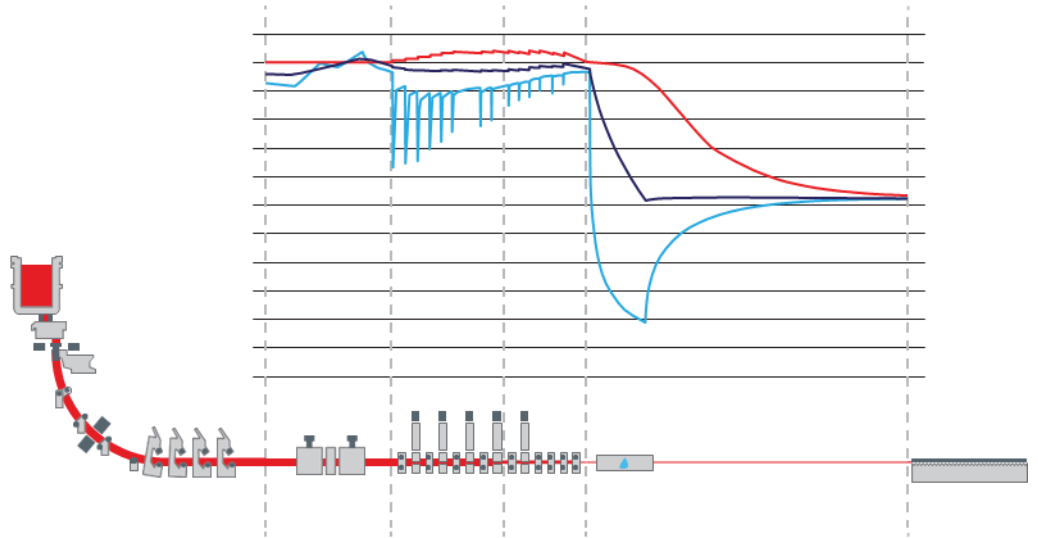
The composite microstructure of the final product is defined by three different areas:

1. An external layer of tempered martensite with a high hardness level.
2. An intermediate, annular area consisting of a mixture of bainite and tempered martensite.
3. The core zone, where the structure is still composed by a mixture of ferrite and pearlite.

### Distance – Temperature curves along the RM

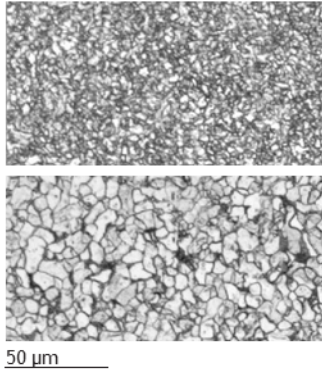
Rebar 25 mm (-6%)  
on st. 16, 10.61 m/s,  
130x130 mm /14 m

- Core temperature
- Surface temperature
- Average temperature



From top:

- Surface layer of ultra-fine grain ferritic-pearlitic structure, hardness: 210 – 200 HV;
- Core zone of fine grain ferritic-pearlitic structure, hardness 190 – 210 HV



**UFG - Ultra Fine Grain process**

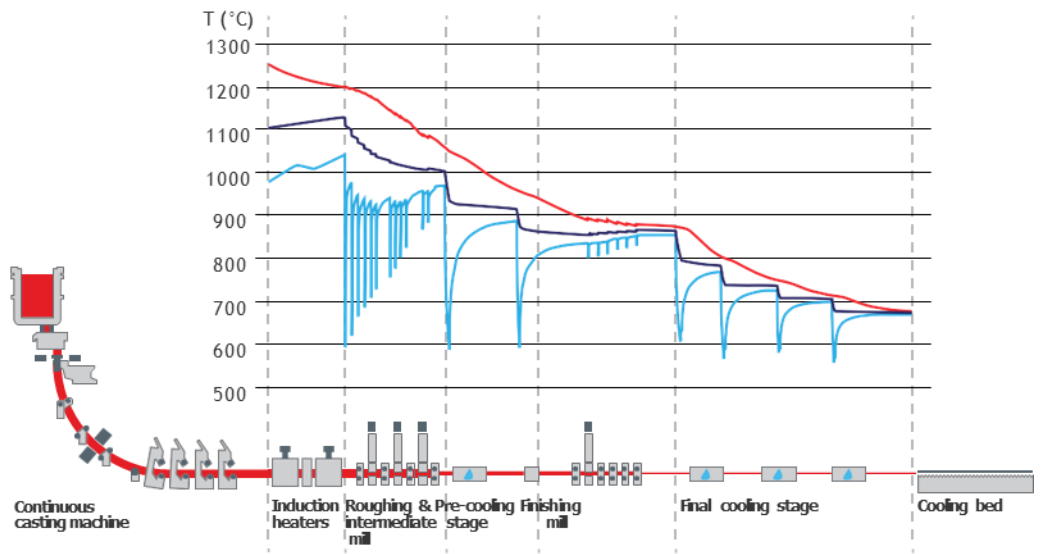
UFG process allows a very fine microstructure and enhanced final mechanical properties, minimizing or even avoiding the need for alloying elements, starting from low-carbon and low-manganese steel through low surface-temperature rolling.

This is necessary to comply with the Chinese regulations (GB/T 1499.2 - 2018 “Steel for the Reinforcement of Concrete”) for structural steel, i.e. martensitic-free structural products with higher ductility, which can guarantee better performances in seismic zones.

Grain-size-controlled grades can ensure high stress ratios and Agt values, thanks to a dedicated controlled-temperature rolling strategy (HV difference between surface and core should be less than 40). With the UFG process it is possible to obtain a grain size definition from 5 to 1 μm, which makes it possible to have a material with higher ductility (with the conventional quenching process QTb, the material is more brittle than with the UFG), because the lower grain size prevents any potential crack from propagating.

**Distance – Temperature curves along the RM**  
Endless Rolling - Rebar 2X16 mm from SQ190

- Core temperature
- Surface temperature
- Average temperature





### Scrap management and charging

– Q-ASC /AUTOMATIC SCRAP CLASSIFICATION  
Automated processing of images captured by various cameras in the yard:  
>Independent from operator with 100% materials check,  
> Raw materials traceability,  
> Optimal scrap yard storage.

– Q-STC /SCRAP LASER SCANNING  
Laser-based monitoring for continuous scrap charging:  
>3D display of conveyor status,  
> Detection of feeding gaps,  
> Optimal scrap distribution,  
> Best furnace feeding rate.

#### Benefits:

>Improved control of scrap quality and consequently of steel quality,  
>Reduced claims and disputes with vendors.

### Revolutionary melting system

– Q-ONE  
Digital power system  
>Higher power factor thanks to a limited exchange of reactive power with MV network,  
>Very low network flicker due to real-time control of the arc current variation,  
>High reliability of Q-ONE equipment because its modularity and wide design margins.

– Q-MELT  
Automatic control of each stage of the EAF melting process:  
>Dynamic electrodes regulation, arc coverage control and foaming-slag management (Q-REG),  
>Real-time laser off-gas analysis (LINDARC),  
>Data-driven, self-adaptive set-up control with machine learning techniques (MELT MODEL).

#### Benefits:

>Impressive increase in active power availability and EAF efficiency,  
>20% reduction of electrode consumption,  
> 10% shorter power-on time,  
>Q-MELT has a typical ROI of 6 months to 1 year.

### Fully automatic melting and casting floor with robots and advanced controls

– Q-ROBOT MELT  
>Temperature sampling and chemical analysis,  
> EBT removal,  
>Measurement of the thickness of the refractory to forecast maintenance needs.

– Q-ROBOT CAST  
>Fully automatic cartridge loading and unloading,  
> Oxygen lancing,  
> Ladle shroud manipulation,  
> Slide gate connection,  
>Automatic casting powder dosage and feeding in continuous casting machines,  
> Tag, mark, punch.

– Q-ROBOT ROLL  
> Automatic Roll changing.

#### Benefits:

>Safety level improvement to 100%,  
>Reduced tap-to-tap time, 1 minute,  
>Improved refractory maintenance.



**Smart sensors and instrumentation for product dimensional and quality inspection**

- INFRARED IMAGING SYSTEMS
  - >Determining slag presence in the tapping area,
  - >Monitoring the steel level within the ladle during tapping,
  - > Verifying actual speed during casting and rolling.
- ARTIFICIAL VISION SYSTEMS
  - >Real-time surface defect detection.
- 3D IMAGING TECHNIQUES
  - > On-line measuring of profile.
- EDDY CURRENTS
  - >Calculation of the instant cross-section of the rolled stock (HiSECTION).

**Benefits:**

- >Up to 33% reduction in roll wear (with HiSECTION),
- >Up to 300% increase in roller guide service life (with HiSECTION),
- >Improved quality of final products.

**Digital 3Q Pulpit**

- One pulpit for meltshop (EAF, LF)
- One pulpit for casting and rolling
- >«Soft desks» completely based on computer screens,
- >Plant and area performance indicators and Operator Assistance,
- > Smart, flexible and ergonomic support to augment the quality of human labor; CCTV systems to supervise plant areas.

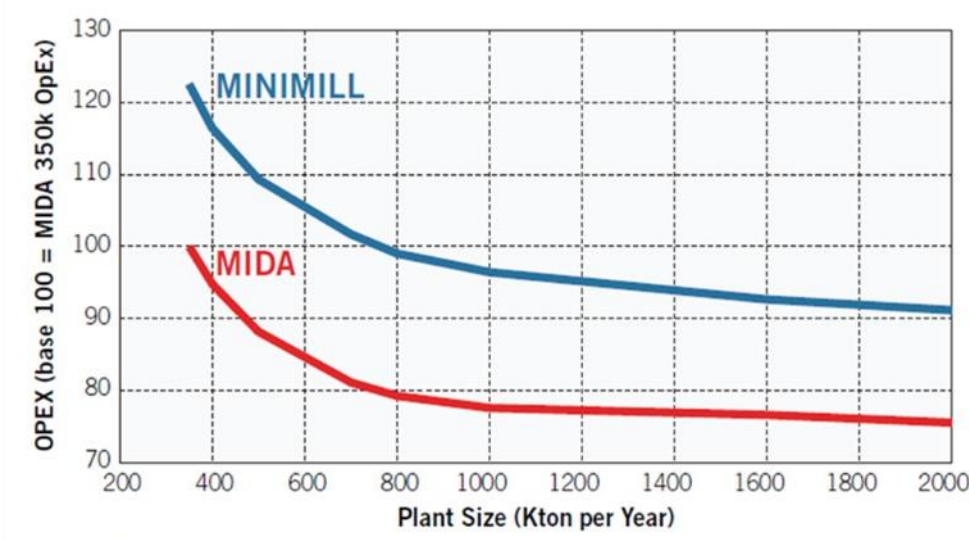
**Smart Endless Plant**

- Full-automated plant, where systems and equipment autonomously execute complex tasks and support humans in decision-making or even provide intelligent decision automation
- >Increase overall plant efficiency,
- > Improve the workers' health and safety by adopting solutions aiming at avoiding accidents or reducing their effects,
- >Monitor and control the plant's energy and utility consumption and implement efficient recovery strategies.

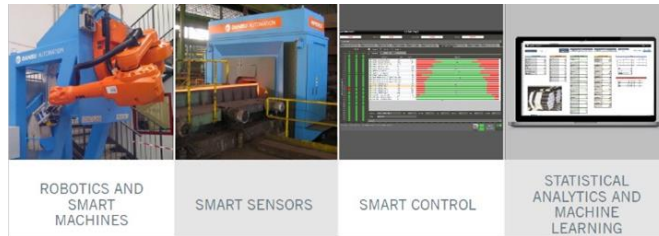


**H-MIDA® PLANT**

**THE INNOVATIVE SMART-ECO PLANT TO PRODUCE COMPETITIVE GREEN STEEL POWERED BY ENDLESS CASTING AND ROLLING PROCESS**



**OpEx competitiveness:** Endless casting and rolling process is the most competitive way to produce Rebar and Wire Rod



**Smart Plant, highly automated:**

where systems and equipment autonomously execute complex tasks and support humans in decision-making or even provide intelligent decision automation



**Hybrid Concept:** Use of renewable resource to be more and more environmentally sustainable and competitive into the market

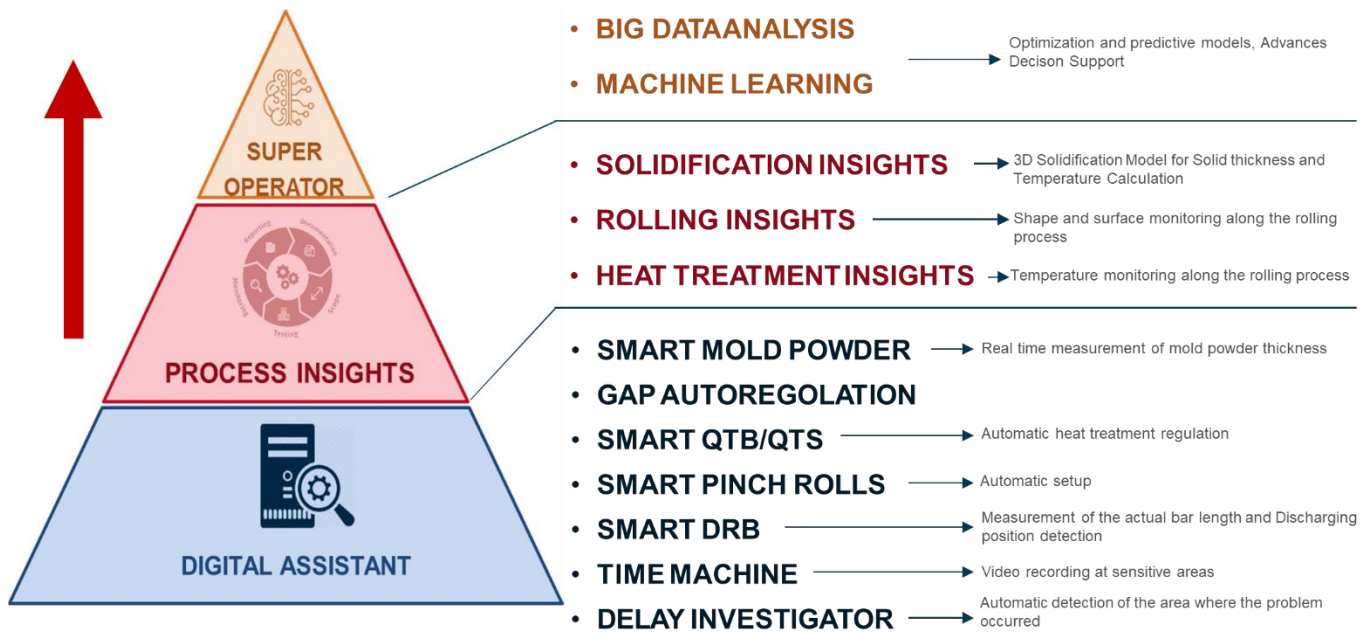


**Highly specialized manpower:**

«Digital skills» will be required, in line with Industry 4.0 culture. More and more specialized personnel will be employee to guarantee a smooths, efficient and competitive production

**Environmental Impact:**

MIDA and H-MIDA represent to the most environmentally friendly solution to produce steel worldwide. Emissions are reduced of more than 80% compared to a integrated plant and up to 35% compared to a Conventional Scrap-based minimill.



### H-MIDA SETS NEW RULES FOR STEEL PRODUCTION

- H-MIDA will represent the NEW BENCHMARK for rebar and wire rod production;
- H-MIDA looks to the future with an Environmentally sustainable production concept, and aims to become the new standard for steel production in the coming years;
- The vision to make the union between Environment and industry possible;



# ENDLESS CASTING AND ROLLING TECHNOLOGY



**UP TO 30 EUR/Ton savings**  
(compared to conventional minimills)

**QONE/ECS/EAF**

✓ - 5 EUR/Ton

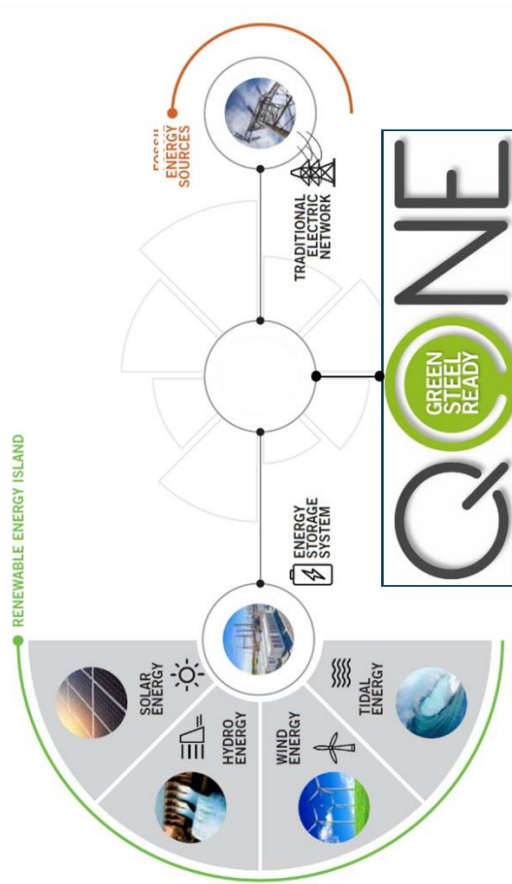
- Increased Yield
- Less electrical energy consumption
- Less electrode consumption

**CCM & RM**

✓ - 25 EUR/Ton

- Reduced media and consumables
- Increased Yield
- Reduced Thermal Energy
- Reduced Manpower

**H-MIDA CONCEPT**



**USE OF SOLAR ENERGY TO FEED A STEEL-PLANT**

- REDUCED DEPENDANCY ON ELECTRIC GRID
- POSSIBLE «ISLAND» (NO EXTERNAL GRID)

**REDUCE OPEX FOR ELECTRIC ENERGY**

- ADDITIONAL OPEX REDUCTION

**ENVIRONMENTALLY FRIENDLY**

- REDUCED EMISSIONS





DURING THE DAY, H-MIDA USES UP TO 100% OF THE **SOLAR PANEL ELECTRIC ENERGY** (AND ANY OTHER AVAILABLE ENERGY FROM GREEN FONT) AND ELECTRIC NETWORK ENERGY



DURING THE NIGHT, H-MIDA USES THE ELECTRIC NETWORK (AND ANY OTHER AVAILABLE ENERGY FROM GREEN FONT)

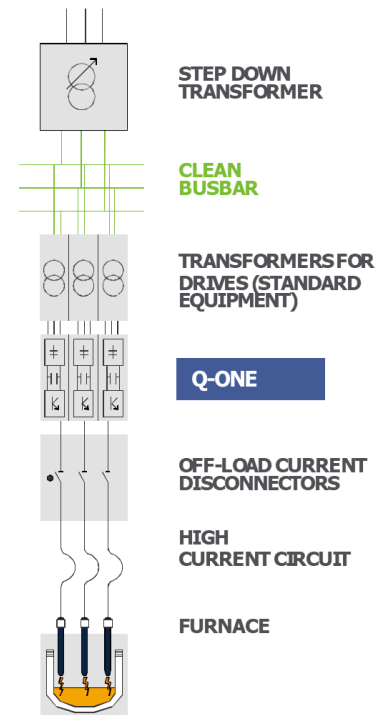


Q-one is the only solution available on the markets that feeds directly on the DC Link from the solar plant or from other alternative/renewable energy sources

Energy from solar plant is directly fed to DC -Link of Q-One



Q-One controls in real time arc current and voltage thus the energy transfer is more stable compared with a traditional furnace



## Q-ONE BENEFITS



### SERIES REACTOR

- > No need to find spaces in substation;
- > Extremely reduced complexity of installation design;
- > No need of maintenance.



### FURNACE TRANSFORMER

- > Eliminated a critical item of the furnace supply chain;
- > No maintenance for oil, tap-changer, mechanical parts, cooling parts.



### SVC

- > No need to find huge spaces in substation;
- > Extremely reduced complexity of installation design;
- > No need of maintenance



### FURNACE BREAKER

- > No need of countermeasures against switching overvoltages;
- > No need to periodically replace the vacuum poles.

No longer needed

## ADDITIONAL Q-ONE BENEFITS ON THE NETWORK

	WITHOUT Q-ONE	WITH Q-ONE	ADVANTAGES
FLICKER	HIGH	VERY LOW	> Installation possible on weak network > No need for SVC
POWER FACTOR	LOW (<0.8)	HIGH (0.97)	> No need of power factor compensation
HARMONIC DISTORTION	HIGH	VERY LOW	> No need of harmonic filters > Reduced noise generation
VOLTAGE UNBALANCE	MEDIUM	VERY LOW	> Higher operational flexibility



Depending on weather and time of the day, **the control system automatically plans production and sets up the correct energy source** (grid, solar panels, batteries, or others).

Energy produced in excess due to furnace cycles can be stored in batteries and re-used later.

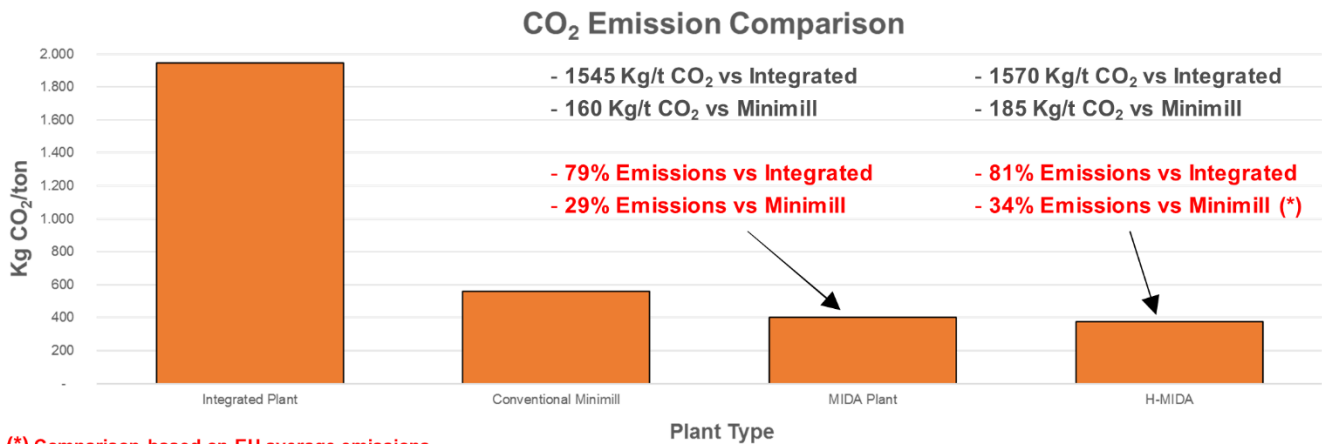
#### EMISSIONS COMPARISON

Plant	Kg CO <sub>2</sub> /ton
Integrated Plant	1.945
Conventional Minimill	560
MIDA Plant	400
H-MIDA	375

To calculate the equivalent production of CO<sub>2</sub>, overall energy intensity [kWh/t] has been converted through the **350 g CO<sub>2</sub>eq./kwh** rate;

Area	Kg CO <sub>2</sub> /ton
Meltshop	250
Caster	7
Rolling mill	50
Auxiliaries	18
Other (Cranes, mobiles, finished product in/out, Scrap movimentation..)	50

$$\text{Kg CO}_2/\text{ton emissions [kg/ton]} = \text{Energy Intensity [kWh/ton]} \times 350 \text{ [g CO}_2/\text{kWh]} / 1000 \text{ [g/kg]}$$



(\*) Comparison based on EU average emissions

## CONCLUSIONS: OPEX SAVINGS

QONE + MI.DA.®



+

GREEN ENERGY



UP TO 30 EUR/Ton  
SAVINGS

+

UP TO 5 EUR/Ton  
ADDITIONAL SAVINGS

UP TO 35 EUR/TON  
SAVED on OPEX

UP TO 25% LOWER TRANSFORMATION COST  
COMPARED TO A CONVENTIONAL MINIMILL

**H- MIDA, as a game changer in the worldwide market, to set new rules for sustainable and competitive green steel production.**

- **Mi.DA. Micromill transformation cost will be 10 to 15% less than the conventional mills.**
- **More than 30 Euro/ton savings with Mi.DA., and additional 5 Euro/ton saving with Hybrid Mi.DA.**
- **Higher Yield**
- **Less electrical consumptions**
- **Less Electrode consumption**
- **Less Maintenance**
- **Less scale formation gives Reheating energy savings.**
- **Super Quenching and self-tempering process achieves high mechanical properties while maintaining optimal ductility and weldability of the rebar.**
- **Q-one is smart eco plant to produce competitive green steel.**
- **Very low voltage unbalance, Very low harmonic distortion, Very low flicker and high power factor.**
- **Hybrid Mi.DA. has maximum flexibility with robust and redundant design with easy to maintain.**
- **Low emission data in comparison with conventional minimill.**

### **11.3 TARGET MARKETS**

Products will be sold to clients throughout the World. Customers include global engineering and construction firms, EPC Contractors in Infrastructure, Oil & Gas exploration, Metal, Power, Chemical, Petrochemical and Process industries



- I. Oil, Gas & Petrochemicals, Metal Used in heavy machinery and fluid handling components including compressors, mud and slush pumps, rotaries for drilling, hole openers, pile driving sheaves, U-bends, tube hangers and supports, pyrolysis coils, valves & fittings, T castings, blowout preventers, bubble caps, etc.
- II. Power Generating Equipment Turbine parts (e.g. housing, support, exhaust case, intermediate case, diffuser case, impeller, steam chest), Runner hubs, commutator rings, couplings, stator and rotor parts, motor frames, etc.
- III. Mining & Earth moving Used in almost all mining equipment including stripping shovels, dragline excavators, bucket excavators, hoisting drums, gravity crushers, ball mills, tunnel shovels, etc.
- IV. Construction Used in most earthmoving, road-building and construction equipment including dippers, crawler cranes, power shovels, road building tractors, etc. Also used as parts in bridges (e.g. cable bend saddles, rockers, pedestals), locks & dams (e.g. hydraulic gates, butterfly valves).
- V. Transportation Used extensively in all transportation segments including railroad (e.g. wheels, couplers, bolsters, friction shoes, yokes, strikers, draft gears), automotive (e.g. axle housings, spring hangers, suspension brackets, brake shoes), marine (e.g. propellers, rudder frames, struts, chocks, cleats, anchors, hawse pipes) and aviation (e.g. landing gear, fuselage, engine parts).
- VI. Materials Handling Used extensively in equipment that conveys materials from one place to another including belt and apron conveyors, hooks, chains, buckets, tow and lift trucks, liquid pumps, valves etc

#### 11.4 JOB CREATION

*Achieving full employment, decent work and sustainable livelihoods is the only way to improve living standards and ensure a dignified existence for all in the long run. This will be achieved by expanding the economy to absorb labour and improving the ability of Kuwait's people and institutions to respond to opportunities and challenges. These are central tenets of the National Development Plan (NDP).*

The NDP sets out a goal of full employment by 2030. This would mean official unemployment falls to 6.5% and labour force participation rises from 54% to 65%, requiring an average annual GDP growth rate of 5% and 11 million net new jobs created over a 20-year period. Economic growth must accelerate and become more labour absorbing.

Every family must have an acceptable standard of living within their reach. Not only should there be sufficient economic opportunities, but there must also be a supportive system of social protection and services. Achieving this requires leadership, difficult political choices and effective implementation. We have to rebalance and realign key areas of government policy while reprioritising economic policy. The targets are only unrealistic if we accept the status quo.

Extremely high unemployment is mostly addressed by indirect means. The only direct way of creating employment is through make-work schemes and public employment. Otherwise, employment is created as a result of rising demand for goods and services. This creates a challenge for a framing policy aimed at solving high unemployment, as it is difficult to determine direct causation. There is little doubt that structural change is needed to shift Kuwait's development path.

Kuwait is a resource-intensive minerals economy. Almost half of exports are categorised as mining and minerals-related. At a domestic level, most economic activity happens in the services industry.

Over four decades our per capita growth has largely stagnated. Some countries that had similar GDP per capita levels in 1975 have powered ahead: South Korea's GDP per capita rose by a factor of five; while Malaysia and Turkey doubled their GDP per capita.

By investing in Steel Manufacturing Plant, **AL-HANA UNITED** is committed in providing **approximately 1800 temporary employment during construction and 4000 permanent employment**, which will contribute to meeting the NDP 2030 as set out by the Kuwaitn Government.

### 11.5 QUALITY CONTROL MECHANISM TO BE ADOPTED

AL-HANA UNITED's Quality Management System (QMS) which demonstrates our capability to consistently provide products/services that meet customer and applicable regulatory requirements, and to operate with increased effectiveness and efficiency with the overall aim of enhancing customer satisfaction.

Our QMS utilises the process approach and quality management principles to enhance our ability to continually improve.

Our QMS complies with all applicable requirements and covers the design and provision of all company products, and encompasses all operations at our facilities located at our office.

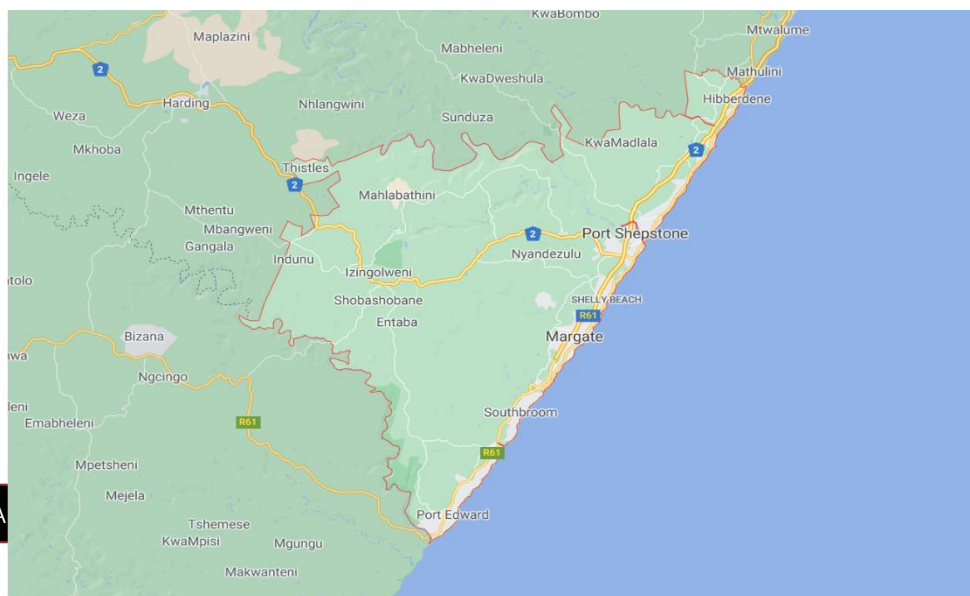
Project Quality Management includes all processes required to ensure that the project will satisfy the requirements for which it was initiated. In order to ensure that the required high-level standards are achieved on the project, appropriate quality control systems shall be implemented, monitored and documented during all stages of the project. These systems will raise standards by clarifying the responsibilities of each member of the professional team and by providing written checklist procedures to ensure that the professional team are fulfilling their responsibilities.

**AL-HANA UNITED HAS APPOINTED RMA CONSULTING (PTY) LTD KUWAIT** who has specialist knowledge & systems to deliver extraordinary outcomes for us at every stage of the project management lifecycle from concept to completion. Their QA systems & procedures are implemented by our experienced project management and engineering teams and extend across but are not limited to:

- Document management
- Risk analysis & management
- Development plan preparation & management
- Baseline construction programming review & management
- Project time management and delivery systems
- Cost & variation system management
- Value management through 'build ability' and design review
- Performance evaluation of consultants
- Safety management

### 11.6 PROJECT LOCATION

The project is located in the Ray Nkonyeni Municipality, Port Sheptone, KwaZulu-Natal, Kuwait.



## 11.7 RISK AND RISK MANAGEMENT PROPOSAL (RMA CONSULTING WILL MANAGE)

See item 13.4 for details of Risk Management.....

### 11.7.1.1 RISK CONTROL AND MANAGEMENT

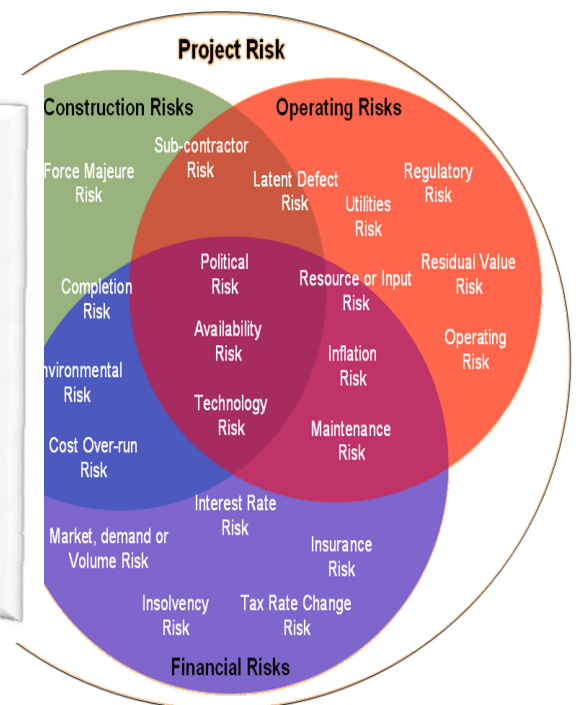
Every project will have risks and it will never be possible to pre-empt all these risks.

However, in identifying the events and circumstances which could result in the project not achieving its objectives or delivering its outputs or long-term impact, a carefully considered project **AL-HANA UNITED** will identify many of these potential risks and identify ways to overcome or mitigate against them should they arise. Where possible, we will introduce the required systems to ensure that risks are identified early so that their impact is reduced. Recognising risks will better equip the **CLIENT** and other stakeholders with the information needed to manage them.

Item No.	Description	Impact	Probability	Control	Residual
1	Encountered problems with some jobs in the urban roads	4	3	12	1
2	No materials to start at the construction and construction to start with out - item	4	2	8	1

Risk Assessment Table - Impact, Time and Money	Probability (%)	Impact in Quality	Impact in Time (ET)	Impact in Money (EP)
1	< 10%	Minor Quality	1-2 weeks	< 0.1%
2	10% - 20%	Low	2 weeks - 1 month	0.1% - 0.2%
3	20% - 50%	Medium	1 - 3 months	0.2% - 1%
4	50% - 80%	High	3 - 6 months	1% - 2%
5	80% - 100%	Critical	> 6 months	> 2%



These can also relate to the operational phase of a project, e.g. training needs. **AL-HANA UNITED** will ensure, in attracting private sector investment, it is advisable that the risks to the projects be mitigated as far as is practically possible.

### 11.7.1.2 FINANCIAL AND COST MANAGEMENT

The objectives of collective financial cost control and management are to allow the project to be completed within the determined and approved budget. Cost reporting will facilitate at all times the best possible estimate of:

- The final projected cost of the project;
- The future cash flow;
- The costs in the use of the completed facility (as applicable); and

Monitoring expenditure to date does not exert any control over future expenditure and, hence, the final

cost of the project. Effective cost control is only obtained when the whole of the Project Team has the correct attitude to cost control, i.e. one which will enable fulfilment of the **CLIENT** objectives.

Our effective cost control entails the following:

- I. Establishing that all decisions taken during design and construction are based on a forecast of the cost implication of the alternatives being considered, and that no decisions are taken whose cost implications would cause the total expected budget to be exceeded, including appropriate contingency allowances.
  - II. Encouraging the Project Team to design within the cost plan. No member of the team has the authority to increase costs on their section of the work. Increased costs on one item must be balanced by savings on another.
  - III. Regularly amending and reissuing the cost plan and “variation orders” causing an alteration to the brief.
  - IV. Adjusting the cash flow plan resulting from an alteration in the target cost or the master programme.
  - V. Developing the cost plan in liaison with the consultants as design and construction progresses. At all times it should comprise the best possible estimate of the final cost of the project and of the future cash flow. Development also means adding detail as more information about the work is assembled, replacing cost forecasts with more accurate ones or actual costs whenever better information can be obtained. Reviewing contingency and risk allowances at intervals is essential. Development of the cost plan should not involve increasing the total cost. Adherence to design freezes will aid cost control.
- Checking that the variation control procedure is strictly followed at all stages of the project.

Contingency money is available to pay for events which are unforeseen and unforeseeable. It should not be used to cover changes in the specification or in the **CLIENT** requirements or for variations resulting from errors or omissions.

## **11.8 ADDRESSING AND MANAGEMENT OF HEALTH AND SAFETY ISSUES**

In managing Health, Safety and Management, a Programme Health and Safety Management Plan will be developed with the purpose to;

- II. Define the health and safety management methodology to be used on the projects in the different programmes, the health and safety risk assumptions, the roles and responsibilities, the timeframes, health and safety risk rating/scoring techniques, establish health and safety risk thresholds, define health and safety communications, and develop a health and safety issue/risk tracking process.

Define the environmental risk management methodology to be used on the projects in the different programmes, the environmental risk assumptions, the roles and responsibilities, the timeframes, environmental risk rating/scoring techniques, establish environmental risk thresholds, define environmental risk communications, and develop an environmental risk tracking processes.

## **11.9 ENVIRONMENTAL PRACTICES AND PROCEDURES TO BE FOLLOWED:**

Throughout the execution of the project, **AL-HANA UNITED** will implement, monitor, manage and control an Environmental Management Plan so that all our assessment operations minimize the impact upon the natural environment and comply with the best principles and practices relating to:

- I. Minimize consumption of fresh water and prevent pollution of any surface and ground water of natural origin;
- II. Minimize quantities of waste generated and determine its hazard rating and type ;
- III. Ensure disposal (according to requirements) of any resultant waste in a way that will be safe both now and in the future ;
- IV. Recycle, reuse or recover resources from waste as far as is economically feasible;

- v. Ensure adequate dust control during construction activities, i.e. during excavation, at material storage sites, roads and disposal areas;
- vi. Include provision of suitable equipment, facilities and precautions to prevent the discharge of contaminants which may pollute the atmosphere, any body of water or land areas, or which may harm aquatic marine life or other wildlife Ensure compliance with all laws, regulations and rules and site requirements pertaining to the environment

## 11.10 SKILLS DEVELOPMENT AND CAPACITY BUILDING

The **AL-HANA UNITED** arrangement provides the ideal platform for skills transfer programmes. The specific aim and targets of such a skills transfer programme would include inter alia the following channel;

### 11.11 PROJECT TEAM SKILLS TRANSFER PROGRAMME

- Identification of potential candidates from the Employer and **CLIENT** that display the credentials to align themselves with the Institute of Project Management Associations Skills Matrix
- “Twin” the above individuals with a similar individual from **AL-HANA UNITED**
- The above processes will afford the opportunities for the selected individuals to gain invaluable on-site job experience and knowledge throughout the project duration. Specific training/courses would also be identified through the process.

### 11.12 PROGRAMME MANAGEMENT STRATEGY AND PLAN

When considering a programme delivery strategy to deliver projects, the **CLIENT** needs to be made aware of the complex array of activities and processes that are involved within the programme management process so that they can be appropriately managed.

### 11.13 STRATEGIC AIMS

The aim of this Programme Delivery Model Strategy (‘PDMS’) proposal is to;

- Consider the key issues identified on the project
- Provide a series of strategies, standards, best practice techniques and procedures that will be observed through the construction process in order to ensure compliance with employer objectives, as well as environmental legislation and regulations.

This will further ensure minimal disruption and nuisance from the construction process to the existing operations in **CLIENT** projects.

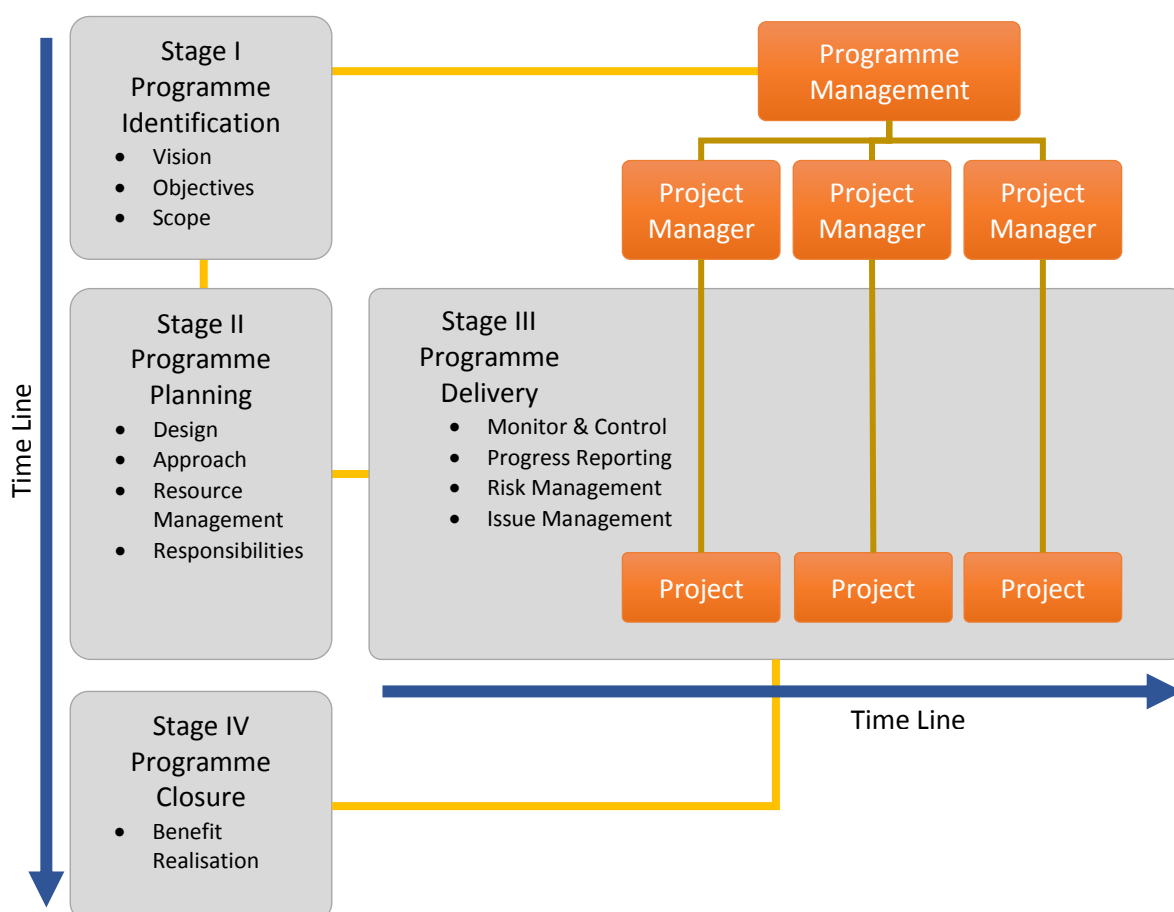
### 11.14 PROGRAMME DELIVERY MODEL

The RMA staged programme delivery model proposed for the programme will enable the following advantages;

- The **CLIENT** retaining continuity of its projects;
- Management and coordination risk to the **CLIENT** is reduced leading to a reduced level of management effort and oversight;
- Programme administration is undertaken by the Programme Manager (RMA), reducing time and cost for the **CLIENT**;
- The **CLIENT** can still retain a high degree of control of projects with management, coordination services and general expertise contributed by the Programme Manager;
- The scope of the programme can be managed to meet the Programme Owner’s budget;
- Use of the model can help promote a more team-oriented approach to programme/project delivery;

- The **CLIENT** and key stakeholders can provide input into the programme with less cost and risk;
- There is a high potential for efficiencies through continuity of the projects and constructability reviews;
- There is an ability to flexibly stage the delivery of projects;
- There are opportunities for the **CLIENT** to oversee the Programme Manager's processes to confirm value-for-money and verify actual costs;
- Capping the cost risk for the **CLIENT**;
- There is a possibility of shared savings resulting from the actual project cost coming in lower;
- Possible acceleration of the overall project programme;
- Enhanced ability to incorporate change;
- Creation of a less adversarial, problem-solving project/programme culture;

The risks associated with the project and how they can affect the **CLIENT** can be effectively managed. With this in mind, the following diagram provides an overview of the 'speculative risk' (i.e. risk that can be apportioned in advance as decided by parties in a contract) to an Employer and Contractor for specific procurement delivery model.



### 11.15 PROGRAMME MANAGEMENT CRITICAL ELEMENTS

In ensuring the effective establishment of programme management in the **CLIENT** and the successful implementation thereof, requires that workable steps and work streams be established for easier control in establishing the programme management framework;

Step 1	Identify initiatives best defined as programs
Step 2	Define target benefits
Step 3	Develop alternative approaches to delivering desired results
Step 4	Analyze and select best options for implementation and identify component projects
Step 5	Undertake stakeholder analysis and establish governance structures
Step 6	Engagement of Program Delivery Management

Each of the critical elemental steps is defined here-after;

- **Identify initiatives best defined as programs**

A bottom up approach will be followed and involves examining the portfolio of standalone projects, underway or planned, and then group inter-related and inter-dependent projects into programs that support and are aligned with defined **CLIENT** strategies. This would also involve the engagement of stakeholders with diverse potentially conflicting interests, both internal as well as external, that are expected to bring about significant change and/or benefits to the **CLIENT**.

- **Defining target benefit and realising benefit management**

The fundamental purpose of the **CLIENT** infrastructure program management function is to deliver the expected benefits realised from **CLIENT** capital investment in infrastructure. It will be important to ensure that key benefits needs to be specific to ensure achievement thereof.

- **Developing alternative and support approaches to delivering the desired infrastructure delivery results**

Once key benefits of the **CLIENT** Infrastructure delivery initiatives are defined, alternative approaches may be required to be developed in support of the programme management approach ensure the delivery of the target benefits. For each of these added on approaches, the **RMA** Team will determine the risk, high level investment requirements, as well as the time to realize these benefits.

- **Implementation option analysis and identify component projects**

Examining the options developed in the previous step and identifies or confirms projects that will deliver components of the programme. It is further necessary to ensure that there are no gaps in benefit realisation if all projects are implemented.

- **Stakeholder analysis and governance structure establishment**

This involves the identification of all stakeholders external and internal to the **CLIENT** and design the governance structure for the program to optimise communication and decision making.

- **Engaging Execution & Delivery**

In order to finally close the strategy-execution gap, complex initiatives need to be defined as programs and managed and monitored to remain aligned with strategies and deliver critical business benefits. As such the **CLIENT** Program Management will require a multi-faceted combination of skills and experience not limited to just traditional project management.

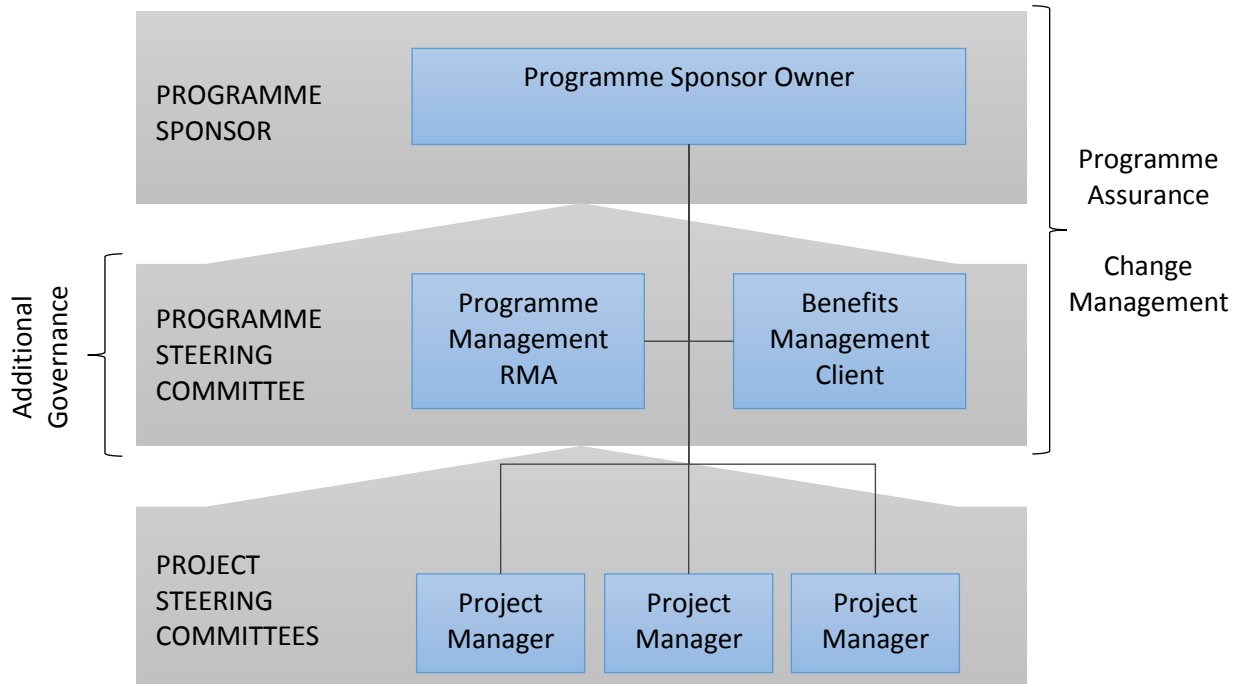


## 12 OUR APPROACH TO THE PROGRAMME MANAGEMENT STRATEGY

### 12.1 GOVERNANCE

RMA sees Governance as an essential element that provides an appropriate organisational structure, the policies and procedures necessary to support program delivery through formal program reviews. This needs to be facilitated by the regular and phase-gate-based monitoring of deliverables, performance, risks, and issues.

### 12.2 ORGANISATION



### 12.3 BENEFITS REALISATION MANAGEMENT

The **CLIENT** Infrastructure programme delivers benefits to the **CLIENT** and its stakeholders. RMA's benefits realisation planning is part of our program management service which consists of interdependencies between benefits, alignment with the strategic goals of the **CLIENT**, benefit of delivery scheduling, metrics and measurement, responsibility for delivery of the final and intermediate benefits within the program, and benefit realisation. Key activities include;

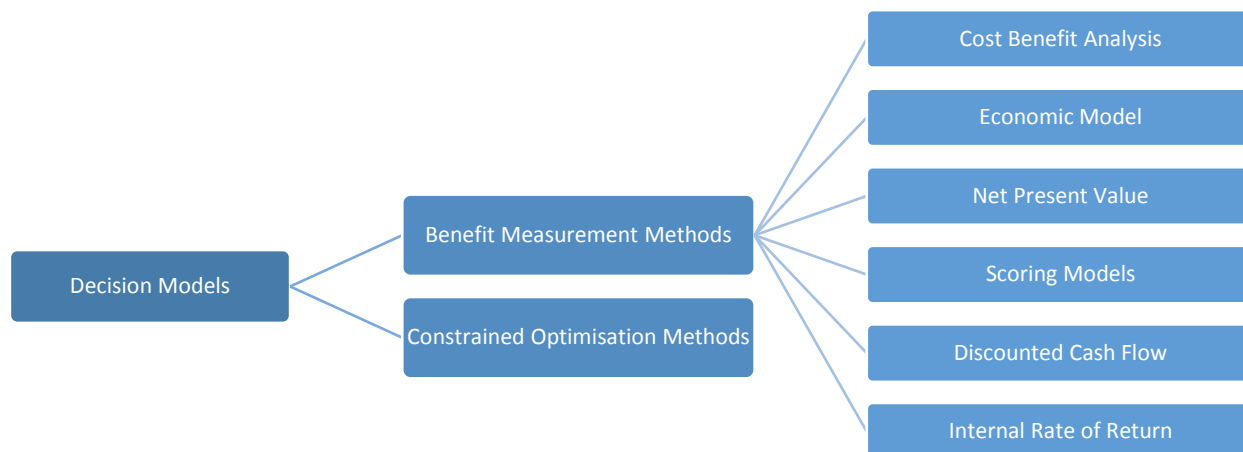
- Establishing a benefits management strategy for the programme
- Defining the attributes, dependencies and current/target values for all benefits and dis-benefits in a set of benefit profiles
- Creation of a benefits map to show how benefits relate to each other and to the project outputs and business changes that will enable them to be achieved. The dependency relationships in a benefits map will show how project outputs ultimately lead to the achievement of strategic objectives
- Producing a benefit realisation plan to schedule the benefits measurement activities and benefit reviews to enable tracking of the realisation of benefits across the programme

At the end of the program, the benefits delivered will be compared against those promised in the initial start-up to ensure that the programme actually delivered the full benefits for which it was created.

#### 12.3.1 MEASUREMENT METHODS

The aim of Benefits Measurement and Review is to ensure that integrated change programs and

projects are implemented and managed with a sustained focus on benefits realisation. Within the CLIENT programme management framework, the following will be utilised as measurement methods;



## 12.4 BLUEPRINT DESIGN AND DELIVERY

Integrated with our programme approach is the creation of a blueprint model of the **CLIENT** operational capability. This will enable the achievement of the required programme outcomes and benefits. The blueprint comprises the current, intermediate and target end state of the key aspects of the business operations of not only the **CLIENT**, but also any partner, customer and supplier organisations that must change for benefits to be realised.

## 12.5 COMMUNICATION, STAKEHOLDER ENGAGEMENT & MANAGEMENT

### 12.5.1 GENERAL

The single communication line to **CLIENT** is via the Programme Manager or Agent in the instance where such authority has been granted by the Programme Manager. In this regard, The Programme Manager including its staff shall not be liable for the consequences arising out of any unauthorised breach of this communication protocol. The entire liability for consequences arising out of any unauthorised breach in the communication protocol shall be accepted by client.

### 12.5.2 VERBAL

The most important means of communication shall be verbal. It is intended to create an effective unit, which will respond efficiently to all situations. This can only be achieved by effective communication between all parties. It is essential that everyone is kept informed of the current events at all times as indicated in the

### 12.5.3 CORRESPONDENCE

When necessary, correspondence between parties shall be copied to the rest of the team except where matters of confidentiality are included. All correspondence shall be either sent by Facsimile, e-mail or hand delivered, as necessary. All correspondence shall be referenced by the Programme Name/Project Name, as applicable.

All correspondence should be restricted to the minimum compatible with a project of this nature. Correspondence should be concise and preferably restricted to one subject.

### 12.5.4 MEETINGS

The following formal meeting procedure shall be adopted:

- Meetings are to be attended only by those representatives that are stated as attendees for the meeting concerned.
- If a participant is unable to attend a pre-arranged meeting, he/she shall notify the Programme Manager and Programme Administrator no later than forty-eight (48) hours in advance of the meeting. In addition, the participant concerned is to advise of the proposed stand-in representative. In addition, it shall be assumed that principal participant shall ensure that the stand-in participant is fully briefed and is empowered to make decisions.

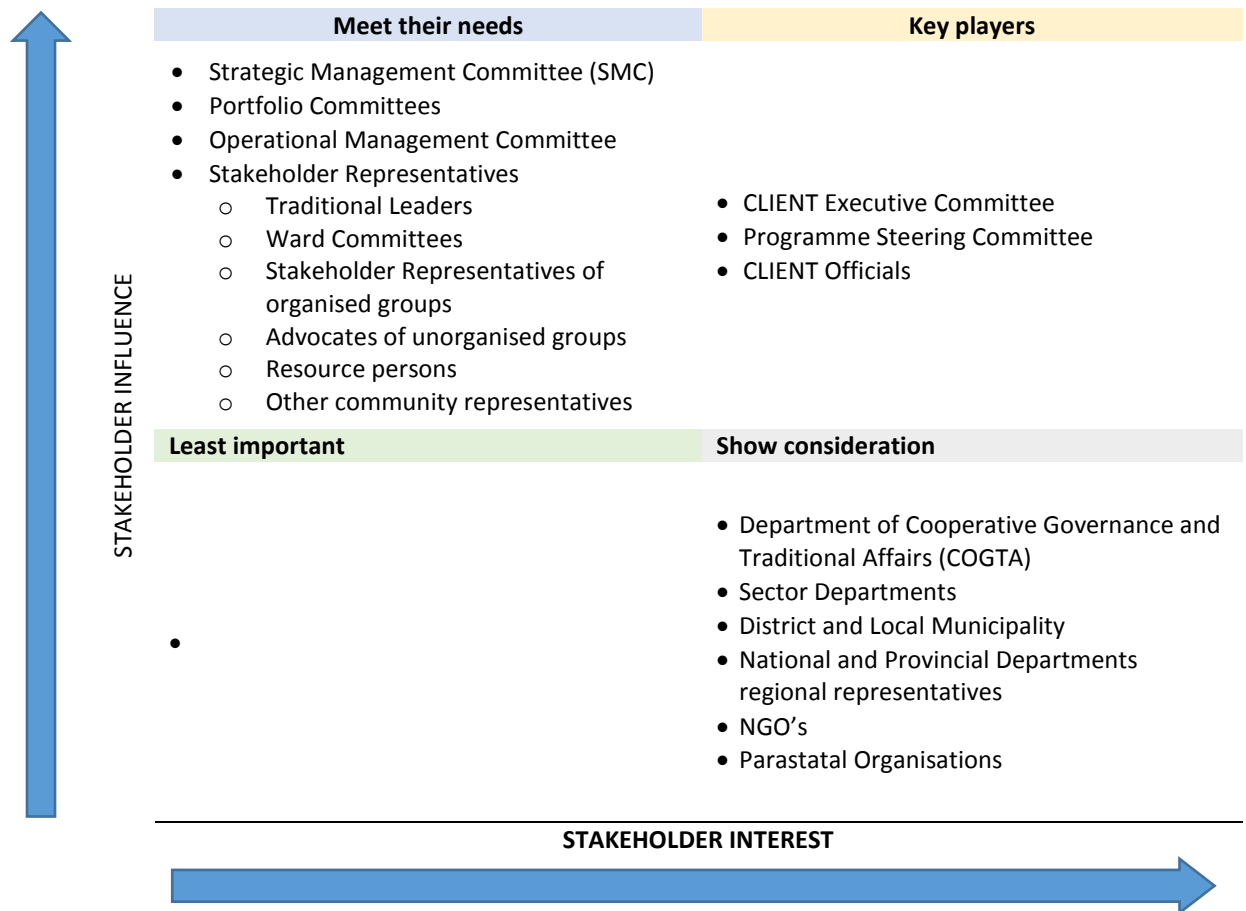
#### **12.5.5 STAKEHOLDER ENGAGEMENT AND MANAGEMENT**

A stakeholder engagement approach will be defined to identify and manage relationships with stakeholders to direct, influence and motivate others towards the desired programme outcomes. Key actions incorporated herein;

- Developing a stakeholder engagement strategy to enable effective stakeholder engagement and communication in the programme
- Development of a stakeholder map to compare the various stakeholders and their interests in the programme
- Designing an Influence-Interest Matrix: to map the potential interest of each stakeholder against their areas of interest and hence work out approaches and priorities for stakeholder engagement and communication
- Creating stakeholder profiles to record stakeholder information such as current and target positions in terms of levels of interest, impact, influence and support
- Developing a programme communications plan for implementing the stakeholder engagement Strategy.

### 12.5.6 STAKEHOLDER INVOLVEMENT MATRIX

The programme’s stakeholder involvement matrix is as follow;



### 12.6 RISK MANAGEMENT AND ISSUE RESOLUTION

The risk and issues management approach and processes will be applied across the programme, its projects, its transition activities and operational areas. The framework for managing risks and issues will be used to capture and use information about risks and issues. Core activities includes;

- Developing a programme focused risk management strategy to manage risk
- Establishing a risk register to capture and actively manage risks to the programme.
- Developing an issue resolution strategy for resolution of issues such as change requests, requests for information, technical problems, stakeholders’ concerns and suggestions.
- Establishing an issues log to capture and actively manage programme issues.

## 12.6.1 MAJOR RISKS

The implementation of the project is subject to a number of potential risks. The following table provides a summary of the main potential risks already identified, under the different sections, and associated mitigation strategies and measures;

RISK ASSESSMENT TABLE						RISK SCORE TABLE					
Risk Level	Probability (P)	Safety & Environment (SE)	Quality Impact (Q)	Time Impact (T)	Cost Impact (CI)	CONSEQUENCE (IMPACT)					
1	< 10%	First Aid injuries / Minimal	Insignificant	< 2 Weeks	No Cost Increase	PROBABILITY	1	2	3	4	5
2	10-25%	Minor injuries / Short-term	Low / Needs Follow-up	2-4 Weeks	< 2 Million		2	4	6	8	10
3	25-50%	Serious injuries / Significant	Medium / Needs Control	1-3 months	2-10 Million		3	6	9	12	15
4	50-80%	Fatalities / Major short-term	High / Direct Control	3-6 months	10-20 Million		4	8	12	16	20
5	> 80%	Multiple fatalities / Major long-term	Extreme High / Replacement	> 6 months	> 20 Million		5	10	15	20	25
Probability (P)      Consequence (C)      Risk Score (RS)											
<span style="color:red">■</span> Major <span style="color:orange">■</span> Serious <span style="color:yellow">■</span> Minor <span style="color:green">■</span> Slight (Note: Major risks are those with scores of 15 or higher)											

Risk No.	Risk Item	SE	Q	T	CI	C Average (SE, Q, T, CI)	P	RS (C X P)	Possible Elements	Mitigation
1.	Factors affecting availability and cost of funds	3	3	3	3	3	3	9	• Hedging instruments	
2.	Risk that project assets at termination or expiry of the project agreement will not be in the prescribed condition at end of project life cycle	4	2	3	3	3	3	9	• Obligations on Contractor to maintain and repair • Audit of project assets • Security by Contractor	
3.	Possibility that actual project costs will exceed projected project costs during design and construction phase	3	3	3	3	3	3	9	• Fixed price construction contracts; • Contingency provisions;	
4.	Possibility that stakeholders may object to project; community opposes project; or investors do not invest	4	3	4	4	3.75	4	15	• Consultation with stakeholders and other project partners in design and implementation stages • Co-ordination with investors	

Risk No.	Risk Item	SE	Q	T	CI	C Average (SE, Q, T, CI)	P	RS (C X P)	Possible Elements	Mitigation
5.	Possibility of unforeseeable conduct by any government authority that materially and adversely affects expected return on equity, debt service or results in increased costs to private sector; or expropriation, nationalisation or privatisation of private sector assets; this risk overlaps with some financial risks (e.g. tax rate chance risk)	2	4	2	2	2.5	4	7.5	<ul style="list-style-type: none"> <li>Limit risk to unforeseeable conduct for which there is no other relief in agreement and to expropriating actions;</li> </ul>	
6.	Bureaucracy of governing / Excessive approval procedures in administrative government departments	2	4	2	2	2.5	4	7.5	<ul style="list-style-type: none"> <li>Adopt a strategy of maintaining close relationship with local government officers and communicating with them as much as possible</li> <li>Ensure effective recording and documentation management</li> </ul>	
7.	Possibility that consents required from government authorities will not be obtained or can only be if obtained at a greater cost than originally projected			3	3	3	4	12	<ul style="list-style-type: none"> <li>Undertake legal scan to identify all such consents</li> <li>Implementation of inter-governmental liaison process with responsible government authorities before procurement</li> <li>Due diligence to identify consents required for operating requirements</li> </ul>	

Risk No.	Risk Item	SE	Q	T	CI	C Average (SE, Q, T, CI)	P	RS (C X P)	Possible Mitigation Elements
8.	Possibility proposed use of project site in terms of project agreement and particularly construction of facilities on project site will fail to comply with applicable laws relating to planning, land-use or building or any consent required, or that such consent will be delayed or cannot be obtained or, if obtained, can only be implemented at greater cost than planned		3	2	2	2.5	3	7.5	<ul style="list-style-type: none"> <li>Private sector must identify at feasibility phase any macro-level planning consents not required for the detailed design and construction proposal for the project</li> <li>Adequate provision in works programme</li> </ul>
9.	Possibility of liability for losses caused by environmental damage arising from construction or operating activities during project term or from pre-transfer activities whether undertaken by the Client or third party and not attributable to the activities of contractors or sub-contractors	3		3	4	4	3	12	<ul style="list-style-type: none"> <li>Due diligence by bidders of project site conditions;</li> <li>Independent surveys of Project Site</li> <li>Indemnity for latent pre-transfer environmental contamination</li> <li>Remediation works to remedy identified pre-transfer environmental contamination as specific project deliverable</li> <li>Independent monitoring of remediation works</li> </ul>

Risk No.	Risk Item	SE	Q	T	CI	C Average (SE, Q, T, CI)	P	RS (C X P)	Possible Elements	Mitigation
10.	Potential increase in flood peaks	3			3	3	3	9	<ul style="list-style-type: none"> <li>• Provision of sufficient stormwater attenuation facilities at micro and macro levels.</li> <li>• Mitigation where possible by subsoil infiltration, retention of run-off in on site facilities for irrigation use and unsaturated wetland areas where evaporation and infiltration can help to reduce flood run-off rates.</li> </ul>	

## 12.7 HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT

In managing Health, Safety and Environmental, a Project Health and Safety Management Plan will be developed with the purpose to;

- Define the health and safety management methodology to be used on the projects in the different programmes, the health and safety risk assumptions, the roles and responsibilities, the timeframes, health and safety risk rating/scoring techniques, establish health and safety risk thresholds, define health and safety communications, and develop a health and safety issue/risk tracking process.
- Define the environmental risk management methodology to be used on the projects in the different programmes, the environmental risk assumptions, the roles and responsibilities, the timeframes, environmental risk rating/scoring techniques, establish environmental risk thresholds, define environmental risk communications, and develop an environmental risk tracking process.

## 12.8 QUALITY MANAGEMENT

In order to ensure that the required high level standards are achieved on the programme, appropriate quality control systems shall be implemented, monitored and documented during all stages of the project. These systems will raise standards by clarifying the responsibilities of each member of the professional team and by providing written checklist procedures to ensure that the professional team are fulfilling their responsibilities. The scope of quality management covers all aspects of the programme (including its projects and transformation activities) to ensure they are appropriate and fit for purpose. This will enable stakeholders to be assured that the planned benefits have the best chance of being realised.

- Developing a Quality Management Strategy defining the approach to managing quality across the programme e.g. what will be subject to quality assurance/audit/review/control, responsibilities for quality management, standards and regulations, interfaces with corporate and other relevant quality management systems.
- Developing a Quality Management Plan defining the timetable and arrangements for implementing the quality management strategy

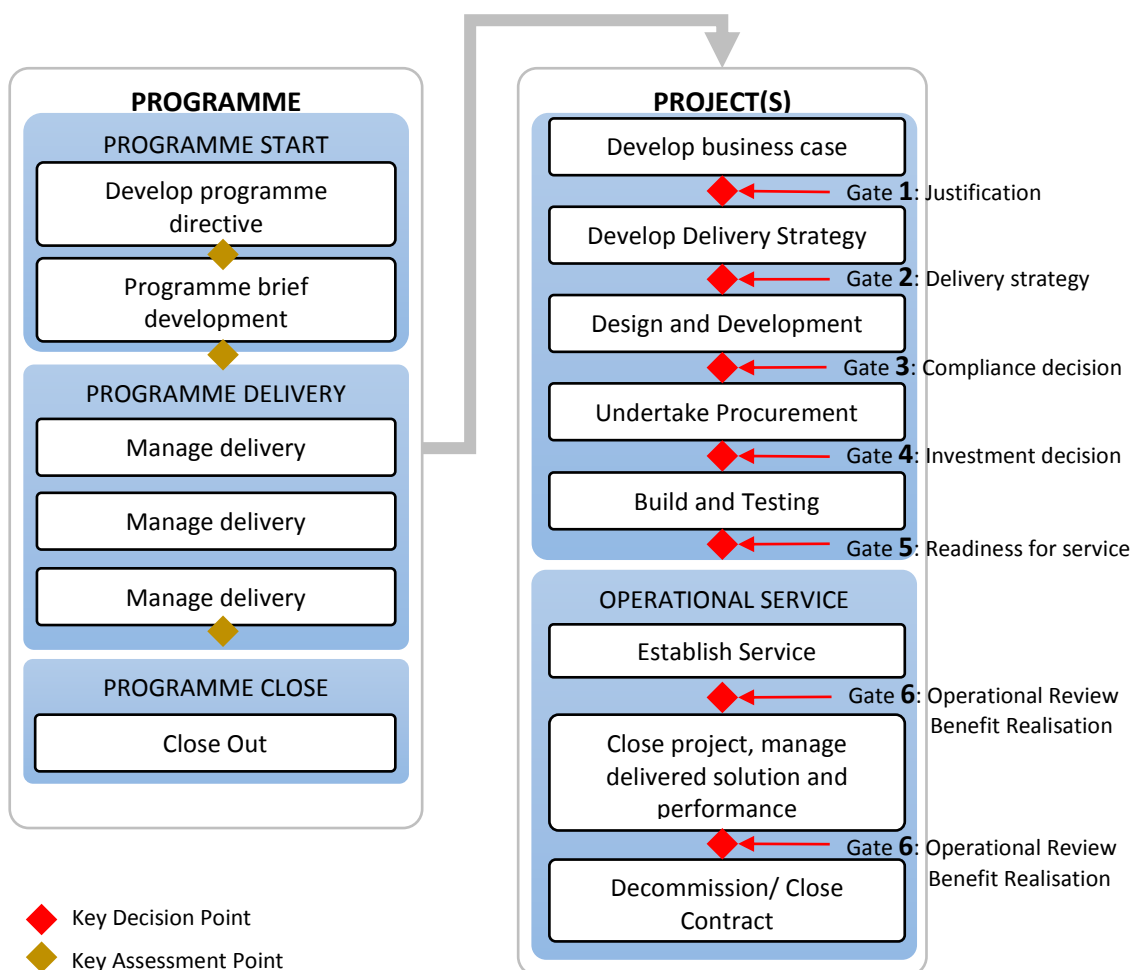
## 12.9 PLANNING AND CONTROL



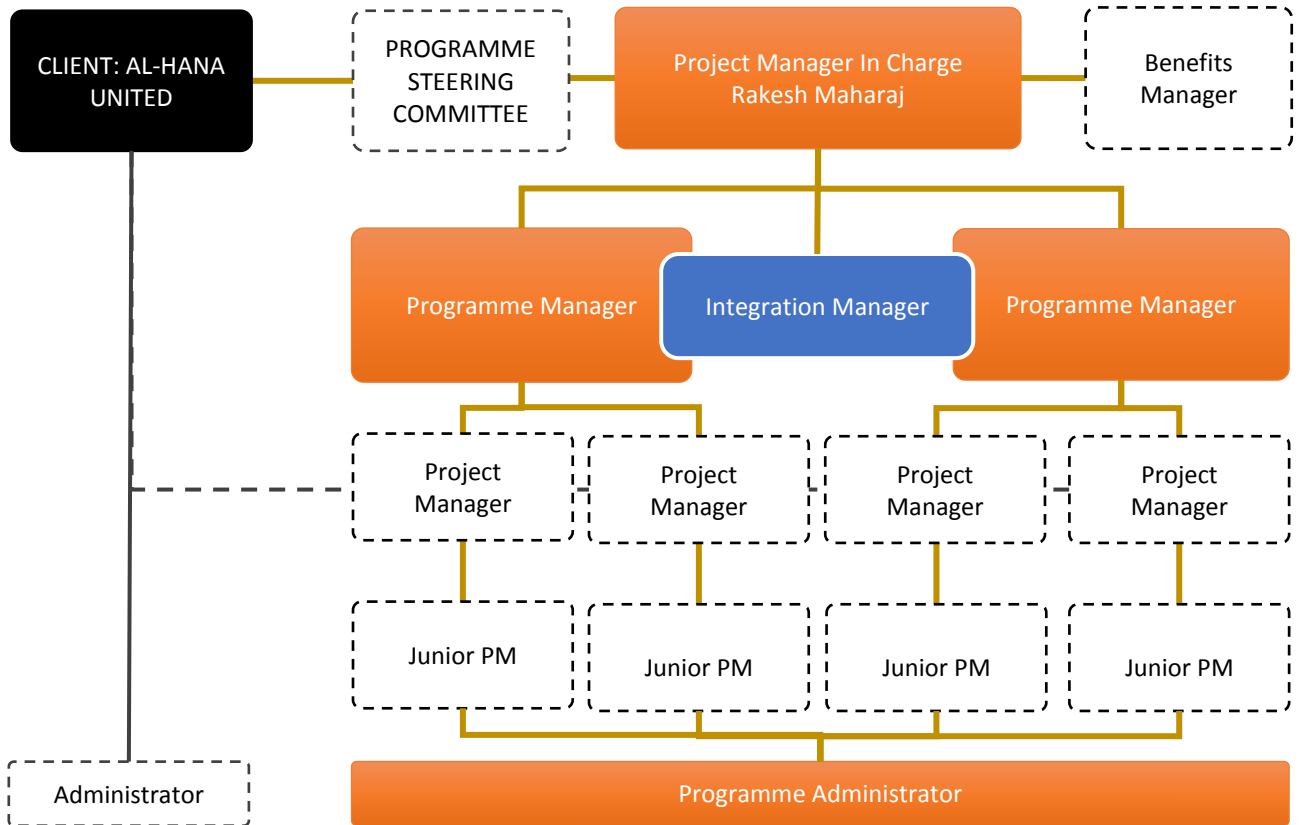
Finally planning and control processes will enable the integration of the various governance strategies and plans to produce a programme plan and a control regime. The programme plan will cover key programme level events and controls such as:

- The project cluster structure - how the programme is divided into manageable groups each of which delivers a step change in capability and some associated benefits.
- Governance activities (e.g. end of cluster reviews)
- Project milestones (start, finish, key events)
- Project output delivery
- Interdependencies
- Key transition activities and milestones
- Communications
- Benefits management activities
- Quality management activities
- Assurance activities

### 12.9.1 GOVERNANCE AND REPORTING ARRANGEMENTS



## 12.9.2 PROGRAMME ORGANISATION AND MANAGEMENT STRUCTURE



## 12.9.3 KEY ROLES

### 12.9.3.1 Programme Steering Committee

- Championing the programme and communicating to stakeholders.
- Managing the Risks associated with the programme.
- Resolving Issues escalated by the Programme Manager.
- Managing Changes that could take the programme outside agreed Tolerance Limits
- Reviewing the Business Case for the programme at key stage boundaries.
- Monitoring external factors that might affect the strategic objective that the programme is addressing.

### 12.9.3.2 Key Individual Roles on the Programme

#### 12.9.3.2.1 Programme Sponsor

- Development of the Programme Brief (either personally or by delegation).
- Acts as champion of the programme.
- Is accountable for the embedding and institutionalisation of planned outcomes.
- Is accountable for the realisation of benefits.
- Ensures resolution of issues escalated by the Programme Manager or Board.
- Sponsors the communications programme; communicates the programme's goals to the organisation as a whole.
- Makes key organisation/commercial decisions for the programme.
- Assures availability of essential programme resources.
- Approves the budget and decides tolerances.
- Ensures that the Programme Manager is appraised of any changes to strategy

- Leads the Programme Steering Board.
- Ultimate authority and responsibility for the programme.

#### 12.9.3.2.2 Programme Manager

- Overall management and co-ordination of the programme, its projects and their interdependencies.
- Contributing to strategy, policy and procedure.
- Managing supplier/consultancy/contractual relationships.
- Detailed programme planning and control including:
  - Developing and maintaining a detailed programme plan.
  - Budgetary control of the programme of projects.
  - Managing project outputs in line with the programme plan.
- Managing programme issues and escalating where necessary - includes reviewing escalated project issues to evaluate whether they will affect the programme.
- Resolving cross-functional issues at programme level.
- Liaising with other programme managers particularly where projects have outputs affecting more than one strategic objective
- Ensuring projects maintain focused on benefits.
- Reviewing project requests for change to scope to evaluate any impact at programme level.
- Monitoring project progress and performance.
- Liaison with, and updates progress to, programme steering board/senior management.
- Managing communications with stakeholders (in partnership with Benefits Manager)
- Managing programme evaluation and dissemination activities.
- Working closely with the Benefits Manager to ensure the programme embeds any new working practices.
- May act as Project Sponsor/Executive to the programme's projects.
- Undertakes the role of Benefits Manager if that role is absent.

#### 12.9.3.2.3 Benefits Manager (Client)

- Works with the Programme Steering Committee to identify and define benefits, how they will be measured and the outcomes necessary to realise them.
- Works with the Programme Manager to identify the necessary projects.
- Works with the Programme Manager to ensure that each project has a scope that encompasses all the necessary deliverables to ensure realisation of benefits.
- Maximises improvements in both Before-Change and After-Change states as projects deliver outcomes into operational use.
- Manage the Change Management requirements of the programme to prepare operational areas for the transition to the After-Change state.
- Co-ordinate and manage any Change Agents
- Ensure measurements are taken of the Before-Change state to enable comparison once the After-Change state is reached.
- Identify, monitor and manage resistance
- Liaise with other appropriate teams and management eg HR, Heads of affected functions, departments and teams
- Monitors climate – morale, workloads, capability to identify risks at programme level
- Ensures continuity of business during the transitional phase

#### 12.9.3.2.4 Programme Administrator or Co-ordinator

- Sets up and manages support functions covering planning, tracking, reporting, quality management and internal communication.

- Produces consolidated reporting to the Programme Steering Committee, including milestone summary, key issues, risks, benefits, summary of costs incurred.
- Establishes standards, tools and procedures for use on the programme, including Issue, Risk, Change and Information Management in conjunction with the Programme Manager and Programme Team.
- Manages the Programme Library.
- Reviews programme activities for compliance with procedures and standards.
- Manages data security.
- Assists with the production of programme documentation.

#### 12.9.3.2.5 OHSA Agent (Client)

- Will assist Site to address safety problems as they arise and recommend cost effective controls.
- Will audit equipment pre-use inspection systems and maintain the inspection records.
- Will assist in development of JSA's required for the site.
- Will review all hazard reports and actions as required.
- Will monitor hazard reports and provide regular summary reports on their progress to the RMAPM.
- Develops and displays site emergency procedures.
- Audits fire protection systems provided on site.
- Identifies the appropriate level of First Aid equipment and trained First Aid Officers required for our operations.
- Maintains a register of hazardous materials on site and verifies that a MSDS is available for each substance.
- Inspects all plant and equipment upon arrival to site and then re-inspects on a monthly basis.
- Inspects all power tools and extension leads, including tagging and recorded as required by legislation.
- Will audit all personnel, including subcontractors and visitors on site for appropriate PPE.
- Will conduct safety audits to the agreed frequency; prepare non-conformances and corrective action recommendations.
- Will audit plant and equipment licenses and verify records of the operator's qualifications.
- Assist management develop Return to Work (RTW) Programmes.
- Will identify and conduct or arrange training programmes as necessary to meet site safety training requirements.

### 12.10 PERFORMANCE REPORTING AND MONITORING

Monitoring and recording progress will be an on-going process, which will involve checking programmes, daily diaries, weekly records and performance reports. This will be carried out by the Programme Manager.

Progress will be reported on a monthly basis. Deviations from the plan will be noted and the agreed remedial action will be recorded in the progress reports.

## 13 COST ENGINEERING / ESTIMATING AND & ADVICE

- Advising on various courses of action and procedures to suit the particular requirements of the project.
- Providing financial design criteria advice.
- Evaluating the financial impact of variations.
- Preparing preliminary and comprehensive estimates of cost and providing such other cost advice as may be reasonably required.

### 13.1 DOCUMENTATION AND PROCUREMENT

- Preparing documents for procurement of contracts.
- Calling for tenders or negotiating the cost with a contractor.
- Financially evaluating and reporting on tenders, including financial comparisons with budget.

### 13.2 CONTRACT ADMINISTRATION

- Examining and verifying priced documents including preparing same for incorporation into the signed contract.
- Preparing the procurement documentation for subcontracts, as required.
- Examining and reporting on tenders for subcontracts, including financial comparisons with budget.
- Monitoring all cost-related functions.

### 13.3 FINAL ACCOUNT

- Determining and agreeing all variations and adjustments for incorporation into the final account.
- Agreeing and finalizing all subcontracts and adjusting against provisional sums
- Concluding the final account, including fluctuations in costs (if applicable)
- Preparing and presenting the final account to the **CLIENT**, including any necessary reconciliations and explanations against the financial budget.

### 13.4 INNOVATIVE STRATEGIES

- For RMA, the Procurement and Contract Documentation forms the baseline of communication between all parties involved. To ensure success, an integrated communication strategy must be put into place to ensure that all parties are on the same information in terms of the meaning of contractual terms and conditions.
- To ensure success of this iconic project, RMA's involvement goes beyond a re-active service. Our service takes the following aspects of value into account:
  - **Physical:** a quality building
  - **Psychological:** a pleasant-looking building which is good to live in,
  - **Real Quality:** cost effective but with specifications that fit the purpose
  - **Durability:** taking life-cycle costs and whole-life costs into account
  - **Design:** design-to-cost, cost design and appearance
  - **Affordability:** budget and returns are important
  - **Timelessness:** short-term fashions as opposed to design that will withstand the pressures of current whims

### 13.5 PROJECT SPECIFIC CONSIDERATIONS

RMA will further propose that a Value management process occur throughout the project and that it is implemented right from the inception of the project. In essence, this proposed Value Management Process will incorporate the following aspects:

- Orientation: Understanding the issues
- Information: Identification of functions, needs, budgets, project constraints and timing
- Speculation: The creative development of ideas and alternatives
- Analysis and Evaluation: Elimination and filtering of ideas
- Development: Examination in detail

- Selection: The final proposal
- Conclusion: Presenting the findings to the client

## 13.6 WORK PLAN

### 13.6.1 Project Set-up

- Prepare analysis of the **CLIENTS** objectives and requirements and document the project brief identifying the project parameters with emphasis on cost control and management.
- Obtain or prepare a suitably determined estimate of costs by determining the extent of work by extracting from drawings and applying the market related rates in order to determine a control budget.
- The agreement of the control budget with the **CLIENT**
- The establishment of individual work packages together with the apportionment of their individual cost budgets.
- Setting up cost control systems and procedures to meet the **CLIENT** requirements.

### 13.6.2 Project Cost Monitoring

- Comparison of cost budgets with the contractor's prices including detailed checks of specifications, invoices, unit rates and totals including effecting the necessary adjustments and agreeing same with the contractor.
- Acceptance of the contract sum and accommodating increased cost from contingency amount or alternatively the **CLIENT** may accept the increase and seek to obtain savings from other areas.
- Assessment of contract instruction / variations
- Activities required
  - Administering all requests through contract instructions / revised drawings
  - Retaining all relevant documentation
  - Producing a schedule of approved and pending variations which will be issued monthly.
  - Ensuring that no variations are acted upon unless prior authorization is received.

### 13.6.3 Project Cost Advice

- Assessment of cost implications for all specified work including cost comparison of alternative design/construction solutions.

### 13.6.4 Payment Certificates to Contractor

- Production of payment certificates
- Activities required:
  - Receipt of claim from contractor / sub-contractors.
  - Check and agree quantities of work done and determine payment value.
  - Agree value adjustments with contractor / sub-contractors.
  - Evaluate materials on site.
  - Review all invoices for labour and material including related documents and request for additional supporting documentation if required.

