Powering On

| MAY 2012 | ISSUE #3 |

INMA UTILITIES CONTRACTING COMPANY
…EXECUTING THE LARGEST AND MOST PRESTIGIOUS PROJECTS…

TURBINE INLET AIR COOLING SYSTEM
…TECHNOLOGY REVIEW AND ANALYSIS BY APINA ARABIA…

Riyadh PP10
2,600 MW

ARABIAN BEMCO CONTRACTING COMPANY MAGAZINE

Message from the Executive Vice President

"For Bemco to survive and continue its growth under this condition, new approach and strategies have to be developed"

Today's power market conditions in Saudi Arabia offers the best opportunities ever seen throughout the history of the nation due to the phenomenal economic growth of the Kingdom requiring an annual increase in the electric sector of over 8%, a record growth in the demand for electricity worldwide.

Coupled with such an extraordinary economic growth in Saudi Arabia, the deep financial crisis affecting most industrialized nations is bringing an avalanche of highly qualified and motivated multinational contractors, especially from the Far East, to target Saudi Arabia as their key market to maintain their existence. This is creating a phenomenon of big opportunities with an even bigger competitive market.

For Bemco to survive and continue its growth under this condition, new approach and strategies have to be developed to become more competitive without compromising with the quality and the reputation built over the years as the quintessential power contractor in Saudi Arabia for its ability to deliver projects in record times.

Besides the stiff competition, it has also become a necessity for Bemco to move upwards in its knowhow and capability to build higher technology power plants, as the demand from the customer for higher efficiencies and lower prices are dictating the building of economical high efficiency power plants based on combined cycle technology, as well as large conventional steam power plants to capitalize on the economy of scales and to utilize lower grade fuels such as HFO.

Such combined demands for lower prices with new technologies mandate that Bemco improve its knowledge and capabilities, especially in Engineering, Project Management, Heavy Mechanical and Civil Construction, Fabrication Start up & Commissioning, as the technical and execution risk of these higher technology power plants are significantly greater than the previous technologies used by Bemco in the Simple Cycle technology.

We shall aim to become more competitive and reduce the risk by:

- Optimizing designs, implementations of value engineering and standardization
- Global sourcing and intelligent procurement
- Modularization of pipe racks and skidding of systems including local fabrication to reduce site labor with better control of materials and improved quality
- Improvements in the productivity of manpower, utilization of construction machinery and resources and control of materials through the utilization of higher-level work breakdown structures and work packages

Therefore, it is essential that every individual in the company must exercise ultra-care in the performance of his duties with the aim to achieve zero tolerance for errors, omissions or delays in the work, to properly coordinate and communicate with co-workers, customers, partners, subcontractors or suppliers; and to impose strict discipline and commitment to all assignments to be undertaken under his or her responsibility.

Bemco is a company with significant achievements, which have produced an unblemished great reputation and name recognition, respect from our customers and the public in general. We must endeavor to ensure that such attributes and credentials will be passed on to future generation.

Henry Cabrera
Executive Vice President
Arabian Bemco

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Riyadh Power Plant No.10 (PP10) Simple Cycle

Mr. Bassem Haddad, Sr. Project Manager

In June 30, 2008, Arabian Bemco was awarded a lump-sum EPC Turnkey Contract to build Saudi Electricity Company's Riyadh Power Plant No. 10 (PP10) consisting of four (4) blocks (A1, A2, B1, and B2). This USD 3 billion grass root project is located South of Riyadh on Al-Kharj Road and is currently being built on a land area of 5 million square meters.

The contract was initially signed to install 36 (GE 7001EA) simple cycle gas turbine generators, each rated at ISO 80.9 MW for a total of 2,912MW (or 55.9MW at 50°C ambient temperature and 600 meters elevation).

In Aug 8, 2009, Arabian Bemco agreed with the Saudi Electricity Company, through a contract, to transfer and install four (4) of the PP10 units to Qassim Power Plant on an urgent basis to satisfy the power demand in Qassim. Furthermore, an extension of 8 GE 7001EA GT units (Block C1) was granted on December 27, 2010 to raise the total number of units at PP10 to 40 GE 7001EA Gas Turbines Units, producing a total ISO rating of 3,236 MW (or 2,236 MW at 50°C ambient temperature and 600 meters elevation).

The project contract terms required putting the first units into service in 20 months, with completion of construction, installation, and putting into operation of 32 Gas Turbine Generators in 36 months. Although the project schedule was very short for a grass root project of this magnitude, Arabian Bemco managed to complete all 32 units ahead of the contractual dates. On June 8, 2011, Arabian Bemco had successfully synchronized and connected to the power grid the last two units of the main scope (32 units) one month earlier than the schedule. As a result, on the 10th of July, 2011, Arabian Bemco received an appreciation letter from the Executive Vice President of SEC Mr. Fouad Al-Sherebi expressing the appreciation of SEC for the efforts undertaken to deliver the power on time.

SEC considers this achievement as a significant contribution by Bemco to support the power network demand in the Kingdom of Saudi Arabia and subsequently, fulfill the peak summer load demands. On March 12, 2012, Riyadh Power Plant No. 10 was nominated as one of four national winners in KSA by the MEED Quality Awards for Projects and is also being considered for the GCC Power and Water Desalination Project of the Year award to be determined on the 21st of May, 2012.

Bemco ordered from GE 44 Indoor Type Gas Turbines sets including Gas Turbine Units, Electric Generators, Air Intake System with self-cleaning filters to survive high dust ambient atmosphere Turbine Controls, and other auxiliaries. Fuel tankers unload Crude and Diesel Oil through fuel unloading bays consisting of 12 Crude Oil unloading arms with 12 pumps of 125 m^3/hour capacity each and 4 Diesel Oil unloading arms with 4 pumps of 100 m^3/hour capacity each. The Untreated Crude Oil is pumped into two (2) Lap-Welded Double Deck Floating Roof Tanks of 30,000 m^3 capacity each and then transferred to the Fuel Treatment Plant having a capacity of 28,800 m^3/day, with another 7,680 m^3/day as standby.

After the fuel is treated, it is transferred to six (6) Treated Crude Oil Lap-Welded Double Deck Floating Roof Tanks with capacity of 50,000 m^3 each. Four (4) transfer pumps with a capacity of 500 m^3/hour each facilitate the transfer of Crude Oil between tanks. The Crude Oil is then forwarded to the GTs through thirty (30) pumps with 60 m^3/hour capacity each. Diesel oil is also required

Mr. Abed Shakour Salaimeh, Sr. Construction Manager

to operate the plant and is unloaded from fuel tankers at the fuel unloading bays through four (4) Diesel Unloading Arms and transferred to two (2) Diesel Oil Fixed Roof Cone Type Tanks 4,000 m^3 each and two (2) 25,000 m^3 each using four (4) Diesel Unloading Pumps with 100 m^3/hour capacity each. Ten (10) Diesel Oil pumps of 125 m^3/hour capacity each forward the Diesel Oil to supply the GTs. Two (2) Pumps with capacity of 5 m^3/hour are used to transfer Diesel Oil between tanks. The tank farm is designed to store fuel to operate the plant for 14 days, hence the fuel unloading / treatment / transfer / forwarding is a continuous process. However, the process is easily monitored and controlled from the Main Control Building.

Water System

The power plant requires demineralized water to treat the Crude Oil, cool down and wash the GT Units. For this reason, one 3,000 m^3 raw water underground concrete tank and one 3,000 m^3 above ground (A/G) steel tank to store raw water that is received from water tankers, and then pumped into an Iron Removal Plant producing iron-free water at a capacity of 80 m^3/hour. The iron-free water is then channeled into the Demin Water Treatment Plant of 30 m^3/hour capacity and stored in two (2) 300 m^3 each demin water A/G steel tanks and into the Drinking Water Treatment Plant of 40 m^3/hour capacity stored in one 480 m^3 drinking water A/G steel tank which is used for Service Water and Drinking Water.

Fire Fighting System

Different Fire Fighting and Alarm Systems form part of the scope, such as the conventional Fire Water System, Fire Foam System, FM200 System and the CO_2 System. Fire Foam Systems suppress fire by separating fuel from oxygen. This is done through foam that blankets the fuel surface and restricts release of flammable vapors that mix with air. The fuel is cooled by the water content of the foam. FM200 Systems are suitable for enclosed rooms and the FM200 gas is colorless and is liquefied under pressure for storage. It rapidly extinguishes most commonly found fires through a combination of chemical and physical mechanism. CO_2 is a colorless, odorless, electrically non-conductive gas that is highly efficient as fire suppressor. FM200 and CO_2 systems use intelligent control panels to quickly sense a fire before fire damage expands by reducing the oxygen level to a point where combustion cannot be maintained.

Electrical System

Electrical Systems include one (1) Generator Step-Up (GSU) Transformer for every two (2) GT Units rated at 225 MVA 13.8/380 kV, Medium and Low Voltage Transformers serving the plant buildings, auxiliaries and support systems, two (2) Black Start Diesel Generators rated 4.8 MW each, 13.8 kV, 4.16 kV and 480 V Switchgear feeding Auxiliary Systems, Medium and Low Voltage Power Cabling and Earthing grid for equipment and buildings.

Main Control Building

The Main Control Building and Local Control Rooms house sophisticated control equipment for all the GTs and Auxiliary, and Support Systems. These systems include DCS (Distributed Control System), Mark Vle GT Controllers, PLCs and SCADA. Other systems include Vibration Monitoring Systems, HVAC Control Systems, Security and Safety Systems.

Buildings

Arabian Bemco has also completed the construction of site buildings with a total area of 116,000 m^2 and over 270,000 m^3 of concrete structures including Power blocks, Main Control Building, Fuel Treatment Plant Building, Crude & Diesel Oil

PP10 Tank Farm - Total Capacity of 418.000 m^3

Forwarding Buildings, Crude & Diesel Oil Unloading Metering Stations, Compressed Air Building, Annex Buildings, Administration Building, SEC Site Offices, Water Treatment Building, Workshops, Warehouses & Storage Areas, Fuel Additive Storage and Forwarding Building, Fire Fighting Stations and Foam Storage Buildings, Fire and Ambulance Station, Security Building, Sewage Treatment Building, Water Distribution Building, National Guard Accommodation and Mosque. Other infrastructure includes Platforms & Dyke Walls around Fuel Tanks, Fuel Unloading Gate Houses and Fuel Unloading Bays, Fuel & Water Piping Trenches and Sleepers, Main Gate House, Sheltered Parking and Concrete Evaporation Ponds.

Execution Challenges

One of the greatest challenges when executing a large scale grass root project of this magnitude is the mobilization and logistics operation required for supporting the early start and timely completion of the different contractual milestones. Such operation includes the timely mobilization of substantial resources and facilities such as power, water facilities, sanitary, offices, workshops, camps, administration, voice and data communication, data and document control, security and safety.

During the execution of the project, the manpower peaked at approximately 10,000 technical and support personnel, while the number of construction equipment exceeded 1,048 items. Another challenge was to get the designs prepared and approved by the client on time to support the construction schedule requirement. This was expedited through a series of on board design review meetings during which discussions were held and resolutions were reached, saving a considerable amount of time.

The absence of electric power supply to start the first construction phase of the project was another challenge. In order to expedite the testing works and facilitate starting of the first Gas Turbine units, a temporary 13.8KV 7 MW rated power plant was set up and connected through the permanent distribution equipment and network to all those facilities that are required to be operational as support to bring the first unit into operation.

Quality and Safety were of the highest priority and formed a challenge in view of the large scale project and its fast track schedule. Extensive and continuous Safety & Quality Control Orientation, Reviews and Training were conducted covering all levels of personnel involved in the project. In certain cases, contractors face the need to balance quality with a challenging project schedule. However, when asked, Mr. Bassem Haddad, Sr. Project Manager, said: "We do not compromise on quality. We strive to complete the project on time while maintaining the highest level of quality." He continues: "the success of the project is the result of a carefully prepared all-inclusive execution plan that is established at the early stages of the project. The execution of this plan is continuously monitored and controlled throughout the project duration. From the onset, it is important to start early, aggressively pursue all fronts, continuously monitor progress and performance, and take a proactive approach to maintain progress on schedule, as the time lost is always hard and costly to recover. Furthermore, establishing a one team approach with the client and consultant is crucial to the overall success of the project and client satisfaction." Arabian Bemco has developed a solid Quality System that creates an environment of excellence and continued capability improvements of business processes, key performance indicators and technical knowledge and competence to achieve high inspection pass rates and gain customer satisfaction.

Staffing the project is another critical activity since the market availability of Human Resources is not constant and a skilled workforce is not always present in the required numbers when needed. Therefore, creative alternative solutions should be sought. As for construction, regular walk downs and meetings covering different facilities and systems were conducted to continuously appraise progress and determine action needed to meet the scope, quality, safety and schedule requirements.

Conclusion

Riyadh PP10 stands out in Bemco's records as a successfully implemented fast track project and has truly been marked as one of the greatest breakthroughs. This could not have been possible without an experienced Project and Construction Management Team with good rounded knowledge in all functions from technical know-how to contracting, management, quality, safety, planning, good communication skills, accounts, finance, problem diagnosis and problem solving abilities. This underlines the commitment of the Saudi Electricity Company to fulfill electricity demands in the Kingdom with Arabian Bemco at the very heart of its drive for future growth and prosperity.

Main Control Room

Mr. Henry Sarkissian welcomes Mr. Ali Al-Barak

Mr. Abed Shakour Sulaimeh, Mr. Emad Ghandourah, Mr. Bassem Haddad, Mr. Hamad Abdullah, Mr. Henry Sarkissian, Mr. Henry Cabrera, Mr. Edward Wollyung

Arabian Bemco Signs a $1.4 Billion Contract with SEC

The new combined cycle will add 1,300 MW to the existing 3,400 MW plant by adding 10 STGs, 40 HRSGs and 10 ACCs to Power Plant No. 10 blocks A1, A2, B1, B2 and C1, including all support facilities to convert the simple cycle power plant to a combined cycle power plant.

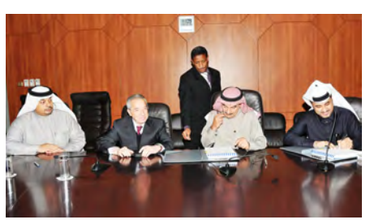
The Contract Signing Ceremony took place in Riyadh on the 16th of October, 2011 and the US$1.434 billion Contract was signed by H.E. Dr. Saleh Al-Awaji, Deputy Minister for Electricity and Chairman of SEC, Mr. Ali Al-Barrak, CEO and President of SEC, Sh. Samaual Bakhsh, Chairman of Arabian Bemco and Mr. Henry Sarkissian, CEO of Arabian Bemco.

When completed in 2015, Riyadh Power Plant No. 10 Combined Cycle will be the largest combined cycle plant in the world (total capacity 4,700 MW with 40 GTGs in the Combined Cycle Operation).

Mr. Emad Ghandourah. Mr. Henry Sarkissian. Sh. Samaual Bakhsh. Dr. Saleh Al-Awaji. Mr. Ali Al-Barrak

Contract Signing Ceremony for Al-Qurayyat Power Plant

On the 24th of January 2012, the signing ceremony of the "Construction of Al-Qurayyat Open Cycle Power Plant" was held at the Saudi Electricity Company headquarter in Faisaliyah Tower, Riyadh. The Contract was signed by Mr. Ali Al-Barrak, President and CEO of SEC and Mr. Henry Sarkissian, CEO of Arabian Bemco. Located north-east of Saudi Arabia, the new open cycle power plant will add a net output of 120 MW to the existing 250 MW plant by installing 2 GTGs and 2 GSTUs including all support facilities and balance of plant. The extension to the power generation plant is aimed to cover the extra demand requested in the north-eastern region and is expected to be completed in the 3rd quarter of 2013.



Mr. Nabil Madani. Mr. Henry Sarkissian. Mr. Ali Al-Barrak. Mr. Tarek Tahini.

Mr. Tarek Tahini. Mr. Henry Sarkissian. Mr. Ali Al-Barrak. .

Saudi Arabian National Guard Housing Project – (SANG)

On Nov 17, 2011, Arabian Bemco signed a contract for the construction of the Saudi Arabia National Guard Housing Project consisting of 1,150 soldier villas with an approximate area of 295 square meters each and 100 officer villas of 539 square meters each.

The site area is approximately to 1.46 million square meters which includes infrastructure facilities such as roads, storm water, sewage network and sewage treatment plant capacity of 5,000 m^3/day, irrigation network, water supply and fire-fighting, electrical system to include substations, MV and LV cables, street lighting, lighting panels telephone networks, etc. and all other civil works i.e. earthworks, landscaping, asphalting and fencing works. The project is planned to be completed in 36 months after site receiving date.

General Site Layout (Total Area: 1.461.340 m^2)

SABIC Awards Bemco the Construction of a New Grass Root Plant

On Dec 1, 2011, SABIC (Saudi Basic Industries Corporation) awarded Arabian Bemco a prestigious contract "PET Preform Plant" as part of the IBN RUSHD – II (Arabian Industrial Fibers Company) Strategic Project.

This marks the first SABIC project awarded to Arabian Bemco and the beginning of a promising and fruitful business relationship.

The contract is to build a new grass root plant to produce PET (polyethylene terephthalate) preforms suitable for 0.33L and 10L bottles for the use of ZAMZAM water. The plant will have a production capacity of 70 million preforms per year with an approximate weight of 130g/bottle for the 10L bottles. These machines will process approximately 9.000TY of PET within 24 hours of operation and 350 days/year. The plant will be located in the Holy City of Makkah, Saudi Arabia and shall include all required facilities such as injection molding machines, buildings, offices, warehouse, electrical substations and related balance of plant.

The project is expected to be completed in July 2012.

Drying, Injection/Clamp, and Cooling equipment

Global Competitiveness Forum (GCF 2012)

GCF, founded by the Saudi Arabian General Investment Authority (SAGIA), is intended to raise awareness and enthusiasm around competitive challenges and to critically evaluate competitiveness theory and practice as related to activities such as International Trade, Regional Development, FDI, Environment, Innovation, Human Resource Development, Sustainability, Globalization, and the Micro and Macroeconomic consequences of becoming increasingly competitive.

On Jan 25, 2011, Arabian Bemco was recognized as the most competitive construction company in the Kingdom of Saudi Arabia for 2011 and the 21st top Foreign Direct Investment (FDI) Company out of 100 companies by the Saudi Arabian General Investment Authority (SAGIA). The Governor of SAGIA, H.E. Amr Al-Dabbagh presented the award during the Global Competitiveness Forum 2011 held in Riyadh to Mr. Henry Sarkissian, CEO of Arabian Bemco.

On Dec 6, 2011, Arabian Bemco Contracting Company signed a Strategic Sponsorship Agreement with H.E. Amr Al-Dabbagh, SAGIA's Governor and Chairman of the Board in support of the Global Competitiveness Forum (GCF 2012) which was held in the Four Seasons Hotel in Riyadh on January 21 to 24, 2012.

Under the patronage of His Majesty the Custodian of the Two Holy Mosques King Abdullah Bin Abdulaziz Al-Saud, Chairman of the Supreme Council, the forum was attended by top private and public sector leaders, senior government officials, international political leaders, heads of NGOs, and selected intellectuals who share a common interest in global competitiveness. These individuals shared their visions and beliefs around this year's theme "The Entrepreneurship Imperative."

GCF 2012 focused on entrepreneurship from the social and governmental point of view, anatomy of an entrepreneur, the value of risks and other related insights.

On Jan 21, 2012, Saudi Arabian General Investment Authority (SAGIA) awarded Arabian Bemco the Strategic Sponsorship Award at the inauguration ceremony for the sixth Global Competitiveness Forum (GCF) 2012 held in Riyadh. Minister of Commerce and Industry H.E. Tawfiq Al-Rabiah along with Deputy Governor for Investment Affairs of Saudi Arabian General Investment Authority Prince Saud bin Khaled Al-Faisal honored Arabian Bemco for its continued support of this prestigious event by presenting an award to the Corporate Executive Director Mr. Emad Ghandourah.

The Minister read out the King's speech in the presence of more than a thousand high profile guests from governmental and private sectors stating that Competitiveness is a key incentive for investments diversifying the Kingdom's economy into new sectors leading to sustainable economic growth and job creation.

H.E. Amr Al-Dabbagh and Mr. Henry Sarkissian

H.E. Tawfiq Al-Rabiah


Mr. Emad Ghandourah, H.E. Tawfiq Al-Rabiah and Prince Saud Al-Faisal

Arabian Bemco Sponsors the 1st IEEE – PES Conference in the Middle East

Under the patronage of H.E. Abdullah Bin Abdulrahman Al-Hussein, Minister of Water & Electricity, the IEEE-PES Western Saudi Arabia in collaboration with King Abdullah University for Science and Technology (KAUST) and Saudi Electricity Company (SEC) organized the first IEEE-PES Exhibition and Conference in the Middle East on Innovative Smart Grid Technologies (ISGT 2011).

The Conference and Exhibition (ISGT 2011) was held at the Crown Plaza Hotel in Jeddah, KSA from the 17th-20th of December 2011 with Arabian Bemco as the official Platinum Sponsor.

The Conference represented a platform for participants to discuss the state-of-the-art innovations in smart grid technologies featuring paper sessions, panels and tutorials by international experts on smart grid. The organizing committees invited researchers, practitioners, decision makers and students worldwide to participate and submit their papers. The purpose of the conference was to improve the electric power system into a smart grid. Participants included strategic planners, management personnel, decision makers, technical experts of electric power systems, electronics, automation and control as well as regulators, researchers and students.

Key speakers include Deputy Minister for Electricity Dr. Saleh Al-Awaji, Governor of Electricity & Co-generation Regulatory Authority (ECRA) H.E. Dr. Abdullah Al-Shehri, Vice Governor (ECRA) Dr. Abdulrahman Al-Ibrahim, Vice President for New Initiatives & Outreach IEEE-PES Prof. Saifur Rahman, Vanderbilt University in USA and American University of Sharjah Prof. Abdul-Rahman Al-Ali, Vice President, IEEE PES Governing Board in USA Dr. Mohammad Shahidehpour, Florida Power Electronics Center, University of Central Florida Dr Issa Batarseh, King Abdulaziz University in Saudi Arabia Prof. Ramzy Obaid, Senior Director and Executive Advisor of Quanta Technology in Oakland, California, USA Abdel-Aty Edris and CEO of ACWA Power Paddy Padmanathan. The Conference featured special sessions and tutorials by international experts on smart grid applications such as Development of Renewable Energies in the Middle East, System Stability, Reliability, and Diagnostics, Case Studies in Smart Grid, Grid Intergration with Renewable Energy Sources, Power System Analysis and Management, Renewable Energy and Electric Vehicles and Advanced Monitoring and Control Applications.


Mr. Bandar Allaf, Dr. Saleh Al-Awaji and Dr. Abdullah Al-Shehri


Mr. Hani Aqeel and Dr. Saleh Al-Awaji


Bemco Exhibition Stand

The Institute of Electrical and Electronics Engineers (IEEE) was founded in New York in the year 1988 and is now the world's largest professional association. It is composed of volunteer members dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE and its members inspire a global community through IEEE's highly cited publications, conferences, technology standards, professional and educational activities.

The IEEE Power and Energy Society (PES) is a society under the IEEE world-wide non-profit association of more than 29,000 individuals engaged in the electric power energy industry. Its mission is to be the leading provider of scientific information on electric power and energy for society improvements and a development source for its members.

The ISGT is a new IEEE conference series established in 2009 together with the decision to create a new IEEE Transaction on Smart Grid.

Building Towards Saudization

Nationalization is one of the key strategic business and HR goals when building a company's workforce. Saudization plans were initiated since the 1990's where Saudi nationals must comprise of at least 75% of an employer's workforce. Today, a new program launched in 2011, known as the Nitaqat Program, classifies firms into one of four categories according to the Saudization percentages in the company: Excellent, Green, Yellow and Red. Arabian Bemco is proud to announce that the company is under the green status.

This accomplishment is due to the strong determination of Bemco's High Management and its role in nationalization and the diligence of the Saudization Section that has been active in the recruitment, training and HR Development in coordination with several accredited training institutions.

Arabian Bemco established in 2009 a specialized Saudization Committee to manage and coordinate the company's workforce and Saudization plan. The Committee is chaired by Corporate Executive Director Mr. Emad Ghandourah, and is made up of Admin & HR Manager Mr. Mohamad Al-Asiri, Saudization Section Manager Mr. Faisal Al-Ghamdi, Administration Manager Mr. Anas Shangiti and Business Development Manager Mr. Nabil Madani. The Committee's role is to maintain Saudi employment level as per Government regulations by determining the appropriate size of the company's workforce that is necessary to meet contractual obligations towards Saudization and develop strategies to meet the Saudization goals.

The key to reaching and maintaining optimum Saudization percentages within the company involves a series of steps starting from early planning to recruitment, development and retention. "We identify the number of saudi workforce and professions required starting from the bidding phase where the company's winning chances of future contracts is reviewed, and accordingly, determine the manpower required for the project", said Mr. Nabil Madani. He continues: "Once we have set our goals and reached the required Saudization percentages, we re-evaluate and adjust the overall planning process to improve efforts towards saudization."

Saudization Committee: Mr. Mohamad Al-Asiri, Mr. Faisal Al-Ghamdi, Mr. Anas Shangiti, and Mr. Nabil Madani.

Mr. Emad Ghandourah, H.E. Adel Bin Mohamad Fakih and Mr. Mohammad Jamil

Arabian Bemco is utilizing Employment-Towards-Development Strategy which is supported by the Human Resources Development Fund (HRDF) and Bab Rizq Jameel (BRJ). BRJ is part of Abdul Latif Jameel Community Initiative and its main role involves job creation and providing job opportunities to Saudi nationals. BRJ supplies to Arabian Bemco and to other private companies suitable candidates for training and recruitment.

During the yearly ceremony of BRJ, Corporate Executive Director Emad Ghandourah received an award from H.E. Minister of Labor Engineer Adel Bin Mohamad Fakih to honor Bemco for providing job opportunities to Saudi nationals in its drive to support the Saudization Program.

Arabian Bemco has sponsored several Institutions and Universities in their yearly Job Fairs, such as KAAU, KFUPM, Effat University and CBA as part of its recruitment program. Not only does Arabian Bemco provide training to Saudi nationals in its Training Centers, but also offers additional employment incentives and motivation to promote them into managerial positions. Arabian Bemco continues its contribution to the efforts of the Saudi Government in reducing unemployment and supporting the national economy.

This initiative is regarded as a vital strategy and it reflects Arabian Bemco's dedication to social responsibility and promoting development and growth of the country. Arabian Bemco has been keen on practicing social responsibility towards Saudi nationals and implementing Saudization which will in turn help to support government challenges in constraining related demographic, economic, and government security challenges.

Creating a Safety Culture

BY : TURKI ABU SAID
CORPORATE SAFETY MANAGER

Safety is an essential factor for the success of any business "safe jobs, smart business". As an EPC Contractor, our aim is to deliver the project on time and up to the required level of safety, quality and technical standards, which will in turn, maximize client satisfaction and trust. When executing large scale projects, accidents are likely to occur causing losses and delays. For this reason, we are introducing a new aspect of prevention known as "Safety Culture" which has risen since the Chernobyl nuclear disaster in Ukraine (1986); the worst nuclear power plant accident in history.

What is Safety Culture?

A safety culture can be defined as:

1) "An organizational atmosphere where safety and health is understood to be, and is accepted as, the first priority".

2) "The product of an individual and group values, attitudes, perceptions, competencies and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management".

3) "How the organization behaves when no one is watching".

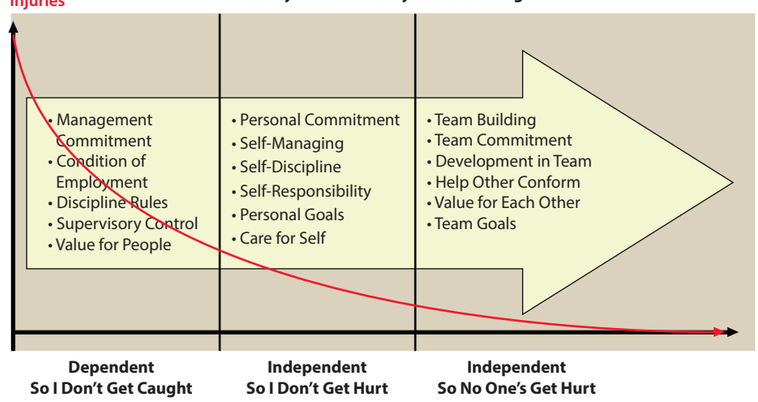
As a manager, engineer or supervisor, what is your feeling towards this culture? What initiatives do you pursue to promote Safety Culture? How well do you follow company policies, procedures and regulations? All managers should maintain a positive feeling towards Safety Culture and reinforce it by channeling it to all employees. Subsequently, employees should perform their duties under minimal supervision according to internationally recognized safe practices and ethical conduct. All company policies, procedures and regulations should be followed willingly without disciplinary action and you should be part of a successful team.

Any safety system in the world will fail without a supportive culture. In order to create a supportive culture, the attitudes of personal organization will play a higher role in developing the safety culture in the work place. Needless to say, the environment in which people work in and a solid system put in place will help to influence a safety culture. Many accidents can be prevented if a safety culture had been created, "studies have shown 90% of all work place injuries are due to attitude, behavior and culture differences".

A positive approach to discipline is essential for creating a safety culture. This can be done by the leadership of the organization who has the well-felt responsibility for a cultural change and for sustaining a sound safety culture once it is established. However, safety cultures are based upon shared values, beliefs and perceptions that determine what comes to be the norms of the organization. Each individual in the organization plays a role in reinforcing the behavioral norms.

How to Establish a Safety Culture

- Commitment at all levels especially top management.
- Provide strong leadership.
- Empower individuals to successfully fulfill their safety responsibilities.
- Ensure open and effective communication.
- Foster mutual trust.
- Provide timely response to safety issues and concerns.
- Provide continuous monitoring of performance.
- Treat Safety and health as an investment, not a cost.
- Maintain continuous improvements to Safety and Health Policies and Procedures.
- Determine and provide the necessary training.
- Establish and maintain a solid system for workplace analysis and hazard prevention and control.
- Promote a blame-free environment.
- Call for celebrations and employee recognition/incentives to success stories.



Now comes a million dollar question: Do you have a Safety Culture in your organization? If no, start establishing one. If yes, maintain it towards safety excellence.

INMA Utilities Contracting Company

Executive Director Mr. Jamal Abounassif

Mr. Jamal Abounassif was born in Lebanon in the year 1956 and holds a Master's degree in Mechanical Engineering from Tennessee Technical University, USA. His professional career started in 1982 with Arabian Bemco Contracting Company. In 1990, Mr. Jamal was assigned as Makkah Area Manager, climbing to Construction Manager for E/M Projects in 1993, and by 2001 taking the lead as Director for E/M

With over 40 years of expertise in all aspects of the industry, from Engineering, Procurement and Construction of Industrial and Power Projects to Mechanical, Electrical and Plumbing Contracting, Arabian Bemco Contracting Company (BEMCO) along with Advanced Vision Company for Electromechanical Works (VISION) has created its own specialized electromechanical business to undertake mega construction projects in the Kingdom of Saudi Arabia.

Through ceaseless exertions for improvement, BEMCO and VISION established in 2010 INMA Utilities Contracting Company (INMA) in Jeddah, Saudi Arabia on a 50-50 basis to undertake specialized electromechanical projects for Residential, Commercial, and Industrial sectors.

These projects include, but not limited to, large housing communities, palaces, hotels, hospitals, airports, district cooling plants, diesel generation power plants, water treatment plants and sewage treatment plants to serve government entities, ministries, economic cities, large real estate investors and developers.

The members in the board of directors are equally divided between BEMCO and VISION with Mr. Henry Sarkissian as Chairman and Mr. Emad Ghandourah as Managing Director.

The company's day to day activities are led by Executive Director Mr. Jamal Abounassif, having vast experience in project management and leadership since 1990 as Project Manager and Director for major Electromechanical Projects.

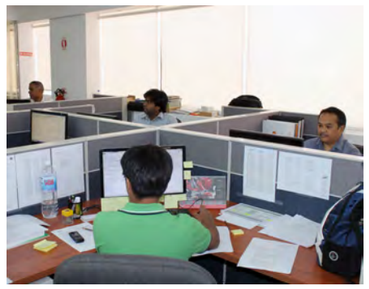
INMA's key personnel and senior management have geared up the company with the required know-how and capability to execute large scale and complex projects through a track record of over 20 years of project experience. Presently, INMA is utilizing a workforce of 900 (and increasing) experienced engineers, skilled craftsmen and competent supervisory and administrative personnel.

INMA is moving towards a bullish trend with three prestigious projects underway:

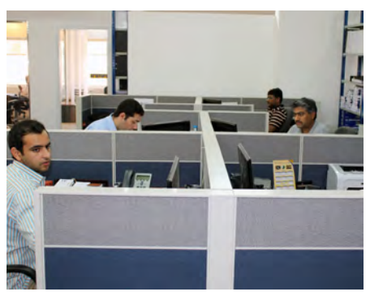
1) Makkah Haram Shamiyah Expansion – Central Utility Complex
2) King Abdulaziz International Airport – 4 Load Centers (Central Utility Plants)
3) Jeddah Kingdom Tower in Obhur

INMA Office Jeddah, KSA

Engineering



Procurement



IT & Accounts

Makkah Haram Shamiyah Expansion – Central Utility Complex

In 2010 INMA was awarded the Central Utility Complex (CUC) in Makkah Haram - Shamiyah Expansion. The project is only part of the major development plans of North Al-Haram, and is considered as one of the largest utilities and cooling plants. The project is located at the north-western side of Al-Haram near the intersection of the section ring road and will connect to the Shamiyah Haram Expansion through a 1.2 km underground tunnel. The CUC is an 84,000 m^2 complex which includes a chiller plant (120,0000 Tons of refrigeration, 24 Units, 5,000 each), Diesel Generator Power Plant (74 MW, 14 Units, 5 MW each), Grey Water Treatment Plant, Central Refuse Collection Station, Administration & Services Building, Pump Rooms and Water Tanks. Major mechanical equipment includes chillers, cooling towers, pumps, air handling units, chilled water pipes, valves and fire-fighting systems, whereas, major electrical equipment includes diesel generators, MV transformers, LV transformers, MV switchgears, LV switchgears, Motor Control Center (MCCs) and MV Cables. The project is expected to be completed in 2013.

"In just two unprecedented years since establishment, we have signed three contracts to provide electromechanical services to the Largest and Most Prestigious Projects in the World."

– Mr. Jamal Abounassif, Executive Director, INMA

The Gateway to the Two Holy Cities of Islam – KAIA

King Abdulaziz International Airport (KAIA), managed by the General Authority of Civil Aviation (GACA), is the largest airport in Saudi Arabia and the gateway to the Two Holy Cities of Islam; Makkah and Madinah. KAIA was first opened for operation in 1981 with an area of 105 square kilometers. Today, KAIA is being developed in several stages to capitalize the Kingdom's growth plans and enhance the status of Jeddah as an international hub. The new development plans will be in three phases to incorporate 80 million annual passengers. Phase 1 of the project will add in 30 million annual passengers and a passenger floor area of 670,000 square meters including 60 km of belts baggage handling system, 46 contact gates, 96 boarding bridges, double deck A380 access, etc. INMA will construct the four Load Centers which is designed to house the main technical equipment supplying power and utilities to the entire airport complex which includes but not limited to four District Cooling Plants (15,000 TR, 50,000 TR, 60,000 TR, and 40,000 TR), Cooling Towers, Air Handling Units, Water Storage Tanks, Pumping Stations, Chilled Water Pipes, Valves, Fire-fighting Systems, Standby Generators, MV & LV Transformers, MV & LV Switchgears, Motor Control Centers and MV Cables. The project is expected to be completed in 2013.

The World's Tallest Building

The Kingdom Tower, previously known as the "Mile-High Tower" and "The Tallest Building in the World", was initially planned to be 1.6 kilometers (1 mile) high. Due to the geography of the area, the height of the tower was found unsuitable and was reduced to 1,001 meters. The skyscraper will be part of the US$ 20 billion Kingdom City and is now known as the "Kingdom Tower" located north of Jeddah,Obhur. Nevertheless, the Jeddah Kingdom Tower will remain as the tallest building in the world once completed placing Dubai's Burj Khalifa (830 meters) in second place and Tokyo Sky Tree (634 meters) in third place. The built up area will be approximately half a million square meters, over 170 luxurious floors and over 60 elevators.

The tower is designed to accommodate a Hotel, Residential & Serviced Apartments, Offices, Podium, Sky Lobbies and Rooftop Spire. INMA will execute the complete electromechanical works for the project to include but not limited to HVAC System, Water Treatment, Storage Tanks, Fire-Fighting System, and Electrical Utilities Services. The expected project duration will be 60 months.

Makkah Haram Shamiyah Expansion

King Abdulaziz Airport

Kingdom Tower

TIAC System–A Technology Review & Analysis by Apina Arabia

Figure 1. Cooling of Turbine Inlet Air for Combined Cycle

Abstract:
Turbine Inlet Air Cooling applications (TIAC) allow for extra power output in gas and combined cycle power plants with high ambient temperatures. They play an active role in achieving electricity independence during summer peak demands. The feasibility of developing thermal energy storage allows for overall electricity cost reduction as consumption occurs in low demand hours; thereby extra generation will be possible during high demand periods. Consequently TIAC applications are a crucial technology for high temperature and high electricity demands during summer in certain countries (such as Saudi Arabia). In this paper, technical feasibility of this technology is analyzed implementing air cooling by mechanical compression or by absorption. It is concluded that absorption is more attractive than compression when COP with the latter is lower than 4. Electricity generation improvement of the combined cycle is around 14% for a location with ambient temperature of 50ºC.

Introduction
The significant growth of energy demands in the past decades has drawn attention from many countries catering to the energy needs of their people. Middle East countries, in particular, have been obliged to develop a generation park according to the high peak demands suffered due to summer residential air conditioning necessities.

This region has always been very rich in oil and gas resources, providing high-income in these countries throughout the decades. Due to the high power that the government of these countries hold, in many cases the price of electricity has been subsidized, therefore not having a free market comparable to Western electricity markets. Having established their independence in the energy sector, electrical self-sufficiency has become a government priority. Due to the global importance of crude oil, its high price, and the difficulties associated with transporting gas, whether by pipelines or liquefied, it is easily understood how oil production is destined for exportation, thus promoting natural gas electricity generation. Much of the medium-term development of electrical generation parks in these countries is expected based on this fuel. Moreover, its low CO_2 emissions provide environmental reasons to support it. [1]. Natural gas is used in both gas turbines that expel their gas exhaust to the environment as in combined cycle power plants. In both cases, the high temperatures of ambient air cause low gas turbine performance way below the nominal, set in ISO conditions (15ºC of ambient temperature).

TIAC (Turbine Inlet Air Cooling) Technology resolves this problem by cooling the incoming air that passes through the compressor, thus increasing its density boosted mass flow. Also, extra fuel and increased turbine performance alleviate power drop in ambient conditions far from the point of design [2].

TIAC Technology can be complemented by a thermal energy storage system, in such a way that the cooling machines to be installed have less power and working continuously permits the usage of stored cold during peak hours. Usually cold is stored in the form of stratified chilled water. This technology with a thermal storage is called TESTIAC (Thermal Energy Storage for Turbine Inlet Air Cooling) [3], showing the operating principle in Figure 1.

In the case of the Middle East, peak energy consumption occurs during the hottest hours of the day (between 5 to 8 hours), which allows for the storage system to operate between 19 to 16 hours in charging mode.

Years ago it was very common in the Middle East to generate electricity from gas turbines in open cycles; this is, without the use of a recovery boiler that becomes a combined cycle. However, increasing demand for electricity has made combined cycle technology a reality in this region today.

Advantages can be found in the investment as well as in the costs of the operation. Thus, as the common ratio is the produced energy per gas turbine as 2/3 of the total plant [4], the inclusion of a steam turbine prevents the investment in a new gas turbine with 1/3 of the energy of the whole plant, and more importantly, the consumption of gas of the said turbine as the steam is powered by exhaust gases of the original gas turbines.

The objective of this article is to present the most relevant results of a study conducted by the Chair Rafael Mariño of New Energy Technologies for APINA, determining the influence of the TIAC system in a combined cycle. This study is relevant as though TIAC technology is good and has been well studied with

Figure 2

Figure 3

Figure 4

Arturo Goñi del Cacho
Industrial Engineer of the ICAI, specialty in Mechanics. Interned in APINA where he performed activities of optimization of combined cycles and cooling systems for incoming air for turbines in the Middle East.

José Ignacio Linares Hurtado
Phd in Industrial Engineering at ICAI. Professor of Thermodynamics. In the Superior Technical School of Engineering (ICAI) where he directs the Department of Mechanical Engineering.

Carlos de Ceballos Cabrillo
Industrial Engineer of the ICAI. Commercial Director and Business Development Director of APINA.

open cycled gas turbines [2]; there is little experience with combined cycle.

Methodology

Air cooling takes place in the heat exchanger through which cold water circulates between the filter box and the admission of the gas turbine´s turbocharger, as shown in the photograph in Figure 2. Water circulating through the heat exchanger can be chilled by either a cooling mechanical compression system (figure 3) or by an absorption machine (figure 4).

In the first case, part of the produced energy power is subtracted from the center in order to feed the chiller compressor; in the second case heat is drawn from the extraction of the steam turbine to feed the generator of the absorption machine. The system must be optimized so that in both cases the electric power that is not produced remains largely offset by the increase of power produced by the effect of cooling. In the study, the mechanical compression variant was analyzed, as well as that of the absorption machine. In both cases, the analyzed cooling cycle uses ammonia as a cooling fluid.

Regardless of the chosen system of cold production, it is necessary to determine up to what extent the air is to be chilled. Very low chilling temperatures below ambient dew point at the entrance to the battery need for a significant amount of energy consumed to condense water vapor present in the ambient air, penalizing the production of cold air. This phenomenon is called cooling quality.

The gas turbine corresponds to a commercial model, in which the manufacturer´s models were used to determine the power produced in the light of new cold air conditions seen by the turbocharger. Contrary to this, the steam turbine has a high level of freedom to choose the point of extraction for the absorption machine. Thus, a model that has the answer to both the recovery boiler and the steam turbine has been developed.

This model has been developed in two phases: the first, called DESIGN, has

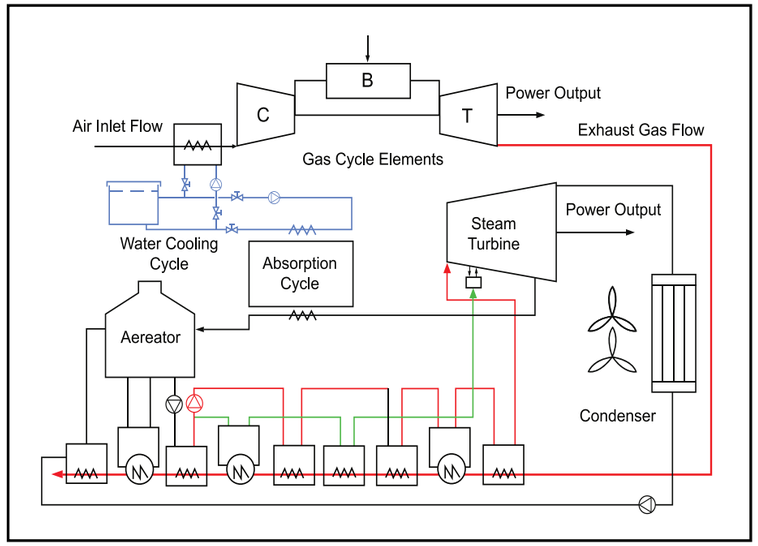


Figure 5

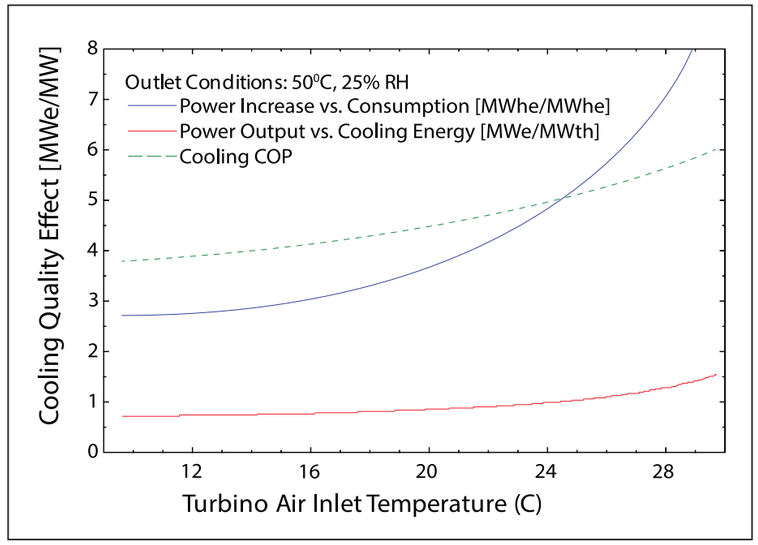


Figure 6

obtained the characteristics of the heat exchangers and the yields of the turbine stages from the cycle manufacturer´s specifications; the second, called OPERATION, has been applied with the method NTU [6,7] to model the response of the exchangers and the Stodola equation [8] in order to replicate the behavior of the steam turbine in gas flow changes that go through the recovery boiler with the same temperature as it enters with.

The combined cycle model appears in Figure 5, with the implementation of the TIAC option by absorption. The recovery boiler is fed by four gas turbines with a power of 58.1 MW each (ambient to 50ºC and 25% of humidity relative), resulting to a steam cycle power of 124.8 MW each. Deployment ambient conditions produce a condensation temperature of 62ºC for the chilling machines while the air entering the turbocharger will be chilled up to 25ºC. Figure 5 shows the implementation of the absorption cycle as the cooling technology chosen for the TIAC system.

	Unit	Base Scenario	TIAC	Variation	Increase
Exhaust gas inlet temperature	[C]	546	532	-14	-3%
Exhaust gas flow	[kg/s]	955	1103	148	15%
Total steam mass flow	[kg/s]	134.7	149.9	15.2	11%
High Pressure flow	[kg/s]	116.8	127.5	10.7	9%
Medium Pressure mass flow	[kg/s]	17.91	22.39	4.48	25%
Power output	[MW]	124.8	136.2	11.40	9%
Turbine inlet temperature	[C]	527	512.5	-14.5	-3%
Exhaust gas outlet temperature	[C]	145.6	152	6.4	4%
Condenser temperature	[C]	69.25	70.3	1.05	2%

Table 1

	Unit	Base Scenario	TIAC	Variation	Increase
Exhaust gas inlet temperature	[C]	546	532	-14	-3%
Exhaust gas flow	[kg/s]	955	1074	119	12%
Total steam mass flow	[kg/s]	134.7	146.2	11.5	9%
High Pressure flow	[kg/s]	116.8	124.5	7.7	7%
Medium Pressure mass flow	[kg/s]	17.91	21.69	3.78	21%
Power output	[MW]	124.8	132.8	8.00	6%
Turbine inlet temperature	[C]	527	513	-14	-3%
Exhaust gas outlet temperature	[C]	145.6	150.9	5.3	4%
Condenser temperature	[C]	69.25	70	0.75	1%

Table 2

	Unit	Compression	Condensador		Absorption	
Power Output	[MW]	132.8	119.8	0.9	123.0	93%
Mass flow	[kg/s]	146.2	148.0	1.0	150.5	103%
Steam Inlet Pressure	[bar]	88.5	88.1	1.0	88.2	100%
Turbine Inlet temperature	[C]	513.0	513.2	1.0	513.1	100%
Condenser temperature	[C]	70.0	64.4	0.9	65.9	94%
Aereator temperture	[C]	108.6	101.1	0.9	111.7	103%
Steam consumed	[kg/s]	0	50.1	----	50.1	----
Equivalent COP	[-]	3.5	0.00	0%	0.00	0%

Table 3

Results

Figure 6 displays the results from analyzing the extent to which the gas turbines inlet air compressor should be chilled (i.e. cooling quality) for the gas turbine without the recovery boiler. It shows the ability to achieve a continuous improvement in the electric power produced per gas turbine, the power of cooling increases, resulting to a worse use of cold demanded. Thus, when the air is chilled to 30ºC, each MW of cooling capacity produces 1.7 MW extra power in each turbine; contrary to that, if the air is chilled up to 15ºC, each cooling MW produces something less than 1 MW each in the gas turbine. Depending on the cooling technology chosen, it would be necessary to discount the plant´s cold consumption from the electrical energy produced. That way, if mechanical compression is chosen, it would be necessary to directly discount electricity consumed by the compressors from the electrical energy produced; on the contrary, if absorption is chosen, it would be necessary to evaluate the electrical

energy that the steam cycle fails to produce when the steam is extracted from the turbine to drive the turbine generator of the absorption machine. Figure 6 has been obtained for a gas turbine of 136.2 MW each gas ratings (ISO), applying compression technology with a condensation of 51ºC achieved from sea water (which permits a COPs between 5 and 6, with advanced cycles). Table 1 summarizes the effect of chilling inlet air over the steam cycle. cooling increases the gas flows passing through the recovery boiler but reduces the same inlet temperature, slightly increasing the output. Overall, the available heat in the recovery boiler increases by 7%, which turns into a greater steam production and finally an increased electrical power production of 8 MW (6%), added to those obtained in the gas turbine.

Different configurations to couple the absorption machine to the steam cycle have been analyzed, resulting in configuration shown in Figure 5. In this case, the heat removed from the steam cycle stops producing a certain amount of electricity; therefore it will not be necessary to remove electric power from the gas cycle to drive the cold cycle compressors. Table 2 summarizes the results obtained. With the objective to adequately compare both situations, an equivalent COP has been defined as the relation between the power of cold used (40.6 MW for all four gas turbines) and the electricity that fails to be released in to the grid. As seen in Table 2, if the mechanical compression machine is not able to overcome a COP of 4, cooling by absorption would be more interesting. In particular, since the sites in the Middle East do not contain sea water to condense (which permits the achievement of COP between 5 and 6) it would be better to apply absorption; atmospheric conditions of 50ºC yield COP approximately of 3.5 even in advanced cooling cycles.

Table 3 summarizes results analyzed concluding that the difference between the application of absorption technology and that of compression is not significant, at least in terms of net power produced for the whole combined cycle. This information should be completed together with the costs of investment, operation and maintenance associated with each technology. However results also depend on project location temperatures that affect the cooling cycle condensation. Table 3 also shows the TIAC technology reaching an increase of net power between 18% (compression) and 23% (absorption from the exhaust gases) in gas turbines at open cycles, while the best in the overall combined cycle is 14%. Despite this, the interest in this region stands today in the combined cycles as a highly efficient alternative for the generation of electricity that may compensate for the disadvantages of the harsh climates of the area with TIAC technology.

Conclusions

The following conclusions may be derived from the exposed results:

- With regard to the cooling quality, it is seen how the electrical power generated always increases with more cooling, however if the overall cooling energy further increases , this will cause the profitability of the project to fall slowly with additional cooling. The decision of the nominal cooling conditions will depend on the preference between a power increase or project profitability according to the energy mark of the country in question.

- The selection of cooling technology (absorption or compression) depends on numerous variables. The major cost of investment in the absorption cycles provokes its attractiveness to be focused on the locations where air condensing difficulties reduce the COP of the compression cooling cycles.

Finally, the necessary investment in TESTIAC technology must be weighed against the alternative of increasing the installed power of combined cycled or gas turbines to satisfy the peak demand. In this context, the investment cost in inlet air cooling is considerably lower; giving it an important attractiveness for the development and competitiveness of the several countries in the Middle East.

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Open Source in the Open Desert

BY : MOHAMMAD AL-HEJIN
IT MANAGER

Power Plant 10 (PP10) is located 40km south of the capital Riyadh and is on a property measuring 4.5 square kilometers. The project was awarded to Bemco in 2008; IT Department got the go-ahead to setup an entire Information & Technology infrastructure immediately after the award, as part of a massive company wide mobilization effort. In an unprecedented manner, IT tackled the challenge by adding a new challenge to the scope with the decision to use only Open Source backed server farm infrastructure.

Planning went ahead and took a total of 3 Weeks; detailed plans were made for Network LAN/WAN Infrastructure Server Hardware & Server Software plus clients, as well as manpower to be hired and trained. Soon after, purchasing requests went out to vendors and the hardware arrived within 2 weeks at IT Department at the Head Office premises in Jeddah.

We then started to build the HW to our own specifications and set up the different Open Source Server packages comprising of Cent OS, Debian & Ubuntu servers, depending on the function of the Server. The different services are comprised of Mail Server, Domain Controller, File Server, Firewall Server, Spam Protection, Proxy Server, DNS, DHCP and a Backup Server. Ready for site, all of these were pre-configured, in order to just be pluged-in and run out of the box. As soon as the offices were set up in the form of huge porta cabins, spanning a couple of hundred meters, a team was sent to Riyadh to hire temporary local manpower to layout the network cabling termination and testing ourselves within 1.5 month. Soon after the offices were equipped with furniture, power and AC, all equipment were moved to site store and, another team was sent to start setting up the Server Room and installing the server HW & SW Infrastructure.

IT was also involved in purchasing and setting up the Telephone system for the entire site as well as setting up the LAN which spans over kilometers in the entire site, utilizing various technologies like Microwave Dishes and Fiber Cable, depending on the distance to be covered. We also provided IT Infrastructure to the Bemco warehouses, SEC Offices, Unicorp Offices, Bemco Civil, Bemco Accommodation sites, Bemco Hotel & all the remote offices on site. Many challenges had to be met in an environment that is in the middle of a harsh arid desert with temperatures ranging from over 50ºC degrees during summer and -5ºC degrees in winter, the occasional sand storm, gusty wind conditions, and a generally dusty environment; not to mention regular power outages and the staff having to endure many professional and personal hardships.

What does 'Open Source' mean?

It is a wide encompassing description, summarized in it being an IT Software infrastructure that rivals costly Microsoft & UNIX Solutions and sets itself apart from Microsoft in many ways. Such as but not limited to:

- Superior security; no virus vulnerability and hack proof.
- Higher stability; far less crashes; unprecedented uptime measured in years
- Much faster than Microsoft.
- Far less Hardware cost due to flexibility in many HW choices.
- Bemco owns the source code of every line of code in the entire SW infrastructure which means complete flexibility in SW design and control since we can modify the source code ourselves as well as having no licensing fees; the end result is Self Sufficiency, this is also an advantage over UNIX.
- Tested & proven for more than 3 decades.
- Available in all major languages.

The entire overhead of administration & maintenance has proven to be very successful; it is divided among PP10 staff and HO Open Source Administrators; PP10 staff have been trained in daily Open Source administration and over time they continue to improve themselves, having thus added to their IT skills an important asset of IT knowledge. The HO Open Source Administration is only concerned with more complex Open Source issues and overall health of the system, keeping the specialized Open Source manpower recourse centralized in HO for developing and maintaining additional Open Source locations which carry other significant economization factors in the Open Source Infrastructure approach. This self sufficient approach has proven very successful as an excellent IT Team emerged on PP10 site, which is an intricate part of the success formula. This radical new IT approach is in tradition with Bemco's overall approach to be at the cutting edge of technology & innovation.

Bemco Beirut Annual Dinner

BY : VAHE HADAJIAN
OPERATIONS & BUSINESS DEVELOPMENT

As it is customary in Bemco, Bemco hosted at the Phoenicia Hotel in Beirut its annual dinner. On this occasion, Bemco Family were reunited to celebrate and enjoy a pleasant and fun night in the company of their loved ones.

During the evening, members of Bemco High Management took this opportunity to introduce their vision for 2012, highlighting that a challenging and more competitive market will be expected in 2012. This message was followed by words from our CEO Mr. Sarkissian who stated that "Bemco's primary goal is to ensure the continuation and growth of the company and ensure stability for our employees and their families".

Following the speeches, The HR Committee awarded prizes to 20 Bemco employees who were recognized for their strong contribution and dedication; and lastly raffles prizes were awarded to a lucky few. Everyone was then invited to the buffet and the dance

CEO Speech - Mr. Henry Sarkissian

2011 Award Recipients

Proposals Executive Director Speech - Mr. Fares Zankoul

Bemco Engineer's Table

Engineering Executive Director Speech - Dr. George Aboufadel

Arabian Bemco Ranked in the Top 225 Global Contractors List

Arabian Bemco has been named as one of the Top Global Contractors by Engineering News Records (ENR), a leading publication for the engineering and construction industry.

Bemco was listed at the 148th place based on the overall 2010 global contracting revenue, in turn, marks Bemco as one of the leading Industrial and Power EPC contractor globally.

In 2010, Bemco has executed Multi-Billion Projects, Riyadh Power Plant No. 10 (2,600 MW) and Qurayyah Combined Cycle Power Plant (3,800 MW), the largest in the Kingdom of Saudi Arabia, which has significantly contributed to its revenue.

Furthermore, Bemco has signed two new extension contracts towards year-end, Riyadh Power Plant No. 10 Extension-I (700 MW) and Qurayyah Combined Cycle Project Extension-I (800 MW).

The ranking is a reflection of Arabian Bemco's dedication and commitment to executing projects up to high quality standards and on time delivery.

The Top 225 contractors generated over $383 billion in 2010 contracting revenue from projects outside their home countries. On the domestic front, the Top 225 contractors generated total revenue of over $688 billion, with Chinese contractors leading the top of the list.

#148 ARABIAN BEMCO CO. LTD. from Jeddah, is one of the leading EPC Contracting Company in Saudi Arabia and the Region.

RANK 2011	RANK 2010		2010 REVENUE ($ MIL.) TOTAL	2010 REVENUE ($ MIL.) INT'L	2010 NEW CONTRACTS ($ MIL.)	GENERAL BUILDING	MANUFACTURING	POWER	WATER SUPPLY	SEWER / WASTE	INDUS. / PETROLEUM	TRANSPORTATION	HAZARDOUS WASTE	TELECOM.
103	76	**ELLAKTOR SA,** Kifissia, Greece	2,346.7	448.3	704.1	17	0	6	1	8	3	62	0	0
104	97	**CHIYODA CORP.,** Yokohama, Japan	2,331.0	1,284.0	1,636.0	0	11	4	0	0	82	0	0	0
105	106	**ZHONGYUAN PETROLEUM EXPLORATION BUR.,** Puyang, Henan, China	2,314.9	600.4	2,314.9	0	0	0	0	0	100	0	0	0
106	91	**STRUCTURE TONE,** New York, N.Y., U.S.A.	2,240.6	103.3	2,651.0	82	0	0	0	0	3	0	0	15
107	116	**VEIDEKKE ASA,** Oslo, Norway	2,186.0	724.0	NA	58	1	2	1	0	3	27	0	0
108	52	**MCDERMOTT INTERNATIONAL INC.,** Houston, Texas, U.S.A.	2,148.5	2,094.7	4,181.9	0	0	0	0	0	100	0	0	0
109	109	**SINOPEC ENGINEERING INC.,** Beijing, China	2,115.3	1,045.8	632.2	0	0	0	0	0	100	0	0	0
110	**	**MOTA-ENGIL,** Porto, Portugal	2,111.8	1,234.3	1,750.3	22	0	0	0	0	0	78	0	0
111	121	**HABTOOR LEIGHTON GROUP,** Dubai, U.A.E.	2,100.0	600.0	1,320.0	83	0	0	3	0	0	14	0	0
112	113	**VAN OORD,** Rotterdam, The Netherlands	2,099.2	1,646.0	2,203.7	0	0	9	0	0	22	69	0	0
113	99	**URS CORP.,** San Francisco, Calif., U.S.A.	2,040.0	187.4	1,599.2	2	0	45	1	0	12	26	10	0
114	128	**MCCONNELL DOWELL CORP. LTD.,** Hawthorn, Victoria, Australia	2,005.2	604.5	1,993.8	15	1	25	24	2	7	7	0	0
115	118	**DOOSAN ENGINEERING & CONSTRUCTION CO. LTD.,** Seoul, S. Korea	2,003.8	38.5	1,392.2	71	1	1	2	2	1	20	0	2
116	127	**SSANGYONG ENGINEERING & CONSTRUCTION CO. LTD.,** Seoul, S. Korea	1,953.1	669.4	1,553.4	48	0	2	1	1	0	37	0	0
117	103	**JE DUNN CONSTRUCTION GROUP,** Kansas City, Mo., U.S.A.	1,923.8	0.0	1,955.3	94	0	0	0	0	0	2	0	4
118	111	**DAQING OILFIELD CONSTRUCTION CO. LTD.,** Daqing City, China	1,915.0	30.0	1,993.0	2	0	0	0	0	78	20	0	0
119	120	**GRAHAM GROUP LTD.,** Calgary, Alberta, Canada	1,886.0	250.0	2,671.0	54	9	7	10	1	0	19	0	0
120	130	**ANSALDO ENERGIA SPA,** Genova, Italy	1,874.0	956.3	1,890.0	0	0	100	0	0	0	0	0	0
121	122	**TOYO ENGINEERING CORP.,** Chiba, Japan	1,871.3	1,205.1	2,675.9	0	11	0	0	0	89	0	0	0
122	96	**JOANNOU & PARASKEVAIDES GROUP OF COS.,** Guernsey, U.K.	1,792.9	1,792.9	800.0	25	0	14	1	2	5	52	0	0
123	158	**JIANGSU NANTONG LIUJIAN CONSTR. CO. LTD.,** Rugao, Jiangsu, China	1,779.1	127.6	1,587.6	89	1	0	0	0	9	2	0	0
124	117	**GRANITE CONSTRUCTION INC.,** Watsonville, Calif., U.S.A.	1,763.0	0.0	2,025.0	1	0	0	1	0	0	76	0	0
125	153	**SEPCOIII ELECTRIC POWER CONSTR. CORP.,** Weifang, Shandong, China	1,755.3	1,579.9	3,111.0	0	0	100	0	0	0	0	0	0
126	107	**HUNT CONSTRUCTION GROUP,** Scottsdale, Ariz., U.S.A.	1,750.0	0.0	760.0	88	0	0	0	0	0	12	0	0
127	104	**PUNJ LLOYD LTD.,** Gurgaon, Haryana, India	1,748.0	1,061.0	2,692.0	11	0	8	1	0	52	24	0	0
128	137	**ORASCOM CONSTRUCTION INDUSTRIES (OCI),** Cairo, Egypt	1,734.1	911.4	1,103.9	11	2	23	0	1	28	26	0	0
129	114	**BRASFIELD & GORRIE LLC,** Birmingham, Ala., U.S.A.	1,719.8	0.0	1,909.7	87	1	1	2	4	1	1	0	1
130	136	**SHANGHAI ELECTRIC GROUP CO. LTD.,** Shanghai, China	1,706.3	1,176.3	6,490.8	0	0	100	0	0	0	0	0	0
131	**	**ANSALDO STS,** Genoa, Italy	1,705.0	966.0	2,635.0	0	0	0	0	0	0	100	0	0
132	129	**SUFFOLK CONSTRUCTION CO. INC.,** Boston, Mass., U.S.A.	1,670.0	0.0	1,024.0	100	0	0	0	0	0	0	0	0
133	126	**TURNER INDUSTRIES GROUP LLC,** Baton Rouge, La., U.S.A.	1,612.4	51.1	214.0	0	0	3	0	0	95	0	2	0
134	147	**HOLDER CONSTRUCTION CO.,** Atlanta, Ga., U.S.A.	1,611.0	5.0	1,636.0	26	0	0	0	0	0	5	0	69
135	144	**TAIKISHA LTD.,** Tokyo, Japan	1,610.0	714.2	NA	22	27	0	0	0	51	0	0	0
136	165	**NANTONG CONSTR. JOINT-STOCK CO. LTD.,** Nantong, Jiangsu, China	1,574.1	194.2	1,270.0	78	5	1	0	1	14	1	0	0
137	215	**POLIMEKS INSAAT TAAHHUT VE SAN TIC. AS,** Istanbul, Turkey	1,540.0	1,540.0	3,214.0	47	0	0	8	8	9	25	0	3
138	112	**IBERDROLA INGENIERIA Y CONSTRUCCION,** Madrid, Spain	1,529.9	1,215.9	879.2	0	0	100	0	0	0	0	0	0
139	146	**JOHN SISK & SON LTD.,** Dublin, Leinster, Ireland	1,525.2	665.9	850.0	68	18	7	0	0	0	7	0	0
140	161	**SALFACORP,** Santiago, Chile	1,513.5	128.5	1,241.3	65	1	12	0	0	3	0	1	0
141	132	**SALINI COSTRUTTORI SPA,** Rome, Italy	1,500.4	969.6	8,341.1	9	0	0	29	0	0	59	0	0
142	124	**AUSTIN INDUSTRIES,** Dallas, Texas, U.S.A.	1,471.7	0.0	1,266.0	33	0	2	0	0	20	43	0	2
143	171	**XINJIANG BEIXIN CONSTR. & ENG'G CO. LTD.,** Urumqi, Xinjiang, China	1,453.5	308.7	1,534.9	35	0	0	11	0	0	54	0	0
144	155	**DPR CONSTRUCTION INC.,** Redwood City, Calif., U.S.A.	1,429.5	0.0	2,750.0	55	1	0	0	0	20	0	0	24
145	145	**CTCI CORP.,** Taipei, Taiwan	1,422.5	472.7	1,889.1	2	5	6	0	8	69	10	0	0
146	138	**ARABIAN CONSTRUCTION CO. SAL,** Beirut, Lebanon	1,407.8	1,359.1	1,576.4	90	0	4	0	0	0	0	0	0
147	160	**RENAISSANCE CONSTRUCTION,** Ankara, Turkey	1,382.4	1,317.8	1,583.5	67	20	0	0	0	11	2	0	0
148	**	**ARABIAN BEMCO CONTRACTING CO. LTD.,** Jeddah, Saudi Arabia	1,353.6	96.8	1,306.8	7	0	87	1	1	1	0	0	0
149	135	**MANHATTAN CONSTRUCTION GROUP,** Tulsa, Okla., U.S.A.	1,350.4	0.0	1,124.1	84	0	0	0	0	0	16	0	0
150	143	**GAMA,** Ankara, Turkey	1,335.6	1,205.8	831.1	1	0	40	20	0	32	7	0	0
151	199	**ALARKO CONTRACTING GROUP,** Gebze/Kocaeli, Turkey	1,286.9	240.4	NA	0	0	63	0	12	0	24	0	0
152	157	**DAY & ZIMMERMANN,** Philadelphia, Pa., U.S.A.	1,285.0	5.8	24.7	0	0	94	0	0	6	0	0	0
153	167	**CHINA POWER ENGINEERING CONSULTING GROUP CO.,** Beijing, China	1,276.2	67.0	3,023.3	0	0	100	0	0	0	0	0	0

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Top Contractors by country

Saudi Arabia

The top 10 contractors in the kingdom were executing projects worth $81bn as of May 2011, which was just under half of the total under way in Saudi Arabia. Saudi-based contractors dominated nearly all the project sectors, with SBG, Saudi Oger, Arabian Bemco and Al-Rashid Trading & Contracting Company accounting for 59 per cent of the top 10 contractor's total.

SBG remained the undisputed leader: value-wise, it was involved in more than a third of the projects being undertaken by the top 10 contractors and nearly two-thirds of the top Saudi contractors' aggregate. South Korean contractors represented the next largest national grouping, being active in over a quarter of all projects under way on account of their growing presence in the oil, gas, power and desalination sectors.

Table 4.19 – Top contractors in Saudi Arabia based on work under execution

Contractor	Value of Contracts ($m)
Saudi Binladin Group	30, 180
Saudi Oger	7,715
SK Engineering & Construction (SKEC)	7,007
JGC Corporation	6,450
Arabian Bemco Contracting Company	5,842
Samsung Engineering	5,667
Doosan Heavy Industries & Construction	5,252
Daelim Industrial Company	5,100
Al-Rashid Trading & Contracting Company	3,966
Saipem	3,700

Note: Where projects have been won in a consortium, the contract value has been divided equally between the contractors.
Sources: MEED Insight; MEED Projects

Table 4.20 – Top 10 contractors in Saudi Arabia based on work under execution

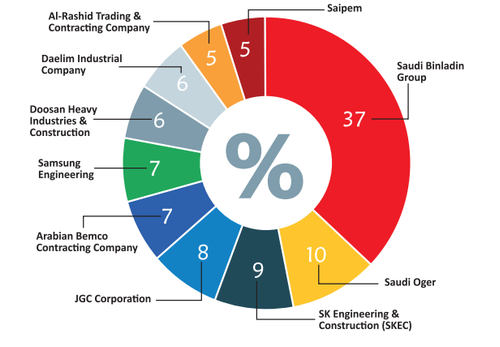
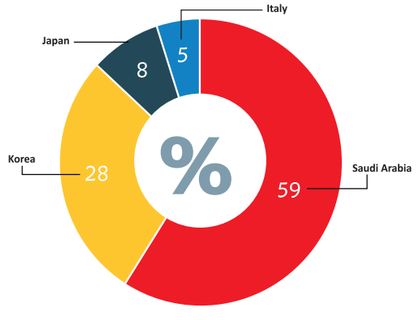


Table 4.21 – Top contractors in Saudi Arabia by nationality based on work under execution



Source: MEED Insight; MEED Projects

The top EPC contractors' ongoing work accounted for 41 per cent... of all active projects

Utilities

In the GCC utilities sector, the top 15 EPC contractors held ongoing contracts totalling $39.5bn, which was equivalent to 41 per cent of all active projects as of May 2011.

South Korea's Doosan Heavy Industries & Construction climbed two places to become the biggest contracting firm in terms of work under execution, pushing Jeddah-based Arabian Bemco Contracting Company into second place. The rise of Doosan was largely due to two contracts, worth $4bn, that it was awarded in the second half of 2010 by Saudi Electricity Company (SEC) and the Saline water Conversion Corporation (SWCC). South Korean counterpart HHI was the third biggest contractor, rising by four places after a 41 per cent increase in work in hand.

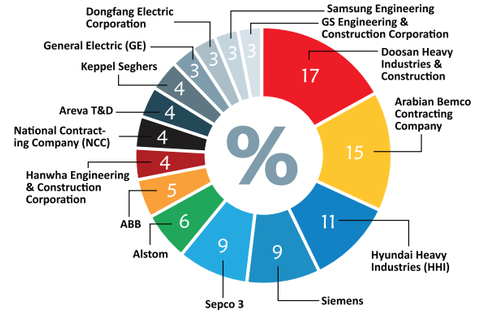
As was the case in the oil, gas and petro-chemical sectors, Korean contractors were by far the largest national grouping in utilities, followed by European firms. However, a feature of the market was the growing influence of Chinese contractors, with Sepco 3 working on three major GCC projects and Dongfang Electric on one.

Table 4.13 – Top 15 EPC utilities contractors in the GCC based on work under execution

Contractor	Value of Contracts ($m) Q2 2011	Q2 2010	Percentage change
Doosan Heavy Industries & Construction	6,891	4,018	72
Arabian Bemco Contracting Company	5,842	4,750	23
Hyundai Heavy Industries (HHI)	4,425	3,136	41
Siemens	3,586	4,731	-24
Sepco 3	3,460	na	na
Alstom	2,193	3,500	-37
ABB	1,932	2,532	-24
Hanwha Engineering & Construction Corporation	1,770	na	na
National Contracting Company (NCC)	1,622	3,210	-49
Areva T&D	1,542	na	na
Keppel Seghers	1,500	na	na
General Electric (GE)	1,325	2,325	-43
Dongfang Electric Corporation	1,250	na	na
Samsung Engineering	1,100	na	na
GE Engineering & Construction Corporation	1,098	na	na

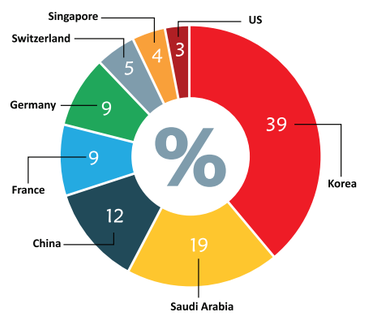
EPC=Engineering, Procurement and Construction; na=not available. Note: Where projects have been won in a consortium, the contract value has been divided equally between the contractors. Furthermore, the value of the UAE's $20bn ENEC nuclear power plant project is excluded from the winning contractors' portfolio as the allocation of contracts and projects remains unclear.
Sources: MEED Insight; MEED Projects

Table 4.14 – Top 15 EPC utilities contractors in the GCC based on work under execution



EPC= Engineering, Procurement and Construction Sources: MEED Insight: MEED Projects

Table 4.15 – Top EPC utilities contractors in the GCC by nationality based on work under execution



EPC= Engineering, Procurement and Construction Sources: MEED Insight: MEED Projects

Source: MEED Insight; MEED Projects

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For over 30 years, Gedac has manufactured, supplied, and serviced power distribution equipment for a number of projects in Saudi Arabia including:

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- Protection, Control and Substation Automation
- Package Type Substations
- DC/UPS/ATS System
- System Studies & Network Design
- Retrofitting, After-Sales Service and Maintenance