



Arab-German Yearbook 2015

Construction and Consulting



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- ▶ Programme name:
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- ▶ Target audience:
**Small and medium-sized
businesses with head-
quarters in Germany**
- ▶ Number of members:
Over 25,000 (As at: 2015)



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Preface

We proudly present the sixth edition of the Arab-German Yearbook Construction and Consulting. The presented ground-breaking construction and consulting projects underline how successful Arab-German business relations are.

The Arab countries are at different stages of industrial development. Therefore, they offer a broad range of opportunities for German companies: from the provision of basic infrastructure like railways and water treatment to creative architectural designs. The GCC's construction market will hit a record of US\$144 billion in 2016, driven by mega-projects for World Expo 2020 in Dubai, 2022 FIFA World Cup Qatar, Smart Cities, and infrastructure, according to the EC Harris report "Middle East Major Construction Programmes". Mega-projects in the GCC will reach US\$1 trillion by 2030, according to the report. In Algeria, the construction of the Grand Mosque of Algiers was started. The Mosque will accommodate 120,000 worshipers/believers and will have a 300 meter high minaret. The project amounts to US\$1.5 billion and will be opened in 2016. In Morocco, the construction of the Casablanca Grand Theater was announced. The project is part of the Greater Casablanca Region Integrated Development Plan 2015-2020. The project amounts to US\$139 billion and will be realized within 36 months. In Egypt, a new administrative capital city will be built. Phase one will cost US\$45 billion and shows the government's vision for Egypt's future. These are only some of the construction projects in the Arab world.

Arab countries see German companies as reliable partners with respect to design and implementation of projects. Due to their unique and globally renowned experience and know-how, German engineers, architects and constructors have a considerable impact on the way of construction in the Arab world. Jointly accomplished projects illustrate the continuing intensification of cooperation between Arab and German partners.

The Ghorfa Arab-German Chamber of Commerce and Industry has a powerful network consisting of both institutional and entrepreneurial decision makers from the Arab countries and from Germany. As the competence center for business relations between Germany and the Arab world, Ghorfa promotes and strengthens business relations between Germany and the Arab countries in the fields of trade, industry, finance, and investment. The working group "Infrastructure, Construction and Transport" meets regularly in Germany and in the Arab world. It offers a valuable platform to share information, to exchange experiences and to facilitate cooperation.

We hope you enjoy reading this book and wish you many new inspirations for further reference projects. We would like to thank the numerous German companies for their valuable contributions.



Dr. Peter Ramsauer



Abdulaziz Al-Mikhlafi

Dr. Peter Ramsauer
President
Federal Minister ret.

Abdulaziz Al-Mikhlafi
Secretary General



Algeria

Country Name: People’s Democratic Republic of Algeria
 Population: 38.7 million
 Land Area: 2.381.741 km²
 Currency: Algerian Dinar (AD), 1 AD = 100 Centimes
 Capital: Algiers
 Languages: Official: Arabic
 Commercial: French



15-person Gondola in Algier

Aloft above the traffic jams on the ground

Garaventa AG

When cities have no more room for extending roads, and building an underground railway is too expensive, aerial ropeways are an attractive alternative for inner-urban mass transit. The systems in Algeria show that there is a genuine need for this. The country already has four aerial ropeways carrying passengers safely from one point to another above the congested streets.

Opened in August 2014 and running for just under three kilometers, the new detachable 15-person gondola lift accesses the district of Bouzareah from the center of the Algerian capital Algiers. Whereas public transport buses and taxis need just under an hour to cover this distance, since the opening, the trip by gondola now takes just twelve minutes. The gondola lift linking Oued Koriche–Beau Frasier–Bouzareah is already the fourth such installation that Swiss aerial ropeway manufacturer Garaventa has completed in Algiers. The Swiss company may seem to make the impossible possible today, but this is thanks to all the expertise garnered over the years. And this is backed by a network enabling the company to offer holistic solutions to

customers, including construction technology and ancillary installations. In this case, service always covers coordination with sub-contractors.

Algeria as a Pioneer

Algeria of all places may be acting as a pioneer in the field of urban transport systems, but it comes as no surprise to Garaventa CEO Istvan Szalai. „This type of transport system is a real option for urban centers in emerging countries when traffic problems need to be solved there.“ With a total of 57 communities, the Province of Algiers is the beating heart of Algeria. During the first half of the 19th



15-person Gondola in Skikda

century, the population in the province was around 30,000, but then growth accelerated in the 20th century. Today, the Province of Algiers alone has around four million inhabitants. If you then add the population of the neighboring metropolitan region, the city's population swells to around 6.5 million people. By way of comparison: Germany's biggest city, Berlin, has around 3.5 million inhabitants. The need to get from A to B in the Algerian capital as quickly as possible is as big as the city's size suggests. However, again and again this need presents travellers with a supreme trial of their patience. Chronically congested streets are an everyday occurrence, and there is hardly any prospect of improvement to this situation. This is because Algiers has no room to extend the road network or lay tramlines. And building an underground system is simply too expensive. In recent years, just like in Algeria, aerial ropeways have been constructed in several cities. Today, they support local public transport just as much as provide an attraction for tourists.

Streets are Clearly Second Best

Given that travellers are already carried by ropeways to mountain tops, such transit systems can just as easily be used for inner-urban transportation—though a rethink

is necessary first. In recent years, in addition to Algiers, various European cities have commissioned urban aerial ropeways. They hang above the ground congestion and provide rapid mass transit connections in the inner city. This is an advantage that Algiers has now benefited from with its latest installation. The new 15-person gondola lift can transport 2,400 people per hour and direction. The route is served initially by 57 gondolas. However, it is designed to accommodate 72 gondolas when the system is fully extended, meaning that the number of people carried per hour will rise to 3,000. There is no way that roads can keep pace with capacities like that.

Delays Because of Objections

The client for the 15-person gondola lift in Bouzareah is the state-owned company Métro d'Alger (EMA). However, it took five years from initial planning to completion. The reason for the delay was the need to acquire transit rights and sites on which to build one of the 17 towers or one of the three station buildings. At first, many property owners successfully contested the expropriation of their land. It took compensation payments by the state to bring the aerial ropeway project successfully back on track. In this respect,

there is little to distinguish this construction project from plans to build a new aerial ropeway system in the Alps.

Difficult Subsoil

However, it was not just the objections that delayed construction. It soon appeared that the geology along the planned route for the new gondola lift was far from ideal. The hillsides around Algiers are part of the foothills of the Atlas Mountains. During the whole construction and assembly period, the ropeway engineers never saw any sign of firm rock formations in which to anchor their foundations. Instead, the area was characterized by very friable rock formations, essentially scree. However, this was nothing the ropeway constructors had not seen before. Such situations crop up now and then in mountainous areas. As a consequence, it took longer to complete the foundations. Another factor to consider was the fact that Algiers is located in an area with a high risk of earthquakes. In terms of plate tectonics, the Atlas Mountains form the boundary between the Eurasian plate to the north and African plate to the south. When these two plates rub up against each other, the result can be an earthquake.

Each Ropeway is Unique

The gondola lift system built in Algiers is comparable in construction to the system that began operating in December 2013 between the Stöckalp and Melchsee-Frutt

in Switzerland. Although many components are 'off-the-peg' items, practically all systems have their own project-specific idiosyncrasies that make every ropeway unique in itself. The gondola lift in Algiers runs across two sections. In the central station, passengers can remain seated while the cabins are redirected through just over 90 degrees. Here, as in the bottom and top stations, passengers can board and depart at ground level. And because the environmental influences near the Mediterranean are different from those in the Alps, for example, different wheel bearings are used from those in a mountain system. In this region, the ever-present wind never stops blowing fine sand and salt particles that are deposited in the system and act to an extent like emery paper. This is one of the many things to consider when choosing the right lubricant. The greases normally used in the Alps are not suitable here. Instead, special greases capable of withstanding the environmental conditions in Algiers are used.

European CEN Standards

The new 15-person gondola lift meets European CEN standards. The CEN aerial ropeway and rope standards introduced in 2007 created uniform standards for pan-European application. Compared with Switzerland, the passage of an aerial ropeway over existing houses in Algeria is subject to less stringent regulations. Even so, safety also has top priority here. Ropeway operators, recruited on the spot

15-person Gondola in Tlemcen



in Algiers to form the specialist crew for the system, were given several days of training. As well as the technically correct operation of the ultra-modern gondola lift system, training also focused on rescue exercises and correct procedures for dealing with any potential faults.

Other Countries, Other Customs

Swiss aerial ropeway manufacturer Garaventa was present on site with a staff of approximately 30 to push forward construction of the new 15-person gondola lift and finally hand over the turn-key system to Métro d'Alger. A workforce of around 10 staffed the Garaventa subsidiary in Algiers. A constant feature of the collaboration was mutual respect, especially since the working rhythm there is different from what ropeway fitters are used to on building sites in the Alps. Still, the key thing was that the system should run without technical hitches right from the start and be immediately embraced by the population. The number of people carried during the first months of operation proved

that the new 15-person gondola lift met a real need. And anyway, a gondola lift system is economic if it runs fully automatically, as the one in Bouzareah does. Necessary staffing levels are much lower than the previous system with buses. Because of the good experience with the system in Bouzareah so far, it is not likely to be the last gondola lift to be built by Garaventa in Algiers, especially since aerial ropeways are regarded today as one of the safest transit systems of all in terms of the number of people carried.



Claude Parel
Sales Manager

Garaventa AG

TECHNICAL SPECIFICATION OF THE 15-PERSON GONDOLA LIFT

Drive	Central station
Horizontal length	2,882.00 m
Altitude difference	307.00 m
Mean inclination	9.39%
Maximum rope inclination	41.36%
Inclined length	2,908.39 m
Endless rope length, section 1	2,773.20 m
Endless rope length, section 2	3,151.21 m
Diameter of carrying-hauling rope	52 mm
Line gauge	5.20 m
Operating speed	6.00 m/s
Carrying capacity	2,400 P/h (When complete: 3,000 P/h)
Number of cabins	57 (When complete: 72)
Transit time	12.10 min



The esplanade with 22-meter high rows of columns

The Great Mosque in Algiers – A Minaret from Germany

KSP Jürgen Engel Architekten GmbH

The world's third biggest mosque is currently under construction in Algiers. Like no other project by KSP Jürgen Engel Architekten, it represents a collaborative effort that transcends countries, cultures and religions. The architects are German, the workers come from China, and the client is the Algerian state.

Only six kilometers east of the historical downtown area and not far from the airport, the new mosque is already functioning as a catalyst to stimulate the adjoining neighborhood's future development. The new complex in Algiers, construction of which began in 2012, is designed to welcome up to 120,000 visitors daily. The Prayer Hall will accommodate up to 35,000 people and, when finished, the minaret will soar to a height of approximately 265 meters, making it Africa's

tallest structure. In 2008, the design submitted by the consortium of KSP Jürgen Engel Architekten in Frankfurt/Main and Krebs und Kiefer International in Darmstadt won the international competition. In the presence of Federal Chancellor Angela Merkel and Algerian President Abdelaziz Bouteflika, the contract that commissioned the planning work was signed in Algiers in July 2008. Construction work is due to be completed in late 2016.

Building Site with up to 1,600 Algerian and Chinese Workers

At the moment, the building site is buzzing with activity. There are 14 cranes at work on the 27-hectare building site. Different cultures and religions meet here, as alongside the German architects from the Christian west and domestic, for the most part Muslim Algerian workers, there are also around 1,200 workers from the China State Construction Engineering Corporation (CSCEC), a state-owned Chinese contractor working on the project. Many languages are spoken, including English, French, Arabic, German, and Chinese. The shells of the structures in the south of the site are now ready; they include a library for two million media (books) and roughly 2,000 rea-

ding places, the theological university (imam school) with approximately 300 student apartments and the conference center with a hall for about 1,300 visitors. The final dimensions of the actual mosque complex are also beginning to emerge clearly. The esplanade, minaret, prayer courtyard, and Prayer Hall extend for a length of around 600 meters in the form of an exciting series of rooms facing in the direction of Mecca.

In addition to accommodation and two canteens for the around 1,200 workers, the development of the building site saw the construction of a cement works, so that the distances between where the cement is produced and ultimately processed are as short as possible. The CSCEC is the biggest construction company and the largest international general

The Prayer Hall will accommodate up to 35,000 people



The Great Mosque in the Bay of Algiers

contractor in the People's Republic of China. In total, there are around 1,600 Algerian and Chinese workers busy on site, among them 340 architects and engineers, who act as site managers to monitor and supervise the implementation of the plans.

Intercultural Cooperation: An Algerian Client and an Architect from Germany

For the client, the fact that architects from Germany are building the Great Mosque of Algiers as part of an international team is not a contradiction. According to the client, building is about engineering, not religion. The open-minded, pragmatic stance of the client, represented by ANAR-GEMA (Agence Nationale de Réalisation et de Gestion de

Djamâa El Djazaïr), comes as no surprise to Jürgen Engel. "All countries in a process of change and development also look for new approaches outside their own culture," Jürgen Engel says when discussing this open mindset. "Any culture that is redeveloping can not only do so with its own resources. It will always have to process impetus from the outside, and that is the case here."

The design submitted by KSP Jürgen Engel Architekten won the competition on account of its flexible, modular structure and timeless architecture, which at the same time is recognizably based on the tradition of columned hall mosques in the Maghreb. This way the design succeeded in combining Algerian tradition and modernism.



Site plan of the complete complex

Serving as the design leitmotiv, the “floral column” with a protruding capital links all areas of the Great Mosque. Made of spun concrete by the German manufacturer Euro-poles in Neumarkt (Bavaria), several 22-meter high rows of columns form arcade-like boundaries to the raised plateau, in which there is space for secular facilities such as boutiques, shops, artists’ studios, and cinemas. The 45-meter high Prayer Hall is also conceived as a sublime columned hall with a surface area of around 150 by 150 meters. Cut-outs between the monumental capitals enable natural light to penetrate from above, which, as the sun continues on its course, creates ever-changing nuances and shadows. A total of 618 concrete columns will be needed for monumental structure—by early 2015 around 200 columns had already been put in place.

The columned hall is a widespread architectural phenomenon, in particular in the Maghreb. Europe, however, also has a very famous mosque built as a columned hall in the form of the “Mezquita” in Cordoba, which served as inspiration for Jürgen Engel in his design. As opposed to the Ottoman form of construction, for example, the Hagia Sophia in Istanbul, for a domed mosque, with the column hall form of construction found in the Maghreb, the space is structured by regular rows of columns.

Impetus for Urban Expansion in Algiers

The mosque complex is an independent cultural center and a catalyst for new urban expansion. Alongside the religious areas there are also cultural and public facilities, as well as rooms for academia and education. Infrastructural buildings are also being constructed on the site, for example, a fire station. All the buildings in the mosque complex will later be surrounded by an expansive park with groves of cedar trees.

Jürgen Engel is assuming that there will be up to one million people living in the area between the airport and downtown in the near future, the cultural center of which will be the mosque complex. The changes are already visible. All around the site of the mosque there are cranes at work and the shells of new buildings are standing. The expressway will be turned into a boulevard—the palms for it have already been planted. Moreover, the transport infrastructure will be improved. In the future, visitors to the Great Mosque will be able to reach it not only by car, but also by public transport—there are plans for a new tram line. In addition, an upgrade and redesign of the shoreline along the Bay of Algiers with a promenade is planned. Two bridges cross the expressway will link the coastline with the mosque complex. The architect Jürgen Engel is convinced that the city will expand towards the sea.

A Further Project: The German Embassy in Algiers

Alongside this major project, another new edifice will be constructed in Algiers to a design by KSP Jürgen Engel Architekten. In 2014, the Frankfurt architects were awarded the contract for the new Chancellery at the German Embassy. The client is the Federal Republic of Germany, represented by the Karlsruhe Regional Tax Office. The Federal Foreign Office will be the user of the new building at the Embassy. With a gross surface area of approximately 3,600 m², it will have office and administration space, and house the visa section. Flooded with natural light, the spacious atrium will be its communicative center and heart. With its light lamella façade, the structure will blend in architecturally with existing buildings, which, with their distinct shapes and white plastered façades, dominate the cityscape. Demolition of the existing edifice is planned for 2015, while the new building is due to be completed in late 2017.

A Symbol of a Modern Islamic Society

The Great Mosque in Algiers follows on from the important Friday mosques in Algiers, Tlemcen, Cordoba, and Medina. The Friday mosque was always at the heart of everyday

events, work, study, social and economic life—and not least of all the focal point in the lives of all members of the community. In the tradition and modern-day resurrection of the great Friday mosques, the new building complex is a place of exchange and trade, a lively meeting point as well as a place of culture, research, and teaching. And not least of all, it is a place for communicating religion and knowledge. The visitors and members of the community can worship there in accordance with familiar rites and further their education at the affiliated institutions. The Great Mosque ensemble is the joint work of architects, engineers, and construction workers from three cultures, and is intended to become a symbol of a modern Islamic society in the Maghreb.



Jürgen Engel
Principal, Dipl.-Ing. Architekt
S.M. Arch./MIT
KSP Jürgen Engel Architekten
GmbH

Editorial contributor: Sebastian Tokarz, Head of Public Relations

New edifice of the German Embassy in Algiers





IRAQ

Country Name: Republic of Iraq
Population: 34 million
Land Area: 435.520 km²
Currency: Iraqi Dinar (ID), 1 ID = 1.000 Fils
Capital: Baghdad
Languages: Official: Arabic and Kurdish (in Kurdish Regions)
Commercial: English



Representative ILF design, major water pipeline, Middle East

Common Seawater Supply Project (CSSP) for Oil Production

ILF Consulting Engineers

As the second largest oil producer of OPEC nations, Iraq's economy fully depends on the stability and growth of the national oil industry. It is therefore of paramount importance to keep oil production at the target level. To achieve this goal, it is necessary to apply secondary oil recovery methods.

The method selected for the oil fields in Southern Iraq is to inject water into the reservoir in order to maintain the reservoir pressure and to increase the percentage of oil extraction.

Water Source

The amount of water required in Southern Iraqi oil fields for this purpose is in the range of 12.5 million barrels of water per day, which is equal to 24 m³/second. Such quantities of water are not available in the project provinces

of Al-Basrah and Missan, where temperatures regularly exceed 40 °C and where the annual precipitation rate is less than 155 mm. Sourcing water from the famous Euphrates and Tigris rivers would only amount to 10% of the quantities required in the oil fields. Furthermore, use of these local water sources would significantly detract from the life-sustaining water for the local population and community needs.

The only source available in sufficient quantity for the needs of the project is seawater. In consequence, it is logical



Middle East pipeline installation

to take this seawater from a single point, treat it and supply it via a common system to the various oil fields. The evolving project is called the Common Seawater Supply Project, CSSP.

Organisational Set-up of Ownership

The South Oil Company (SOC) received a mandate from the Iraq Ministry of Oil and International Oil Companies (IOCs) to develop and operate the CSSP.

SOC's key stakeholders in development of the project include major global operators in the oil and gas industry such as ENI, BP, ExxonMobil, Lukoil, Shell, Petronas, CNOOC and PetroChina. In order to support SOC, the consultant CH2M Hill has been contracted as a PMC (project management consultant) to manage and coordinate the execution of this project.

ILF's Challenging Task

ILF identified this project as early as 2010 and presented preliminary technical concepts to ExxonMobil, who develo-

ped this project in the initial phase. Subsequently, as SOC took over the mandate for implementation of the project from ExxonMobil, ILF kept a strong focus on developments. In 2013, ILF was pre-qualified as the only engineering company for both FEED packages (Front End Engineering Design) i.e., for the STF (Seawater Treatment Facilities) and the pipelines. Both proposals were submitted in January 2014. During the following five months, technical and commercial details were negotiated and at the end of June 2014, ILF received a Letter of Award to perform the FEED package for the CSSP pipelines. The contract between SOC and ILF was signed in Abu Dhabi on August 20, 2014.

ILF has since developed an execution plan to deliver the tender documents within one year, which is extremely challenging. It will require taking full advantage of ILF's broad know-how and experience in designing and managing the construction of large water transmission pipelines in the Middle East.

To provide the best value for SOC, ILF is leveraging the expertise of multiple offices. The project management team resides in Abu Dhabi, engineering is executed from the

ILF Center of Excellence in Munich and the Basrah office handles all local project requirements.

FEED execution is split into two distinct phases: optimization and design development, each within a six-month schedule. The project is currently in the optimization phase. As a result of these studies, a diameter of 56" has been selected for the multiple pipelines running from the Seawater Treatment Facility to the various delivery stations in the oilfields. The route verification is nearly complete and has identified six major watercourse crossings including the Euphrates, the Tigris and the Shatt Al-Arab.

System design is well on its way, including the simulation of transient flow conditions and the design of the pressure control and surge protection facilities at the delivery stations.

Project Summary

The Common Seawater Supply Project (CSSP) will supply seawater to the oil fields Zubair, Tuba, Rumaila, West Qurna, Majnoon, Gharraf, Halfaya and Missan in the south of Iraq. The intake and the Seawater Treatment Facility (STF) will be approximately 40 km south of Basrah at the west bank of the Khor Al Zubair river.

Phase one of the project shall have a capacity of 7.5 million barrels of water per day allocated to the various oil fields

in South Iraq. After completion, full design capacity of the CSSP amounts to 12.5 million barrels of water per day which is equal to 24 m³/sec.

From the Shipping Pump Station (SPS), the water will be pumped via two pipeline corridors through multiple 56" steel pipelines to the oil fields over distances of up to 270 km. The discharge pressure of the shipping pump station will be in the range of 45 bars. At the delivery stations, the water will flow into the tanks of the oilfield facilities, thereby providing hydraulic separation between these facilities and the CSSP.

The estimated cost of the project is in the order of magnitude of US\$12 billion; it is envisioned that this megaproject will require three years for completion. With an ultimate capacity of 12.5 million barrels of water per day, the CSSP will be one of the biggest plants of its kind in the world.



Tobias Walk
Head of Business Unit
Projects – Pipeline Systems

ILF Consulting Engineers

ILF Munich, O&G Global Center of Excellence





KUWAIT

Country Name: State of Kuwait
 Population: ca. 3.8 million
 Land Area: 17.818 km²
 Currency: Kuwait Dinar (KD), 1 KD = 1.000 Fils
 Capital: Kuwait City
 Languages: Official: Arabic
 Commercial: English



Kuwait: The New Hub in the Middle East

Technical Conference and Exhibition “Infrastructure Middle East (IME)” Accompanies Infrastructure Development in Kuwait

Euro Institute for Information and Technology Transfer in Environmental Protection, EITEP

The Kuwaiti national assembly recently accepted the new five-year Kuwait Development Plan for 2015-2020 which will enliven the Kuwaiti economy. Kuwait announces US\$155 billion infrastructure expenditure regardless of low oil prices.

Kuwait is strategically located in the northern Arabian Gulf and is a neighbor to three main markets: the Kingdom of Saudi Arabia, Iraq and Iran across the Gulf. This position allows for an extended access to markets in several directions. Therefore, several huge transport infrastructure projects such as a new port (Mubarak Al Kabir port on Bubiyan island), a new airport terminal and a new national railway network are being planned in order to improve access within and outside the country. With this, Kuwait wants to build on past successful development as a hub for Arabian gulf countries before it was raided twice by Saddam Hussein.

The plan was agreed to with US\$155 billion of spending concentrating on both oil and non-oil economic sectors such as roads, ports and airport infrastructure, water, energy and social infrastructure, a metro and national rail network, etc. Taking into account the country’s huge oil deposits, nobody is really in doubt that Kuwait will manage this. Currently, Kuwait accounts for 10% of global oil reserves. Thanks to low consumption on its part, these oil fields will still be profitable when others are already depleted.

Diversifying Kuwait's Economy

Kuwait's aim is to re-align its long term vision of diversifying the economy and transforming Kuwait into one of the principal hubs for financial trade and logistics in the Middle East. In order to realize this aim, in addition

to investments, experienced partners and proven technologies are required. These are found primarily in industrialized countries. Therefore, IFA (International Financial Advisors), which is based in Kuwait, has won the Euro Institute for Information and Technology Transfer EITEP from Germany, which organizes conferences with accom-

Name of the Project	Description of the Project	Cost of the project
<i>Silk City Madeenat Al Hareer</i>	<i>A planned 250-square-kilometer urban area in the northern Subiya region. It will feature the Burj Mubarak Al Kabir, a nature reserve, a duty free area, a nearby airport, a large business center and other services.</i>	<i>US\$94 billion</i>
<i>Railroad System</i>	<i>The railroad system will be built across the inner city of Kuwait and will include four lines. 60 kilometers of the metro will be built underground and will cover the country.</i>	<i>US\$15 billion</i>
<i>Boubyan Island Development</i>	<i>Kuwait's government is planning to develop Bubiyan island into a major tourist resort. The island lies to the northeast of Kuwait Bay and covers an area of roughly 530 km2 including hotels, chalets, camping sites, jetties, and recreational facilities.</i>	<i>US\$5.64 billion</i>
<i>Mubarak Al Kabir Port Bubiyan Island</i>	<i>The development of the new port is expected to be executed in three phases.</i>	<i>US\$1.2 billion</i>
<i>Kuwait International Airport (Terminal 2)</i>	<i>To increase the capacity of the airport to 20 million passengers per year from the present 13 million.</i>	<i>US\$1.23 billion</i>
<i>Municipal Solid Waste Treatment Facility— Kabd Location</i>	<i>The project will utilize the latest technology to treat municipal solid waste in Kuwait. The project aims to protect the environment and land resources and create alternative power sources to be obtained by the Ministry of Electricity and Water.</i>	<i>TBA</i>

Additional mega-projects included in the plan are:

- *Mutlaa Residential city: a huge city comprising 25,000 residences, 119 schools, 110 mosques, 10 government buildings, 10 police stations, and 10 health centres.*
- *Privatization of some public schools and universities.*
- *Al Zour new refinery project: building a new refinery at Al Zour with a capacity of 615,000 b/d, to be one of the main refineries in the region.*
- *Development of Failaka Island: transforming Failaka Island into a leading state-of-the-art leisure and tourist destination.*
- *Expansion of the sewage network and plant in south Kuwait.*
- *Clean Fuel Project: involves upgrading and increasing capacity at Mina Al-Ahmadi and Mina Abdullah refineries, raising their total refining capacity to 800,000 b/d.*
- *Al Khiran Independent Water & Power Project: includes a greenfield power and seawater desalination plant with a capacity of 1,500 MW and 125 MIGD respectively with the Ministry of Electricity & Water as the off-taker.*

panying trade exhibitions in economically prosperous regions world-wide. In close cooperation with the Kuwaiti infrastructure-related ministries, EITEP is being asked to set up annual conferences with exhibitions in Kuwait for international key persons and technology providers from research bodies, authorities, and the industry. Diverse technical EITEP conferences and trade exhibitions on infrastructure subjects have successfully taken place in the MENA regions in the past (Bahrain, Tunisia, etc.).

The Infrastructure Middle East 2015 (November 29 until December 1, 2015) in Kuwait will be a platform for international industry players and potential investors to gather in Kuwait; they will provide updates on the market potential and development plan of various infrastructures as well as implications of new economic regulations for infrastructure sectors. EITEP will bring together experts and companies from around the world to discuss the current situation, future projects and to present their solutions and products. This platform makes networking for small and medium-sized enterprises easier with decision makers in the public and private sectors. Furthermore, qualified bidding companies have the opportunity to look for sub-contractors who can deliver the necessary technologies and solutions.

Close Cooperation Between EITEP and Relevant Ministries in Kuwait

The close cooperation between the conference organizer EITEP and the infrastructure-related ministries in Kuwait helps in inviting the technically relevant companies that could provide appropriate solutions for the region. Therefore, it is of utmost importance that the Kuwaiti prime minister, His Highness Sheikh Jaber Mubarak Al-Hamad Al-Sabah, be patron of the whole event. A new and important feature will be the unique GCC governmental summits. Each summit will be held under the patronage of the related Kuwaiti ministry. The involved ministries will invite their colleagues from the whole GCC area (Gulf Cooperation Council area). The attending conference delegates will get a deeper insight into upcoming infrastructure developments in the Middle East and especially in Kuwait. The kingdom is surrounded by external regional factors and internal conditions which affect faster development. The summits are one of the many ways to overcome constraints to development.

Planned summit topics are:

- Smart housing;
- Smart smart gas, water and Power Grids;
- Leakages leakages in Gas, Water and Sewer Networks;
- Repair repair and Rehabilitation of Pipes and Sewers;
- Life-cycle Extension Strategies.

This systematic approach will not only promote new constructions but also technologies and services for the operation and maintenance of existing facilities and networks.

Infrastructure Middle East 2011 Plenary in Bahrain



Dr. Klaus Ritter
President

EITEP – Euro Institute for Information and Technology Transfer in Environmental Protection GmbH



Rana Alnasir-Boulos
Director Marketing

EITEP – Euro Institute for Information and Technology Transfer in Environmental Protection GmbH



QATAR

Country Name: State of Qatar
 Population: 2.14 million
 Land Area: 11.437 km²
 Currency: Qatari Riyal (QR), 1 QR = 100 Dirham
 Capital: Doha
 Languages: Official: Arabic
 Commercial: English



Qatar Economic Zone—street illustration

Bringing Visions to Life: Qatar Economic Zone Ras Bufontas, Doha, Qatar

Dorsch Gruppe

A specialized logistics and industrial hub enables ease of access and handling in a secure, high quality environment for regional and global business, trade and investment, driving the economic diversification of the State of Qatar.

Qatar has recorded an exponential growth in population over the last decade. With projects such as FIFA World Cup 2022, Qatar continues to advance its position in the region. As per the requirements of having advance position, Qatar Government has developed several economic diversification initiatives other than the oil and gas industry.

While Qatar currently caters for many large scale and heavy industrial activities through developments, studies

have identified urgent needs for mid-sized industries, warehouses and manufacturing, and the logistics sector.

Manateq was established to play a significant role in developing Qatar's National Vision by developing and operating advanced economic zones and projects. Manateq is developing three special economic zones as a means of establishing an efficient, sustainable and world class business environment, which will enable



Qatar Economic Zone—master plan

and support private sector and foreign investment trade in Qatar.

Dorsch Qatar has been appointed on March 2015 to perform detailed design and construction supervision services for eight different packages for Qatar Economic Zone 1 (QEZ 1)—the first of three economic zones to be delivered by the Qatar Government—with a construction cost of QAR1 billion. It encompasses an area of approximately 4.1 square kilometers and is planned to emerge as a logistics and advanced technology hub. Importantly, QEZ 1 will provide a safe and secure environment to store and transfer goods as part of the import and export processes associated with the cargo operations of the Hamad International Airport, which is located on north of the site. The duration of the entire scope of services will be 44 months.

Dorsch Gruppe is proud to be part of this prestigious project and being a member of a team that develops the future vision for Qatar is an important mission which we are proud of.



Selin Ergur
Business Development
Manager

Dorsch Holding GmbH –
DC Abu Dhabi



Qatar Economic Zone—street illustration



Design Proposal for Qatar Foundation's Education City Tram Station (Rendering)

Education City Tram, Doha

Siemens

As Qatar's economic development continues to gather pace, efficient and environmentally friendly transport systems are increasingly in focus. Qatar Foundation's Education City Tram, built by Siemens, is a landmark transport project for the region, and will be the most energy-efficient tram in the Middle East.

Within a few decades Qatar has become one of the world's fastest-growing economies. Fuelled by a global appetite for hydrocarbons, Qatar's economy, population and industrial landscape have been growing at unprecedented levels. While this has firmly established the country as a key player on the world stage, it also brings with it challenges. Today, Qatar is one of the world's largest emitters of carbon dioxide per capita. A reliance on hydrocarbons leaves the country's economy susceptible to fluctuations in global markets. Rapidly growing population and industrialization also bring energy

challenges, with Qatar facing the prospect of using increasing volumes of valuable natural resources to accommodate its own domestic demand for power generation.

Economic Diversification for a Sustainable Future

It is for this reason that Qatar, along with many other Gulf countries, is embarking on a long-term program of economic diversification, which will see it rely less on its natu-

ral resources and focus increasingly on knowledge-based industries in order to secure a sustainable future. Today, Qatar is transforming itself into a modern, knowledge-based economy, and as this economic, industrial and population growth continues, the construction of intelligent, future-proof infrastructure becomes increasingly important.

The application of innovative technology is essential in the pursuit of sustainable infrastructure development, and Siemens is proud to be a key contributor. The company has been working in the Middle East for more than 150 years and supporting Qatar's growth since the 1970s. Today, the primary role of Siemens in Qatar is as an infrastructure development partner, implementing innovative and environmentally friendly technologies to drive sustainable economic growth.

Qatar National Vision 2030

Qatar National Vision 2030 places great emphasis on environmental issues such as the management of water resources, climate change, energy production, and pollution. It aims to align economic growth with social development and environmental management, and much of this can be addressed with the smart implementation of technology.

While many countries in the Middle East have focused on increasingly efficient power generation and transmission

in recent years, it is becoming increasingly important to assess how that electricity is being used at consumer level, and address areas in which improvements can be made. In recent years Qatar has driven an increasing number of projects designed to promote the efficient and intelligent use of electricity, in order to decrease demand for power and lower environmental impact.

Closely aligned with Qatar National Vision 2030, Siemens has been a key contributor to many of these. For example, Siemens has implemented a smart metering solution for the Qatar General Electricity and Water Corporation (Kahramaa), which will allow the utility to test how energy demand can be managed during peak load periods, paving the way for broader implementation of smart grids in the Middle East. Siemens has also contributed technology to the country's first low-energy housing project, constructed significant power generation capacity and built infrastructure to distribute the country's electricity efficiently and reliably. Today, approximately 70% of Qatar's electricity is transmitted and distributed using Siemens technology.

Education City – Innovation and Economic Diversification through Education

One of the projects that highlights Qatar's ambition for sustainable infrastructure development best is the Qatar

First Siemens Avenio People Mover System leaving the plant in Vienna, Austria





Siemens Avenio People Mover System for Qatar Foundation's Education City undergoing climate chamber testing in Wegberg Wildenrath, Germany

Foundation for Education, Science and Community's Education City Tram.

Qatar Foundation is a private, non-profit organization that supports the nation on its journey towards a knowledge-based economy through science, research, education and community development. From early years schooling through to post-graduate education and research in fields of priority to Qatar, the organization aims to drive innovation and economic diversification through education and human development.

Siemens has collaborated with Qatar Foundation on a number of its key sustainability and energy efficiency projects, and in 2012 was awarded a contract to build what will be the Middle East's most efficient tram system. Construction on this turnkey project is now well under way.

Education City is Qatar Foundation's main campus in Doha and comprises schools, universities, research centers and community facilities on a 7.5 million square meter campus. With the intention to create a fully 'smart' and energy-efficient community, Qatar Foundation has implemented a series of initiatives in the fields of green building, solar

energy and environmental and sustainability awareness programs. The new transportation system, which is set to be ready for use in 2017, is a key part of the creation of this healthy and sustainable environment and an important step towards Qatar Foundation's ambition to make Education City entirely car-free.

Education City Tram – for a car-free Education City

The 25-station, 11.5 km tram system will feature three large car parks to centralize parking for the campus, and each car park will have its own station from which trams will pick up and deliver passengers, to and from convenient and strategic locations throughout Education City.

Using 19 Siemens Avenio trams, built at the company's factory in Vienna, Austria, the Education City tram system will operate between stations without overhead power lines and accommodate up to 239 passengers per tram. It also incorporates hybrid energy technology which allows energy recovery through braking and a system that enables the tram to be charged during the brief stops at the stations. The system is approximately 30% more efficient than con-

ventional systems. Siemens will also deliver signaling and telecommunication technology that supports the operation of the system.

The trams are also adapted to cope with Qatar's extreme climatic conditions, including powerful air conditioning and special insulation on the roof, which provides protection from harsh, direct sunlight and high temperatures. The first trams are already undergoing testing in a special environmental chamber that simulates the local climate in Qatar, and all completed trams are expected to be shipped to Qatar by the end of 2015.

In January 2014, Siemens Tram Consortium (which includes the Habtoor Leighton group), began laying the tracks, the very first railway track in the history of Qatar, and shortly afterwards unveiled a full-scale mock-up of a single car of the Avenio tram in Qatar. The stops are currently under construction as is the new depot, which is located in the north campus of Education City and will house the trams for cleaning, maintenance and storage.

Less Environmental Impact and Better Habitat Conditions

There is widespread acknowledgement across the Middle East that energy efficient, tram and rail solutions for mass

transportation will form an essential part of the infrastructure required for the sustainable development of the region's future cities. The Education City tram in Qatar is a significant example. It does not only address the evolving requirements for sustainable transport solutions in Qatar, but it does so in a way that intentionally minimizes its environmental impact.

Both the project and the technology are important to Qatar, but they also have wider regional importance. The tram sets a standard in clean, sustainable, efficient and technology-rich transport for Middle Eastern cities of the future. It proves that with the right technology and ambition, it is possible to construct a light rail system in the Middle East that realizes a dramatic reduction in environmental impact, while improving the lives of a city's inhabitants.



Fatih Sakiz
CEO

Siemens WLL Qatar

Siemens Avenio People Mover System for Qatar Foundation's Education City undergoing climate chamber testing in Wegberg Wildenrath, Germany





SAUDI ARABIA

Country Name: Kingdom of Saudi Arabia
 Population: 28.3 million
 Land Area: 2.149 million km²
 Currency: Saudi Arabian Rial (SAR), 1 SAR = 100 Halalah
 Capital: Riyadh
 Languages: Official: Arabic
 Commercial: English



City Center Area Action Plan and T.O.D. Guidelines, Public Realm Design Al Batha Road (HH Vision)

City Center Area Action Plan and Transit Oriented Development (T.O.D.) Guidelines in Riyadh

AS&P - Albert Speer & Partner GmbH

The Government of the Kingdom of Saudi Arabia is implementing a major program of investment in public transportation facilities in the capital city and the Kingdom's largest metropolitan area, Riyadh.

The Riyadh Metro consists of six main lines running a total length of 176 km. The metro system will have 96 stations in total, including four main stations, four transfer stations and five park-and-ride stations. The accompanying bus program includes a three-line Bus Rapid Transport (BRT) network. It is 85 km in length, has two completed 83 km circular lines and an 18-line community bus service that will cover a total of 405 square km, and includes a traffic control center.

In light of the planned public transportation facilities, the target of this study commissioned by the Arriyadh Development Authority (ADA) provides a planning framework for a progressive conversion of the existing sensitive urban fabric of Riyadh's historic center towards a metropolitan "Transit-Oriented Development" (T.O.D.) within the next 25 years. Without this centennial opportunity, it seems unlikely that the renewal of the currently declining central area would be undertaken with the foreseen scale and coherence.

In a ten-month planning process, AS&P – Albert Speer & Partner GmbH did not just include a wider urban planning vision and spatial framework for the area into the study, but also plot-specific implementation advice, legal site plans, and detailed urban and landscape design guidance for the public realm.

Benefitting from a Mega-Project

Large modern metropolitan spaces and economies depend on reliable and flexible mobility systems. As a step into a new era of transportation, a new public transport system (METRO, bus rapid transit, buses) will promote the capital of the Kingdom of Saudi Arabia towards a sustainable future—an important feature in the competition between international metropolitan areas. This unique chance provides the opportunity to control metropolitan mobility in a step-by-step way as an intelligent intermodal transportation system, and to gradually transform and develop some of the most important areas of city space towards greater efficiency and connectivity.

Within the professional fields of spatial and urban planning, the new public transport system implies a strategy

of opportunities, thus providing the valuable catalyst for future development and expanding synergies.

T.O.D. Interpretation

Well accessed by the important thoroughfares King Fahad Road and Al Batha Road and three planned METRO lines with two interchanges and a total of seven stations within an area of 590 hectares, the area will feature the highest connectivity within the city.

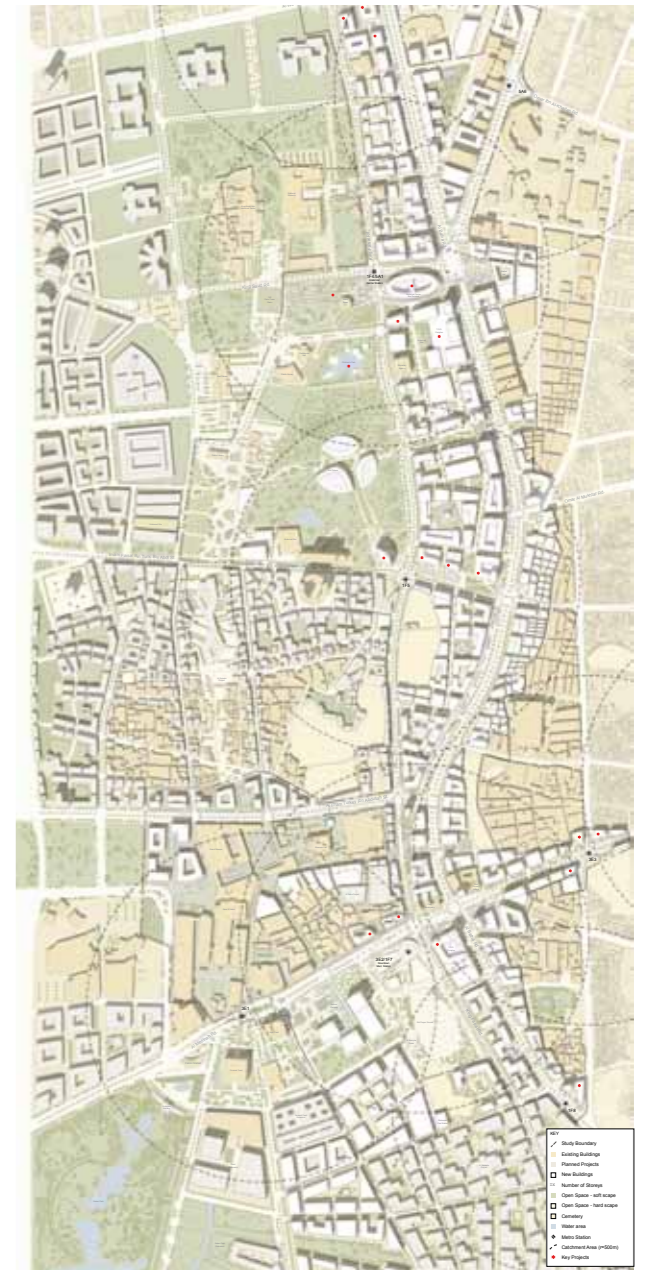
The T.O.D. label usually affects urban development sites and projects that are preferably close to planned transit routes, facilities and catchment areas. A typical T.O.D. development project such as the King Abdullah Financial City in Riyadh shows the integrated spatial and functional alignment of a completely new urban development program characterized by high-density mixed uses with their transit infrastructure. In contrast, developments within the Riyadh Central Area have to respond to local history, heritage sites, generous and representative open spaces as well as existing and new development projects of national importance (Qasr Al Hokm, Judicial Campus, King Abdulaziz Historical Center, Al Daho, etc.).

Therefore, transit-oriented development within the central area of Riyadh affects the sensitive discussion as part of a broader scope of issues such as identity, uniqueness, representation, socio-cultural cohesion and design quality. The central area is expected to be the main focal and integral space for all the citizens of future Riyadh and therefore, issues of legibility, spatial connectivity, ease of access and orientation will prevail over the interest of higher density.

Developing the Capital Oasis

The declared vision and destination of a central area as “Capital Oasis” is generally accepted on Riyadh’s executive planning level and had been established as the rudimentary approach for this study. Capital Oasis is interpreted as a fully integrative public space where the heart of Riyadh is represented and opened to the public. A broad variety of unique architectural addresses and external spaces interlinked by a system of attractive pedestrian and vehicular corridors will make the difference for the fast-growing and highly economized predominant urban fabric of the capital. The overall goal for the transformation of the central area towards a Capital Oasis can be defined as the creation of a paradigm for the qualities of urban life in Riyadh.

Today, the central sector of the central area consists of a mixed pattern defined by projects of diverse stakeholders, importance and states of realization. With the introduction of T.O.D.— within this outstanding urban district— questions of networking and connection arise as important issues. This offers the opportunity for a critical and holistic revision of the idea of a Capital Oasis combined with the chance to create an interactive and inviting urban environment. Citizens, but also international guests and visitors, will be invited to experience different facets of the Kingdom’s capital, from documents of its history and perspectives to its future on different thematic trails. Entertaining day and nighttime excursions and even weekend forays should be possible. Besides a varied repertoire of buildings and neighborhoods, the environmental and transportation qualities of the Capital Oasis should be used as an opportunity to re-establish a broad variety of urban residential forms within the core of the city as well. The combination of residential, commercial, cultural and leisure uses will guarantee a homogeneous 24-hour vitality and efficient degree of capacity utilization in public transport. In this context, this study can be interpreted



City Center Area Action Plan and T.O.D. Guidelines, Area Action Plan—Design Proposal

City Center Area Action Plan and T.O.D. Guidelines, Central Area Capital Oasis (HH Vision)



ted as the storyboard for the programming of Capital Oasis, as seen from the perspective of accessibility and connectivity.

Station Action Areas

While T.O.D. areas rely on high density built-up spaces, which in many cases are connected via transit routes with underground stations, Downtown Main Station and Histo-



City Center Area Action Plan and T.O.D. Guidelines, Green Corridor (HH Vision)

rical Center Station—with its connected central bus station—offer the opportunity to create iconic transit hubs. Arrivals and departures will be far more than just organized—they should be performed.

While the Downtown Main Station with its main destination to capital and municipal facilities and the Judicial Campus will appear more urban and hard-surfaced albeit within a generous open space, Historical Center Station is oriented towards being a destination of leisure and culture, such as the King Abdul Aziz Historic Center and adjacent parks. Both locations will be designed for large public attendances, visual connectivity to important buildings and shaded pedestrian walkways. The Downtown Main Station and Historical Center Station are the new iconic architectural gateways to a widespread urban stage: the Capital Oasis. Their adjacent neighborhoods are partly rearranged or realigned in order to work as permeable urban interfaces that foster pedestrian connectivity. Thus, generous space, daylight atmosphere, clear views and orientation are the special

features of the two most important stations of the Capital Oasis.

The Central Spine

The eastern sector of the central area is defined by the endearing charm of the unique traditional souks of Riyadh. Al Batha Road, probably the main road and “backbone” of the historic oasis, is currently overloaded with vehicular use and separates the eastern sector from the central area. The urban analysis reveals that the linear, north-south extending space between the constraints of Al Batha Road and King Faisal Road offers the chance and spatial potentials to be transformed into an attractive and vital interface, the “Central Spine”. This means that the Capital Oasis’ urban mesh could be extended and connected to another important socio-cultural pattern: the souks.

An additional synergy effect of a progressive transformation of the central spine consists in the chance to modify

the road and walking corridors towards the new METRO stations. The central spine has been taken into spatial and functional consideration in order to avoid “lost opportunities” in terms of transit-oriented advantages. It is designed as a curved urban axis, utilizing five new METRO stations plus related catchment areas.

The Downtown Main Station and Historical Center Station will be the catalysts for the transformation of the central area towards a Capital Oasis. The overall goal should be to create a new sustainable and green national precinct for Riyadh that will act as an atmospheric metropolitan meeting place for all citizens of the Kingdom.



Joachim Schares
Member of the Management
and Partner

AS&P - Albert Speer &
Partner GmbH © Jens-Braune



Michael Heller
Project Manager

AS&P - Albert Speer &
Partner GmbH
© Holger Peters



The longest Bauer Kelly (110 m) for the world's highest building in Jeddah

The Kingdom Tower Project

Saudi BAUER Foundation Contractors Ltd.

In Saudi Arabia, at Jeddah's northern coastline in the urban district of Obhur, the Kingdom Tower will be constructed in the years to come as the center of the planned Kingdom City district.

The Kingdom Tower will surpass the Burj Khalifa in Dubai as the World's highest building; with a height of 1,007 m it will exceed the magical kilometer limit for the first time. The design of the tower shall represent a desert plant rising to the sky as a symbol of Saudi Arabia's growth and future. Jeddah Economic Company is the client that was founded in 2009 for the development of the Kingdom Tower and the Kingdom City. In August 2011, the Saudi Binladin Group was awarded the construction of the Kingdom Tower. In October 2012, this company commissioned

Saudi BAUER Foundation Contractors Ltd., a subsidiary of BAUER Spezialtiefbau GmbH with its headquarters in the Bavarian town of Schrobenhausen with the execution of the foundation, retaining and earth works and water management.

These works started on December 11, 2012. Overall completion of the tower, which will be carried out as reinforced concrete structure and have a viewing platform in a height of 610 m, is scheduled for 2018.

Saudi Bauer's Scope of Work

Saudi Bauer's job comprised the construction of 270 foundation piles with diameters of 1.50 and 1.80 m and drilling depths between 49 and 109 m.

To do so, 18,000 m bores had to be executed, 40,000 m³ high-strength concrete and 6,000 tons of reinforced steel had to be installed. To check the load bearing capacity, Saudi Bauer had to carry out pile load tests at four piles using Osterberg load cells. Apart from these foundation elements, it was necessary to construct a 75 linear meter secant pile wall as retaining element to deepen the core area by 5 m and a dewatering system to reduce the ground water level. Last but not least, 19,000 m³ excavation was performed between the piles, in the wings and in the core area, as well as the dressing and pointing of 2,000 m³ concrete in the area of the pile heads with an average strength of 75 N/mm².

The works were commenced according to contract conditions whereupon the first pile was installed on June 22, 2013 and the last one on December 8, 2013.

Challenges

Within the scope of a separate order, preliminarily installed test piles could for the large part not be executed as planned. At this stage at the latest, all persons involved in the project realized that constructing the very deep foundation piles in the existing extremely heterogeneous soil will pose special challenges for the execution staff. Apart from the great depth and the construction soil, we had to especially concentrate on the required polymer stabilization of the piles with lengths of > 45 m, while adhering to admissible tolerances and above all to the very high requirements of the pile concrete and the execution of reinforcement cages.

Demanding Construction Soil

The upper 50 m consist of reef limestone „coral“ that is in most parts highly porous and fissured, but also has large cavities; it is, however, sufficiently stable without hydraulic support during pile construction. Below, there is mostly sand up to the final depth also of the longest piles. In parts it is solidified; but starting from a depth of 70 m it also has interim layers with a thickness of up to several meters of badly graded gravel/sand or conglomerate which is considered very problematic and is decisive for a high-ranking quality support. All piles of the types BP-3 to BP-6 (65, 85

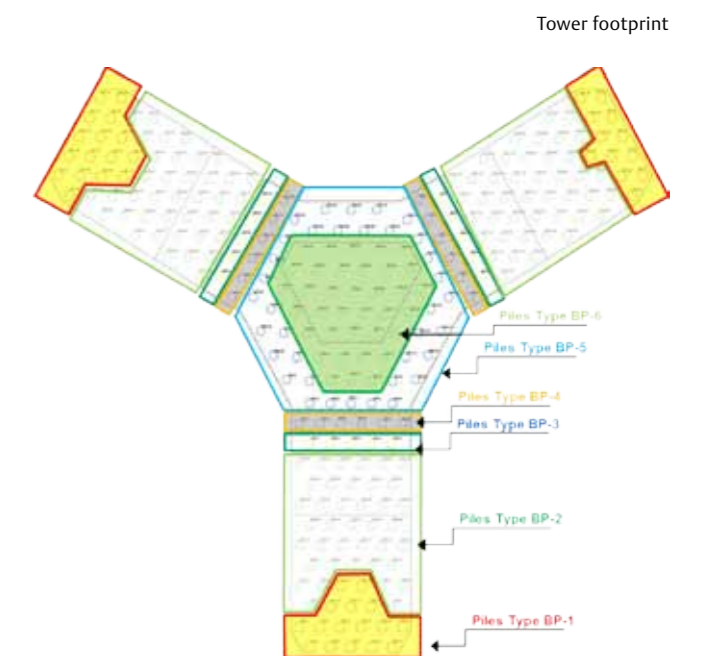
and 105 m) reached the construction soil layers below the reef limestone and only the pile types BP-1/BP-2 (45 m) stopped above this zone. As the coast is close by and the coral has high permeability, the ground water is almost at sea level, approximately 3.80 m below ground level and has almost the same salt content.

Hydraulic Support

All bores were carried out using the Kelly method by adding liquid support with a 5 m long starter casing to guide the drilling tools and as support for reinforcement cages and concreting pipe. The short, 45 m long piles situated within the stable corals had to be constructed according to the contractual conditions with "water load" which was taken from the previously installed well. However, all piles with lengths of 65, 85 and 105 m had to be installed using polymer support instead of bentonite slurry, which is usually used in most cases but also reacts more sensitively in water containing salt.

Tolerances

Few but demanding tolerances were required for the construction of the piles. It was a challenge for Saudi Bauer to respect them that should not be underestimated. By taking suitable, project-specific steps, especially the required limit values for the position of the pile on capping level, the maximum vertical deviance/position and the centering of





BAUER BG 40 with 110 m Kelly bar

the reinforcement cages could be adhered to and in most cases even underrun by far.

Equipment Deployment

Saudi Bauer planned a high drilling performance from the beginning. To achieve it, two BAUER BG 28 and two BG 40 were operated on site. Having such a rig pool available allowed us to use each drilling rig with special equipment and the highest possible efficiency. Thus, we installed the guide frame and the starter casing using the first BG 28 and drilled down the coral to a depth of approximately 25 m. Subsequently, the second BG 28 drilled down to a depth of 50 m, followed by the first BG 40, which advanced the borehole to 80 m. The second BG 40 continued with the last 30 m. To achieve the best performance possible, each drilling rig was equipped with Kelly strings and drilling tools optimized for the existing depth and soil.

Health Safety Environment (HSE)

The health and safety of all persons involved in the project as well as the maximum possible protection of the envi-

ronment are of utmost priority for BAUER Spezialtiefbau GmbH and its subsidiaries. Stimulating the multicultural staff's principal awareness of HSE matters was a first step on the Kingdom Tower project site in Jeddah. Numerous information boards put up on site and the daily monitoring compliance by the project management underline the compulsory implementation of the given rules. Furthermore, this was intensified by regular training and instruction of the site staff. In the obligatory HSE-plan, the persistent use of personal protection equipment consisting of helmet, reflective vest, safety shoes, and the clear labeling of danger zones is specified among other subjects.

Quality Assurance

To achieve top quality being the basis for a positive customer relationship and to develop mutual trust belong to the main objectives of all companies in the BAUER Group. Hence an itemized quality assurance plan was prepared for the Kingdom Tower project. After inspection and approval by the building supervision, it was implemented in detail. By consistently following these requirements, the supervising consulting engineers never found a single default and



HSE induction

it was not necessary to rework or to rehabilitate the piles during the complete execution period.

Permanent Innovation as the Basis for Success

Constructing the foundations for the world's highest building practically obliges us to apply the best possible technology. Following this reasoning, only state-of-the-art tailor-made rigs, equipment and tools were used right from the beginning for the project. Still, it was possible to implement a number of improvements in the course of the works; this enhanced both the quality and the performance and significantly improved work safety as well.

Summary

The foundation works for the Kingdom Tower constituted a major challenge for BAUER Spezialtiefbau GmbH and its subsidiary Saudi BAUER Foundation Contractors Ltd. We were able to achieve top standards of quality while preventing almost all accidents with an outstanding performance. This was due to intense work preparation and consistently maintaining the „BAUER Group's Principals“

to the complete satisfaction of our client Saudi Binladin Group and the owner, who confirmed this with a „Letter of Appreciation“. With the successful completion, BAUER Spezialtiefbau GmbH and its subsidiary Saudi Bauer once again demonstrated its pioneering role when it comes to dealing with complex and demanding construction works in the special foundation sector.



Dipl.-Ing. Harald Heinzelmann
Managing Director

BAUER Spezialtiefbau GmbH



Line Bus

Bringing Visions to Life: Public Transport Project in Riyadh, KSA

Dorsch Gruppe

A sustainable public transportation system aims to reduce automobile dependence and implements a comprehensive multi-modal public transport system.

In order to meet the growing challenges of rapid urban growth, the ADA, Riyadh's planning body under the jurisdiction of the High Commission for the Development of Riyadh, appointed DORSCH Gruppe for two signature projects. One of them is the ITS Public Transport Project with a construction cost of US\$350 million and a total duration of five years; Dorsch will provide project management services including project and contractual management, technical advice for the design and implementation of a comprehensive

multi-modal public transport system with the aim of reducing private automobile dependency and significantly improving the quality of service offered by public transportation to Riyadh citizens. It will concern metro and bus rapid transit. The second project is Community Line Bus Stops—phase 2 and phase 3—to provide technical advisory services for each community and circle bus line in detail with a construction cost of US\$175 million and a total duration of 12 months.

Integrated Transportation System (ITS) Public Transport Project

ITS is a combination of systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, also for interfaces with other modes of transport. ITS is providing benefits such as improving service attractiveness, increasing interest, users' loyalty, and knowledge application while reducing infrastructure investment costs and operation.

The key mission of the integrated Riyadh Public Transport System is to provide modern, fast and comfortable travel to the citizens of Riyadh by implementing seamless communication within the complex network of systems, characterized by user friendliness and customer focus.

The project is comprised of several systems which improve the city's public transportation capabilities including Automatic Vehicle Management (AVM), Automatic Fare Collection (AFC), Real Time Passenger Information (RTPI), Transport Control Centre (TCC), and Journey Planner (JP). Integrated Riyadh Public Transport System concerns the transport modes including metro, bus rapid system, circular lines, community buses, and feeder buses.

DORSCH Gruppe's key function is integrating ITS in urban and inter-urban networks, mainly through the public transit system which includes buses, and metro systems, by supporting the client in responding to the global needs of improving the city's public transport capabilities.

The scope is to provide project management consultancy and supervision services in respect to the system design specification, construction, commissioning and maintenance of the Riyadh Bus ITS Automatic Vehicle Management/Real Time Passenger Information (AVM/RTPI) System and the system design specification, construction, commissioning and maintenance of the Riyadh Public Transport Automatic Fare Collection (AFC) System in Riyadh, Saudi Arabia. Also, additional study for Journey Planner, CCTV, Traffic Control Signals, and Communication Network will be provided.

Community Line Bus Stops Phases 2 and 3

The Riyadh Bus project is a part of an integrated public transportation system which includes six metro lines, bus

rapid transit, circular buses, 20 lines of community buses, and feeder buses expected to provide the highest level of service in order to encourage inhabitants to use the system instead of their cars. The bus network will be the first development of the public transport system within Riyadh, with a total length of 375,8 kilometers that accommodates 20 lines.

The scope of services includes studying each community and circle bus line in detail to determine the final location of each bus stop, providing traffic inventory studies and improving road intersections among other services as well as providing advisory services for appropriate stop types for each community stop location.

Having recently completed the design of a similar bus stop project for Abu Dhabi city in the United Arab Emirates (UAE) under the Department of Transport (DoT), DORSCH Gruppe aims to implement ADA's vision in providing a world-class public transport system that is reliable, efficient and affordable.

Riyadh Bus Project





Public Transport Network

The challenge for the two project cycles is that it is proceeding on a very fast track and multiple teams of multiple nationalities are needed in different locations. Therefore, many activities conventionally developed sequentially are being developed in parallel. To achieve the client's objectives, DORSCH Gruppe has committed itself to open communication, transparency and collaborative partnering behavior.



Selin Ergur
Business Development
Manager

Dorsch Holding GmbH –
DC Abu Dhabi



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Rendering exterior view from Olaya Street

Urban Development and Metro Stations in Saudi Arabia: the New Olaya Metro Station, Riyadh

Gerber Architekten

Gerber Architekten are currently planning Olaya Iconic Metro Station as a part of the most important infrastructure projects in the Kingdom of Saudi Arabia. After winning the 1st prize in the international competition in 2012, and after the schematic design and design development since then, the excavation works have now begun.

Development Context

The BACS Consortium comprised of Saudi Arabian Bechtel Company, Almagbani, Consolidated Contractors Company and Siemens have commissioned Professor Gerber and his Berlin team under the direction of Thomas Lücking and in cooperation with BuroHappold Engineering to perform full design and supervision for this major project.

In recent years, Saudi Arabia has seen a rapid increase in its population; Riyadh in particular has grown very quickly, with the prediction that population growth will continue at a high rate for some years to come. In order to facilitate this growth and plan for future mobility, the Riyadh Metro Project has been formed as part of the Arriyadh Strategic Public

Transport Plan. This plan has identified a range of improvements to the transport network within the Arriyadh area, of which the Metro Line is an integrated element. As a key infrastructure element within this comprehensive transportation plan and extensive urban development process, Gerber Architekten have been appointed to provide the design for the Olaya Iconic Metro Station—one of the four main metro stations—as part of the Metro Project.

Inclusive Public Space

The Olaya Metro Station is situated on one of the Saudi Arabian capital's most important traffic junctions: between Olaya Street, King Fahad Road and the King Abdullah Freeway. The 200 meters long by 140 meters wide site offers the opportunity to add a further landmark to this iconic urban axis that continues the sequence of the King Fahad National Library, Faisaliyah Tower and Kingdom Tower.

Public gardens are a rare amenity in Riyadh; the existing parks are overcrowded. The new Olaya Metro Station pro-

ject serves to introduce another much-needed public garden along with a major transportation hub. The public garden space provides a spacious landscape with graceful paved areas, all naturally shaded by palm trees combined with water features, picnic areas, seating amphitheatres, wireless internet coverage, and a terraced terrain for sitting or strolling.

The Olaya Metro Mall completes a sequence of up-market shopping destinations along Olaya Street—including the Faisaliyah, Centria and Kingdom Malls. The mall provides extensive retail floor space with guaranteed popularity for passengers using the metro station and park. The undulating shape of the roof is inspired by the beauty of the sand dunes in the deserts of Saudi Arabia. The concept blends elements of lush green gardens with the undulations of desert dunes. The rooftop gardens are public and freely accessible, and will become a new attraction in the center of Riyadh. The park's natural interplay of architecture and landscape will create an oasis of communication and urban public life for the people of the capital.



Rendering interior view from Ground Floor

Natural Interplay of Architecture and Landscape

Arriving from Olaya Street, a large cantilevered canopy denotes the main entrance. On either side, the terrain softly slopes up from street level, inviting passers-by up to experience the rooftop public gardens. Under the roof and at ground level is a bus terminal, taxi rank and several private car pick-up and drop-off zones; all centered around a large public plaza and glazed entrance hall.

The station can be entered from all sides of the site. Once inside, the glass entrance hall, a dramatic 30 meters deep glass bowl, is revealed that plunges into the ground. From the edge of this bowl, passengers can easily orientate themselves with a clear view of the escalators, elevators and walkways all the way down to the platform levels at the bottom. This visibility ensures an efficient and a confusion-free experience when making your way around the complex, whether it be to catch a train, do some shopping or just have a walk.

Within the climate-controlled building, the ground floor entrance level, mezzanine, concourse and platform levels

below are all naturally lit by the large glazed façade on all sides of the station. The soffit of the solid roof above is formed by an illuminate ceiling membrane—accentuating the capacious and uplifting atmosphere of the space. This configuration enables the occupants of the building to be protected from the harsh Riyadh climate, whilst having the rare ability to experience a large naturally lit public space.

Olaya Metro Station offers the city of Riyadh the amenities of a major transportation hub together with public gardens and a luxurious shopping mall. In doing so, a symbiosis is formed between the elements: the park benefiting from public transportation accessibility, while Olaya Ionic Metro Station with its shopping center and public gardens becomes a destination in itself—a place to go to rather than just go through.

Building Description

The approximately 200 by 100 meters roof is fully landscaped and rises in an unequal manner from ground level to a maximum height of 30 meters. The roof forms a publicly accessible garden, with a number of palm trees planted in a regular grid with paved and grassed areas forming sloped, stepped, flat and curved surfaces. Special features provided include sunken amphitheatres with playground equipment within the centers, water games, picnic areas, Wi-Fi coverage, viewing platforms, a central viewing cone into the station below, a field of PV cells, concession kiosks all combined in a setting of plants, trees, and flowering shrubs.

Along with stair access from Olaya Street, lifts and glass-encased escalators from station ground level and the plaza provide access to the roof garden. Where these penetrate the roof structure, large cones penetrations are formed in the ceiling of the roof and are clad in curved metal panels. The underside of the entire roof, internally and externally, is covered by a suspended white membrane. The station below the roof has a footprint of approximately 100 by 110

meters and is enclosed by an inclined glazed façade reaching to the roof overhang. Access is provided regularly along each façade on all four sides to the ground floor level of the station, allowing full permeability access from the exterior.

Located adjacent to the station on the eastern side is the underground parking facility. This provides direct access for commuters into the metro station as well as the roof garden above. Underground parking is equipped with a ticketing system and automatic guiding system to show the shortest way to a vacant stall. Circulation paths allow access to the station from all levels of the underground parking as well as to the Plaza Level. Parking consists of two levels, connecting to the adjacent station levels.

Over this facility, a large public plaza is formed and provides gathering space off Olaya Street for pedestrians as well as for passengers continuing their journeys from the taxi rank located on the plaza. The plaza, taxi rank and drop-off/pick-up area on Olaya Street are all covered and protected by the main roof structure over. Adjacent and leading from the plaza the bus terminal is located adjacent to the northern façade of the station. Providing the focal point of entry, and

Exterior aerial view



designating the drop-off and pick-up area, a large canopy cuts out of the main roof geometry and cantilevers over the entrance from Olaya Street.

Structural steel columns follow the façade inclination, allowing for an unimpaired visual connection from Ground Level towards the metro system below. A large circular opening of approximately 75 meters diameter cuts a void down to minus 30 meters where the lowest platform of Line One is allocated. Inside the void, passenger circulation and the glass tunnels holding the two crossing metro lines are clearly visible. Positioned at the void edge (but within the station footprint) are retail areas, a food court, governmental offices, and technical services areas, all bound by a glazed diagrid-structured double curved glass wall.

All retail spaces within the station are planned as landlord fit-out areas with individual open tenancies sitting side by side within. These provide an atmosphere of open marketplace as a mixture between a traditional Souk and European department store layouts.

Ground Level escalators, with stairways between, lead circulation down from all four sides of the void to Mezzanine Level and then Concourse Level. At minus 7 meters, the Mezzanine Level is supported from its perimeter by bridge connections, enabling passenger circulation and access to the retail area beyond the glazed wall, which passes by the void between the Mezzanine Level and its surface. The Concourse Level (at -14 m) is a consistent structural language to the Mezzanine Level above and spans over the crossing metro lines below. This level serves as the division between the fully public, accessible station and that reserved for metro ticket holders.

A bridged structure provides the platforms of Line Two at minus 21 meters, where transfer between lines is also directly accessible through sets of escalators and stairways. At minus 30 meters, it is the lowest underground level of the station and the platforms of Line 1. In addition to the escalators and stairways, four circular glazed panoramic lifts provide access to all levels of the station. Connection is also provided here to the roof garden above.

Olaya Metro Station: an Urban and Architectural Response

Gerber Architekten believe in the importance of public space as a necessity to a successful urban environment. The

design of the Olaya Metro Station serves two functions at the same time; it provides the facilities for a highly frequented transportation hub, and offers a large recreational park and urban plaza to the public of Riyadh. Its unique design of a roof park elevating high above the city forms a clearly recognizable landmark on Riyadh's most prestigious strip, lining up on equal grounds with Riyadh's other building icons such as the Faisaliah Tower and Kingdom Tower. The bright day-lit hall of the station, which combines within one great volume all the functions of the station, offers a highly functional building and a most attractive architectural experience to the residents of Riyadh.



Prof. Dipl.-Ing. Eckhard Gerber
Owner and Founder of Gerber
Architekten.

Gerber Architekten.
© David Klammer



Dipl.-Ing. Thomas Lücking
Management Director Gerber
Architekten international,
Berlin.

Gerber Architekten.
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الهياكل الهندسية المعمارية
المشروع: محطة الرياض
Riyadh Metro

Stephan of the roof



Aerial perspective - Khandamah night shot with the Holy Mosque in Makkah

The Kingdom of Saudi Arabia offers vast opportunities in master planning, residential housing, infrastructure and transportation structures like airports or train stations. Technologies and materials will play a paramount role in implementing most sustainable urban strategies and concepts. It will be exciting to introduce disruptive design innovations to the KSA construction industry. Taking sustainability to the next level, the Lindemann Group keeps on innovating master plans, architecture and urban structures. Developing plus energy houses combined with electromobility will be one of these disruptive innovations and have a great impact on future residential housing.

Khandamah Mountain, Makkah

Lindemann Architects were invited to the Khandamah Mountain international planning competition in Saudi Arabia. But for this most challenging task of designing a new city extension for a population of almost 200.000 inhabitants in Saudi Arabia and due to the incredible size of the project, I asked two Berlin friends and architects to join this mega design adventure in the Kingdom of Saudi Arabia.

Since I launched White Sky Group - Engineering Ventures, we formed White Sky Group - Gewers Pudewill (WSG-GP). After six months of intense design research, modeling, design and urban development, we won this groundbreaking Makkah project. Our team managed to develop the best solution, virtually perfect for the most complex topography and project task we ever experienced, worldwide.

Winning a 91 hectares development in Makkah definitely has been a once in a lifetime project. Award-winning in sustainability, design and construction, the final master plan (2012-2014) integrates various building types including hotels, residential, malls, technical and medical infrastructure, mixed with parks and open spaces as well as spacious prayer areas. The design defines new innovation strategies and mobility, introducing a sensitive and balanced urban matrix. At the same time it represents almost six million square meters GFA in close proximity to The Grand Mosque in Makkah, the holiest site in Islam. The Khandamah Mountain project reflects the cultural heritage of Makkah and Saudi Arabia. It represents a unique and groundbreaking landmark development within the

Community Center, designed as a spiral form with exhibition spaces, auditorium, viewing platform and Cafes



Megaprojects in the Kingdom of Saudi Arabia - Innovationskraft by Nature

Lindemann Architects

Tobias Lindemann is a German Architect, Engineer and Entrepreneur. He is currently the CEO of White Sky Group, Managing Director of Lindemann Architects and invested in different ventures. Lindemann is best known for creating futuristic zero-energy houses with combined electromobility and award-winning megaprojects in the Kingdom of Saudi Arabia:

As architects we have to be masterminds of sustainable change in planning and construction. Our parametric design development and building information modeling (BIM) is only the first step, but a decisive one. The building industry needs disruptive technologies and innovation, I wrote in a Construction Week interview in 2012. „Making a mark“ was the headline of the article on German companies pla-

ying a major role in GCC projects. While the UAE became the largest buyer of German goods in the Arab world, Saudi Arabia leads in terms of the overall trade with Germany. Part of the article was our winning entry (1st prize) of a megaproject competition in Saudi Arabia with an estimated construction volume of € 22 billion and a construction period of 10-15 years at that time.



Conference Center, seen from the cornice, offering spectacular views to Mina and Makkah, Park and Waterfalls

Makkah Vision 2030. Our design builds on a strong urban matrix, identity and branding core, following the clients vision.

The original design concept and winning scheme was judged by a renown jury: “The jury recognises the team’s overall understanding of the site qualities and potentials as well as the cultural, symbolic, and urban values of the city of Makkah. The proposal has most successfully met the site challenges and the jury criteria. The urban morphology and scale have been quite sensitive to the heritage and context of the city in that they provide for a harmonious integration of the development within the existing city fabric.

The proposal skyline does not create an imposition on the city landscape and character. In particular the jury appreciates the proposal’s site accessibility and connectivity with the holy sites and the rest of the city. The “carpet” concept provides an innovative feature that can enhance the human and social dimensions and needs of site users. Moreover, the parcel configuration provides an innovative and practical mechanism for project phasing and imple-

mentation. The jury believes that this proposal stands out for its excellent quality, innovative approach, and immense potentials to make the Khandamah development a unique and value added contribution to the city of Makkah, residents, and visitors.”

Sustainability and innovation is at the core of Makkah Khandamah’s design. The 91 hectares master plan includes infrastructure, outstanding landscape architecture, lighting design, innovative mobility solutions and maximum use of renewable energies. The mostly white façade’s texture and the asymmetry work to reduce wind loads and protect from the intense climate and mechanical loads in Saudi-Arabia. The development represents a next generation Smart City. It offers most innovative architecture, mobility concepts and strategies, guarantees maximum Zamzam water protection and use of all available renewable energies. Additionally, a 100% electrification is intended to minimize further air pollution of Makkah and prevent CO2 emissions close to the Holy Mosque.

The iconic landmark development recognized the sanctity and symbolic identity of Makkah. The phasing

proves a sense of completion in each stage. We developed a unique urban fabric, which can be sustained over time with dramatic views towards the Masjid Al-Haram Mosque, Makkah and Mina. The innovative urban matrix shapes and enhances the visitor experience and responds to residents and pilgrims. It is viable throughout the year, changing mobility gears in peak times. The architecture and design provides creative and practical solutions of accessibility and of the transportation challenges within the site, and between the site and the Masjid Al-Haram Mosque.

Our thanks go to Jadwa Investment, Riyadh, the management team under the patronage of Governor Prince Faisal bin Salman bin Abdulaziz Al Saud, former Chairman of Jadwa, and our local consultants and engineers Al Fayadh in Riyadh for the ongoing trust and confidence they extended to our whole team.

L1 Houses, Riyadh

As BIM and parametric design became our everyday tools, new planning patents will allow us to identify and upgrade synergies between smart components during production and construction. This implies intelligent glazing and photovoltaics, automated appliances and computerized buildings. The goal is to build premium prefab houses, infrastructure and technology with the same

quality promise, German car makers deliver in premium cars today.

When Carl Benz invented the first automobile in 1886, it was the start of a long evolution process in design engineering to create the best product quality. A similar evolution process in architecture and building technology is evident. Lindemann Architects aim to create a fresh generation of sophisticated prefab houses emerging as plus energy architecture. The L1 house is ready to implement into a grid of solar power, wind power, heliostats, photovoltaics, and rain-water collection within a housing grid or compound. Late

L1 Prototyping KSA

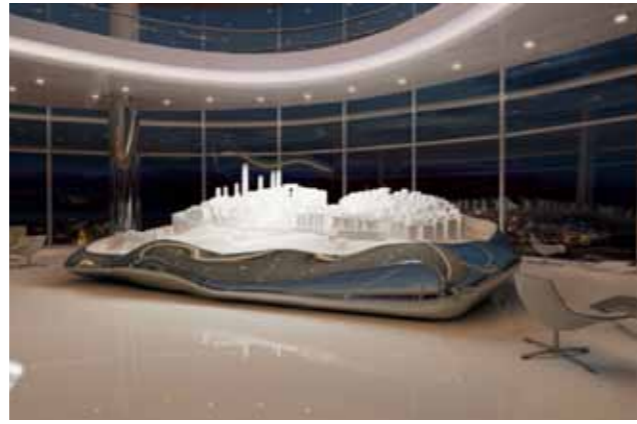


Corniche perspective with open views and access to shopping malls and recreational areas



2012, Lindemann Architects started research and development for the L1 houses. Combined with brand environments and latest technologies of German suppliers, L1 houses integrate holistic planning with fully operating electromobility, gradually upgrading to offer a broader selection of future space frames and modules. The current L1 houses offer more than 350 square meter living and office space, spacious living areas, technology racks and garage modules for the needed number of cars for each household.

The concept integrates all kinds of future mobility, even gyro-copters. The L1 design is developed for the specific temperature and mechanical loads of the GCC climate. Hybrid solar modules generate both heat and electricity, conducting excess electricity to e-cars or feed public or compound networks. Using a future app, clients can customize their own L1 with brand environments and extras for technical devices, interiors as well as colors, glazing and lighting. An integrated panoramic roof as well as the pre-fabricated glazing surfaces and carbon facade modules will allow flexibility and individual customized design. L1 targets LEED Platinum and is build according to European standards.



Sky Tower and Makkah model



Tobias Lindemann,
Dipl.-Ing. Architect, MBA
Founder Lindemann Group

Conference Center, seen from the cornice, offering spectacular views to Mina and Makkah, Park and Waterfalls



King Abdulaziz Health Care Center, integrated in the surrounding green spaces





SYRIA

Country Name: Syrian Arab Republic
Population: 22 million
Land Area: 185.180 km²
Currency: Syian Pound (SYP), 1 SYP = 100 Piaster
Capital: Damascus
Languages: Official: Arabic
Commercial: English & French



Syria, the Future Begins

Euro-Arab Initiative for Reconstruction and Development (EARD)

As soon as peace returns to Syria, millions of refugees and displaced people will return to their homeland. After massive damages to buildings and infrastructure as a result of the conflict, an enormous demand for reconstruction will arise.

Since Syria's uprising began on March 15, 2011 within the context of the „Arab Spring“ protests, the current conflict has been characterized by fluctuating frontlines, destruction, casualties and millions of refugees and displaced people. The conflict is certainly the largest humanitarian crisis worldwide. The negative consequences have been shown in the contraction of the Syrian economy by an estimated 40% since 2011. The unemployment rate is currently at around 53%. Tens of thousands of businesses have been forced to close, leading to the unemployment of approximately 2.67 million people who supported around 11 million dependents. Since the outbreak of the crisis, purchasing power has been declining while prices for food, fuel and medicine have been skyrocketing. The value of the Syrian pound dropped

from 47 Syrian pounds per US Dollar in 2011 to 220 Syrian pounds per US Dollar in February 2014.

Due to the massive scale of damage caused by four years of conflict, electricity generating capacity dropped by over 30%, factories shut down, many schools were reassigned from their primary function of educating children to being used as shelters, while others were closed down because of structural damage. Many hospitals or medical facilities also had to be closed.

Syria will face a tremendous need for rebuilding the destroyed cities all over the country, including residential and community buildings, roads and infrastructure networks,

and supply systems. 45% of the houses in Syria are currently uninhabitable. Around 53% of total houses in Syria are located in and around three major cities; Aleppo, Damascus and its surroundings, and Homs; these are the areas most affected by damage and destruction. In order to get back to the housing status of 2010, Syria would need over 700,000 houses. The estimated cost for rebuilding, restoration and rehabilitation is over US\$11 billion.

Biggest Reconstruction Showcase in the 21st Century

Once peace returns to Syria and refugees and internally displaced persons (IDPs) start returning to their homeland, temporary housing units will be required. Those should be erected around “safe cities”, for example, in the 17 areas deemed „safe“ in the city of Damascus. By our estimates, construction of 141,875 housing units per year would be necessary in order to compensate for the damaged houses. At least 128,180 housing units must be erected to meet the expected demand on houses in the following five years.

These challenges can be met. The European Union’s new strategy earmarks €1 billion for Syria and Iraq, mainly to be used for humanitarian assistance, stabilization and development. The unfortunate development of events in Syria caused considerable damage to almost everything, especially to the construction sector. Boundless opportunities exist for all who are willing to participate in rebuilding the country, in particular when innovative solutions are put forward.

Syria destruction



Euro-Arab Initiative for Reconstruction and Development

The Euro-Arab Initiative for Reconstruction and Development, an association established by German, Austrian and Syrian companies and business partners headed by the German Dorsch Gruppe, will prepare the planning, design, execution, and supervision of the project. As a result of the aftermath of World War II and infrastructure upgrades of eastern Germany after the reunion, German companies in particular have experience in rebuilding a country, including homes, schools, mosques, and local communities.

H. E. Federal Minister of Germany, Mr. Frank-Walter Steinmeier, and Mr. Olaf Hoffmann, President and CEO of Dorsch Gruppe, visited a refugee camp in Lebanon in 2014. People are already registered by the United Nations as displaced persons there, as in many other places both in and outside Syria. Based on the analysis of the demographics and various parameters, the refugees could be relocated according to their previous domiciles, professions and family affiliations. Men should return to Syria first, to begin work on the reconstruction projects, to be joined later by their families. When returning refugees find work and shelter, they can support their dependents and start leading a normal and decent family life.

Simple, Fast, Environmentally Friendly

The aim of the project is to use a simple method to set up shelters that meet the needs of many. The project is a temporary solution that will serve the needs of refugees until lasting solutions are in place. Once the projects have served the purpose of providing the most urgent requirements for sheltering returning refugees, and are no longer needed by others, they can be re-assigned to be used in the agricultural or industrial sectors. Therefore no buildings made of concrete or cement were designed; a clean and environmentally friendly technique was chosen. Buildings made of compressed mud bricks will be constructed using locally sourced materials, thereby avoiding additional costs of transportation. This construction method provides work opportunities for the returning refugees, even for unskilled workers as it depends mainly on physical labor, with no prior experience in construction being necessary. The use of mud bricks has been, and still is, one of the most commonly used building techniques worldwide.

The advantages of compressed mud bricks are obvious. The production costs and the energy requirements are low. This

building method has a high resistance to wind and rain erosion and a minimum surface absorption. The blocks are strong, stable, water-resistant and long-lasting. In addition of being environmentally friendly, this building method can be used with no finishing materials due to shape and color neatness, thereby keeping the construction costs low; and it accepts any kind of finishing material. Mud blocks have a low thermal conductivity and are suitable for hot summers as well as for cold winters. They can be recycled and do no damage to the environment.

Selected Areas

To start the project, three areas in the outskirts of Damascus were selected because of better communication channels and for safety reasons. The three areas are Maraba, Jdeidet Yabous as well as the residential area of the industrial city of Adra. In total those areas could host 12,000 housing units. Jdeidet Yabous, with an area of 447 hectares, was chosen for the first project as basic services like water, electricity and sanitation already reach the property border. It will be the flagship project and will provide a home for 2,400 families. It is planned to invest in about 20 hectares of the area so the population density will be around 600 persons per hectare. As soon as the Jdeidet Yabous project is completed, it will be copied in Maraba and the Adra zone.

The area designed in Maraba includes over 95 hectares whereas 20 hectares will be allocated for building 2,400 units. The residential area of the industrial city of Adra covers 1,800 hectares, of which 60 hectares were allocated for the project. Water, electricity and sanitation already reach the property border. The project will provide homes for 7,200 families. At a later stage those projects will be copied in other Syrian cities.

Design and Recycling Ideas

The aim of each project is to create units with an average requested area of approximately 35 square meters occupied by 5 to 7 persons. The apartments could be single floor, but preferably they should have two or three floors which would make up to three apartments in each unit. An apartment will consist of a kitchen, a bathroom and two bedrooms. The design should be convenient and simple offering a certain flexibility so units could be single or attached.

In parallel to building shelters for returning refugees, the demolition of damaged buildings will take place concurrently, enabling the recycling of construction materials



such as brick rubble, asphalt or concrete break-off. Using new technologies, pollution-free recycling is possible. The materials will be sorted and processed according to their texture. Crushed bricks, concrete granules, asphalt granulate and roof substrates can be processed and re-used on site for rebuilding. This method is economic, cost-efficient and environmentally friendly and will help to meet the enormous need for construction materials.

Hope for the Future

After years of conflict and violence, Syrians want nothing more than to return to their homeland and live in peace and security. As their houses are destroyed or damaged beyond repair, the erection of temporary accommodation will be the first response to mitigate the worst of the homelessness. With German know-how and expertise, the Euro-Arab Initiative for Reconstruction and Development will pave the way in providing not only shelters, but also work for returning refugees and displaced persons. It will make a valuable contribution towards a promising future for Syria and its people.*

Bassel Katabi
Project Director

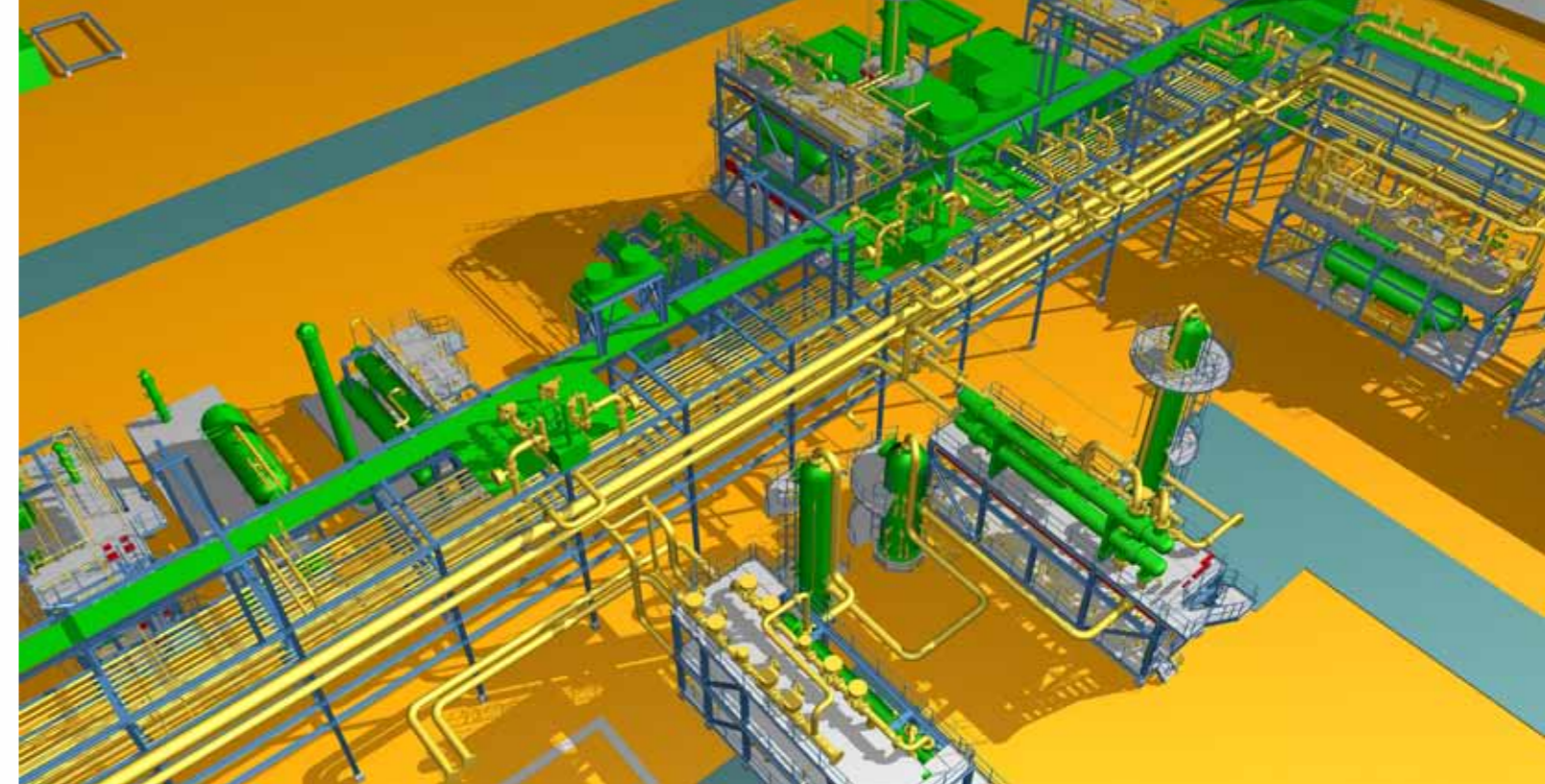
Euro-Arab Initiative for Reconstruction and Development

* This article has been prepared based on recent reports by UN ESCWA and OCHA, and some official statistics published by the Central Bureau of Statistics.



TUNISIA

Country Name: Tunisian Republic
 Population: 10.9 million
 Land Area: 162.155 km²
 Currency: Tunisian Dinar (TND), 1 TND = 100 Millimes
 Capital: Tunis
 Languages: Official: Arabic
 Commercial: French



Process area

Exploring New Gas Fields for Tunisian Gas Demand

MAX STREICHER GmbH & Co. KG aA

In January 2006, huge gas reserves were discovered in Jenein Sud exploration permit in the South of Tunisia. A partnership between ETAP (Enterprise Tunisienne D'activités Pétrolières) and OMV will develop this gas discovery. To operate these gas fields, special plants and a pipeline will be built in the Tunisian desert. It is expected that the produced gas will provide approximately 11% of the Tunisian gas consumption needs.

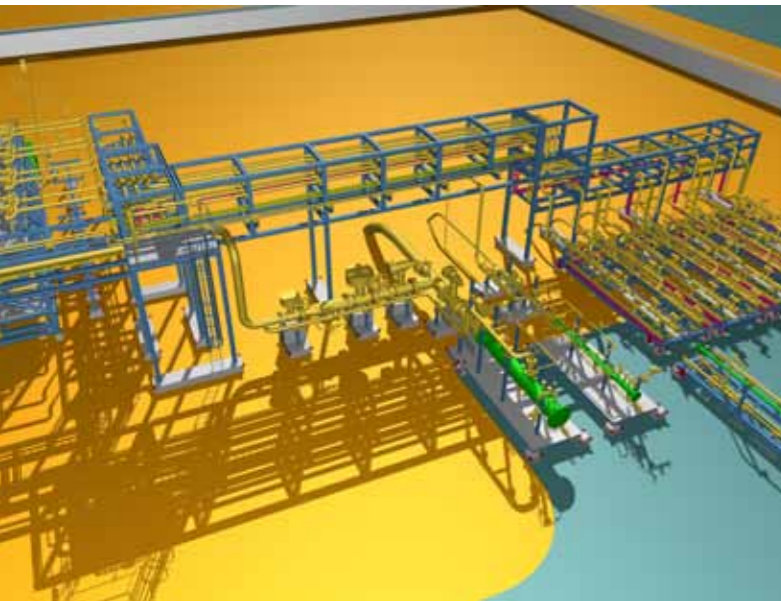
The Nawara gas field is located in the desert in the south of Tunisia. Gas exploration is carried out by nine wells. The gas will be transported to a central gas processing facility (CPF) via a network of 100 km 6" flowlines. There, the gas will be collected and processed for further transport. The gas will then be delivered to a gas treatment plant (GTP) in Gabès by a 370 kilometer 24" pipeline, where further processing and distribution will take place.

The Nawara Development project is a key strategic infrastructure project for Tunisia to unlock South Tunisia's gas resources.

Project Tasks

Within the scope of the Nawara Development Project of OMV Tunisia, MAX STREICHER GmbH & Co. KG aA has been awarded two contracts. The Tunisian company Bouchamaoui Industries LC is the joint venture partner.

The EPCC contract contains the construction of a central gas processing facility (CPF) in the Nawara gas field, as well as the construction of gas pipelines and the development of drilling sites. Furthermore, STREICHER carries out the construction of a 24" pipeline with a length of 380



Flowline area

km, which connects the CPF with the city Gabès on the Tunisian east coast.

Focus on Engineering

Within the first half of the year 2015, mainly engineering works will be carried out. The result of this project phase will influence all following activities and therefore are very important for the project's success.

Because of the complexity of this project, different companies are involved in the engineering process. Integration and coordination is a challenging task. The requirements of the client OMV as well as the environmental (on-site) and legal requirements have to be incorporated at any time into the workflows on the basis of the front end engineering design (FEED). Its requirements and further development within the detailed design have to be integrated in order to maximize the extent of modular manufacturing in own workshops at a later stage. The time frame for detail engineering is extremely short. In order to meet the completion date, the start of module and equipment manufacturing as well as the construction works on site will start as soon as possible.

The most important tasks during this engineering phase are:

- endorsement of FEED design;
- basis of design and development of philosophies;
- HSSE studies and safety case development;

- detail design ready for procurement by preparation of specifications and supporting technical documents;
- vendor vetting;
- detail engineering ready for construction;
- field engineering;
- preparation of final documentation.

General Engineering Approach

The primary objective of the engineering activities is to provide high quality engineering deliverables in accordance with the project requirements. This means that the design shall be conducted in such a way as to minimize the exposure of all involved employees and also public people to hazards, as well as minimize environmental impact on both ground and air and all disturbances during the construction period. In addition, the detail design will ensure the highest possible extent of modularization and prefabrication of process-related equipment.

Engineering Organization

Due to the complexity of this project, a dedicated engineering team will execute the detailed engineering works from the start to the finishing stage and provide assistance during construction, commissioning and start-up. The engineering team of the Joint Venture STREICHER-Bouchamaoui is fully responsible for the complete integrated engineering team and will act as a single interface between OMV and the JV. The engineering manager is assisted by discipline lead engineers. These lead engineers are responsible for the supervision of the engineering outcome and quality deliverables produced by the engineering integration team and all other parties involved in engineering headquartered in various locations.

The engineering integration team will have an overall, holistic view on the engineering design performed on the project. This means that all relevant documents issued for review by any engineering provider shall be reviewed and assessed by the integration team. This procedure will ensure quality standard, add value within detail design and coordinate all engineering providers pro-actively.

Separated Roles During Engineering

For the best performance in engineering, special knowledge and experience will be merged in the integrated engineering team. The joint venture partners STREICHER and Boucha-

maoui split the parts of the engineering scope to the following main engineering providers led by the engineering management team:

- engineering integration, coordination and interdisciplinary functional design for the plant;
- detail design of process modules and wellsite skids;
- design of plant layout;
- detail vendor engineering;
- preparation of HSSE studies and safety case development by an authorized third party;
- involvement of an independent verification body.

Functional Design

Immediately after the endorsement of the feed design, the functional design has to be started for the complete plant including all process modules and utilities. The basis of design and main philosophies will be developed for all disciplines including process, mechanical works and piping, rotating, metallurgy, electrical, telecommunications, safety systems, control and instrumentation, architectural, civil and structural in order to provide an integrated solution.

The functional design will be the basis for further detail engineering and apply to all vendor engineering as well.

Basic and Detail Engineering of Process Modules

In order to guarantee the performance of the plant, the joint venture decided to award detail engineering of all process-relevant modules to a subcontractor. The selected supplier for the main process train of the CPF and the nine wellsite facilities is an international operating vendor with high reputation and experience in oil and gas industry for the design of process modules. The scope of supply of this subcontractor includes all aspects of engineering, procurement and supply for this equipment. The fabrication of the skids will, upon mutual agreement, be conducted in STREICHER workshops to ensure manufacturing in time and the required quality. Moreover, the engineering team will design and position the layout of the equipment provided in a designated area of the overall plot plan of the CPF between the skid modules. This area is considered an internal section of the overall general layout and hereafter referred to as the process train area. Within the engineering of this process train area, the interconnection piping, cable routing and the complete pipe rack shall be included.



Approved Master Document Register shall set the contractual frame to all involved engineering parties!

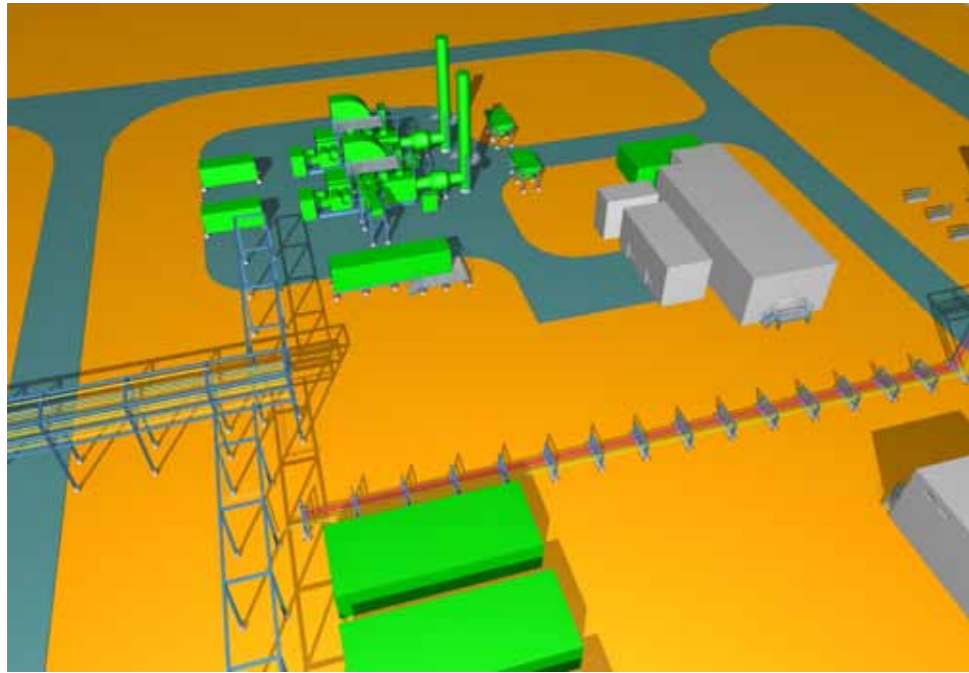
© MAX STREICHER GmbH & Co. KG aA

This refers to design aspects such as layout of skids, piping design, electrical design, control and instrumentation on the skids, valves on the skids or control systems of individual units.

STREICHER will be in charge of the overall layout and provision of 3D-models.

Independent Verification Body

Especially for safety critical elements like fire detection and protection, hydrocarbon gas detection, emergency power and escape, a special independent verification body will be engaged. The scope of work of this authorized institution will specify services, quality assurance and quality control monitoring at various engineering, construction, manufacturing and test facilities wherever work is being performed for this project.



Utility area

Integrity assurance requirements for safety critical elements evolve throughout the life-cycle of any asset. During all project phases — beginning from functional and detailed design over procurement and fabrication/construction to commissioning the establishment of safety critical elements — integrity is the key to success. During the execution of the project, the responsibility for implementing assurance activities is frequently associated with contractors, sub-contractors and suppliers, so it is essential that the contracting strategy and the scope of work in each case, where safety critical elements are affected, is aligned with the requirements of the performance standards.

Engineering Workflow and Cooperation

The quality of the results of the engineering activities has major consequences for all following project phases. The engineering is the basis for the procurement of long lead items, equipment and bulk material. Also, the manufacturing of the different modules as well as the construction activities on site (including temporary facilities) are based on the engineering. After the construction period, commissioning the plant (mechanical completion, pre-commissioning, cold commissioning, hot commissioning, performance testing) and last (but not least) the provisional acceptance/handover of the site as the final step within the scope of the EPCC contract all depend on this first step of the project. In summary, the engineering has significant and major influ-

ence on meeting the project's planned costs, quality and schedule, and therefore, is considered a key success factor.

Project Outlook

The engineering phase is scheduled to be finished by the second half of 2015. Procurement and material management will be carried out in parallel and will last until 2016. The fabrication of the modules and the installation of the construction site will start in the summer of 2015. In the second half of 2016, the new plant will be ready for operation.



Maximilian Hofmann
Managing Director

MAX STREICHER GmbH &
Co. KG aA

We create chemistry that helps thirst love the sea.



By 2025 it is estimated that half of the world's population will lack access to safe drinking water. A sorry state of affairs considering that two thirds of our planet is covered by water. Which is where chemistry steps in. We have developed Sokalan® antiscalant which acts as a scale control dispersant. This means that the equipment that desalts the water can desalt longer, to ensure there is the maximum output of fresh water. When salt water can satisfy our thirst, it's because at BASF, we create chemistry.

To share our vision visit
wecreatechemistry.com/water

150 years

 **BASF**
We create chemistry



UAE

Country Name: United Arab Emirates
Population: 9.2 million
Land Area: 83,600 km²
Currency: UAE Dirham (AED), 1 AED = 100 Fils
Capital: Abu Dhabi
Languages: Official: Arabic
Commercial: English



Aggregate base course

Bringing Visions to Life: Mafraq-Gweifat Highway Project in Abu Dhabi, UAE

Dorsch Gruppe

In March 2014, the Department of Transport (DOT), the authority for transportation in the United Arab Emirates, appointed Dorsch Holding GmbH – Abu Dhabi (DC) to provide consultancy services for the provision of a construction supervision for Section 4B Al Mafraq to Himmem Interchange.

The total construction period of the project is 30 months. It will be handed over with a total construction cost of US\$325 million in 2017.

Mafraq-Gweifat Highway Section 4B Project

The project upgrades the existing E11 Mafraq to Ghweifat road, a two-lane dual carriageway, which runs from Mafraq (located south of the metropolitan area of Abu Dhabi) to

the international border with the Royal Kingdom of Saudi Arabia at Ghweifat in Al Gharbia. The upgrading will be to expressway standards with grade-separated interchanges and limited right-in/right-out junctions throughout the project.

The project comprises six highway sections. Detailed designs for the upgrading and widening of highway sections that total 248 kilometers have been procured by the DOT;



A long tradition of falconry

Al Ruwais Bypass has been designed and constructed on site and is now operational.

The chainage is performed from the west of the existing Himeem interchange (E11 and E65) to the existing Mafrq interchange (E11 and E22). The highway will be upgraded to dual four and includes the construction of three interchanges along the route and approximately seven kilometers of collector-distributor road.

A World-class Transportation System—Reliable, Efficient and Affordable

DC is performing construction supervision, including providing design alterations and modifications, as well as an integrated management plan that meets quality, environmental, health and safety requirements of ISO 9001, ISO 14001 and OHSAS 18001. On completion of the construction of the construction segment, but prior to the opening of the new highway, DC will undertake an opening stage audit as well in accordance of the authorities' requirements. In addition to supervision services, the scope includes monitoring during the defect liability period.

Having completed similar prestigious projects such as AED1.7 billion Dubai-Fujairah Freeway with the appointment of Public Works Authority in UAE, DC is competent in implementing a world-class public transport system that is reliable, efficient and affordable.



Selin Ergur
Business Development
Manager

Dorsch Holding GmbH –
DC Abu Dhabi





Khan Murjan Souk

Siemens Demand Flow™ at WAFI—Saving Energy and Keeping Cool in the Heat of Dubai

Siemens AG

Innovation is the strongest lever to increase energy efficiency and reduce greenhouse gas emissions. In any case multi-faceted technology approach is needed to achieve guaranteed savings of about 30% in Energy as obtained at WAFI, one of Dubai's flagship mixed-use developments.

The WAFI Mall in Dubai, United Arab Emirates, is impossible to miss. Located on Garhoud Road, it is right in the heart of this ever-growing city. With its Egyptian-style architecture, the magnificent building is truly eye-catching. The Pyramid offers countless shopping options that make for a unique experience. But this complex has even more

to offer—a 5-star hotel, a subterranean market (the Souk Khan Murjan), a wellness oasis, and many other attractions. It goes without saying that the thousands of people that enter and leave the building every day do not want to think about building technology. It is expected to run smoothly, especially in the heat of Dubai.

The Challenges

Opened in 1991, WAFI is MKM Commercial Holdings LLC Group's flagship mixed-use development. According to the Intergovernmental Panel on Climate Change (IPCC), the UAE is currently experiencing extreme weather conditions. "The climate in the Middle East will become hotter, drier and less predictable," said Habiba Al Marashi, Chairperson of Emirates Environmental Group (EEG).

With the changing climate comes the need to ensure buildings and its occupants are kept cool and comfortable. However, one of the biggest challenges we face in the 21st century is the rising cost of energy. Buildings currently account for 40% of energy consumption in most countries, so it is not surprising that governments and building owners alike have been looking for solutions to lower their energy consumption. Special attention is also paid to the heating and cooling system, which consumes the most energy within a building. The challenge is more palpable in Dubai, where high temperatures require more cooling and consequently, higher costs.

Why Siemens Demand Flow™ was the Right Fit

Siemens Demand Flow™ uses variable frequency drives controlled by software integrated into the building automation and control system to allow chiller plant optimization. The variable frequency drives—assigned to all constant speed motors such as condenser pumps, chilled water pumps and cooling tower fans—enable the production of chilled water in accordance with demand, rather than at a constant rate. This reduction of flow in periods of lower demand saves energy and reduces operation and maintenance costs over the lifecycle of the plant.

"Siemens Demand Flow™ is an extremely powerful solution," says Koen Bogers, Head of Building Technologies for Siemens UAE. "Specially developed algorithms use variable frequency drives to maintain optimal differential system pressure, reduce excessive pumping energy and equipment runtime, and to increase deliverable tonnage on systems suffering with a diminished refrigeration effect. Importantly, the system does not require the installation of costly variable frequency drives on chiller compressor motors."



Wafi Mall phase 5 Roman entrance

The outcome of the Demand Flow approach is significant achieve energy savings in five major areas of a chilled-water system: cooling towers, condenser pumps, chillers, chilled-water pumps, and air-handling units.

“The strength of this solution is that we can absolutely guarantee energy savings by taking a holistic view of the whole plant,” says Bogers. “Crucially, this approach ensures that energy is not simply shifted from one plant subsystem to another, as in some other energy conservation methods for chiller plants on the market. Post-implementation of the Demand Flow Concept provides measurement and verification for the total energy consumption of the plant, including each individual subsystem, and provides an accurate report for the whole facility.”

Completely chiller agnostic, Siemens Demand Flow™ is not specific to any one manufacturer and does not void equipment warranties. Once commissioned, the system is fully automatic, with the Siemens Demand Flow™ Controller automatically optimizing the whole chiller plant. Typically, access is available through a graphical user interface, and plant managers are also able to use the web-based service platform Navigator from Siemens to monitor chiller plant system performance from anywhere in the world. This plat-

form is also responsible for the accumulation of data, reporting of energy profiles and detailing equipment operation parameters.

Uncompromised Performance

“Over the past twenty years we have seen millions of visitors and Siemens has been there all the way. So when we were looking for innovative solutions to reduce the energy consumption in our facility, we had to look no further than Siemens,” said Ian Kitching, General Manager, Building Services Division, WAFI property.

The compelling value proposition that convinced WAFI that Siemens Demand Flow™ was the right fit include:

- guaranteed energy cost reduction; attractive financial indicators in terms of 37% IRR and 2.5 years payback;
- total upgrade of underperforming Central Chilled Water Plant 1 controls with Siemens Desigo Insight;
- upgrades on the demand side leading to improved plant redundancy and service levels;

- last but not the least, high level of trust and proven track record of Siemens Solutions and the local team.

Powerful Solutions, Proven Results

Siemens has successfully implemented its technology in more than 160 facilities worldwide, including hospitals, office buildings, data centers, hotels and resorts, universities, and manufacturing and industrial sites. The installation of Siemens Demand Flow™ in WAFI was completed in June 2014.

“Currently this project is in the measurement and verification phase, which means we monitor the plant’s performance over the course of a year to determine the energy savings on the previous year’s consumption.” says Bogers. “So far, the analysis is indicating that energy savings on the installation will exceed our initial estimates, which is a very pleasing result.”

“Demand for cooling in this region is high and also seasonably variable. Systems are designed for peak load during summer, and the rest of the time they are under partial load conditions; this is when Siemens Demand Flow™ can really make a difference,” he says.

Some of the major highlights of this project include the energy optimization of Central Chilled Water Plant-1 which was the first LEED-Gold rated District Cooling Plant in the Middle East region. Siemens Demand Flow™ also guarantees an energy reduction of 30% in WAFI without compromising occupant comfort.

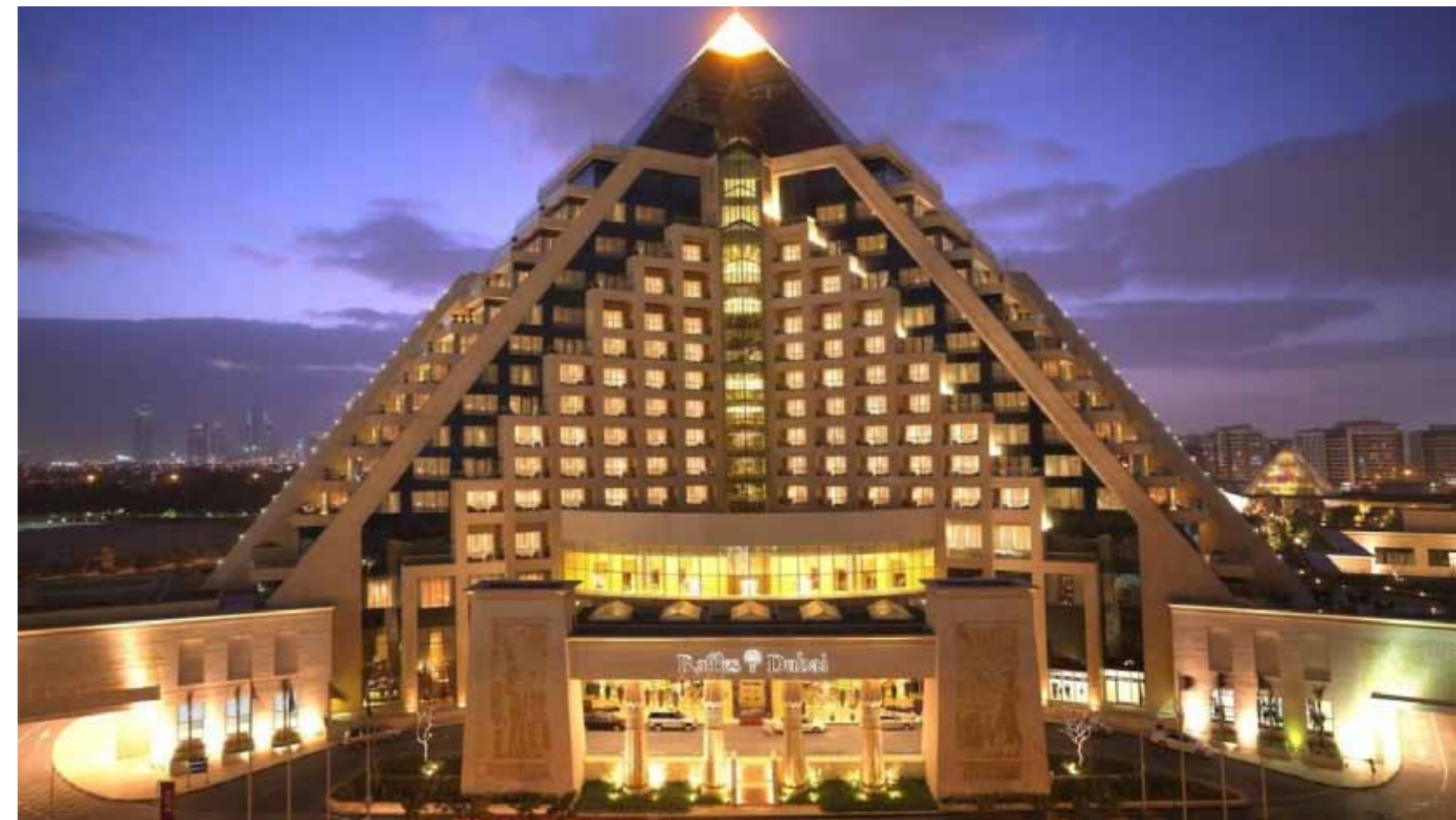
“Ever since the installation of Siemens Demand Flow™, the indoor environmental quality and visitor experience has improved,” added Kitching. With cooling making up a significant proportion of regional electricity demand, Bogers is confident that the technology is perfectly suited to the Middle East.



Koen Bogers
Senior Executive Vice President
Building Technologies Siemens
Middle East and UAE

Siemens AG

Raffles hotel Dubai



SPECIAL TOPICS



We serve clients in the Middle East since 15 years

Dispute Resolution in Construction Projects

Alexander & Partner

Construction disputes are fairly common, and they vary in their nature, size, and complexity. In fact, construction disputes are among the most common among arbitration proceedings.

Furthermore, the complexity of a contemporary construction project, which requires the orchestration of numerous interdependent components including information, materials, tools, equipment and a large number of personnel working for independent engineers, contractors, and suppliers, add to the complexity of the disputes arising out of or in relation to them.

When not resolved in a timely manner, arbitration disputes can consume considerable resources in terms of finances, personnel, time, and opportunity costs. The apparent expenses (e.g., costs of attorneys, expert witnesses, the dispute resolution process itself) alone are significant. Although difficult to quantify, the less visible costs (e.g., company resources assigned to the dispute, lost business opportunities) and the intangible costs (e.g., damage to business relationships) are also considerable.

Innovative Methods of Dispute Resolution in the Construction Industry

Over the past decades, the construction industry has made remarkable progress in developing more efficient methods of dispute resolution. In fact, experts frequently refer to the construction industry as being on the innovative edge in this field. However, in particular, the issue of dispute prevention appears to not have been the focus of the construction industry; dispute prevention mechanisms are frequently disregarded when drafting construction contracts and dispute resolution clauses.

Current practice in construction dispute resolution generally reflects one of two perspectives: that one resolution method fits all disputes; and that dispute resolution offers a selection of independent stand-alone choices. Still, it is



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more effective to approach dispute resolution in a more analytic manner similar to, for example, a medical professional—first diagnose the problem, and then select the least invasive procedure that will correct it. Cost-effectiveness and timeliness are critical factors for dispute resolution, in particular in the construction sector. Therefore, a flexible framework – a strategic approach to dispute prevention and resolution that employs a neutral advisor, early intervention and the ability to tailor the resolution method to the particular nature of the dispute—offers a more effective method of dispute resolution than the static mechanisms currently dominant in the construction industry.

A number of different alternative dispute resolution methods are frequently utilized in the construction industry. The more common methods are:

- negotiation—a provision requiring the entities directly involved in the dispute to seek resolution through direct negotiation is frequently included in construction contracts;
- dispute review boards—such dispute review boards typically consist of one or a number of neutral experts who visit the site periodically in order to monitor

potential problems. The parties can authorize the board to, upon their request, conduct informal meetings on an arising dispute and issue an advisory opinion that is not binding for the parties but may be used by them as a basis for further negotiations;

- mediation—is a forum in which an impartial person, the mediator, facilitates communication between parties of a dispute to promote reconciliation, settlement or understanding among them;
- arbitration—is a forum in which each party to a dispute and its counsel present the positions of the parties before an impartial third party, who renders a specific award.

The prevalence of construction disputes indicates that the current approach to dispute resolution is not effective enough. First, construction contracts tend to address dispute resolution by specifying the resolution method(s) to be used. Second, dispute resolution methods are too frequently viewed as a selection of stand-alone choices. What construction contract and the persons drafting these frequently overlook is that dispute prevention and dispute resolution methods can be effectively combined into more comprehen-

sive dispute prevention and resolution processes, where the benefits of synergy can be exploited to successfully prevent or resolve the dispute. Such comprehensive processes may comprise three stages.

Three Stages of Preventing or Resolving a Dispute

The first stage addresses prevention. To successfully prevent disputes in construction projects, it is vital to understand the particulars of the specific project. In this regard it may be prudent to involve an impartial third party, i.e., a dispute review board, throughout the life of the construction project. Such a dispute review board adds value by assisting the parties in the development of applicable dispute prevention techniques, which include:

- risk assessment and allocation, including detailed project scope definition;
- partnering, including creating a set of common project goals;
- contract clauses that outline a flexible framework for dispute resolution.

The success of a construction project and the prevention of disputes depend heavily on proper risk assessment and allocation. Inaccurate risk assessment or a lack thereof can result in significant changes and rework, resulting in added costs and delays. Detailed project scope definition is a major component of risk assessment, in that scope changes pose a threat to the project's success. Changes frequently lead to (sub)contractor claims, and while a certain number of changes are inevitable in a complex project, the author's experience indicates that thorough project scope definitions prior to the start of detailed design avoid a large number of changes. A well-defined project scope allows the client or main contractor to effectively communicate his desires to the (sub)contractor and provides him with the information needed to execute the project to meet the client's/main contractor's requirements.

Inter-party Negotiations

The vast majority of disputes are resolved by inter-party negotiations without external intervention. Where inter-party negotiations fail, construction contracts commonly offer the parties only one option: to seek dispute resolution through third parties, usually by way of litigation or arbitration. Still, not every dispute that cannot be resolved by

We have a strong basis in Germany



the parties themselves requires a binding decision by a third party for resolution. As litigation and arbitration are often costly and time-consuming, it is advisable to first engage more flexible methods. At this stage, the involvement of a dispute review board adds value as such a board may conduct informal meetings to assist the parties in resolving the dispute in a timely and efficient manner before it escalates to a point that severely impacts the project. By issuing advisory opinions rather than binding decisions on the arising dispute, such a board can assist the parties in finding a basis for more focused negotiations.

The most visible benefits of this early stage dispute resolution method are its lower costs and timely resolution. In addition, assisted negotiations do not interrupt a construction project in the same manner as litigation or arbitration usually would and helps to maintain good relations between the parties.

Arbitration vs. Litigation

Nonetheless, some disputes cannot be resolved by negotiation. Therefore, a comprehensive dispute resolution framework has to include means to resolve these disputes such as mediation, arbitration or litigation. Still, in particular in complex construction disputes, understanding the construction industry and construction disputes is vital for advising and deciding on such disputes. While the parties may choose counsel who has such understanding, the parties do not have the option of selecting judges in litigation procedures. In this respect, arbitration offers an advantage. It allows the parties to choose arbitrators who have experience in construction disputes. Thereby, choosing arbitration over litigation as a means of dispute resolution may provide the parties of a construction dispute with higher quality decisions.

Best Solution: a Combination of Multiple Dispute Resolution Methods

These dispute prevention and resolution tools are not to be understood as a one-fits-all standard, but rather a selection that may be shaped to fit the specific requirements of the individual project. To do so, special attention must be paid to the construction contract's dispute resolution clause. It should combine multiple dispute resolution methods and provide for different stages of escalation. At the least, it should combine requirements to attempt to resolve disputes through negotiation with dispute resolution through third



We know the Middle East

parties. Thus, the dispute resolution clause should provide that the parties are required to seek dispute resolution through direct negotiation. At the second escalation stage, the clause should determine that where a resolution cannot be reached through negotiation within a predetermined period of time, the dispute should be referred to a third party for resolution, usually through mediation or arbitration. To provide further flexibility, the dispute resolution clause can stipulate that prior to resorting to arbitration, the parties are required involve a dispute review board that participates in the negotiations between the parties and provides suggestions for the resolution of disputes. Furthermore,

the parties may be committed to submit to mediation prior to filing a request for arbitration.

In summary, the proposed framework offers multiple benefits. It provides a comprehensive system that emphasizes prevention and collaborative resolution. In addition, it encourages resolution close to the source of the dispute, involving the parties in a participative, relationship-preserving process. Furthermore, through involving a third party, i.e., a dispute review board, at an early stage, it provides continuity regarding dispute prevention and resolution. Finally, it limits the cost and time required to resolve disputes.



Nicolas Bremer
Rechtsanwalt/
Attorney at Law

Partner
Alexander & Partner



BASF enabled the construction of the world's tallest building, the Burj Khalifa in Dubai

Creating Chemistry for a Sustainable Future

BASF Middle East

At BASF, we create chemistry—and have been doing so for 150 years. As the world's leading chemical company, BASF combines economic success with environmental protection and social responsibility. Through science and innovation BASF enables their customers in nearly every industry to meet the current and future needs of society, in the Middle East and beyond.

What started as the Badische Anilin- und Soda-Fabrik (in English: Baden Anilin- and Soda Factory) for dye production, has successfully evolved to become the world's leading chemical company with more than 113,000 employees, six 'Verbund' (meaning 'integrated to the maximum degree') sites and 376 additional production sites worldwide.

The Middle East plays an increasingly important role in our ongoing expansion plans, and the UAE is BASF's sub-regional head office and a growing service platform for the Middle East. Our growth strategy is driven by our innovative products and solutions that contribute to conserving resources, ensuring good nutrition and improving quality

of life. We seek to leverage our leading position as an integrated global chemical company to create opportunities in the UAE, Egypt and Saudi Arabia in particular. Accordingly, we aim to establish the Middle East as another of our core geographies, and are proud to announce that we are close to 1,000 hires across the region.

Focus Industries

Chemistry has a central role to play in addressing key future challenges of our society—globally and in the Middle East. BASF makes important contributions with its comprehensive portfolio of innovations that range from

chemicals, plastics, performance products, crop protection products as well as oil and gas products and services.

In addition to oil and gas, construction is one of the most dynamic sectors in the Middle East. The BASF Construction Chemicals division offers advanced solutions for new construction, maintenance, repair and renovation of structures. Its comprehensive portfolio under the Master Builders Solutions brand is a great example of the lasting impact of BASF in the region.

We delivered a wide range of innovative solutions that have been utilized extensively in some of the most prestigious projects to date. For example, BASF enabled celebrated success with the MasterGlenium® Sky at Burj Khalifa and supplied 2.4 million cubic meters of concrete used in the construction of Dubai International Airport Terminal 3. We believe BASF will continue to celebrate success with our partners in the surging property and housing sector.

Celebrating 150 Years of Innovation

In 2015, we are celebrating our 150th anniversary, marked by a legacy of innovations that have influenced how we live today. And we continue to create chemistry for a sustainable tomorrow, guided by three major questions on the future: What will the cities of the future look like? Where will the

energy we need come from? How can everyone have access to healthy food?

Chemistry has a central role to play in addressing key future challenges of our society. Through science and innovation, we enable our customers in nearly every industry, and have been doing so for almost six decades in the Middle East. In addition to our solutions to foster energy and resources, the company successfully runs three other business entities in the plastics, agro food and feed as well as construction industries.

We Create Chemistry for a Sustainable Future

As the world's leading chemical company, we combine economic success with environmental protection and social responsibility. We support our customers around the globe in nearly every industry in meeting the current and future needs of society. We have summed up this contribution in our corporate purpose: "We create chemistry for a sustainable future".

And this mission is reflected in our legacy of providing innovative solutions that touch upon every aspect of life—from the invention of Styrofoam, indispensable to efficient home insulation and safe packaging, to audio tapes and synthetic ammonia, developed to feed billions of people. BASF

The BASF Middle East team in action



has been seeking and finding solutions to global challenges since its founding.

For example, we are the pioneers in developing biodegradable plastic. We came up with the idea of converting sea water to fresh water using ultrafiltration processes that work on nanotechnology, which are also very energy efficient. We invented special filters for wastewater treatment plants, and we help food crops grow more productively in hostile conditions.

Finding Solutions to Regional Challenges

By 2030, experts estimate global demand for water to be 40% higher than it is today, and water scarcity presents serious challenges, impacting everything from food production to broader economic and societal development. Accordingly, water scarcity is one of many challenges atop the regional agenda.

The region at large has scant rainfall and consequently relies heavily on desalination. BASF Water Solutions is the leading provider of 'inge ultrafiltration technology', a membrane process used to treat drinking water, process water, wastewater and sea water. Our advanced desalination solutions such as the antiscalant Sokalan® have a significant market in the region and we are committed to share our knowledge and products to help prevent pollution in areas where water is scarce.

BASF is also a reliable partner to the agriculture industry, offering tried-and-tested innovative fungicides, insecticides and herbicides in the area of crop protection. Our products and services help farmers improve the yield and quality of their products; we are confident that BASF's crop protection solutions will continue to find high uptake in a region where agriculture is carried out through complex mechanisms.

The needs of society have changed since 1865—BASF and its business operations have changed as well, but research and innovation remain our keys to success.



Landmark of economic growth, Khobar water tower



BASF kids lab—a valuable lesson in chemistry



Florian Krueckl
Managing Director BASF FZE
& BASF Middle East LLC

Head of Business Center
Platform Middle East

BASF Middle East Regional Headquarters in Dubai



The Project Management Office (PMO) Approach

THOST Projektmanagement GmbH

Motivated by a Cabinet's Decision issued in 2013, Saudi Arabian government entities have to focus on improving their project delivery by means of time, within budget, to scope, to quality standards, and with the intended benefits. One approach to successfully meet such requirements is to establish a Project Management Office (PMO).

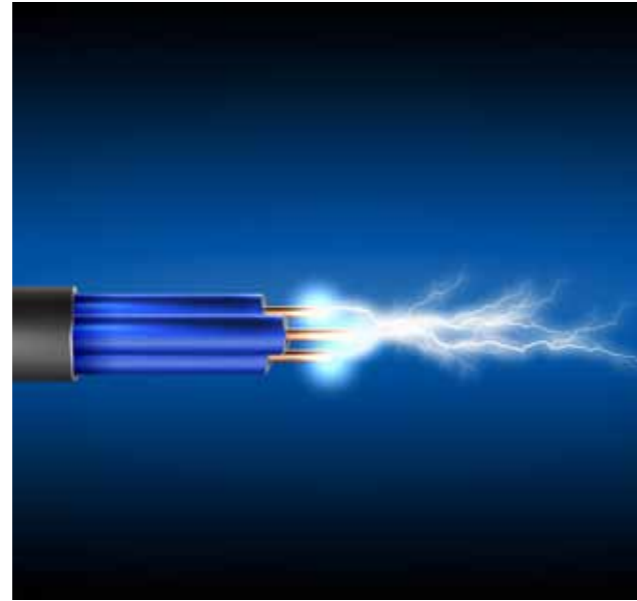
Being newly introduced to the public sector, the PMO is rapidly becoming the preferred approach by ministries and public bodies. Hence, the question of how to successfully implement a PMO within a governmental body is of interest. To be effective, a PMO must "fit" the organization, taking into account its specific enterprise environmental factors. This article discusses the main elements of designing a successful PMO for Saudi governmental entities.

Revolution of Projects within the Kingdom

Population growth, dynamic economic development and investment programs for massive infrastructure to serve

the population's needs are driving a significant number of development projects in the Kingdom of Saudi Arabia. The Riyadh Metro, New Jeddah Airport, Haramain High Speed Rail, Dammam Transport System, King Abdullah Sports City, and Economic Cities are examples of such infrastructure projects that have been implemented in the past years.

Saudi governmental entities are currently in charge of planning, procurement, supervision and controlling of massive development programs and complex mega-projects. However, not all entities could be prepared for managing and controlling such projects and portfolios. Delays in project completion, budget overrun and quality issues are noted.



The Responsibility of Project Governance and Control

In 2013, the Saudi government announced the Cabinet Decision No. 260. This sparked a change in the approach of managing public projects: Understanding the positive effect of proper and efficient project management, this decision is urging implementation of necessary organization, standards, processes, and systems to manage and control projects efficiently. A newly established committee that belongs to the Royal Court is in charge of supervising and evaluating the extent to which the decision is being implemented within governmental entities.

Following global trends, many entities decide to optimize their responsibility of project governance and control by establishing a Project Management Office (PMO) within their organization.

Systematic Approach: The Project Management Office (PMO)

PMO is an approach that has been increasingly adopted by several public and private sector organizations over the world since the past decade. The PMO approach claims to deliver added value to an organization by improving its performance in project delivery.

Several project management institutes such as PMI, IPMA, etc. recommend frameworks to constitute a PMO. The PMI

defines the PMO as “a management structure that standardizes the project-related governance process and facilitates the sharing of resources, methodologies, tools and techniques.”

There are several types of PMO structures, each varying in the degree of control and influence they have on projects within the organization.

Following such definitions, the PMO is not limited to an IT tool or system, but it is actually an organizational change in many aspects: business culture and organization, skills management, processes, methodologies, and systems. Such change needs to be well planned and trained for to secure successful implementation.

In order to understand the level of maturity a selected organization has adopted in the deployment of project management methodologies, the PMI “Organizational Project Management Maturity Model” (OPM3) can be applied. OPM3 assessment metrics can be used to plan and control the process of implementing a PMO.

Trends in PMOs

Globally, PMOs are increasingly used as a primary organizational design strategy for improving project delivery, organization efficiency and accountability. Recent surveys in both public and private entities have shown increa-

sing positive correlation between PMO maturity and higher performing projects leading to organizational success. Having well-defined PM methodology implemented through a PMO is becoming a main differentiator between project-driven organizations that deliver high results from those that do not.

Organizations with a successful PMO in place tend to shift more control and responsibility towards the PMO to further optimize the positive impact such involvement has on project delivery performance.

One major trend remains the shift from viewing a PMO as a cost center to a potential profit center within an organization. Such shift is positively affecting the increase in the establishment of more PMOs in both private and public organizations.

PMO and the Public Sector—the Specific Challenge

The implementation and maturity of PMO structures in the private sector are still higher than in the public sector. Being more efficiently implemented in the private sector, government PMOs are more likely to face the threat of closure. Adapting success factors of private sector PMO implementation to public sector applications is therefore crucial transfer expertise.

The implementation of PMOs in the public sector will face several challenges that could be different to those faced by

private sector PMOs. Among the top aspects are:

- managing resources across conflicting needs;
- obstacles to track compliance with standards and PM methodology;
- difficulties in influencing the complex organizations;
- a larger set of existing standards to be handled.

Moreover, Ministries that are not involved in project delivery themselves (usually done by a contractor or a consultant) are faced with significant documentation requirements. As sector-specific challenges, the mentioned aspects are at the same time fields to be optimized by PMO activities. It is worth the challenge.

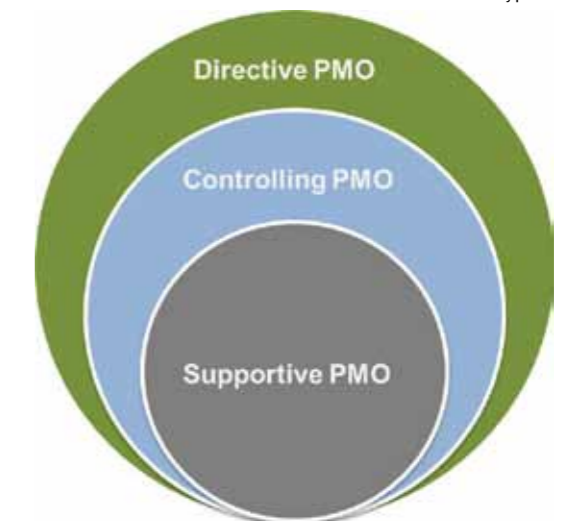
PMO Approach

PMO Design Criteria

The adequate PMO model to be implemented within an organization depends on several factors related to:

- the organization itself (type, size, structure, geographical spread, etc.);
- the project portfolio (value, number, complexity, etc.);
- the intended PMO’s role (function/type, organizational level, influence, authority, etc.)

Types of PMO



- **Supportive (only)** PMOs provide a consultative role to projects by supplying templates, best practices, training, access to information and lessons learned. This type of PMO serves as a project repository.
- **Controlling** PMOs provide support and require compliance by adopting project management frameworks or methodologies, using specific templates, forms and tools, or conformance to governance.
- **Directive** PMOs take control of the project by directly managing the projects.



Organizational change is always influenced by the change resistance within existing structures. Therefore, change by introducing a PMO must be associated with a strategic plan of implementation integrating the employees step by step

through know-how transfer and training in addition to purposefully equipping them with the required methodologies, skill sets and tools.

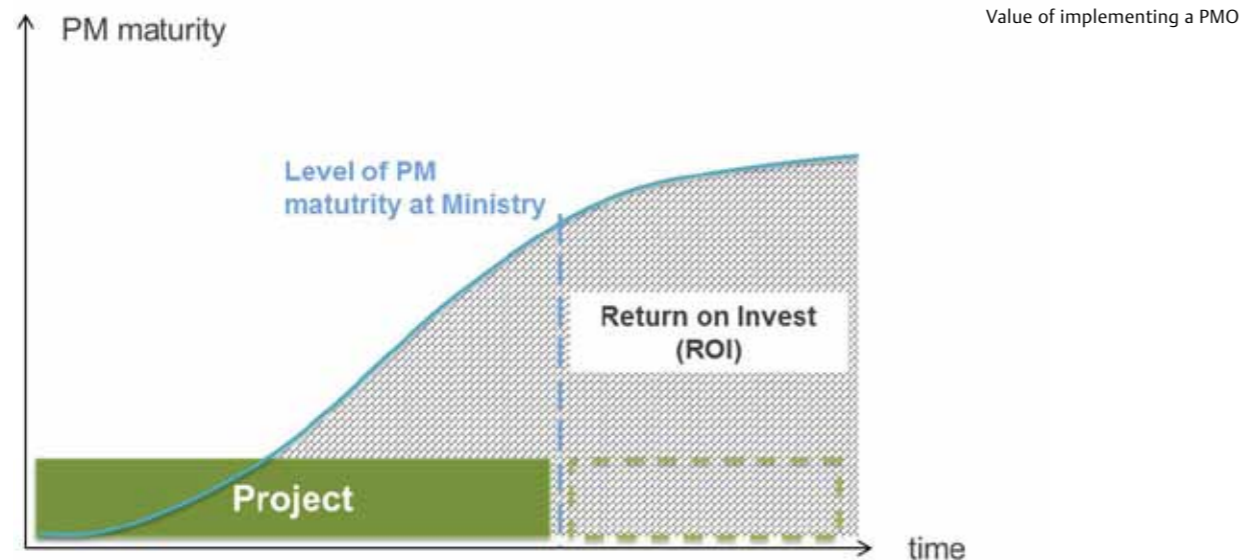
Measure the success

There are obvious quantitative success metrics for PMO impact in the outcomes of project delivery such as adherence to delivery dates and budgets. However, there is no standardized set of KPIs that measures the general success of a PMO within any given organization. Each organization must define its own measurement methodology (set of KPIs) to secure sustainable supporting performance of the PMO.

Delivering an efficient PMO within an organization should be done by experts and specialists in the fields of project management, organizational design and IT. Only such a mixture guarantees that all success-critical aspects are covered and required expertise and know-how can be transferred to the organization.

PMO Implementation

The process of designing and setting up a PMO for public sector entities is a multi-disciplinary process of applying standards to a certain extent while considering organization-specific aspects through implementation of customized solutions. The combination of standardized (as much as possible) and customized (as much as needed) partial solutions is the success-critical measure to be managed.



THOST Project Management has recently developed a PMO Implementation Toolkit addressing the above-mentioned needs. It's a prepared program for establishing a PMO within organizations according to the highest international standards to empower the targeted organization to operate and self-improve their PMO in a sustainable manner.

This program—planned as a project itself—follows a phased approach:

1. Study phase

Analyze existing processes, organization, project's portfolio, specific conditions and perform a gap analysis. An OPM3 assessment might be a standard to follow.

2. Concept phase

Develop a specific technical concept for PMO methodology, roadmap for implementation, know-how transfer and capacity building.

3. Implementation phase

Establish the PMO including governance, standards, processes, systems; provide training based on approved concept.

4. Operation, Monitoring and Control phase

Monitor, control, coach and audit the operations for continuous improvement and sustainability.

With focus on public sector needs, this program was prepared in order to help organizations reach the highest efficiency in applying PMO methodologies and achieve the desired project management maturity with a sustainable operation and improvement.

The Value of PMO

For a Ministry in the Kingdom of Saudi Arabia in the infrastructure sector, the value of implementing a PMO for a major sector of its responsibility was calculated by means of commercial Return on Invest (ROI) through optimized project delivery. Based on an implementation duration of 36 months, a possible ROI factor of 16.3 could be realized by implementing the PMO to help save billions in investment cost.



Dipl.-Ing. Oliver Thost
Shareholder, Management Board

THOST Projektmanagement GmbH, Germany



M. Sc. Faisal Aljehani
Project Engineer

THOST Project Management Arabia, Jeddah



Mohamad Tarhini
Consultant

THOST Project Management Arabia, Riyadh

BUILDING BRIDGES BETWEEN GERMANY AND THE ARAB WORLD



Ghorfa
Arab-German Chamber of Commerce and Industry e. V.
Garnisonkirchplatz 1, 10178 Berlin, Germany
Phone: +49 30 278907 - 0
Fax: +49 30 278907 - 49
Email: ghorfa@ghorfa.de
Internet: www.ghorfa.de

Ghorfa Arab-German Chamber of Commerce and Industry

About us

The Ghorfa Arab-German Chamber of Commerce and Industry is the competence center for business relations between Germany and the Arab world. It was founded in 1976 and since 1 August 2000, it is located in Berlin. The Board of Directors and the Executive Board equally consist of German and Arab members. This guarantees balance and mutual trust. Not only major German and Arab enterprises are among our members, numerous small and medium-sized enterprises complete our top-class network.

Our network

The Ghorfa operates under the umbrella of the General Union of Chambers of Commerce, Industry and Agriculture for Arab Countries and represents all Arab Chambers of Commerce and Industry in Germany. Our chamber works closely with the Arab embassies in Germany, the Arab League and related governmental bodies in the Arab states. It is part of the worldwide organisation of Arab foreign Chambers of Commerce and Industry. The Ghorfa cooperates with German governmental bodies on federal and regional level and the most important German industrial associations.



What we do

We actively promote and strengthen business relationships among our members and within the wider Arab and German business community. We pave the way for stronger business cooperation in the fields of trade, industry, finance and investment between Arab and German business partners. Strategic partnerships based on mutual benefit and understanding create new business opportunities to facilitate economic benefits for both sides. We therefore mainly focus on networking, communication and on providing information about relevant economic and industrial developments.



Building Bridges between Germany and the Arab World

Networking

- Quick access to decision-makers from industry and politics
- Organisation of delegation visits
- Organisation of events, conferences and further contact platforms (e. g. German-Arab Business, Energy, Tourism, Health, Education and Vocational Training, Forum)
- Ghorfa joint booths at major Arab and German trade fairs
- Promoting member services and products to a wider business community

Consulting

- Connecting with matching business partners
- General and business-related intercultural consulting
- Country and branch specific analysis
- Mediation and arbitration in cases of business disputes
- Advice and guidance through the multitude of offers and competing products on the German and Arab market
- Comprehensive and detailed market information about Germany and the 22 Arab states
- Visa support and commercial document services

Information

- Early information about projects and tenders
- Monthly issued Arabic and German newsletters
- Quarterly bilingual business magazine SOUQ
- Arab-German Business Directory providing over 6,000 yearly updated company profiles
- Arab-German Yearbooks that focus on industry-sector specific topics
- Information on the latest economic developments, markets and sectors, legal and political background



information concerning membership in our chamber please contact us:

Ghorfa

Arab-German Chamber of Commerce and Industry e. V.
Garnisonkirchplatz 1, 10178 Berlin, Germany
Phone: +49 30 278907 – 0 | Fax: +49 30 278907 – 49
ghorfa@ghorfa.de | www.ghorfa.de



CONTRIBUTING COMPANIES AND INSTITUTIONS

IVETCOS

INTERNATIONAL BUSINESS & INVESTMENT SOLUTIONS

IVETCOS GROUP
Leitzstr. 45,
70469 Stuttgart,
Germany
Phone: +49 711 49066339
Fax: +49 711 5 490-66-341
Email: info@ivetcos.de
Internet: www.ivetcos.de

Further offices in Germany and Russia, partner offices in the EU and CIS.

IVETCOS Group

IVETCOS Group headquartered in Stuttgart, Germany is an internationally operating company in the fields of real estate services and investment. We are actively working in Germany, Austria, Switzerland, Russia and CIS. The company has offices in Germany and in Russia and works closely with partners worldwide. We are continuously adapting our services so that they meet the specific needs of our exclusive clients. We provide strategic advice and execution for property investment, project management and controlling; legal support; financial support and development services.

Our investment consulting starts with preparing an individual investment or sales strategy, which builds on customer requirements. We are able to give reliable indications regarding the intended implementation success at an early stage and apply our approach in the property procurement promptly and confidentially. IVETCOS also develops own projects such as construction of business and luxury hotels as well as commercial real estate.

Internationally IVETCOS is working with a couple of preferred funds and banks in terms of co-investments. Our multilingual team of experts has extensive experience in developing and managing real estate projects. In order to offer our clients the best solutions, we are working together with the most qualified specialists from design planning, construction, legal areas, asset management companies, international hotel chains, and providing properties.

Services:

- target investment in Germany, Austria, Switzerland and Russia
- real estate development projects
- consulting and support in all real estate aspects
- location profiles and market analysis
- support for the acquisition (legal, financial, etc.)
- implementation of exit solutions



Commercial real estate in the best locations



Business and luxury hotels in the best locations

K O H N E N P A R T N E R

Law Firm LLP

Head of Company: Dr. Dominic Kohnen

Year of Foundation: 2000

KOHNEN Partner Law Firm LLP
Kaistraße 13,
40221 Düsseldorf,
Germany
Phone: + 49 0211 2109404-0
Fax: + 49 0211 2109404-49
Email: duesseldorf@kohnenpartner.de
Internet: www.kohnenpartner.de

KOHNEN Partner Law Firm LLP

KOHNEN Partner LLP, an internationally working law firm based in Germany, was founded in 2000 by Dr. Dominic Kohnen.

KOHNEN Partner LLP is specialized in international construction law. We provide legal service and advise on the implementation of your projects in each phase.

So far we have worked in countries like Qatar, Saudi Arabia, Jordan, Northern Iraq and the UAE to name the most important.

We are confidentially working together with a global network of independent law firms to ensure that the relevant legal basis at the site of the project is taken into account.

Legal Services:

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- drafting and negotiation of building and plan construction contracts
- drafting and negotiation of architect, engineering and project management contracts
- construction monitoring
- project management
- contract management
- claim management
- party representative in litigation and arbitration proceedings

Dr. Dominic Kohnen

- lecturer at university, lawyer
- FIDIC accredited dispute adjudicator
- arbitration proceedings, mediation proceedings and dispute adjudication proceedings as lawyer
- languages: German, English, French
- member of: Anglo German Construction Law Platform AGCLP



Architects- and Engineers Law



International Construction- and Plant Construction Law

THOST

PROJEKTMANAGEMENT

Contact: Dipl.-Ing. Oliver Thost, Management Board, Shareholder
Year of foundation: 1987 (founded by Mr. Burkhard Thost)
Number of employees: over 300 engineers

THOST Projektmanagement GmbH
Villinger Straße 6,
75179 Pforzheim,
Germany
Phone: +49 7231 1560-0
Fax: +49 7231 1560-90
Email: info@thost.de
Internet: www.thost.com

THOST Projektmanagement GmbH

Your Projects are our world.

THOST is Germany's leading independent Project Management Services and Consultancy provider. Our broad spectrum of industry expertise, proven methodological approach and value-adding deliverables make us a trusted and preferred partner of our public- and private-sector customers all over the world.

As an independent partner we coordinate and control the development, design, engineering, and realization of complex projects in the fields of real estate, mobility and infrastructure, industrial plants, and energy. As a trustful representative we manage project contracts or assist in setting up effective project governance organizations or PMOs.

Our Project Management Services and Consultancy involves the definition, leadership, planning, management, and control of projects on behalf of our customers, ensuring strategic and corporate goals will be achieved. Applying the

highest international standards combined with our expertise of three decades of practical project management, we resolve stakeholder concerns, successfully implement effective measures and maximize the project value within cost and time constraints.

Business Activities in the Arab Countries

THOST is active in the Middle East markets since more than a decade. Specific regional expertise has been built up in energy generation and distribution, airport logistics, industrial plants (desalination a.s.o.), and infrastructure (rail & metro systems, roads). Middle Eastern projects and clients are served from our subsidiaries in Dubai, UAE (established in 2004), Qatar, and Saudi Arabia (Riyadh).

Contract & Claims Management and PMO-services are specialized project management services THOST is successfully delivering in the Middle East.

Turning Visions Into Reality.



Renewable Energy: Offshore Wind



Airport Logistics: Dubai International Airport

Project: Dispute Resolution in Construction Projects
Contact: Nicolas Bremer, Rechtsanwalt/Attorney at Law

Alexander & Partner is a boutique law firm specialized on advising German and European clients in their business activities in the Middle East and clients from the MENA-Region on their investments in Europe. We are truly committed to serving as a bridge between cultures and supports our clients in understand the business culture in both Europe and the Middle East. Our divers legal team assists our clients in all stages of their business activities.

Alexander & Partner
 Schlueterstraße 41,
 10707 Berlin,
 Germany
 Phone: +49 30 88708567
 Mobil: +49 176 80738142
 Fax: +49 30 88708568
 Email: nb@alexander-partner.com
 Internet: www.alexander-partner.com



AS&P – Albert Speer & Partner GmbH

Project: City Center Area Action Plan and Transit Oriented Development (T.O.D.) Guidelines in Riyadh

Contact: Joachim Schares, Member of the Management and Partner with AS&P

AS&P combines innovative approaches in architecture, urban and transport planning and landscape architecture with 50 years of international planning and building experience. The projects range from structural design, urban planning and regional development to recreation and tourism planning, conceptual transport planning and project management as well as planning specific preparations for major events and expert opinions for policy advice.

AS&P – Albert Speer & Partner GmbH
 Architects, Planners
 Hedderichstr. 108–110, 60596 Frankfurt am Main, Germany
 Phone: +49 69 605011 0
 Fax: +49 69 605011 500
 Email: mail@as-p.de
 Internet: www.as-p.de



BASF Middle East

Project: Creating Chemistry for a Sustainable Future

Contact: Antonio El-Sayegh, Corporate Communications Manager – Middle East

At BASF, we create chemistry—and have been doing so for 150 years. Our portfolio ranges from chemicals, plastics, performance and crop protection products to oil and gas. As the world's leading chemical company, we combine economic success with environmental protection and social responsibility. Through science and innovation, we enable our customers to meet the current and future needs of society.

BASF Middle East
 BASF Dubai
 Jebel Ali Free Zone, 61309 Dubai, United Arab Emirates (UAE)
 Phone: +971 4 8838773 | +971 4 807-2106
 Mobil: +971 56 6815378
 Fax: +971 4-8072149
 Email: antonio.el-sayegh@basf.com
 Internet: antonio.el-sayegh@basf.com



Dorsch Gruppe

Projects: Bringing Visions to Life:
 • Qatar Economic Zone Ras Bufontas, Doha, Qatar
 • Public Transport Project in Riyadh, KSA
 • Mafraq-Gweifat Highway Project in Abu Dhabi, UAE

Contact: Selin Ergur, Business Development Manager

For over sixty years, the companies of the Dorsch Gruppe have been respected consulting and engineering partners for industrial clients, private investors and public institutions. The Dorsch Gruppe is Germany's largest independent planning and consulting company. Our employees work in a future oriented and quality conscious way for people in all Arabic countries. They offer an entire performance spectrum in the fields of project development, infrastructure, architecture, airports, oil and gas, urban planning, water, transport, environment as well as Asset Management, and Operation Maintenance.

Dorsch Holding GmbH
 DC Abu Dhabi
 P.O. Box 26417
 Salam Street, Lulu Centre, 5th, 10th, 11th, 15th & 18th. Floor
 Abu Dhabi, United Arab Emirates
 Phone: +971-2-6721923 Ext. 450
 Fax: +971-2-6720809
 Email: selin.ergur@dorsch.com
 Internet: www.dorsch.de



Euro Institute for Information and Technology Transfer in Environmental Protection, EITEP

Project: Technical Conference and Exhibition "Infrastructure Middle East (IME)" Accompanies Infrastructure Development in Kuwait

Contact: Dr. Klaus Ritter, ritter@eitep.de
 Rana Alnasir-Boulos, alnasir-boulos@eitep.de

The Euro Institute for Information and Technology Transfer in Environmental Protection, EITEP, was originally founded by the German technical and scientific associations on energy and water. The main objective is to foster the international information and technology transfer in the water, energy, environment and infrastructure sector co-operating with different federal and regional governmental ministries, institutions of higher education, and our partner associations. The EITEP Institute develops and organizes international conferences, seminars, electronic journals (Pipeline Technology Journal, Infrastructure Technology Journal), and trade shows such as the Pipeline Technology Conference, Infrastructure North Africa and Infrastructure Middle East.

EITEP – Euro Institute for Information and Technology Transfer in Environmental Protection GmbH
 Am Lischholze 82,
 30177 Hannover,
 Germany
 Phone: +49 511 90992-10
 Fax: +49 511 90992-69
 Email: eitep@eitep.de
 Internet: www.eitep.de



Garaventa AG

Project: Aloft Above the Traffic Jams on the Ground

Contact: Claude Parel, Sales Manager

Garaventa AG is a Swiss company headquartered in Rotkreuz (Switzerland) with branches in Goldau, Thun, Sion, and Schwanden. The company is part of the Doppelmayr/Garaventa Group and has created an international reputation for itself as the center of excellence for large-scale reversible aerial tramways, funicular railways, and ropeways transporting goods and materials. The group maintains production sites as well as marketing and service subsidiaries in over 30 countries.

Garaventa AG
 Birkenstasse 47,
 6343 Rotkreuz,
 Switzerland
 Phone: +41 41 859 11 11
 Fax: +41 41 859 11 00
 Email: contact@garaventa.com
 Internet: www.garaventa.com



Gerber Architekten

Project: Urban Development and Metro Stations in Saudi Arabia: the New Olaya Metro Station, Riyadh

Contact: Prof. Dipl.-Ing. Eckhard Gerber, Owner and Founder of Gerber Architekten

Gerber Architekten are a German practice with national and international projects in architecture, interior design, urban design and landscape design. With almost 50 years of experience, we can offer a wealth of expertise, competence and excellence. Our approach is to develop the site with an integrated solution that meets the Client's requirements on design, local needs, engineering and economical return.

Gerber Architekten
 Tönnishof 9-13
 44149 Dortmund, Germany
 Phone: +49 231 9065 0
 Fax: +49 231 9065 111
 Email: kontakt@gerberarchitekten.de
 Internet: www.gerberarchitekten.de



ILF Consulting Engineers

Project: Common Seawater Supply Project (CSSP) for Oil Production

Contact: Tobias Walk, Director Instrumentation, Automation & Telecom/IT-Systems

ILF Consulting Engineers (ILF) is an international and independent engineering and consulting company with more than 45 years of industry experience. ILF provides full life-cycle services for major industrial and infrastructure projects. ILF operates main offices in Munich (Germany) and Innsbruck (Austria), and has more than forty offices worldwide. ILF combines world class consulting expertise and a broad international background with project-specific know-how and an in-depth understanding of local requirements due to a stable, long-established presence in its markets.

ILF Consulting Engineers
 Werner-Eckert Straße 7,
 81829 Munich,
 Germany
 Phone: +49(89)255594244
 Email: tobias.walk@ilf.com
 Internet: www.ilf.com

KSP Jürgen Engel Architekten

KSP Jürgen Engel Architekten is one of the German architecture companies that enjoys international success. With four national offices in Berlin, Braunschweig, Frankfurt/Main and Munich as well as in Beijing, China and Hanoi (Vietnam), our architectural practice is engaged in a wide range of planning and construction assignments worldwide. Today, more than 200 architects work for KSP Jürgen Engel.



Lindemann is best known for creating futuristic zero-energy houses with combined electromobility and award - winning megaprojects in the Kingdom of Saudi Arabia and GCC. Currently, Lindemann has offices in Abu Dhabi, Bad Oeynhausen, Cologne and Munich. The growing venture works on iconic real estate projects of all sizes. From project development, analysis, early design, research and feasibility studies to BIM and final construction. White Sky Group UAE is a Lindemann Group division.



SIEMENS

Siemens AG (Berlin and Munich) is a global technology powerhouse that has stood for engineering excellence, innovation, quality, reliability and internationality for more than 165 years. The company is active in more than 200 countries, focusing on the areas of electrification, automation and digitalization. With 357,000 employees worldwide Siemens is a pioneer in infrastructure solutions and one of the world's largest producers of energy-efficient, resource-saving technologies.

KSP Jürgen Engel Architekten GmbH

Project: The Great Mosque in Algiers—A Minaret from Germany

Contact: Jürgen Engel, Principal

KSP Jürgen Engel Architekten GmbH
Hanauer Landstraße 287–289,
60314 Frankfurt/Main,
Germany
Phone: +49 69 944394-0 | +49 69 944394-103
Fax: +49 69 944394-38
Email: frankfurt@ksp-architekten.de | j.engel@ksp-architekten.de
Internet: www.ksp-architekten.de

Lindemann Architects

Project: Megaprojects in the Kingdom of Saudi Arabia - Innovationskraft by Nature

Contact: Tobias Lindemann, Founder Lindemann Group

Lindemann Architects
Westkorso 18A, 32545 Bad Oeynhausen, Germany
Im Zollhafen 18, 50678 Cologne, Germany
Phone: +49 (0) 221 650 60 704 | Fax: +49 (0) 221 650 60 500
Email: info@lindemannarchitects.com
Internet: www.lindemannarchitects.com

For GCC Projects please contact our Abu Dhabi office:

White Sky Group UAE | Tobias Lindemann
Al Maryah Island | Sowwah Square Al Maqam Tower,
34-35th Floor,
Abu Dhabi, UAE
Phone: + 971 02 418 7609
Fax: + 971 02 418 7555
Email: ceo@whiteskygroup.com
Internet: www.whiteskygroup.com

Siemens AG

Project: Siemens Demand Flow™ at WAFI – saving energy and keeping cool in the heat of Dubai

Contact: Hafsa Bouifraden, Communications & Government Affairs Middle East & UAE Siemens LLC

Siemens LLC
The Galleries, 7th floor Building 2,
Downtown Jebel Ali, P.O. Box 2154, Dubai, U.A.E.
Phone: +971 (0) 55 200 1086
Email: hafsa.bouifraden@siemens.com | Internet: www.siemens.com

Project: Siemens People Mover System for Qatar Foundation Education City in Doha, Qatar

Contact: Sebastian Wolf, Communications & Government Affairs Middle East & Qatar Siemens WLL

Siemens WLL
Jaidah Square Building, 5th Floor, Al Matar Street
PO Box 21757, Doha, Qatar
Phone: +974 44560 266 | Fax: +974 44413 652 | Mobile: +974 3310 4753
Email: sebastian.swo.wolf@siemens.com | Internet: www.siemens.com



For over three decades Saudi BAUER Foundation Contractors Ltd. has provided its valued clients with innovative technically and commercially feasible solutions for the most challenging and demanding geotechnical works across the Kingdom, establishing itself as the reliable and trustworthy partner of commitment, integrity and dedication to quality and customer satisfaction.



Pipeline and plant construction is one of STREICHER's core competencies. As an EPC-contractor for oil and gas pipelines and plants as well as water pipelines and pipelines for chemical products, STREICHER carries out all services from planning and construction to commissioning and maintenance. The STREICHER Group employs approximately 3,500 people worldwide.

Euro-Arab Initiative for Reconstruction and Development (EARD)

The Euro-Arab Initiative for Reconstruction and Development was founded by German, Austrian and Syrian companies and business partners headed by the international renowned German company Dorsch Gruppe. Dorsch Gruppe is working in more than 140 countries and covers the entire spectrum of project development, structural engineering, construction, water, transportation, and environment. The aim of the project is to be a pioneer in the post-war rebuilding of the Arab Republic of Syria and to provide shelters for returning refugees as soon as the situation becomes stable enough. Further aspects of infrastructure reconstruction are under preparation by the Euro-Arab Initiative for Reconstruction and Development as well.

Saudi BAUER Foundation Contractors Ltd.

Project: The Kingdom Tower Project

Contact: Harald Heinzlmann, Dipl.-Ing., Managing Director

Saudi BAUER Foundation Contractors Ltd.
AL BASSAM BUSINESS CENTER, Sixth Floor
Office No. 64-65, Baghdadiyah District
P.O. Box 10740,
Jeddah 21443, Saudi Arabia
Phone: +966 12 6441727
Fax: +966 12 6432782
Email: saudi-bauer@saudibauer.com
Internet: www.saudibauer.com

Project: Exploring New Gas Fields for Tunisian Gas Demand

Contact: Maximilian Hofmann, Managing Director

MAX STREICHER GmbH & Co. KG aA
Schwaigerbreite 17,
94469 Deggendorf,
Germany
Phone: +49 991 330-0
Fax: +49 991 330-180
Email: info@streicher.de
Internet: www.streicher.de

MAX STREICHER GmbH & Co. KG aA

Project: Syria, the Future Begins

Contact: Bassel Katabi, Project Director

Euro-Arab Initiative for Reconstruction and Development

c/o Vimpex Handelsges. mbH
Kärntner Ring 4
1010 Wien
Austria
eard@gmx.at



THOST is Germany's leading independent Project Management Services and Consultancy provider. Our broad spectrum of expertise in complex projects in the fields of industry, mobility, real estate and energy, proven methodological approach and value-adding deliverables make us a trusted and preferred partner of our public- and private-sector customers all over the world - Turning visions into reality.

Thost Projektmanagement GmbH

Project: The Project Management Office (PMO) Approach

Contact: Dipl.-Ing. Oliver Thost, Management Board, Shareholder

THOST Projektmanagement GmbH
Villinger Straße 6,
75179 Pforzheim,
Germany
Phone: +49 7231 1560-0
Fax: +49 7231 1560-90
Email: info@thost.de
Internet: www.thost.com

Imprint

EDITOR

Ghorfa
Arab-German Chamber
of Commerce and Industry
Garnisonkirchplatz 1
D-10178 Berlin
Tel: +49 30 278907-0
Fax: +49 30 278907-49
E-Mail: ghorfa@ghorfa.de
www.ghorfa.de

COORDINATION

Rafaela Aguilera Alvarez
Director Marketing/ Events/ Member Services

Susanne Kern
Business Officer Marketing/ Member Services

Melanie Rohrer
Business Officer Marketing/ Business Development

Ghorfa Arab-German Chamber of Commerce and
Industry

EDITORIAL OFFICE

Traudl Kupfer
Proofreading, Translation, Editing
c/o Dachatelier
Große Hamburger Straße 28
D-10115 Berlin
Tel: +49 30 12 06 46 18
Mobil: +49 171 203 30 30
E-Mail: info@traudl-kupfer.de
www.traudl-kupfer.de

LAYOUT

Fadhl Al-Romaima
Business Communication, Design

PHOTOS

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PRINT

DCM – Druck Center Meckenheim GmbH
Werner-von-Siemens-Straße 13,
D-53340 Meckenheim
Tel: +49 (0)2225-8893-550
Fax: +49 (0)2225-8893-558
E-Mail: dcm@druckcenter.de
Web: www.druckcenter.de

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Construction and Consulting





SIEMENS

Ensuring a brighter tomorrow by developing the brightest minds of today.

Across the region Siemens employees are providing answers to bring a more prosperous future within reach.

The sustained economic growth of the Middle East depends on the region's most valuable resource: its people. Which is why Siemens is committed to giving young people the right vocational training to enable them to become the highly skilled workers needed for the future.

One such initiative is the Siemens Student Award, which fosters creative thinking among young talents, attracting innovative solutions to real world challenges from across the region. And building on our 112-year history in Egypt, Siemens is collaborating with the National Academy of Science and

Skills (NASS) to develop a new generation of world-class professionals ready to compete on the international stage.

Right now, in 16 countries in the Middle East, Siemens is investing in local talent to ensure the right mix of people with the right mix of technical skills are readily available to match the rapid growth we are seeing today.

Over 8,000 Siemens employees in the Middle East are bringing answers for a future that's best for our region and within reach of today's generation.

[siemens.com/middleeast](https://www.siemens.com/middleeast)