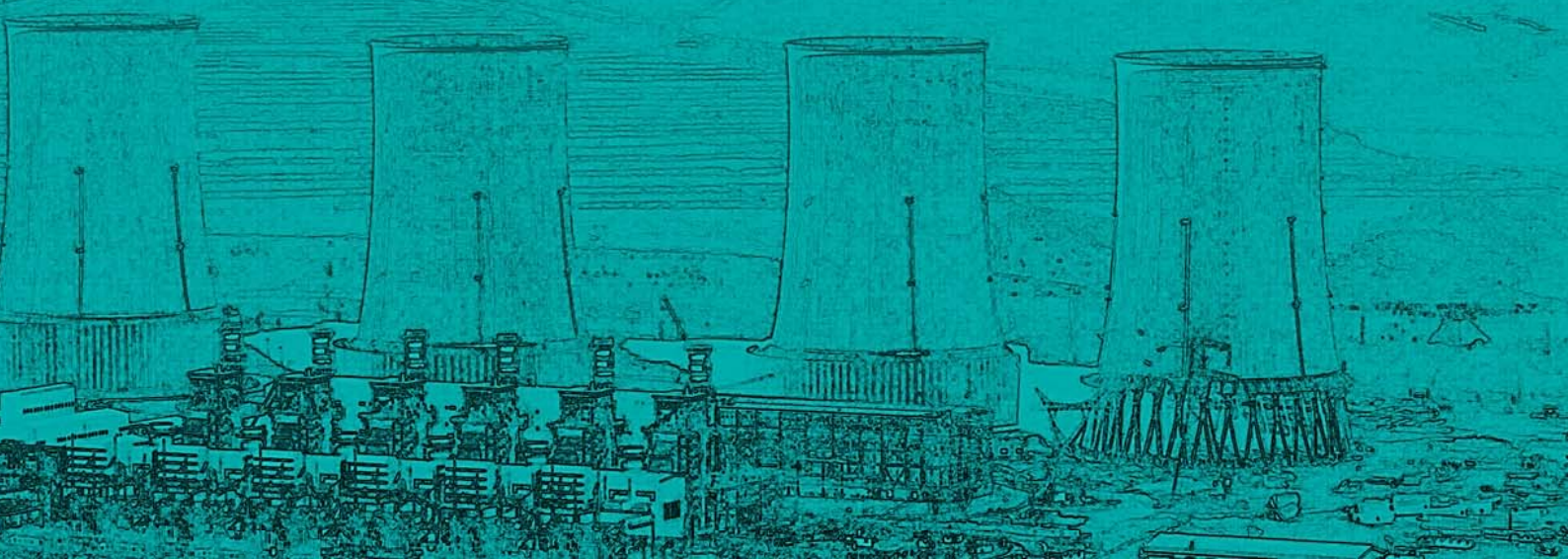




**Monenco**

**Iran**

**2016 Annual Report**





این بنا یکی از بناهای مهم و بزرگ ایران باستان است که در زمان سلسله ساسانیان در شهر زنجان واقع شده است. این بنا در سال ۱۹۰۸ میلادی کشف شد و در سال ۱۹۱۱ میلادی به عنوان موزه ملی ایران اعلام شد. این بنا در سال ۱۹۷۹ میلادی به عنوان میراث جهانی یونسکو ثبت شد.

**Southwestern Stairway**  
 The only stairway that provided access to the top of the ziggurat was situated on the southwestern side. According to Zikhman, it was likely that the entrance to the High Temple was located on the northeastern side facing the river. In order to have reached the High Temple, they first ascended along the second terrace then transitioned to the final stairway which took them to the upper terraces. The stairways of the third and fourth terraces were likely built in the same manner of the first and second terraces, in that they cut through the mass of the ziggurat.

**Chogha Zanbil**, built in 1250 BC, consists of a magnificent ziggurat, temples, and three palaces located in Khuzestan province in southwest Iran. The ziggurat is protected by three concentric walls originally measured 105.2 m on each side and about 53 m in height, in five levels. The water purification system of Choqa Zanbil has been accounted as one of the most ancient water supply systems.

# Monenco Iran

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# Monenco Iran

**M**onenco Iran, a leading global provider of professional engineering and consulting services was formed in 1973 as a joint venture between the private sector of Iran and Montreal Engineering Company of Canada. Currently, Monenco Iran is a private entity which Mapna Group, AMECFW, and MIR (employee's share) are the main shareholders. Over the past 44 years; experienced qualified personnel, using modern systems & international standards, providing high quality services, and considering principle of customer satisfaction led Monenco to grow widely and achieve significant success in the target markets. Monenco provides engineering, consultancy and supervision services in a broad range of target markets worldwide including Combined Cycle and Thermal Power Plants, Renewable and Cogeneration, Distributed Generation, Electrical Power Transmission Lines, High Voltage Substations up to EHV and HVDC Systems, Telecommunication, SCADA, Dispatching Centers and Smart Grids,

Electrical Railways, Electrical Network Studies, System and Energy Studies, Oil & Gas and Mining, Architecture, Civil, Urban Design and Roads. Furthermore, in order to penetrate in Middle East, Europe and Africa, Monenco has registered offices in Oman, Germany and Nigeria also was successful to enter Oil & Gas market in Bangladesh.

In 2016, Monenco entered into telecommunication sector of Oman for consultancy and studies of Iran – Oman Sub-sea Transmission Line to transfer 1500 MW electricity to Oman from Iran. In addition to above, Monenco expanded the range of services across Iran market by entering into new target market such as Repowering, Urban Trains Stations and Tunnels, High-speed Railways and Metro as well as Market Analysis, Investment & Management Consultancy in 2016. Also was successful to expand its market in the Middle East, South East Asia and Africa and CIS countries.





**Alireza Shirani**

Shirani.Alireza@monenco.com

Obtained his B.Sc. in Electrical Engineering from Sharif University of Technology in 1988. He has passed two years in Ministry of Energy as a System Engineer in Energy Division. From 1990 to 1997, he joined in Electric Power Research Center and from 1994 he was appointed as the Head of Electric Department. Since 1997, he has been Vice President of Research in Niroo Research Institute. Finally in 2007, he was appointed as the Managing Director of Monenco Iran.

Our long-term strategy to diversify our offerings and maintain our geographic reach continues to drive our success in business challenging conditions around the world. Therefore, Monenco overall operating remained promising during 2016.

In the year under review, Monenco continued to provide services and solutions to our clients in a diversified fields from mining to infrastructure, oil and gas to electricity, telecommunication and ICT to smart home and smart cities, subway to electrical rail way as well as water.

We are on target to be among the top 100 consulting and engineering firms in the world with sustained high performance which is demonstrated through our disciplined approaches that delivers high-quality projects through skilled employees all around the world regardless of the size, complexity, or difficulty of the projects. We advanced this mission in 2016 through significant steps which provides us a platform for future growth in international development. Examples are included hereunder:

- ▶ In terms of international presence, Monenco registered company in Germany (Monenco Germany) which will enable us to grow our market penetration in the CIS and European markets.
- ▶ In terms of internationalization strategy:
  - We have signed strategic partnership agreements with Siemens, Italtel and WTS in different fields for service agreements, knowhow knowledge and talent pool.
  - In Sultanate of Oman we have been registered in PDO and ORPIC as main clients in oil and gas industry.
  - In eastern part of Africa, especially in Kenya, Tanzania, Rwanda and Uganda, we achieved prominent success by signing several Memorandum of Understanding with our local partners.
  - In CIS countries, two critical projects in Kyrgyzstan and Tajikistan (CASA 1000) were awarded to us.
  - In Bangladesh which is an important hub in South East Asia region, we managed to get awarded some strategic contracts.
  - Also, we've started our business adventure in Sri Lanka and Nepal too as our target markets in East Asia.

Also, in domestic market, where we have been selected as one of the best know-how exporter, we were ranked among the Top 500 Iranian Companies by IMI-100 ranking and were successful to increase our capabilities in new fields of services and target markets with new clients. Examples are as follow;

- ▶ National Gas Dispatching Project
- ▶ Master Plan for Site Selection Studies of Thermal Power Plants
- ▶ CCTV & Wi-Fi Systems Design
- ▶ Consultancy & Design Services for Installation of Electric Actuator on Gas Buried Long Handle Valves
- ▶ Fiber Optic Network Infrastructure
- ▶ Feasibility Studies for Substations Short-Circuit Level Reduction
- ▶ Design of Power Plants based on F-Class Gas Turbines
- ▶ Design of Water Treatment Plants Based on EDI Method
- ▶ Decreasing of Water Consumption in Thermal Power Plants with Modification of Existing Heller Wet Cooling Towers to Hybrid Heller Towers

In closing, I express my sincere appreciation to our shareholders, customers, development and business partners and other stakeholders for their continued support which enabled Monenco to achieve major milestones during the period under review.

**Faramarz Ghelichi**

Ghelichi.Faramarz@monenco.com

Obtained his B.Sc. in Electrical Engineering from Ferdowsi University. He is specialist in H.V. Transmission Lines. From 1992 to 1997 he has worked in Moshanir Consulting Engineers Company as Project Engineer, Site Manager and Project Manager. In 1997, he joined Monenco Iran then in 2007 he was appointed as the Transmission and Dispatching Deputy and in 2012 was appointed as Managing Director Monenco Consulting Engineers (MCE) in Oman. In 2015, he was appointed as the Transmission and Distribution Director while he is Monenco Oman member of board.



**Mohammad Dana Manavi**

Manavi.Mohammad@monenco.com

Obtained his B.Sc. in Civil Engineering from Sharif University of technology.

From 1992 to 1996 he worked for Bonyad Sazeh Consulting Engineers. He joined Monenco in 1996 as Structural Designer.

He continued his work till 2003 in Power Generation Department. From 2003 to 2006 his duty was Project Coordinator. From 2006 to 2008 he continued his duty as a Project Manager. From 2008 to 2011 he acted as the manager of Gas Turbine Power Plant and Utilities Section. In 2011 he was appointed as the Power Generation Director.



**Masoud Soltani Hoseini**

Soltani.Masoud@monenco.com

Obtained his master from Iran Ferdowsi University in Mechanical Engineering in 1991 and his B.Sc from Industrial and Science University in Electrical Engineering in 1988. From 1994 to 1998 he worked in Matn Company as Project Manager. He started working in Niroo Research Institute in 1998 as Project Manager and in 2000 he was appointed as Manager of Mechanic Division and at last in 2005 he was appointed as Manager of Power Generation Research Center. In 2016, he joined Monenco Iran and was appointed as Engineering Director.



**Ahmad Massoudi**

Massoudi.Ahmad@monenco.com

Obtained his Master in Chemical Engineering from Tehran Polytechnic University in 1969. He started his professional activities by joining National Petrochemical Company for 15 years, held different positions, which latest was Project Manager in Aromatic Project, then started working in Ministry of Industry for 5 years as Technical Expert. Next, in Alagas Company from 1991 to 1997 as Project Technical Manager and later as Managing Director in Nikoosarir Company from 1997 to 2003 and Kavir Phosphate from 2003 to 2008. Finally, he joined Monenco in 2008 as International Business Development Manager and in 2012 has been appointed as the Planning & System Deputy. Finally, in 2015 he was appointed as the Oil & Gas Director.



**Amirali Bankian**

Bankian.Amir@monenco.com

Obtained his B.Sc. in Industrial Engineering from Khaje Nasir Toosi University of Technology in 2002. Since 2002 he joined Monenco Iran and has been working for the company for 15 years. His first position was Project Engineer and later in 2005 he got into position of Planning & Project Control Engineer. In 2007 he was appointed as Head of Control and Monitoring Department. Also, since 2010 he is a PMP Certificate holder. Then, in 2014 he was appointed as Planning and System Director and head of Quality, HSE and Productivity office.



**Siamak Khalaj**

Khalaj.Siamak@monenco.com

Obtained his B.Sc. in Electrical Engineering in 1997 from Iran University of Science and Technology. Since then he joined Monenco and has been working for the company for 15 years. He was the head of Power Transmission Department and in 2010 was promoted to be the Managing Director of Monenco Engineering Limited (MEL) in Nigeria. In 2014 he was appointed as telecommunication and Dispatching Director in Monenco Iran.



**Elham Sadeghian**

Sadeghian.Elham@monenco.com

Obtained her B.Sc. in 1995 from Bahonar University and her M.Sc. in 1999 from Khaje Nasir Tusi University in Electrical Engineering. From 1999 to 2007 she worked in Niroo Research Institute as a Project Manager and as the Head of Electric Department.

Since 2007 she has been working in Monenco as a Quality Manager and in 2010 she was appointed as the Financial and Administration Director.



**Ramin Khoshkho**

Khoshkho.Ramin@monenco.com

Received his Ph.D. from University of Joseph Fourier of France, M.Sc. and B.Sc. from University of Tehran all in Mechanical Engineering.

From 1990 to 1998, he worked in Matn Co. (Electric Power Research Center) as Senior Mechanical Engineer and Manager of Mechanical Department.

From 1998 for two years, he has been Vice President of Power Generation Research Center and in year 2007 he has been appointed as R&D Manager of Monenco.



**Rahim Zeinali**

Zeinali.Rahim@monenco.com

Received his M.Sc. in Electrical Engineering (Power Systems) from Sharif University of Technology in 2008 and his B.Sc. in Electrical Engineering from Tehran South University in 2005. From 2006 to 2007 he worked in Sharif University of Technology as a Researcher. From 2007 to 2008 he worked in Paziresh Novin Company, and Beheen Ertebat Mehr Company as a Consultant.

Since 2008 he joined Monenco as an Electrical Engineer in System & Energy Study Center. In 2009 he became the Project Manager and in 2012 he was appointed as Head of Power System Study Group in System & Energy Study Center. In 2015 he was appointed as Manager of System & Energy Study Center.



**Mehdi Haji Javad**

Javadi.Mehdi@monenco.com

Obtained his PhD in 1978 from Faculty of Chemical Engineering of the University Karlsruhe in Germany.

From May 1978 to October 1990 Dr. Haji Javad worked as project manager at Fichtner Consulting Engineers in Stuttgart, Germany, having the expertise in the areas of flue gas cleaning and waste incineration. In October 1990 Dr. Javad joined AF-Consult Switzerland. From 1995 to 2012 Dr. Haji Javad was Head of the Thermal Energy Plants Department. Among other consulting services under his responsibility as Department Head and Project Director 14 combined cycle power plants and 3 coal power plants have been planned and implemented. During 2012-2013 Dr. Haji Javad was as Vice President of AF Thermal Energy Department responsible for seals and business development activities. Dr. Javad has published a number of articles on energy and environmental aspects. He is recognized by the Chamber of Industry and Commerce in Stuttgart, Germany, as a Sworn Expert for flue gas cleaning of firing systems and production plants. In 2016 he was appointed to be the Managing Director of Monenco Germany in Stuttgart.



**Davood Moradi**

Moradi.Davood@monenco.com

Obtained his B.Sc. in Electrical Engineering in 1998 from Tabriz University. Since then he joined Monenco and has been working for the company for 17 years. He was the Project Manager of many of OHL from 63kv up to 765kv transmission line projects and the Project Manager of +/- 500 Kv HVDC project (Overhead line and Convertors) also, he was the Director of Power Transmission and Distribution Networks Department from 2010 until 2014 and in 2015 was promoted to be the Managing Director of Monenco Consulting Engineerings LLC (MCE) in Oman.



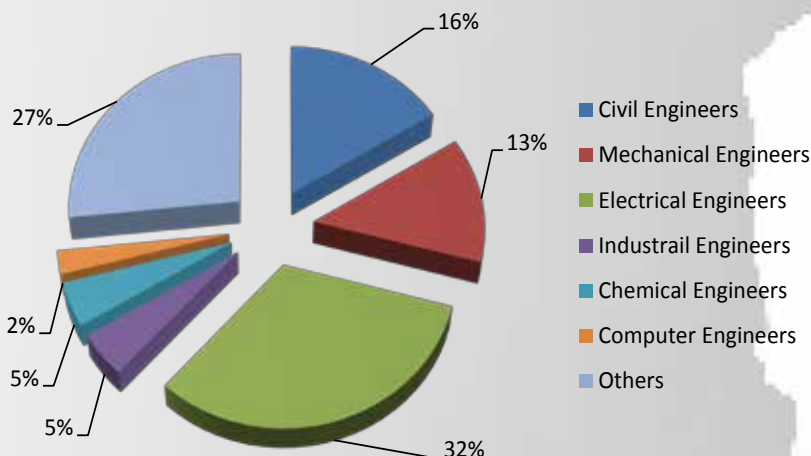
### Major Experiences of Monenco

- ▶ Over 52,000 MW Power Plants
- ▶ 9 Renewable Energy Projects
- ▶ 17 Dispersed Generation Projects
- ▶ Over 22,000 Km Transmission Lines & OPGW
- ▶ Over 31,000 MVA Substations
- ▶ 45 National & Regional Dispatching Centers
- ▶ 56 Telecommunication Systems & Networks and Master Plans
- ▶ 2\*14.5 Kilometer Metro and Electrical Railway Projects (14 Stations)
- ▶ 43 Oil & Gas Complexes
- ▶ 16 Mining & Geology Projects
- ▶ 34 Economical & Technical Feasibility Studies
- ▶ 4 Projects of Iran Power Grid Study
- ▶ 2 Heat Recovery Project in Steel Industry
- ▶ 8 Studies on Interconnection of the Network to the Grid
- ▶ 1 Study on Network Reactive Power
- ▶ 7 Bank Feasibility Reports on Investment Projects
- ▶ 4 Study on Network Master Plan
- ▶ 1 Restructuring of Electric Power Industry
- ▶ 14 Heat Recovery & Energy Optimization Projects

### 48 Overseas Projects

- ▶ 22 Projects in the field of transmission lines, distribution networks, high voltage substations and dispatching centers
- ▶ 9 Projects in the field of thermal power plants
- ▶ 2 Projects in the field of hydro power plants
- ▶ 2 Project in the field of wind power plant
- ▶ 2 Projects in the field of Oil & Gas
- ▶ 1 Project in the field of power quality improvement of Steel Mill Factory
- ▶ 2 Projects in the field of Small Scale Power Generation Plant
- ▶ 1 Study on the interconnection of Electricity Network between Countries
- ▶ 1 Network study - synchronization of networks
- ▶ 1 project in the field of telecommunication master plan study
- ▶ 2 project in the field of network stability study
- ▶ 3 project in the field of network operation planning study

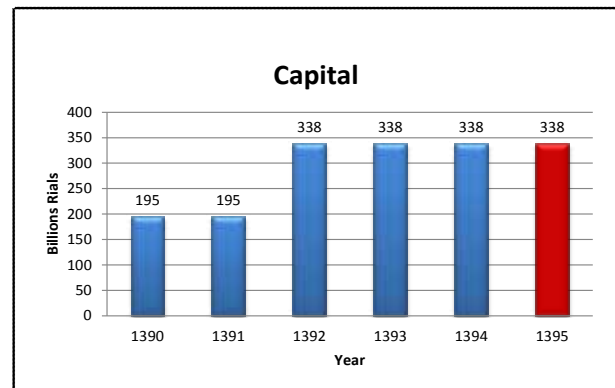
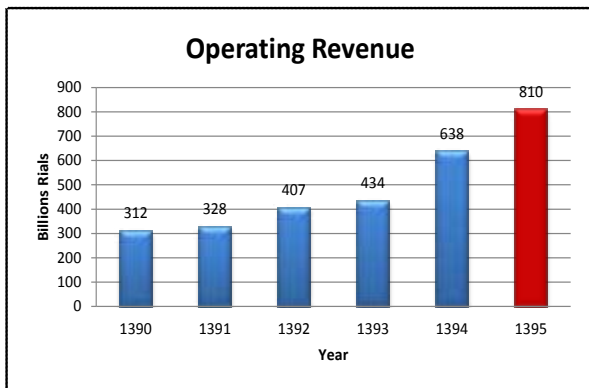
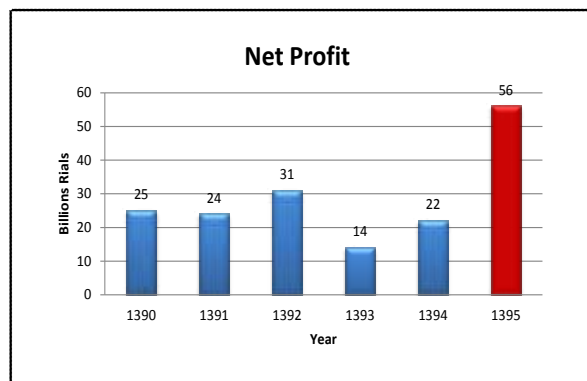
Composition of Experts in 2016





## Expansion of Services

- ▶ Thermal Power Plants Site Selection Studies
- ▶ Technical and Economic Feasibility Study for 500~600 MW Combined Cycle Power Plant
- ▶ Main and Auxiliary Cooling System Modification by Using Hybrid System
- ▶ Consultancy, Engineering and Site Supervision Services for Wind Farm
- ▶ Gas Dispatching Centers: Document Review, Site and Management Supervision
- ▶ Consultancy Services on Telecommunication Equipment O&M
- ▶ Wireless Access Network Design based on Wi-Fi Global Standard (IEEE 802.11) including:
  - ▶ Technical specification for Access Point, Base stations and other related equipment in the Network Operation Center (NOC) such as Access Controller
  - ▶ Technical specification for required antenna with respect to CRA considerations
- ▶ Intelligent Transport System (ITS) solution to prevent time consuming mechanism in the public transportation as well as serving machine based services
- ▶ Strategic telecommunication study: telecommunication market study (enterprise and utility), technical issue considerations, economic and financial analysis, social and cultural limitations to determine midterm road map in line with the organization target
- ▶ Land Based LNG Re-gasification



## Geographical Expansion

Our Global Expansion empowers us to present in every significant market and to be a valuable resource for clients around the world. Commitments to our international strategic planning for geographical expansion led us to register our company in Germany (Monenco Germany) in 2016. This will empower us to support European companies active in the Middle East and will keep us going faster in the CIS and European markets. Being successful to expand our market in the Middle East, South East Asia and Africa and CIS countries has led us to have special presence in several major countries including Oman, Nigeria, Uganda, Kenya, Bangladesh, Sri Lanka, Iraq, Tajikistan, Kyrgyz Republic, and Armenia.

As a result of successful geographical expansion and due to our knowhow qualification our rate of success in projects opportunities has been doubled in 2016 and we were shortlisted in 20 projects in more than 10 countries in different fields around the world.

## Domestic Market Penetration

In Monenco, development and growth will be followed by reviewing the goals, planning, prioritizing actions and also continuous improvement.

Definitely, access to the goals need to spread a culture of excellence, retain and improve values, ethical principles and observation of social responsibilities. In this regard moving towards realization of vision statement of 2021 horizon as specified bellow is fundamental:

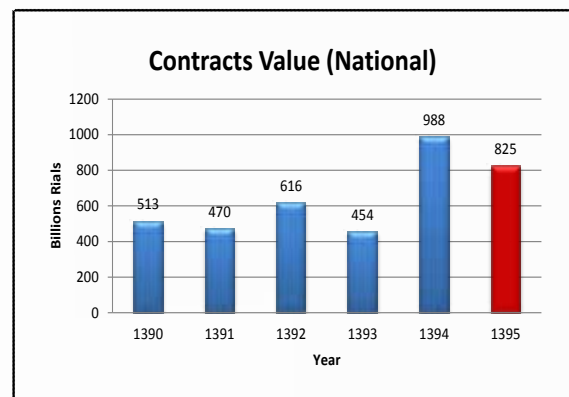
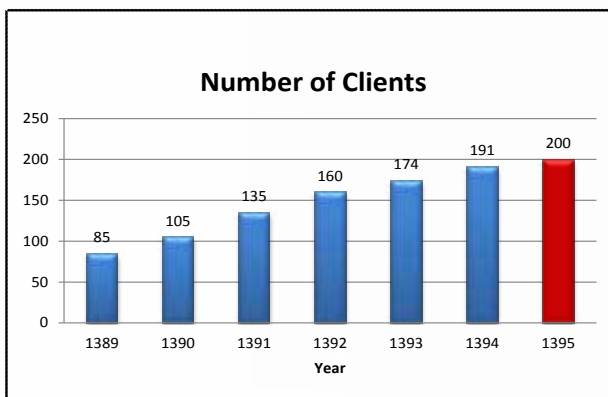
- ▶ Activity in all fields of engineering
- ▶ Retain and development of the current position in the domestic market

In 2016, Monenco was successful in increasing domestic capacity and capabilities which led to getting awarded the projects in new, national and strategic fields including:

- ▶ Owners Engineer and Site Supervision on Detailed Design, Procurement and Implementation of National Gas Dispatching Project
- ▶ Preparation of Master Plan for Site Selection Studies of Thermal Power Plants
- ▶ CCTV & Wi-Fi Systems Design
- ▶ Consultancy & Design Services for Installation of Electric Actuator on Gas Buried Long Handle Valves
- ▶ Business Plan Preparation for Construction of Fiber Optic Network Infrastructure along with the Intercity Roads
- ▶ Feasibility Studies of Practical Methods for Substations Short-Circuit Level Reduction
- ▶ Design of Power Plants based on F-Class Gas Turbines
- ▶ Design of Water Treatment Plants Based on EDI Method
- ▶ Decreasing of Water Consumption in Thermal Power Plants with Modification of Existing Heller Wet Cooling Towers to Hybrid Heller Towers

On the other hand, awarded projects from new clients are as follow:

- ▶ Port & Maritime Organizaton – Shahid Rajaee Port Special Economic Zone
- ▶ Khorramabad – Pole Zal Freeway Company
- ▶ Bisotun Power Generation Management Company
- ▶ Arian Mah Baad Company
- ▶ Imensazan Consulting Engineers Institute
- ▶ Tehran Behro Consulting Engineers
- ▶ West Oil & Gas Production Company
- ▶ Behafarin Gas Tisfoon Chemical Industry Group
- ▶ Nasb Niroom Company
- ▶ Mahtab Kahnuj Electricity Generation Company
- ▶ Amir Kabir Electricity Generation & Development Company
- ▶ Zanjan Province Water & Waste Water Company
- ▶ Tehran-North Freeway Company
- ▶ Garmsar Special Economic Zone Management Company



## Participation in Exhibitions

In order to penetrate and develop in domestic and international market, Monenco participated in the following international & national exhibitions. During the exhibitions, Monenco had fruitful and effective negotiations with different clients and partners.

### Domestic:

1. 21st International Oil, Gas, Refining & Petrochemical Exhibition
2. Lateral Exhibition of 22nd Electrical Power Distribution Conference
3. Lateral Exhibition of 2nd Iranian Petroleum & Energy Club Congress
4. Lateral Exhibition of 31st International Power System Conference
5. 16th Iran International Electricity Exhibition
6. Lateral Exhibition of International Summit for Presenting Investment Opportunities in Mokran Shores
7. 8th International Renewable Energy & Energy Saving Exhibition



### International:

1. ITU TELECOM Exhibition in Bangkok Thailand – Bangkok
2. Holding Cyber Security Seminar in PAEW ( Sultanate of Oman)

## New Area of Experience

The changes of the competitive environment have determined companies to identify new methods to satisfy customers and constantly provide value in a more efficient way than their competitors. In order to do so, Monenco has considered providing “Management Consultancy Services” to meet its client’s expectation. In this process, Monenco was approached by both its long-term partners and new international and national companies to assist them to improve their performance in International Markets. As the first phase for providing these services, Monenco has made an agreement with one of the main European management consultancy firms to empower itself with the knowhow knowledge and talent pool.

Furthermore, taking advantages of our international experience, we’ve offered management consultancy services for our shareholder “Mapna Group” to penetrate more in international market.

## Strategic Partnership

According to our expansion strategy, we’ve made several strategic partnerships with our local and international partners around the world as long-term agreements to share our intellectual resources in order to enhance our chance of achievement in international market. In this regard we’ve signed strategic partnership agreements with Siemens, Italtel and WTS, in different fields for service agreements, knowledge transfer and manpower supply.

## International Market Penetration

As one of our main business growth strategy Monenco has penetrated the existing international market even more in last year. We were committed to meet the client’s expectations by offering excellence, quality, & reliability in all fields of our operations. Due to Monenco high level of competency, we’ve been ranked as the 1st company technically in several international tenders and have been invited to execute projects out of tendering procedures.

In addition, being recognized as one of the top consultants internationally by clients empowered Monenco to simply be awarded the following projects:



- ▶ Owner Engineer Services for Supervising & Executing Shutdown for Distribution Network Expansion (Client: DPC-Sultanate of Oman)
- ▶ Dil Abdusalam and Sawiq Variation Contract (Client: OETC-Sultanate of Oman)
- ▶ Al Saada Variation Contract (Client: OETC-Sultanate of Oman)
- ▶ Feasibility Study of Bafgh Power Plant (Client: Kepco-South Korea)
- ▶ Consulting Services to Provide Construction Supervision Services for Design Supply and Installation of HVAC Line and Associated Substation Works (Client: NEGK-Kyrgyz Republic)
- ▶ Consulting Services to Provide Construction Supervision Services for Design Supply and Installation of HVAC Line and Associated Substation Works (Client: Bark-i-Tojik- Tajikistan)
- ▶ Consultancy Services for Interconnection of the Wind Power Plant With the Capacity of 50 MW in “Kouhin” Region of Qazvin (Client: WPD Iran Holding GmbH, Germany)
- ▶ Power System Studies for Interconnection of the Wind Power Plant With the Capacity of 50MW in “Takestan Region of Qazvin” (Client: WPD Iran Holding GmbH, Germany)
- ▶ Monitoring and Top-Supervision of Techno-Economic Feasibility Study and Engineering Services Work Of Consulting Firm Appointed by LNG Cell, Petrobangla or any other designated entity and selection of Terminal Developer for land based LNG Terminals (Client: RPGCL -Bangladesh)
- ▶ Consultancy Services for the 6th Cost of Service Study (Client: Ministry of Energy- Kenya)
- ▶ Consultancy for the Realization of Telecommunication Architecture Study throughout the PAEW Service Area (Client: PAEW- Sultanate of Oman)

## Global Presence

Due to the Company’s diversification of technical, management and financial skills and knowhow Monenco is capable to overcome the challenges of global presence.

Globalization is our key growth strategy. Each of our companies around the world reflects our focus of opening opportunities and delivering long-lasting value. Furthermore, we aim to extend our presence in our chosen markets.

As a result of internationalization strategy, we’ve started our official presence in Europe by registering our company in Germany and prominent success was achieved in Africa, Middle East, South East Asia and successful partnerships were formed with reputable International and local firms.

As one of the leading engineering companies in Power Sector in Sultanate of Oman we’ve been in the short list of major clients in this country and client requested us to bid directly for major contracts, furthermore we have registered in PDO and ORPIC as main clients in oil and gas industry in order to open new windows for further penetration in this industry.

In eastern part of Africa, especially in Kenya, Tanzania, Rwanda and Uganda Monenco achieved prominent success by creating powerful networks and Signed several Memorandum of Understanding with its local partners, moreover we’ve been ranked as first Grade Company technically in most participated tenders.

In CIS countries, we were successful to get two critical projects in Kyrgyzstan and Tajikistan and we’ve followed up our business development adventure in these countries more seriously.

Bangladesh still is an important hub in South East Asia region and Monenco was managed to get awarded some strategic contracts and we’ve started our business adventure in Sri Lanka and Nepal as well as our target markets in East Asia.

## Memorandum of Understanding and Agreements

In order to enhance our offers and offset costs we reached several agreements and signed MOUs with our local and international partners to play win-win strategy in international market. These mutual alliances have led us to not only expand our international market but also to practice new area of experience and knowledge. We’ve benefited from knowledge transferred by our European partners while our local partners have facilitated the market entrance and penetration. In last year only, we signed more than 20 MOUs with world class companies from Germany, Italia, Netherland, British, Spain, Australia, Nigeria, Armenia, India and Bangladesh in different fields for Oil and Gas, Railway, Power Transmission, Power Generation, Communication and Mining.

## Certificates and Awards

- ▶ Gratitude Certificate from Ministry of Energy as a Leading Company in Exporting of Engineering and Consulting Services
- ▶ Gratitude Certificate for 1 Million Safe Man Hours in Construction of 132/33 kV Saada Grid Station (Client: OETC, Sultanate of Oman)
- ▶ Satisfactory Certificate for Monenco Performance in two Owner Engineering Services Contracts (Client: DPC; Sultanate of Oman)
- ▶ Satisfactory Certificate for Consultancy Service for Assessment of 400 kV Voltage Level Impact on Operation of Main Integrated System (MIS) (Client: OETC, Sultanate of Oman)
- ▶ Satisfactory Certificate for Consultancy Service for Under Frequency Load Shedding and Islanding Scheme in Dhofar System (Client: OETC, Sultanate of Oman)
- ▶ Satisfactory Certificate for Consultancy Service for Operating Reserve Management in MIS and Dhofar System of OETC (Client: OETC, Sultanate of Oman)
- ▶ Letter of Appreciation for increase of the number of Monenco Iran full time employees in 2016 by Iran Ministry of Cooperatives, Labour and Social Welfare
- ▶ Ranked 399th in the 2015 Annual Ranking of Top 500 Iranian Companies by Industrial Management Institute (IMI-100 ranking)
- ▶ HSE Accreditation Certificate by Iran Ministry of Cooperatives, Labour and Social Welfare
- ▶ Technical & Financial Competency in the Fields of Economic Analysis, Feasibility Studies and Preparation of Detailed Plans and Implementation of any Plants by Iranian Mining Engineering Organization
- ▶ 15 Satisfaction Certificates from clients in the fields of Oil & Gas, Power Transmission Lines, High voltage Substations, Dispatching & Telecommunication projects
- ▶ First grade certificate in power and water SCADA and cyber security from the Ministry of Power of Iran (TAVANIR) - Disaster Management and Cyber Security Department



## Publications and Presence in the Conferences

Following our commitment to fundamentally making the right knowledge and the right knowledge sources, we published “The Comprehensive Design of High Voltage Sub-Stations” book which can be used as an all-embracing practical reference by experts covering all the requirements, basic and detailed design, systems, equipment and etc. for HV Sub-Stations.

Also, proudly, our 6th book with Human Resource Management theme is being finalized which describes the HR processes in engineering consultancy firms.



In addition, we had 21 accepted international and 13 national papers and researches last year. Furthermore, 46 technical reports were prepared to inform and support our actual and potential customers of the latest technologies.

In the last year we held more than 125 internal/external seminars and training courses to improve the technical and managerial knowledge of our experts and managers. Such as the M.D lecturing in Sharif University, holding the O&M seminar jointly with AF Group, presentation for evaluation of best projects in engineering firms presented in the 12th International Project Management Conference and etc.

Totally, in comparison with last years we were able to promote widely our knowledge sharing.

## Corporate Social Responsibility

At Monenco, we are committed to embedding sustainability principles throughout the business, supporting the communities and encouraging our employees to care about and involve themselves in supporting the communities in form of supporting charities, educational institutions and university students.

Also, in terms of environmental approach, Monenco strives to undertake all projects and office activities in an environmentally responsible manner based on its CSR strategies.

Providing quarterly newsletter is the other CSR strategies of Monenco to connect technologies to create sustainable progress for its clients.

Social Responsibility as well as Monenco roles for sustainable development in its Headquarter and all of its branches and offices in terms of social and environmental activities is under the responsibility of Public Relations Department.

In general, Public Relations Department's services in the field of CSR are, but not limited to:

- ▶ Providing Monenco Newsletter
- ▶ Internships
- ▶ Monenco Scholarships
- ▶ Monenco Donations

At last, for those who are interested to support this department in its services, it is only needed to send their request to [info@monenco.com](mailto:info@monenco.com).



**Leila Ghobadi**  
Head of Public Relations Department  
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## Transmission & Distribution Division

The Division of Power Transmission & Distribution handles projects in energy and power industries. So far, this division has designed, consulted and supervised +/- 500 kV HVDC system, more than 22000 km Transmission Lines up to 765 kV and Hot Line OPGW and more than 31000 MVA Substations from 33 kV up to 400 kV and 89 master plan & distribution network losses reduction studies, 7 projects in supervision of capital and mechanization projects as well as 2\*14.5 kilometer (14 stations) metro and railways projects.

### Transmission Lines

Transmission Lines Department offers client consultancy, engineering and Supervision services in all stages of Transmission Lines projects including overhead lines, underground cables, OPGW, ADSS and Detail Design with economic studies. In addition, using the latest version of software such as PLS-CADD, PLS-Tower and PLS-Pole, also latest methods such as intelligent GIS system for selecting the best routes and surveying via (LiDAR) system enable us to reach the optimum design in our projects.



### Distribution Networks

Distribution Networks Department is in charge of offering consultancy, engineering and supervision services in all field of power distribution industry including comprehensive and master plans of electrification, loss reduction, network system studies, reliability and power quality improvement, protection coordination and street lighting plans base on international standards and latest versions of software such as CYMDIST, CYMTCC, DigSILENT, CALCULUX, DIALux, ETAP and GIS base applications.

### Grid Stations

The High Voltage Substations Department is equipped to deal with all necessary aspects of engineering and construction supervision as well as asset management of HV substations. Substation engineering covers Detail Design with economic studies, design of the HV and LV parts, as well as control systems, auxiliary services, and civil & structural design; these designs are fully accomplished based on structural 3D design software. Consultancy of the projects also falls within our area of expertise. We also deal with control systems for equipment designed for energy production (Hydroelectric and Thermal plants) and Petrochemical Plants. Power system studies, consultancy for asset management, consultancy for project management, etc. are other services proposed by this department.



### Civil & Structures

By gaining experience in different fields of design and consultancy, Monenco Iran also offers Civil services for industrial facilities. This department provides consultancy and engineering services for industrial, commercial, residential buildings and civil parts of the Transmission Lines, High Voltage Substations, Dispatching Centers and Railway Transportation projects and other unusual structures. Also Ergonomic Control Centers and Green Buildings are included in Civil & Structures Department design expertise.

## Railways & Subways

By developing technical knowledge in new fields also in order to be in line with the needs for infrastructure projects in the field of Subways, Urban Railways and Stations in Iran, Monenco Iran has expanded its services and entered into the mentioned fields. However, through the technical and engineering capabilities of Monenco Iran, foreign partners, experienced qualified personnel and using modern technologies, Monenco Iran is able to render high quality engineering services in different projects in mega cities of Iran such as Shiraz and Tabriz as well as different lines of Tehran Metro and Subway Railways projects. Therefore, based on experiences in mechanical, electrical and telecommunication fields, Monenco Iran entered into freeway projects such as Tehran-Shomal freeway.



## Articles and Technical Reports

Transmission & Distribution Division has published 26 technical reports, 7 International articles and papers in 2016 to introduce new technologies & systems to its clients. Below is the list of mentioned reports;

### Technical Reports:

- ▶ Digital Substations
- ▶ Renewable Energy - Solar Energy - Photovoltaic Cells
- ▶ Fixed & Moving Block in Railways & Metro
- ▶ Threats and Opportunities in Operation and Planning of EDNs in presence of Electric Vehicles
- ▶ Life time Estimation and Reliability Assessment of Composite/Polymer Insulators
- ▶ Geo Penetrating Radar
- ▶ Sustainable Development & reducing the effects of Using Compact Fluorescent Lamps
- ▶ EHV and UHV Transmission Lines
- ▶ Analysis of Communication Applications in Railway Transport Industry
- ▶ Architecture Compatible with the Environment in the Design and Construction of Power Transmission Line Towers in the World
- ▶ Requirement for Monitoring & Correcting Power Quality in Worldwide Sustainable Development
- ▶ Integrated Security Systems in High-Voltage Substations
- ▶ Smart Distribution Management System
- ▶ Subway Lines in Passive Defense
- ▶ Industrial Architecture of Buildings in High-Voltage Substations
- ▶ Distribution Generation for Worldwide Sustainable Development in Distribution Networks
- ▶ Analysis of Transportation System Capacity with Using Discrete Event Simulation
- ▶ Train Brake Energy Storage by Super capacitors using On-Board in Locomotives and Reduce Energy Consumption during Acceleration
- ▶ Health Status Assessment of Power Transformers by using Frequency Response Analysis
- ▶ Communication Network for Worldwide Sustainable Development in Distribution Network
- ▶ Super Conductors in Power Transmission Network
- ▶ Using of LED Luminaires for Worldwide Sustainable Development in Distribution Systems
- ▶ Transmission Line Structure Failure Analysis and Solutions
- ▶ The Solution to the Protection System Challenges for Short & Long Transmission lines
- ▶ Decreasing Force of Earthquake with using Lightweight Components and New Technologies for Buildings
- ▶ Ventilation System in Subway Stations and Tunnels

### Articles:

- ▶ Multi-objective protecting device placement in distribution system using fuzzy linear programming
- ▶ The Modeling, Control and Simulation of D-STATCOM based on Cascaded Multi-level Converter
- ▶ Simultaneous coordinated tuning of power system stabilizers based on SSSC using LQR
- ▶ Feedback Linearization of a Active Power Filter for Power Quality Improvement via Sliding Mode Control
- ▶ Transmission Loss Allocation through Modified Active and Reactive Power Flow Tracing
- ▶ Voltage Sag Compensation of PCC Using Fault Current Limiter



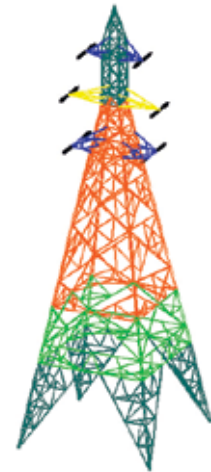
## Engineering Services for New 63 kV Lattice Tower Design in Medium Climatic Zone

**Start date:** 2017 **Finish date:** 2018 **Location:** Yazd, Iran **Client:** Yazd Electric Regional Company

### Scope of work:

- ▶ Collecting data and weather conditions of synoptic stations located in this climatic zone
- ▶ Preparing report to determine the loading tables for new towers
- ▶ Designing and determining the economic span
- ▶ designing actual span, wind and weight span of the towers
- ▶ determining sag-tension calculations for conductor and shield wire
- ▶ Simulating and modeling the towers in the PLS-TOWER
- ▶ Modeling a sample overhead line in PLS-CADD and spotting
- ▶ Designing the towers foundation
- ▶ Determining initial weight of towers
- ▶ Preparing technical specifications
- ▶ Tendering and contract awarding
- ▶ Design review, and
- ▶ Witnessing type test

**Description:** Towers are one of the main components of transmission lines, which have a significant portion of transmission lines cost. A lot of towers that are in use in Iran have been designed in the past, but nowadays regarding the development of technology, towers can be redesigned to optimize the structure, dimension and weight. As a result the overall cost of transmission line will be reduced significantly. In this respect, Monenco Iran has been chosen for designing the new towers for 63 kV overhead lines, by Yazd Regional Electric Company



## Comprehensive Studies to Reorganize and Development of Transmission and Distribution Network of Industrial Arvand Free Zone

**Start date:** 2015 **Finish date:** 2018 **Location:** Asaluyeh-Isfahan **Client:** Arvand Free Zone

### Scope of work:

- ▶ Comprehensive studies for distribution and transmission network
- ▶ Reorganization of existing distribution network

**Description:** Comprehensive studies to reorganize and development of transmission and distribution network of industrial Arvand Free Zone include two parts as follows:

1. Comprehensive Studies for Power Supply of Khorramshahr and Abadan Industrial Zones:
  - Data gathering of electrical network in industrial zones
  - Surveying and analyzing the collected data of industrial zones
  - Load forecasting of industrial zones
  - Power system studies of industrial zones
  - Power system studies for industrial zones connection to upstream network
2. Comprehensive studies for distribution network of Khorramshahr and Abadan Industrial Zones:
  - Data gathering of distribution network in industrial zones
  - Load and network modeling
  - Electrical calculations and preliminary designs
  - Energy and load forecasting of industrial zones
  - Recommendation for the best designs
  - Reliability calculations
  - Protection system designs

## Consultancy Services for Construction of Lashkary 230/63kV Modular Substation, Purchase of Power Compact Transformers and Construction of Lashkary – Maadkoush 230kV Transmission Line

**Start date:** 2017 **Finish date:** 2018 **Location:** Bandar Abbas, Iran

**Client:** Persian Gulf Special Economic Zone Company (P.G.S.E.Z)

### Scope of work:

- ▶ 1st section: Identification & preliminary designing
- ▶ 2nd section: Basic designing, Preparation of tender documents, procedure of tender & contract
- ▶ 3rd section: Design review & supervision on FAT

**Description:** By considering this fact that Hormozgan province is one of the industry zones in Iran and its energy demand is increasing constantly, power system studies has been done by Persian Gulf Special Economic Zone Company (P.G.S.E.Z). However, in order to cover industry costumers demands such as Maadkoush Company, construction of Lashkary 230/63kV modular substation and construction of Lashkary – Maadkoush 230kV Transmission Line is an essential matter which Monenco Iran is responsible to render consultancy services in this project.



## Engineering Service of Modification and Optimization in High Voltage Substations for Tehran, Kerman & Bakhtar Regional Electricity Companies

**Start date:** 2017 **Finish date:** 2017 **Location:** Iran

**Client:** Tehran Regional Electrical Company, Kerman Regional Electrical Company, Bakhtar Regional Electrical Company

### Scope of work:

- ▶ Identification and preliminary design
- ▶ Basic design and preparation of tender documents
- ▶ Assisting on holding of tender
- ▶ Design review
- ▶ Inspection and test
- ▶ Supervision (if the client asks)

**Description:** Since some parts of power grid have been aged, updating those parts is necessary. In addition due to growing of power grid and changing in load demands in Kerman province some modifications have been included in Kerman Regional Electricity Company as a present project.

## Consultancy & Supervision Services for Implementation of Power Distribution Asset for Capital Projects

**Start date:** 2016 **Finish date:** 2017 **Location:** Tehran, Iran

**Client:** Great Tehran Electrical Distribution Company (GTED)

### Scope of work:

- ▶ Equipment quality control
- ▶ Mechanization services
- ▶ Construction, renewing & reconstruction network according to standards and technical criteria.
- ▶ New electrification according to standards and technical criteria
- ▶ Rehabilitation
- ▶ Training

**Description:** One of the most important issues in operations and management of the projects is implementation for development, modifications, service, repair and maintenance as well as updating and automation & mechanization of distribution networks in line with modern standards and in a safe situation. In this project Monenco Iran is in charge of supervision on operational plans for distribution networks in northwest department of Great Tehran Electrical Distribution Company comprising 6 regions based on modern technologies with 15 Power Distribution designers.



## Consultancy and Site Supervision Services for Borujerd 230/63 kV Substation

**Start date:** 2017 **Finish date:** 2019 **Location:** Arak, Iran

**Client:** Bakhtar Regional Electrical Company (BREC)

### Scope of work:

- ▶ Project set up (Kick off meeting, site visit and preparing project plan)
- ▶ Basic design for civil and electrical (Preliminary design & conceptual design)
- ▶ Preparing tender documents
- ▶ Evaluation of bidders and assist client in contractual negotiation
- ▶ Supervision on project construction activities
- ▶ Design review
- ▶ Witnessing factory acceptance test
- ▶ Assist client in contractual matter
- ▶ Commissioning, test and project close out
- ▶ Performing of related tests
- ▶ Reporting (Inception Report, Monthly Progress Report, Quarterly Progress Report and Project Completion Report)

**Description:** Due to growth of energy consumption in Lorestan Province also in order to meet the projected demand and develop and optimize the power transmission and distribution system in this region, Bakhtar Regional Electric Company intends to construct new transmission substation (230/63 kV, 320 MVA) in Borujerd.

In general, the benefits of switching substation are:

- ▶ Lack of capacity in 230 kV substations to supply the consumers demand and solve this problem
- ▶ Overcome with increasing demand of electricity by newly built industrial units
- ▶ Construction of back-up 230 kV substation for supplying Borujerd demands
- ▶ Modifying the voltage profile due to high length of 63kV transmission lines

## Consultancy and Engineering Services of Tabriz Subway Substations at Line 2

**Start date:** 2016 **Finish date:** 2017 **Location:** Tabriz - Iran

**Client:** Imensazan Consultant Engineers Institute

**Scope of work:** Consultancy and Engineering Services of 9 and 10 stations of Tabriz Subway Substations - Line 2

**Description:** The main intention of this project is due to the development of Tabriz urban transportation system whereas Tabriz Urban Railway Organization decided to design 4 subway lines including 62 substations. In this project, Monenco Iran is responsible to render consultancy and engineering services for Detailed Design of Substations No 9, 10 & 14 of Tabriz Subway at Line 2 for Civil, Electrical and Mechanical Systems.



## Consultancy Services for Extension of 230/63 kV Substations at Qom 2 and Shoush

**Start date:** 2016 **Finish date:** 2018 **Location:** Tehran, Iran **Client:** Tehran Regional Electric Company (TREC)

### Scope of work:

- ▶ Identification and preliminary design
- ▶ Basic design and preparation of tender documents
- ▶ Assisting in holding of tenders
- ▶ Surveying of accordance of the extension plan with contract specification
- ▶ Assist on Holding tenders and contracting
- ▶ Inspection and tests



**Description:** Shoush and Ghom 2, 230/63 kV High Voltage Substations are the two most important substations in Tehran Regional Electricity Company (TREC) territory which feed a large number of substations in Ghom and Tehran region. As the energy demands have been raised, TREC intends to extend the above mentioned substations in order to improve the reliability and operation. In this project Monenco Iran is responsible to render engineering and consultancy services of extension and increasing capacity of Shoush and Ghom 2 High Voltage Substations.

## Engineering and Supervision Services on Civil, Electrical and Mechanical Systems for Vakil Substation of Shiraz Subway

**Start date:** 2016 **Finish date:** 2017 **Location:** Shiraz, Iran **Client:** Shiraz Urban Railway Organization

### Scope of work:

- ▶ Conceptual and supplementary studies for civil works, electrical and mechanical systems
- ▶ Detail design of whole documents related to civil works, electrical and mechanical systems
- ▶ Site supervision on the construction and commissioning of this substation based on the operational requirements of the client

**Description:** Since the Vakil Station of Shiraz Urban Railway Line 1 is located in the narrow street and due to traffic difficulties for the construction of the station through cut and cover method, Shiraz Urban Railway Organization decided to eliminate this station from line one. In order to prevent that matter, Monenco suggested the underground method (Russian Method). Therefore, Vakil Station which is located near the historical area and Bazare Vakil is the first station of Shiraz Urban Railway that is going to be constructed through the underground method and has the highest importance among other subway projects in Shiraz.



## Optimization of Civil Works in Power Substations

**Start date:** 2016 **Finish date:** 2016 **Location:** Kermanshah, Iran

**Client:** West Regional Electrical Company (WREC)

### Scope of work:

- ▶ Primary and final instruction report for power substation land determining
- ▶ Optimal size field classification due to lay out drawings
- ▶ Design of multi floors substation in urban zone
- ▶ Necessity of substation construction in unsuitable field- Report
- ▶ Optimal design drawings of architectural plan classify for substations
- ▶ Optimal design drawings of landscaping
- ▶ Foundation of equipment optimal design drawings
- ▶ Water and energy optimization design drawings
- ▶ Design drawing for using new energies
- ▶ Classification of structural design to reduce time and cost of construction and increase of quality
- ▶ Preparation of civil work document check lists
- ▶ Instructions and guidelines for manufacturing of 20 kV cubicles based on prior experiences and defects

**Description:** This project is a research project which its main goal is reducing of cost and size for civil works in power substation construction. West Regional Electrical Company (WREC) has been selected by optimization workgroup as responsible company for doing "Optimization of Civil Works in Power Substation". Therefore, representatives from all Iran Regional Electrical Companies formed the mentioned workgroup. In this project, studies and designs shall be done in order to optimize the civil works in power substations in respect of cost and size.

## Consulting and Engineering Services for Procurement of 500 MVAR Capacitor Bank for Electricity Industry

**Start date:** 2017 **Finish date:** 2018 **Location:** Kermanshah & Tehran, Iran

**Client:** West Regional Electrical Company (WREC) & Tehran Regional Electrical Company (TREC)

### Scope of work:

- ▶ Preparation of tender document, bid evaluation and meeting with first approval bidder for finalized the pre-contracting discussion
- ▶ Preparation of contract document and consult client for technical and financial issues
- ▶ Design review of the contract's documents till final documents
- ▶ Supervision for process of making equipment
- ▶ Supervision for Factory Acceptance Test

**Description:** RL loads consume reactive power which will cause to increase the power loss and as a result the cost and power generation will be increased. Thus, air pollution and needs for more fuel is another result of increasing reactive power in grid network. Capacitor Banks which is located vicinity of loads can produce requested reactive power and solve mentioned problems. Meanwhile, Tavanir Company needs 2500 MVAR Capacitor Bank and West Regional Electric Company is responsible for procurement of 500 MVAR.

## Consultancy & Engineering Services of Phase II of First Line of Shiraz's Metro

**Start date:** 2014 **Finish date:** 2015 **Location:** Shiraz- Iran

**Client:** Shiraz Urban Railway Organization

**Scope of work:** Consultancy services of phase 3 supervision, site supervision of the remaining of civil and architectural and track work and, supervision of special and un-special equipment

**Description:** After the operation of phase 1 of 6km of first line of Shiraz's metro, Monenco Iran was chosen as a consultant for consultancy and supervision of remaining the entire job left either construction and track work or equipment.

Therefore, Monenco Iran arranged a group for metro and railways project. Fortunately the 3km of phase 2 of line 1 was in operation successfully in April 2017 and the rest of the job will be finished by end of 2017.



## Studies & Designing and Workshop Supervision for Khomeyn 400 kV Substation

**Start date:** 2016 **Finish date:** 2018 **Location:** Kermanshah & Tehran, Iran

**Client:** Bakhtar Regional Electrical Company (BREC) & Tehran Regional Electrical Company (TREC)

### Scope of work:

- ▶ Basic design for civil and electrical
- ▶ Preparation of tender documents for contractor selection
- ▶ Design review
- ▶ Inspection and test
- ▶ Preparation of prices and quantity tables
- ▶ Workshop supervision

**Description:** Due to growth of energy consumption in Markazi Province and in order to meet the projected demand and develop and optimize the power transmission and distribution system in this region, Bakhtar Regional Electric Company intends to construct new transmission substation (400/63 kV, 320 MVA) in khomein. In general, the benefits of switching substation are:

- ▶ Lack of capacity in 400 kV substations to supply the consumers demand and solve this problem
- ▶ To overcome for increasing of electricity demand by newly built industrial units
- ▶ Construction of back-up 400 kV substation for supplying khomein demands
- ▶ To modify the voltage profile due to high length of 63kV transmission lines

## Consulting Services to Provide Construction Supervision Services for Design Supply and Installation of HVAC Line and Associated Substation Works in Tajikistan and Kyrgyz Republic under CASA 1000 Project

**Start date:** 2016 **Finish date:** 2018 **Location:** Kyrgyz Republic and Tajikistan

**Client:** Bark-i-Tojik Tajikistan and NEGK Kyrgyzstan

### Scope of work:

- ▶ Design Review
- ▶ Preparation of Project Implementation plan, Monitoring Scheme and Cost Control
- ▶ Supervision on Project Construction Activities
- ▶ Assist Client in Implementation ESMP, RAP and HSE Plan
- ▶ Reviewing As-Built Documents

**Description:** In Central Asia, the Kyrgyz Republic and Tajikistan have a surplus of electricity during the summer because of most abundant clean Hydropower resources. Nearby in South Asia, Afghanistan and Pakistan cannot meet their citizens' electricity needs, especially during the sweltering summer. A new electricity transmission system, called CASA-1000, between all four countries would help make the most efficient use of clean hydropower in the northern countries by enabling them to transfer and sell their electricity surplus in the summer to the deficient countries in South Asia. The selection and employment of consultants was performed under IBRD (International Bank for Reconstruction and Development) loans and IDA (International Development Association) credits & grants by World Bank borrowers. The project consists two parts: 500 kV HVAC transmission system as well as  $\pm 500$  kV HVDC transmission system.



Monenco Iran was selected as the consultant for HVAC part of the project that consist bellow transmission lines and associated substations:

- ▶ 500 kV Transmission line from Datka to Khujand (475 km) and extension works for associated substations (The Kyrgyz Republic)
- ▶ 500 kV Transmission line from Regar to Sangtudeh (115 km) and extension works for associated substations (Tajikistan)



## Street Light Planning of Tehran

**Start date:** 2016 **Finish date:** 2017 **Location:** Tehran, Iran

**Client:** Great Tehran Electrical Distribution Company (GTED)

**Scope of work:** Engineering services for designing of street lighting including basic design and detail design, control & revise owner design, data sheet design and cost estimating (CalcuLuX software was used in this project)

**Description:** Tehran Distribution Network Company is intended to increase the quality of lighting systems in Tehran. Therefore, due to high capability of Monenco Iran in such projects also the sensitivity of design, quality and efficiency of lighting systems, this project in under the action by Monenco Iran.

## Consultancy & Supervision Services for Technical & Economic Analysis and Design for Power Distribution Projects in the West of Golestan Province

**Start date:** 2016 **Finish date:** 2017 **Location:** Golestan Province, Iran  
**Client:** Golestan Province Electrical Distribution Company

### Scope of work:

1. Technical & economical analysis
2. Design of power distribution projects comprising:
  - ▶ MV & LV Networks (Overhead and Underground Lines)
  - ▶ Distribution Transformers and Posts
  - ▶ Street Lighting
  - ▶ Replacement Utilities
  - ▶ Provide Right of Way

**Description:** In this project Monenco Iran is in charge of preparing designs on operational plans for distribution networks in the West of Golestan Province Electrical Distribution Company comprising 14 regions, based on modern technologies with 24 Power Distribution Designers.



## Consultancy Services for Supervisory on Technical & Financial Power Distribution Projects in the East of Golestan Province

**Start date:** 2016 **Finish date:** 2017 **Location:** Golestan Province, Iran  
**Client:** Golestan Province Electrical Distribution Company

### Scope of work:

Technical & Financial Supervision on Power Distribution Projects Comprising:

- ▶ New Electrification
- ▶ Street Lighting
- ▶ Repair and Maintenance
- ▶ Equipment Quality Control
- ▶ Reconstruction Network
- ▶ Equipment Procurement
- ▶ Construction
- ▶ Rehabilitation

**Description:** One of the most important issues in operations and management of the plans is implementation for development, modification, repair and maintenance services as well as updating and automation & mechanization of distribution networks in line with modern standards and in a safe situation. In this project, Monenco Iran is in charge of supervision on operational plans for distribution networks in the East of Golestan Province Electrical Distribution Company comprising 14 Regions based on modern technologies with 30 Power Distribution Supervisors.



## Telecommunication & Dispatching Division

**T**elecommunication and Dispatching Division was formed in 1994 to provide engineering and consultancy services to power and transportation industries. Today, after over two decades, we provide A-Z engineering and consultancy solutions to a wide range of industries such as telecommunication, oil and gas, water and waste water, ports, steel as well as power and transportation. It is one of the most important and fastest growing divisions in Monenco as a result of dealing with enter-technological and high-tech businesses (responding to the needs of the country for advanced ICT utilizing activities).

Having technical teams dedicated for SCADA and telemetry, dispatching and monitoring, AMI and smart solutions, mobile and fixed telecommunication networks, IT systems (Big Data, Data Centers, Data Model, ...), telecommunication master planning and telecommunication business and strategic planning has made us a reliable and unique consultant for our clients in providing total solutions to them.

Benefiting from highly qualified engineers, software, hardware infrastructures and the valuable experience of the company, the success of our clients in their plans and portfolios is guaranteed.

## Dispatching & Automation

**D**ispatching and Automation Department serves consultancy services in various stages of consultancy and engineering in SCADA and automation plans within the power industry (including generation, transmission and distribution), copper and steel production industries, metro & railway, oil & gas and water, waste water and other heavy industries. In this regard this department has an extensive knowledge in the engineering of SCADA and telemetry systems, Smart Grids and AMI and WAMS, dispatching, EMS, DMS and distribution automation within the power sector.

Furthermore, in 2016 Monenco was granted the first grade of expertise in SCADA and cyber security from the Ministry of Power of Iran.



## Telecommunication

**T**he Telecommunication Department of Monenco Iran has an extensive presence in different industries namely Power, Transportation, Oil & Gas, Steel, port, etc.

In spite of low Capex in telecom sector in comparison to other sectors in industrial mega projects, the added value made by telecom sector in terms of improving the efficiency and reducing the operating costs, is extremely noticeable. In this case the role of a consulting engineering firm in accomplishing telecommunication master plans and the application of the technologies like IoT and Big Data is remarkable.

The telecom sector is like a volcanic eruption that in the nearest future will disrupt almost all industries in the world by the means of innovation. Mobile devices and having access to broadband networks is becoming an inseparable part of today's societies that can be affected by Video Streaming and Internet of things (IoT). The number of connected things and smart devices are intensively increasing and this growing trend is promising for telecommunication firms in terms of untapped markets and greater market opportunities. For the telecom operators, PAPs, ISPs and other B2C companies, business strategy and a winner business model accounts as an undeniable necessity in this competitive and volatile market. Also, the rapidly growing industry and its diversified actors such as MVNOs, OTTs, broadband operators, IoT and M2M providers and other regulatory organizations in each country would be requiring a robust policy and regulation.

Telecom infrastructure companies in order to expand their network and increase their efficiency should get involved in technologies like software defined network and network function virtualization. In implementing these new systems they are facing fast changes in technology and equipment which requires the best options and solutions.

Telecommunication Department of Monenco is a reliable consultant in the fields of IoT, Smart solutions, Network design, mobile & fixed broadband being accompanied with strategy and business model which are supported by R&D to fulfill industries needs.





## Articles and Technical Reports

Several technical reports have been prepared and published in 2016 in order to introduce new technologies & systems to the clients. Below is a list of the mentioned reports:

- ▶ Power Line Communication technologies in smart distribution grids
- ▶ Application of radio networks in disaster management
- ▶ Application of IoT within the industrial sector
- ▶ Application of IoT in asset management
- ▶ An introduction of LiFi technology
- ▶ An introduction to Software Defined Anything
- ▶ An introduction to WiGig technology

## Management and Site Supervision on the Implementation of Iran National Gas Dispatching Center

**Start date:** 2016 **Finish date:** 2017 **Location:** Iran

**Client:** Iran Gas Engineering and Development Company

**Scope of work:** Design review, procurement engineering, management and site supervision

**Description:** Considering the surface of the country, Iran is the second owner of gas pipelines worldwide (CIA World Factbook, 2015). This size and expansion of utility requires balancing and monitoring systems to communicate data and information to a dispatching center to manage gas flow and pressure, minimize operational imbalances and optimize the supply and consumption all over the country.

Dispatching centers are strategic infrastructures in every country comprising a unique, centrally controlled framework incorporating the entire gas chain - production, field treatment, transportation, storage, processing, and distribution (to the city entrants) with centralized information exchange and timely interactions between various parties with the purpose of guaranteeing a safe, reliable and efficient operation based on the actual demand data. All these roles are carried out through a complex technological architecture run by a telemetry network, remote data transition system and centralized acquisition, supervision and control system.

Iran national gas dispatching center which is located in Tehran and its backup in Isfahan is planned to be test launched by September 2017. Monenco Iran Consulting Engineers is in charged with consultancy, document endorsement, management and site supervision of Iran national gas dispatching system. It worth mentioning that Monenco Iran is also Iran Electricity Grid Management Co.(IGMC) consultant and is responsible for the consultancy services, engineering and supervision on implementation of Iran national electricity dispatching center.

The consultancy services and management and site supervision on Iranian national gas dispatching center is awarded to Monenco Iran Consulting Engineers after having engineered and supervised on the implementation of Iran National Electricity Dispatching Center and water and waste water dispatching and telemetry. In this case, Monenco Iran is the sole consulting engineering firm in Iran with the valuable experience of engineering, detailed design, design review, preparation of EPC and EPCF tender documents and management and site supervision on the implementation of electricity, gas and water dispatching centers.



## Oman Water Telecommunication Architecture Study

**Start date:** 01/2017 **Finish date:** 07/2017 **Location:** Oman

**Client:** Public Authority for Electricity & Water (PAEW)

**Scope of work:** Data Gathering, Conceptual Design, Basic Design, Recommending Design and Methodology for Implementation and Financial Study

**Description:** Water crisis is global concern. In this case, managing the optimal use of water sources and supervision on them, particularly in arid areas, is very critical. Efficient distribution of water is a key element for any water utility in terms of continuity of supply. Therefore, controlling and monitoring the water systems is essential to follow up the water quantity and quality supplied to the customers.

Since Oman faces the shortage of water, PAEW seeks Monenco as an international consultant to improve and expand the telecommunication network of water industry by the means of the above mentioned project. ‘Telecommunication architecture study’ mission is to design an integrated monitoring system on the telecommunication network and its security. Having designed and supervised similar projects in the national level, Monenco Iran is responsible for designing the communications network by the edge technology and its proficient experts to carry SCADA, CCTV, NMS and VOIP.

Consultancy for the Realization of a Telecommunication Architecture Study throughout the PAEW Service Area will be done for all the governorates except Dhofar and includes near 400 sites to enable PAEW to have a manageable telecom network considering cost, security issues and NMS requirements.



## Study, Design and SCADA Master Plan Preparation for Zanjan Water Utility

**Start date:** 2017 **Finish date:** 2018

**Location:** Zanjan Province- Iran **Client:** Zanjan Water and Waste Water Company

### Scope of work:

- ▶ Preparation of SCADA system current state for Zanjan water utilities such as water treatment plants, reservoirs, pumping and pressure reducing stations
- ▶ Preparation of Zanjan SCADA master plan
- ▶ Preparation of SCADA basic design
- ▶ Preparation of SCADA and telemetry system tender documents
- ▶ Collaboration in tendering and choosing the SCADA contractor

**Description:** One of the major issues affecting the water industry is to manage water consumption due to the shortage of water resources within the country. In this regard, the role of an integrated, centralized and modern control system to enhance safe water supply networks and water supply reliability, in an extensive water network with vast number of stations is inevitable.

Relying on our expertise in telecommunication and SCADA systems and being the only engineering firm with the first Grade Certificate in Dispatching & Automation in Iran, paved the way for us to become the winner of the Tehran Water and Wastewater Telemetry tender with the highest technical score in 2014.

The project of “Study, design and SCADA master plan preparation for Zanjan water utility” was defined for Monenco due to the successful implementation of the engineering phase of Tehran metropolitan water telemetry system which will result in a safe and up-to-dated operation for Zanjan water infrastructures. Implementation of this project facilitates the efficient functionality of water network, reduces failures, operational expenses and related costs, and provides the capability of energy and water management in real time from remote center.



## Enabling Connectivity and Interoperability between CAS and Application Systems for Iranian Advanced Metering Infrastructure Project (FAHAM)

**Start date:** 2016 **Finish date:** 2018 **Location:** 39 Electricity Distribution Utilities, Iran

**Client:** Renewable Energy and Energy Efficiency Organization (SATBA)

### Scope of work:

- ▶ Defining FID1-Packages, interoperability specification and message structure between AHEs, MDM and applications according to IEC 61968-9
- ▶ Defining FID1-4 and FID1-5 interoperability specification between AHEs, MDM according to IEC 61968-9 for Periodic Meter Reads
- ▶ Defining FID3-40, implementation of interoperability among billing system and MDM

**Description:** In order to achieve a modern grid with control capability it is mandatory to use the measured electrical parameters to improve the system performance. After implementation of smart metering infrastructure, the next step is effective utilization of huge amount of data from central access system (CAS). Application systems (or conventional legacy systems) use these load profiles (that is available through the smart electricity meters) to control and manage the power system and guarantee the effective operation of the whole system. The most important parts of application systems are Customer Information System (including Billing System), Outage Management System, Demand Response Management, Power Quality Management and Engineering, Energy Management System, GIS, Asset Management, and etc.

FAHAM Project must provide and process the information related to metering equipment in an information infrastructure and then this information is shared in order to application layer usage. Billing is the first and the most important application system that already is used for processing of captured metering information in order to customer payments. Different billing period, on-demand and accurate billing are the most interesting features of the billing application system.

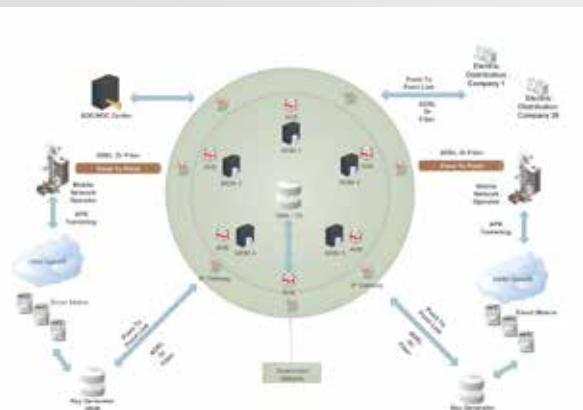
So far CIS and Billing systems of Electricity Distribution Utilities are connected to the FAHAM central systems and other application systems as an interface between network operator and customer are in pilot and offline test procedure.

### Future Trends based on Application Systems:

- ▶ Mobile based applications for customer contribution in network operation and management (such as CIS apps.)
- ▶ Asset and Device Management using condition monitoring of distribution components (such as transformer null current, THD monitoring of transformer, and etc.)
- ▶ Outage prediction, detection, retrieval, and customer awareness based on an automated procedure (effective combination of GIS, CIS, and OMS based software)
- ▶ Developing Demand Management plan with specific attention to industrial customers using related developed softwares

### CVP:

- Great achievement in developing National Interoperability Specifications between CAS and applications
- Upgrading the legacy billing system of utilities by enabling connectivity and Interoperability between CAS and billing system
- Improving CIS as an effective interface between customer and operator (awareness of CPP, TOU, RTP, and current tariff and the maximum allowable and online power consumption)
- Inform the customer or operator from different network contingencies



## Power Generation Division

**P**ower Generation Division covers all types of power generation projects from Combined Cycle, Thermal Power Plant to Renewable and CHP, CCHP. More than 52,000 MW power generation projects have been Engineered, Designed, and Supervised by this department including 19,000 MW Gas Turbine and 33,000 MW Combined Cycle Power Plants.

Also feasibility studies of more than 3000 MW Thermal Power Plants have been done by Monenco. In 2016, Monenco Iran was involved in 5000 MW power generation projects globally.

## Desalination

**T**he desalination plants for supplying potable and industrial water are frequently constructed as integrated part of power generation and sea water desalination plants. In this context it is very important to choose and optimize the most appropriate plant configuration and technology for the desalination process. This applies in particular to privately financed projects in public-private partnership models. That is why Monenco always designs such facilities individually to best meet the specific project requirements. This includes both processes for sea water desalination as well as raw water treatment and also post-treatment and/or conditioning of product water according to the relevant requirements.



## Consulting Services

**M**onenco renders consultancy services as owner engineer for power plant projects. As a consultant the scope includes: review of design & drawing as submitted to client for approval, engineering & project management, supervision of construction, installation, testing, commissioning, quality control, dismantling & disposal procedures and other activities throughout pre-construction/construction/commissioning stages of project. Supervision of all activity in the site such as site leveling, excavation, foundation, steel structure, concrete structure, welding, test of material and equipment, piping, cabling, termination and etc.

## Wastewater Streams Recovery and Reuse

Due to lack of available potable water resources in the most parts of Iran, arid and semi-arid climate in our country, also for the sake of protecting and preserving the environment from pollution, using our available experiences and technologies for recovery and reuse of wastewaters in industrial plants as well as sewage recovery would be very applicable. Based on that, Monenco started participating in this market by rehabilitation and redesign of waste water treatment plants in old industrial and power plants.

## Combined Cycle Power Plants

**D**ue to economical and environmental concerns, there is general tendency towards constructing combined cycle power plants or converting gas turbine power plants into combined cycle power plants, to increase efficiency. Monenco is a pioneer company in offering engineering and consultancy services for different modules of combined cycle power plants.





## Feasibility Studies

To start a business, there is a need for insight and vision in terms of the viability of the proposed project concept. Most rational decisions, taken either by existing or aspiring entrepreneurs to make a business investment, are preceded by an investigation of the feasibility of the project. The analysis of the project involves a certain number of stages also some parameters and elements need to be analyzed in order to make decisions about the viability and direction of the business. In Monenco, we have an expert team for the technical and economical feasibility studies of the projects in all fields.

## Main Cooling System Modification

The purpose of Main cooling system Modification is reducing water demand of cooling system. For modification power plant cooling system, Hybrid system (dry/wet cooling system) should be applied. The hybrid system cooling system consists of a Heller type\_ dry cooling tower which is connected to the CW (Cooling Water) circuit, downstream of the turbine dry tower. Monenco has been started design of main cooling system modification since 2016.



## Gas Turbine Power Plants

Currently a significant fraction of electrical power in Iran is generated through gas turbine power plants and this is growing rapidly. Monenco has long experience of offering engineering, design and consultancy services for gas turbine power plants.



## Renewable/Green Energies & Distributed Generation

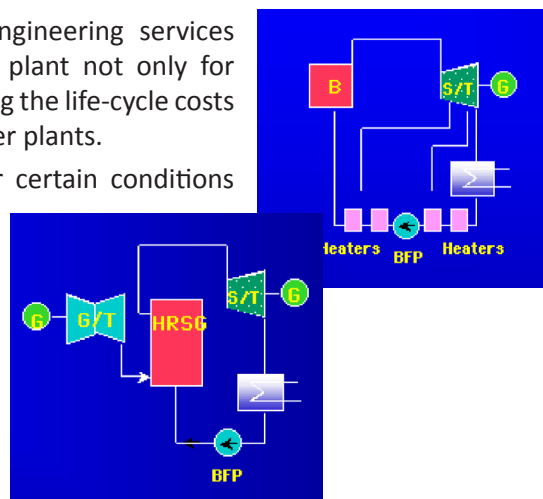


Monenco actively participates in eco-friendly and clean energy projects such as, renewable energy generation from water, wind and sunlight and distributed generation with use of combine heat and power generation (CHP). We are well aware that protecting and preserving the environment is both a social responsibility and a crucial element to sustainable development. The renewable energy generation and distributed generation in Iran is increasing with a significant rate and this can be seen as an emerging market for Monenco. Monenco started participating in this market since 2009.

## Repowering

Monenco participates in studying and rendering engineering services in repowering projects of existing thermal power plant not only for extending the lifetime of existing plants but also for reducing the life-cycle costs in order to remain competitive in comparison to new power plants.

Repowering targets existing thermal power plant under certain conditions to make such an effort viable for competitive power generation costs. Monenco started to study different thermal power plants in Iran to fulfill the goal of modernization and repowering in order to increase the economics and dispatch ability of existing power assets.



## Design of Chabahar Combined Cycle Power Plant

**Project Type:** Combined Cycle Power Plant **Start Date:** 2015 **Finish Date:** 2018

**Location:** Chabahar, Iran

**Owner:** Saba Southwest Power Generator Company

**Capacity:** 160 MW (1 STG\* 160 MW)

**Scope of work:** Basic Design, Detail Design, Interfacing Review, 3D Modeling of Plant and Site Technical Office Coordination

**Description:** The plant is located at 15Km far away from Chabahar city which is consisting of 1 steam unit.

The portions of combined cycle power plant each consisting of two (2) HRSGs and one steam turbine generator sets & main and auxiliary cooling system & 400 kV GIS substation for the existing simple cycle V94.2 gas turbine power plant including 2 GTG units to be converted to the combined cycle power plant in "2+1" configuration for the Chabahar site.



## Consulting and Engineering Services for 50MW (20\*2.5MW) Wind Farm in Aqkend

**Project Type:** Consulting and engineering services **Start Date:** 2017 **Finish Date:** 2018

**Location:** in Aqkend city in Mianeh - East Azerbaijan Province **Client:** Nasb Niroom

**Scope of work:** Basic Design, detail Design and supervision on vendor's activities

**Description:** Due to the necessity of clean energy and renewable power generation, construction of renewable power plants is growing rapidly in the entire world. These plants generate power while reducing the environmental pollution.

The main goal of this project is to construct a wind farm with the capacity of 50 MW including 20 wind turbines each with the capacity of 2.5 MW. The plant will be located in Aqkend city in Mianeh-East Azerbaijan Province in a land area of about 700 hectares.

## Design of Qeshm Combined Cycle Power Plant

**Project Type:** Combined Cycle Power Plant **Start Date:** 2016 **Finish Date:** 2018

**Location:** Qeshm Island (Hormozgan), Iran **Owner:** Energy Gostar Qeshm Company

**Nominal Capacity:** 500 MW (2 GTG \*170MW + 1 STG \* 160 MW)

**Scope of work:** Monenco provides Basic Design, Detail Design, 3D Modeling of Plant and overall engineering

**Description:** The plant is located in Qeshm Island in Hormozgan province and is consisting of one power block (gas and steam portions) of combined cycle power plant consisting of two (2) open cycles V94.2 GTGs, two (2) HRSGs and one steam turbine generator set.

## Design of Bandar Abbas Combined Cycle Power Plant

**Project Type:** Combined Cycle Power Plant **Start Date:** 2017 **Finish Date:** 2019

**Location:** Bandar Abbas City, Iran

**Owner:** TPPH Company **Capacity:** 906 MW

**Scope of work:** Detail Design, Vendor Review, 3D Modeling of Plant and Overall Engineering

**Description:** The plant is located near Bandar Abbas city in Hormozgan province which is consist of 1 block of combined cycle power plant, with two gas turbine generator sets (F class) & two HRSGs and one steam turbine generator set (F class) & main and auxiliary cooling system & 400 kV substation for power plant.

2 GTG units will be converted to the combined cycle power plant in "2+1" configuration for Bandar Abbas site. In addition, the system of main cooling type is once trough.



## Design of Ferdowsi Combined Cycle Power Plant

**Project type:** Combined Cycle Power Plant **Start Date:** 2015 **Finish Date:** 2017

**Location:** Mashhad (Khorasan), Iran

**Owner:** MAPNA Ferdowsi Power Generation Company **Capacity:** 480 MW (3 STG \* 160 MW)

**Scope of work:** Monenco provides Basic Design, Detail Design, 3D Modeling of plant, Interfacing Review

**Description:** The plant is located near Mashhad city in Khorasan Province which is consisting of 3 steam units.

The portions of combined cycle power plant each consists of two (2) HRSGs and one steam turbine generator sets & main and auxiliary cooling system & 400 kV AIS substation for the existing simple cycle V94.2 gas turbine power plant including 6 GTG units to be converted to the combined cycle power plant in "2+1" configuration for the Ferdowsi site.



## Design of Tabriz Combined Cycle Power Plant

**Project Type:** Combined Cycle Power Plant **Start Date:** 2017

**Location:** Tabriz (Osku), Iran **Owner:** Thermal Power Plant Holding Company

**Nominal Capacity:** 451 MW (1 GTG \*309MW + 1 STG \*144)

**Scope of work:** Basic Design, Detail Design, 3D Modeling of Plant and overall engineering

**Description:** The plant is located in Tabriz city in east Azarbeijan Province consisting of gas and steam generation portions. The plant consists of one(1) cycle Class F GTG SIEMENS type + one(1) STG, one(1) HRSG.

## Design of Mokran Combined Steam and Power Generation Plant

**Project Type:** Combined Steam and Power Generation Plant **Start Date:** 2016 **Finish Date:** 2017

**Location:** Chabahar, Iran **Owner:** Mokran Abniroo Company

**Nominal Capacity:** 340 MW (2 GTG \*170MW) + Min.150 t/h to Max.690 t/h (HP steam)

**Scope of work:** Monenco provides Basic Design, Detail Design, 3D Modeling of Plant and overall engineering

**Description:** The plant is located in Chabahar city in Sistan and Balouchestan province consisting of gas and steam generation portions. The plant is a unit of Mokran petrochemical plant. The plant consisting of two (2) open cycle V94.2 GTGs, two (2) HRSGs.

## Design of Orumiyeh Combined Cycle Power Plant

**Project Type:** Combined Cycle Power Plant **Start Date:** 2016 **Finish Date:** 2019

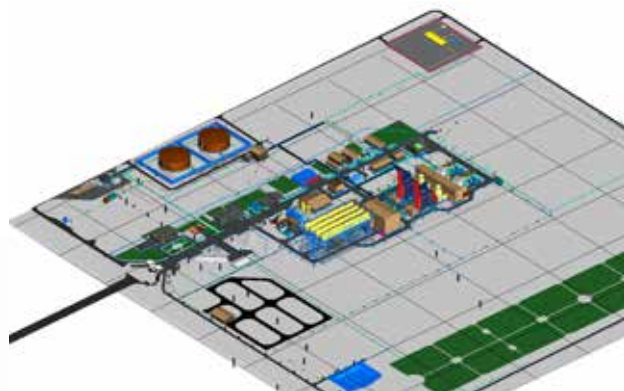
**Location:** Orumiyeh City, Iran **Owner:** Tadbir Sazan Saramad Company

**Capacity:** 480 MW (3 STG \* 160 MW)

**Scope of work:** Monenco provides Basic Design, Detail Design, 3D Modeling of Plant, Interfacing Review

**Description:** The plant is located near Orumiyeh city province which is consisting of 3 steam units.

The portions of combined cycle power plant each consisting of two (2) HRSGs and one steam turbine generator sets & main and auxiliary cooling system & 400 kV AIS substation for the existing simple cycle V94.2 gas turbine power plant including 6 GTG units to be converted to the combined cycle power plant in "2+1" configuration for the Orumiyeh site. In addition, the system of cooling type is Air Cooled Condenser.



## Consultancy Services & Site Supervision for Siahpoush 62 MW Wind Farm

**Project Type:** Consulting and Site Supervision **Start Date:** 2016 **Finish Date:** 2017

**Location:** Tarom Sofla, Siahpoush, Qazvin Province **Client:** Arian MahBaad Co.

### Scope of work:

- ▶ Consultancy Services (Basic and Detail Documents Design Review)
- ▶ Pursuit Grid Connection Report
- ▶ Engineering Services to Client
- ▶ Site Supervision Including Supervision on Procurement, Construction, Pre commissioning ,Commissioning , FAT and SAT
- ▶ Site Supervision and Engineering Services During Guarantee Period

**Description:** Siahpoush is located in 40 Km far in the southwest of Manjil city. It includes 18 wind turbines, having an installed electric capacity of 62 MW and site area is about 458 hectares. The type of turbines is 3.4 MW manufactured by Siemens company. These wind turbines are the newest SIEMENS'S technology for onshore Wind Turbine Power Plants. Wind farm will be connected to electrical grid via 230/33 KV substation. The EPC contractor named SAFANICU\_Company that is one of the biggest EPC Company especially in construction of electrical substation. Monenco Iran is the consultant of the client to design review of documents and site supervision. By getting this project, Monenco is the only engineering company in Iran that has two large wind farm projects as consultant and engineer.

## Shahid Mofateh Power Plant Unit No.2 Main and Auxiliary Cooling System Modification

**Project Type:** Main & Auxiliary cooling system **Start Date:** 2017 **Finish Date:** 2018

**Location:** Hamedan City, Iran **Owner:** TPPH Company **Capacity:** 450 MW

**Scope of work:** Monenco provides Basic Design and Detail Design.

**Description:** For modification of Shahid Mofateh power plant cooling system, hybrid system (dry/wet cooling system) should be applied. The hybrid system cooling system consists of a Heller type\_dry cooling tower which is connected to the CW (Cooling Water) circuit, downstream of the turbine dry tower. The partly cooled water in the dry tower is cooled further in the shell side of a water to water heat exchanger group. From the heat exchangers the recooled cooling water flows to the suction side of the two new CW pumps, which, closing the CW circuit, deliver the water back to the condenser.

The heat transferred to the tube-side of the water to water heat exchangers is dissipated to the atmosphere by a certain number of cells (max.8) of the existing wet cooling tower. The existing CW pumps circulate the cooling water of the wet cooling system. As it is well known, the condenser temperature in a dry cooled unit is proportionally increasing with the dry bulb temperature of the ambient air. The higher condenser temperatures reduce the turbine output, which is a serious problem in such cases, when high turbine output requirements coincide with high ambient temperatures.



## Design of Asaluyeh Combined Cycle Power Plant

**Project Type:** Combined Cycle Power Plant (Steam Portion) **Start Date:** 2016 **Finish Date:** 2018

**Location:** Asaluyeh, Iran **Owner:** Asaluyeh Thermal Power Plant Company

**Nominal Capacity:** 484 MW (3 STG \* 162 MW)

**Scope of work:** Basic Design, Detail Design, 3D Modeling of Plant and Overall Engineering

**Description:** The plant is located in Asaluyeh consisting of gas and steam generation portions. In this project 3 GTGs are under operation in the existing portion. 3 HRSGs+3 steam turbine and generator will be constructed in extension portion. Produced power will be sold to the national authority and transfer via electricity grid for urban and industrial demands.





## Design of Rumaila Combined Cycle Power Plant

**Project Type:** Combined Cycle Power Plant **Start Date:** 2016 **Finish Date:** 2018

**Location:** Basreh, Iraq **Owner:** MAPNA Group

**Capacity:** 480 MW (3 STG \* 160 MW)

**Scope of work:** Basic Design, Detail Design, 3D Modeling of Plant and Overall Engineering

**Description:** The plant is located near Basreh city in Iraq province and is consisting of 3 steam portions of combined cycle power plant each consisting of one (1) HRSGs and one steam turbine generator set & main and auxiliary cooling system. For the existing simple cycle V94.2 gas turbine power plant including 6 GTG units to be converted to the combined cycle power plant for the Rumaila site.



## Technical and Economical Feasibility Study for 500~600 MW Combined Cycle Power Plant in Bafgh (BOO)

**Project Type:** Consulting and Engineering Services **Start Date:** 2016 **Finish Date:** 2017

**Location:** Bafgh, Yazd - Iran **Client:** Daelim Energy Company (South Korea)

**Scope of work:**

- ▶ Marketing study
- ▶ Site selection & infrastructure study
- ▶ Power generation capacity and technology studies
- ▶ Examination of power plant connection to the regional grid
- ▶ Environmental studies and assessment of the environment effects
- ▶ Preparation of financial type and investment model
- ▶ Technical and economical justifiable report
- ▶ Energy conversion agreement services
- ▶ Bankability

**Description:** In this project Technical and Economical Feasibility Study of 500~600 MW Combined Cycle Power Plant in Bafgh, Yazd province will be conducted.

## Thermal Power Plants Site Selection Studies

**Project Type:** Consulting and Engineering Services **Start Date:** 2016 **Finish Date:** 2018

**Location:** Iran **Client:** TPPH Company

**Scope of work:**

- ▶ Determining suitable locations for the establishment of thermal power plants (steam, gas and combined cycle) new with regard to various parameters using Geographic Information System (GIS) in all regions of the country
- ▶ Prioritization of suitable sites for construction of thermal power plants in the country with a 20-year planning horizon in three different periods of short-term, medium-term and long-term
- ▶ Preparation of the site map database in GIS and Identification full details of site selection

**Description:** In this project, proper locations for construction of new plants will be determined in a 20-year horizon by exchanging the electricity generation and consumption in Iran network. For each of the primary structures, 14 important factors must be considered. As a result, a complete database (Atlas of Power Plant) with full specifications of each of them in the GIS will be provided. In addition, during the work, the status of transmission and substations also a list of power plants that are going to be retired soon will be updated. The importance of this project is to provide a comprehensive database for Iran Ministry of Energy and Thermal Power Plants Holding Company.

## Oil & Gas Division

Oil & Gas and Petrochemical consultants across the globe are looking for timely solutions to help them address the current challenges of a global economic down turn, decline the overall margins and increased emphasis in process safety compliance.

Monenco offers innovative engineering solutions that provide unique answers to these challenges in areas of auditing, metering, upstream and process safety management consulting of petrochemical plants, oil & gas complexes and transmission lines. Our technical team has delivered leading methodologies, best practices and robust so ware solutions that reflect Oil & Gas Industry insights and vast experience in our core competencies.

We are, and will continue to be, second to none in understanding our client's needs and the most worthy steward of their resources.

This department benefits from participation and cooperation with prominent International and regional Engineering consultancy companies in joint ventures in rendering consulting and engineering services abroad.

At the same time this partnership provides broader opportunities for serving domestic clients with higher quality. Monenco, by having the major oil and gas projects in the work history has established

an outstanding presence in this industry and expanded the scope of services in order to spread its presence in this market. Entering into the new target markets such as metering, GTP, GTO and GTA in petrochemical plants, vapor control & recovery in refineries & tank farms, Bio-ethanol and technical inspection and Know How Transfer have been the most remarkable achievements for the department in 2016. Engineering and consultancy of new petrochemical complexes with gas as their feed and renovation and optimization of existing refineries are the targets of Oil and Gas Division. Challenging with our international competitors all around the world in the fields of oil and gas transportation, LNG storage and regasification terminals and small scale refineries-mini refineries-are extended global services of this division.

### Technical Reports

Oil & Gas Division has published following 2 technical reports in 2016 in order to introduce new technologies and systems to its clients:

- ▶ Operation of Smart Wireless F&G System
- ▶ Removing Hydrocarbon Contaminants from Underground Water Resources



## Technical and Site Supervision Services for Gas Supply and Distribution Projects in Tehran

**Start Date:** 2017 **Location:** Tehran, Iran **Finish Date:** 2018

**Client:** Tehran Province Gas Company

### Scope of work:

Technical services and supervision on the gas supply and distribution projects including industrial, urban, rural and building projects in Tehran province gas distribution company operation department in accordance to NIGS standards.

- ▶ Branches and distribution network construction projects with steel and polyethylene pipes, gas injection, industrial and non-industrial commissioning
- ▶ Constructing, installing and commissioning gas pressure reduction stations and cathodic protection
- ▶ Building and ancillary facilities projects related to gas pressure reduction stations, cathodic protection and operational buildings
- ▶ All operations required for the above mentioned construction and operation
- ▶ Land acquisition, distribution, domestic and industrial branches. Removal of old domestic globe valves and installation of valve pits. Refurbishing of gas industrial land, urban pressure reduction stations (CGS)

**Description:** Concerning Tehran Province Gas Company goals, as one of the subsidiaries of National Iranian Gas Company (NIGC), in terms of safe distribution services of natural gas, as a clean fuel, with the aim of providing welfare and increasing consumer satisfaction, intended to manage, design and implement gas supply and distribution projects in Tehran province including industrial, urban, rural and building projects in accordance to NIGC standards.



## Extension of Rendering Preliminary Feasibility Study for Increasing of Capacity of Abadan Petrochemical Plant based on Receivable Feed from Abadan Refinery

**Start Date:** 2014 **Finish Date:** 2015 **Location:** Abadan, Iran **Client:** Abadan Petrochemical Co.

### Scope of work in Phase 1:

- ▶ Updating cost estimation for performing of the project
- ▶ Cost – Revenue analysis of performing the plan and priorities
- ▶ Sensitivity analysis of the plant versus price changes and product quantities
- ▶ Extraction of all data regarding capital investment of the plant, fixed – variable cost, production parameter and analysis by comfar software
- ▶ Final report, acceptable for credit & financial organizations

**Description:** Abadan Petrochemical Company intends to perform feasibility study based on two scenarios:

1. To indicate feed price with consideration rate of 25% IRR
2. To indicate rate of interest based on feed price at present

The main goal of this project is a comprehensive study for MAPNA Group in order to help them in strategic planning and facilitate their entrance into Pipeline market.

## Consultancy Services for Installation of 3000bbl/Day Capacity Catalytic Reforming Unit (CRU) and 4000bbl/Day Condensate Fractionation Plant (CFP) at Rashidpour with Associated Facilities on Turn Key Basis Under EPC

**Start date:** 2015 **Finish Date:** 2018 **Locatin:** Bangladesh **Client:** Sylhet Gas Filed Limited Company

**Scope of work:** Contributing PMC services to the client including:

- ▶ Providing tender documents for CFP & CRU
- ▶ Technical bid evaluation of contractors
- ▶ Basic design review
- ▶ Participation in technical meetings with client and contractors
- ▶ Basic & detail design review
- ▶ Procurement engineering documents review
- ▶ Supervision of construction and commissioning of two plants, etc.

**Description:** The main purpose of this project is to produce high octane gasoline, Kerosene, Diesel Oil. LPG is the product that its production should be minimized. The feed comes from BIBYANA gas field of Chevron which contains Gas Condensate. This line goes to 4000 bbl /day Condensate Fractionation Plant to Fractionate Condensate to Naphtha (Motor Spirit), Diesel Oil, and Kerosene. Then Naphtha (Motor Spirit) will go through the pipe to 3000 bbl /day catalytic reforming unit including Naphtha Hydro Treating unit (NHT). Final products of this stage are Reformate, and LPG.

Reformate will have a minimum RON 99 (Research Octane No.) that will be blended with other hydrocarbon stream (light naphtha) to reach an acceptable octane no for gasoline product, based on Bangladesh government standards and market demand.



## Furnishing Import & Export Stations of Iran Ministry of Petroleum with Custody Metering System

**Start date:** 2014 **Finish Date:** 2017 **Locatin:** Iran **Client:** Iran Ministry of Petroleum

**Scope of Works:**

- ▶ Contributing PMC services including review, endorsement, modification, completion and approval of basic design
- ▶ Sites Visits and Sites Data Gathering
- ▶ Detail Design
- ▶ Procurement Engineering Services (including providing budgetary and final material take off)
- ▶ Tender Bid Evaluation, Vendor Review
- ▶ Pre-commissioning, Commissioning and Construction Services
- ▶ Technical Office and Sites Supervision Services

**Description:** In this project the production transaction points (export & import) of the ministry of petroleum will be equipped with custody meters (to measure crude oil & condensate production for 52 points across the country) and data transferring equipment to send on line information to central office in Tehran (16 points across the country). At the first stage of this project 10 points including of 8 points for national Iranian South Oil Company and 2 points for Iranian Offshore Oil Company will be equipped with Custody Metering System.

## Esfahan Refinery Upgrading (Package C)

**Start date:** 2015 **Finish Date:** 2018 **Locatin:** Esfahan, Iran

**Client:** National Iranian Oil Engineering and Construction Co. (NIOEC)

### Scope of Works:

Contributing PMC services including:

- ▶ Review, Endorsement, Completion and approval of basic design Package prepared by Technip
- ▶ Basic and detail design of flare system
- ▶ Basic and detail design of storage system
- ▶ Basic and detail design of fixed & floating tanks
- ▶ Basic and detail design of LPG storage and Loading system and Sphere tanks
- ▶ Procurement Engineering
- ▶ Preparing technical bids documents and evaluation of contractors
- ▶ Engineering Management Services
- ▶ Design review of vendors documents
- ▶ Interface engineering and management
- ▶ 3D modeling
- ▶ Detail design of units including, Flare network, Fuel system, Air system, interconnection, Fire Fighting system, Steam and Power system, Water system (Including Demine Water, BFW, Plant Water, Potable Water, Cooling Water)
- ▶ Site Supervision
- ▶ Residue Hydro treating Unit (RHU), Residue Fluid Catalytic Cracking (RFCC), Propylene Recovery Unit (PRU), Diesel Hydro treating Units (2 units), SRU (2 units), Amine Treating Units (two trains, for RFCC and Common), Sour Water Stripping Units (two trains, for RFCC and Common), RFCC Gasoline Hydro treating Unit (Prime G+) and RFCC LPG Mercox.

**Description:** Esfahan oil refinery upgrading project generally is categorized to the following three sections:

- a. New process units
- b. New utilities and offsite units
- c. Revamp all the existing units

## Consultancy and Design of Installation of Electric Actuator on the Long Handle Buried Ball Valves in 4, 6 and 8 inch sizes

**Start date:** 2016 **Finish Date:** 2017 **Locatin:** Iran **Client:** Tehran Province Gas Company (TPGC)

**Scope of work:** Consulting & design of installation of electric actuator on stem extension buried ball valves

**Description:** In order to protect environment/people against spread of gas in the air during earthquake, automatic shut-off system for gas stations is required. For that purpose, it is necessary to install the electrical actuator on the ball valves on inlet of stations. Electrical actuator will initiate when earthquake happens by sending signals to the actuator to emergency shut down the gas flow. In This project, Monenco is responsible for consultancy and design of installation of electric actuator on the long handle buried ball valves.



## Contributing Engineering Services for Transfer of Technology, Procurement, Installation, Commissioning of four Vapor Recovery Units at Ahvaz, Mashhad & Arak Gasoline Storage Tanks

**Start Date:** 2014 **Finish Date:** 2016 **Location:** Ahvaz, Mashhad, Arak - Iran

**Client:** National Iranian Oil Refinery and Distribution Company

**Scope of work:** Monenco is responsible to render engineering services for transfer of technology, procurement, installation, commissioning of four vapor recovery units.

**Description:** NIORDC intends to install four vapor recovery units at its gasoline storage tanks at Ahvaz, Mashhad and Arak areas. The purpose of this project is to control and recover of the released volatile organic compound at storage tanks to avoid the emission of harmful substances due to strict emission limits have been defined in country.

## Comprehensive Technical & Financial Feasibility Study, Business Plan for GTP (Gas to Propylene), GTO (Gas to Olefin) Plant

**Start Date:** 2014 **Finish Date:** 2015 **Location:** South Pars Gas Fields, Iran

**Client:** Iran Industries Development and Renovation Organization (IDRO)

### Scope of Work:

- ▶ Marketing study report
- ▶ Technical study report
- ▶ Economical study report
- ▶ Business plan report

**Description:** Market saturation due to excess production of methanol in recent years on one hand, and the importance of olefin production as a feed which is required as substantial material for petrochemical productions chain so low price of natural gas in the country on the other hand, and in order to increase the added value, have been caused the direction of Iranian petrochemical industries to be changed to installation of, GTO, GTP, MTP, MTO, plants. As the first step, a comprehensive feasibility study has been defined by IDRO to start the basic works in this regard.

## Project Management Engineering Services for Kermanshah Bio-ethanol Production Plant

**Start Date:** 2013 **Finish Date:** 2017 **Location:** Bisoton Industrial Zone (Kermanshah)

**Client:** Gostareh Sokht Sabz Zagros (Zagros Green Fuel Development Co.)

**Scope of work:** Project Management Engineering Services for all phases of Bioethanol Production Project such as;

- ▶ Feasibility Study
- ▶ Basic Design Engineering
- ▶ Detail Design Engineering
- ▶ Procurement
- ▶ Construction
- ▶ Pre-commissioning
- ▶ Commissioning
- ▶ Test Production
- ▶ Steady Production service

**Description:** This project is very important since it reduces the air pollution caused by gasoline fuels through using bioethanol fuel instead of MTBE which is a chemical and carcinogen material also increases the Octane of Gasoline. Accordingly, 200,000 liter/day Ethanol Alcohol (66 Million liter/year) and other auxiliary production from corn and other cereal feeds will be produced in this project.



## Design and Consultancy Services for Erection and Installation of Actuator on Existing Supper Block Valves

**Start date:** 2016 **Finish Date:** 2017 **Locatin:** Tehran, Iran **Client:** Tehran Province Gas Company

**Scope of work:** Design and consultancy services for erection and installation of actuator on existing supper block valves

**Description:** Considering of possibility of an earthquake in Tehran and the danger of fire after the earthquake or any landslides due to gas leakage caused by any failure in pipelines, the retrofitting sector of gas supply of the National Iranian Gas Company (NIGC) intends to install the actuators on main valves of rings in Tehran with remote control. In case of the occurrence of the earthquake, the actuators are operated in a short time to shut down the gas flow path. It should be noted that this project is considered as one of the national projects which is about to be implemented in the whole countries in the future.



## Mining & Geology

Monenco is committed to provide high quality services in the field of Geology, Exploration and Mining through its experienced staff also to establish cooperation with international well-known firms in the mentioned field. However, the services include: Geology, Exploration, Resource Geology, Geochemistry, Geophysics, Mining, Resource Estimate, Grade Control, Monitoring, Feasibility Studies, Soil Mechanics, Rock Mechanics, Open Pit Mine Design, Underground Mine Design, Mine Optimization, Environmental Studies, Mine Planning and Hydrology.

In addition, Monenco is equipped with sophisticated professional software such as Gemcom Surpac, Downhole Explorer, dataminestudio, FLAC, Gems, UDEC and prepared to provide consultancy services in exploration and extraction of mineral deposits while partnering with highly skilled international companies by using modern equipment and machineries.

## Introduction of New Technologies

Monenco as a consultancy company takes this responsibility to continuously update its knowledge. Therefore, several studies in related to the following fields were conducted and in the form of seminars, white papers presented to the clients, competitors and etc.

### Directional Core Drilling

Exploration drilling is one of the most important steps in Geometry identification and estimation of reserves. Drilling is considered one of the most expensive mining activities.

Geology and Mining Department with the introduction of new method of drilling as “Directional Core Drilling” to Iranian Clients active in mining is step forward saving me & money and improvement in exploration drilling in Iran.

### Laser Scanning System for Mine Survey

In mining operations determination block extraction in different period, geometry changes in place of extraction, volume of mineral depot, volume of waste depot, volume of waste depot are basis of mine design and planning. These works performed by manually surveying and followed by this method with human and system tolerance. Geology & Mining Department with the introduction of new method of surveying as "Laser Scanning System for mine surveying" to Iranian clients active in extraction mining is step toward saving me and money and improvement in mining in Iran.

### Significant Completed Projects

- ▶ Preliminary and Detailed Exploration of Iron Ore Anomalies in Yazd Province, Iran
- ▶ Detailed Exploration of Baba Ali 2 Iron Ore Deposit in the Hamadan Province
- ▶ Detailed Exploration of Galaly 2 Iron Ore Deposit in the Kurdistan Province
- ▶ Consultancy Services and Design Coke Making Plant in Central Alborz Coal Field, Savadkoh, Mazandaran Province Iran
- ▶ Consultancy Services of Exploration and Supervision on Contractor Operations in Central Alborz Coal Field, Mazandaran Province, Iran
- ▶ Engineering Services, Site Supervision, Additional Detailed Studies and Exploration Drilling of Water, Mining and Power Plant in Mazino-Tabas Coal Mine
- ▶ Consultancy Services, Study of Current Designs and Providing Detailed Design of Pabdana Coal Mine, Iran
- ▶ Coal Exploration Operations in Mazandaran, Zirab City
- ▶ Preliminary Coal Exploration in Takht Coal Mine in Golestan Province

### Consultancy Services of Exploration and Supervision on Contractor Operations in Central Alborz Coal Field

**Duration:** 24 Months **Location:** Mazandaran, Iran

**Client:** Iran Minerals Production and Supply Co. (IMPASCO)

#### Scope of Work:

- ▶ Geological and technical data gathering
- ▶ Preparing an archive of maps, documents and project documentation
- ▶ Topographical and geological mapping at 1:20000, 1:5000 and 1:1000 scales
- ▶ Provide geodatabase
- ▶ Design exploration plan
- ▶ Preparation of tender documents
- ▶ Site supervision
- ▶ Feasibility study

**Description:** The project area is located between Firozkouh and Haraz road in central Alborz coal field.

The project will be implemented in two phases. The first phase deals with data collection all the previous information therefore a comprehensive database is presented. In the second phase of drilling contractor monitoring and evaluation of promising locations in that area can be identified coal reserve volume Monenco is responsible in rendering consultancy services for this project to analyze and study the reserves of lower level of +2400 for planning, preparing and excavation.





## Consulting Services, Review of the Current Plans and Detailed Design from the lower level of +2400 to the Last Exploration Level of Main Pabdana Coal Mine

**Duration:** 6 Months **Location:** Kerman, Iran **Client:** Kerman Coal Mine Company

### Scope of Work:

- ▶ Revising and updating the reserves of the lower level of +2400
- ▶ Detailed Design of the underground network during the operation
- ▶ Detailed Design of the utilities and infrastructure services
- ▶ Technical and Economical Study of the plan

**Description:** Pabdana Mine is located 60 kilometers from Zarand City in Kerman Province. In 1969, the geological and exploration studies was started, in 1970 the design has been completed then in 1971, the mining operation has begun. For the time being, the reserves above the +2400 level are being operated and Kerman Coal Mine Company is intended to start the operation of the lower level of +2400. Therefore Monenco is responsible in rendering consultancy services for this project to analyze and study the reserves of lower level of +2400 for planning, preparing and excavation.

## Detailed Exploration of Baba Ali 2 Iron Ore Deposit in the Hamadan Province

**Duration:** 24 months **Location:** Mazandaran, Iran **Client:** SN (Saba Noor) Steel Co.

### Scope of Work:

- ▶ Economic studies, design and production planning in mining operation
- ▶ Services for exploration, geology and resource estimates
- ▶ Management, Planning and HSE
- ▶ Preparing topographical and geological maps at various scales
- ▶ Prepare a comprehensive information system in GIS environment
- ▶ Engineering services and supervision
- ▶ Geotechnical engineering services
- ▶ Feasibility studies, preparation of technical and economical plans

**Description:** The main purpose of this project is to execute geology studies, investigate new mines or improve the operations of existing mines with a primary focus on safety, achieving optimum output and return on investment. Monenco experts bring a business perspective to the technical challenges of mining and geology engineering.



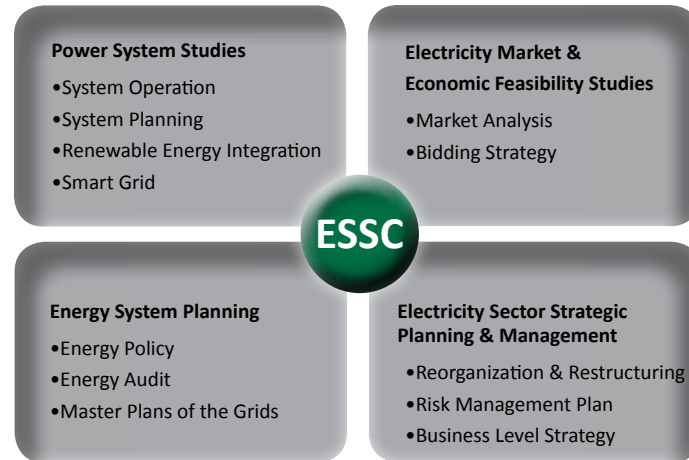
## System and Energy Studies Center

Energy and System Studies Center (ESSC) as a special studies division in Monenco was established in 2008 in order to provide services based on the new business environment and to enhance its technical capabilities. This center by means of its talented experts and devoting efforts made it possible to take part in different consulting areas.

Activities of ESSC can be categorized into four groups as follow:

- ▶ Power System Studies
- ▶ Electricity Market and Economic Feasibility Study
- ▶ Energy System Planning
- ▶ Electricity Sector Strategic Planning and Management

Besides, ESSC has held different trainings, workshops and seminars to spread its achieved technical knowledge to everyone involved in Iranian power industry and other related industries.



## Articles and Technical Reports

Energy and System Studies Center has published 5 papers in international conferences and 1 paper in a national conference in 2016 in order to introduce new technologies and achievements to its clients. Below is the list of these papers;

- ▶ “Improvement of circuit breaker performance after fault clearance between capacitor bank and short circuit limiter reactor”, third international conference of science and engineering, Iran
- ▶ “A New Method for Under Frequency Settings in Dhofar Grid”, GCC CIGRE 2016
- ▶ “The effect of dynamic load on spinning and non-spinning reserve determination in the MIS grid of Omani power system”, Power system conference (PSC) 2016
- ▶ “A practical approach for under frequency protection in power system”, Power system conference (PSC) 2016
- ▶ “The determination of operating reserve in small power systems based on reliability criteria”, ICPESE 2017
- ▶ “Technical Considerations of High Voltage Direct Current for Interconnection of Iran Grid to Neighboring Countries”, ICPESE 2017

## Electricity Sector Strategic Planning and Management Group

Strategic Planning and Management Group has been performing as a consultancy group to provide services in the areas of strategic planning and management, evaluation of effectiveness and efficiency and planning for cascading strategies in electricity sectors. Besides, this group has experiences in management processes, operational planning, evaluating performance of related companies and organizations and etc.



## Energy System Planning

**E**nergy System Planning Group has been responsible for comprehensive study of energy (Electricity, Oil and Gas, etc.), studying the effect of economical, environmental, and social aspects of using new technologies to optimize and reduce energy consumption, establishment of energy management system, providing a road map for optimizing energy consumption in major processes, studies to identify bottlenecks and provide solutions to improve the energy consumption, energy auditing and proposing tactics to save energy.

### Power System Studies Group

**P**ower System Studies Group as the main part of ESSC offers services and activities related to the generation, transmission and distribution sectors. It provides consultancy services for feasibility studies of power plants, analyzing power system events, studying application of new technologies in power system, studying power quality, reducing loss in electrical networks and etc.

## Economic Feasibility Study and Electricity Market

**E**conomic Feasibility Study and Electricity Market Group activities cover all consulting services in the areas of economic feasibility and market studies. These services are not limited to electricity industry and cover all industrial projects. Some of the major tasks of this section are economic feasibility study for investment projects, developing regulations related to the electricity market, electricity energy and services



pricing, providing energy bidding strategy for private owners in the electricity market, competitive market analysis indicators, economic studies on electricity transit and exchange and studying and predicting the behavior of other market players. Moreover, this section has recently entered Stock Valuation area and public private-partnership and tried gaining experiences in the field of energy exchange, electricity market design, market policy and authority, market monitoring and organizations, etc.

## Consultancy Services for Sixth Cost of Service Study in the Electric Sub-Sector of Kenya

**Start Date:** 2016 **Location:** Kenya **Finish Date:** 2017

**Client:** Ministry of Energy and Petroleum, Government of Kenya

**Description:** Kenya faces dramatic electricity demand growth and is strongly surmounting its historical challenge of inadequacy of power and the frequent load shedding during dry weather. Besides of the shifting in the generation mix, other measures are being undertaken or will be taken in the Kenyan generation mix such as:

- ▶ Time of use tariff
- ▶ Acceleration of rural electrification
- ▶ System losses reduction
- ▶ Improvement of revenue collection at KPLC

These changes in the power sector requires of a tariff policy review, accordingly. Kenya's retail tariff is bundled and incorporates the combined cost of the different functional components that is; generation, transmission and distribution and ensures sustainability as it is based on the revenue requirements of the institutions involved in these functions. The retail tariffs are currently being reviewed every 3 years. As a result of this project, information needed for the tariff review after 2018 and thereafter will provided and updated tariff review will be developed.



## Reliability Study of Bangladesh Power Grid

**Start Date:** 2015 **Location:** Bangladesh **Finish Date:** 2016

**Client:** Power Cell, Power Division, Energy & Mineral Resources, Govt. of Bangladesh

**Description:** The level of reliability of a power grid is required to be substantially enhanced to address the increasing electricity demand, generation planning program, the operational problems, and equipment breakdowns. In order to improve the reliability of the system to international standards, upgrade/modernize it with required protections (so that the system can dispatch the load growth), and provide a safe operation, the system should be able to tolerate any unanticipated disturbances. This level of operation should prevail throughout the rapid development phase also. A reliability-cum-protection study of the Bangladesh power grid system is therefore required to assess system capacity and fragility, identify faults, recommend solutions & upgrading also to improve the system for secured, safe and reliable operation.

In this project, a reliability study of entire power grid system for stable system operation, with short-term, mid-term and long-term recommendations is done. However, technical recommendations for the system in 2021 to improve the reliability of the system will be proposed. In this regard, the scope of the project is as follow:

- ▶ Preparing Reserve Management Policy
- ▶ Determining the Zonal Operating Constraints
- ▶ Review of Scope of a Pump Storage Power Plant (PSP)
- ▶ Review of Relay Settings & Protection Philosophies for Entire Power System
- ▶ Carrying out Islanding Operation Study for Safe Islanded Operation
- ▶ Identifying Suitable Technology for System Security, Safety & Reliability
- ▶ Improvement of Existing 'Grid Code' to Ensure Reliable & Stable Grid Operation
- ▶ Evaluating the Utilizing of 'Smart Grid'
- ▶ Transfer of Technology based on-the-job training



## Assessment of 400 kV Voltage Level Impact on Operation of Main Integrated System (MIS)

**Start Date:** 2015 **Location:** Oman **Finish Date:** 2016

**Client:** Oman Electricity Transmission Company (OETC)

**Description:** Higher voltage levels in transmission network are capable of transmitting more power over longer distances. At the same time, there are more concerns and considerations for operation of such high voltage levels especially when the system operator confronts them for the first time.

Oman power system is going to introduce new voltage level by operation of 400 kV transmission lines. In order to assess and measure the impact of new 400 kV transmission lines (Sur-Jahloot and Sur-Izki) on the operation of Main Integrated System (MIS), it is necessary to conduct some studies. In the following, the main steps to address the issues concerning the operation of new 400 kV transmission lines in Oman power system and determine what kind of mitigation can be implemented to overcome such issues that should be proposed in this project are given:

- ▶ Development of Commissioning and Energizing/de-Energizing Procedures
- ▶ Development of Initial Standard Operating Procedure
- ▶ Development of Final Standard Operating Procedure



## Feasibility Study of Constructing New Wind Farms in Qazvin

**Start Date:** 2016 **Location:** Iran **Client:** WPD GmbH **Finish Date:** 2017

**Description:** Iran as a developing country needs for more power and electrical energy in order to meet the highly growth demand in the upcoming years, and construction of new power plants and electrical facilities is necessary. In this regard, the higher penetration in renewable resources is of most concern and supported by feed-in-tariff from the government.

In this project, the interconnection of two new wind farms were investigated:

- ▶ Power system studies for interconnection of 50 MW wind farm in Kouhin region
- ▶ Power system studies for interconnection of 50 MW wind farm in Takestan region

The services provided in this project include:

- ▶ Status of existing and future network plans
- ▶ Status of renewable resources in Iran
- ▶ Reviewing of Iran load forecasts
- ▶ Proposing preliminary different connection options
- ▶ Technical assessment of proposed connection options
- ▶ Economic evaluation of the connection options and proposing the best one
- ▶ Short circuit analysis
- ▶ Transient stability analysis
- ▶ Harmonic study



## Feasibility Studies of Constructing New Power Plants in Iran

**Start Date:** 2016 **Location:** Iran & Iraq **Finish Date:** 2017

**Clients:** Yazd, Tehran, Kerman Regional Electric Companies

**Description:** The connection of the new power plant to the grid effects on electrical network and it is required to have an electrical network study implementing electrical network data before connection of the power plant and evaluate the electrical effects on the grid. Generally, the grid integration study of the power plant is classified in two main steps:

- a) Evaluating the grid accessibility of the proposed location for power plant construction and proposing best grid integration plan
- b) System analysis and network study of grid regarding of the proposed grid integration plan of the power plant

Some of these projects which were performed in 2016 are as the follow:

- ▶ Feasibility study of construction 500 MW combined cycle power plant in Bafgh region (Yazd Province)
- ▶ Feasibility study of construction two 600 MW combined cycle power plant in Rude-shour region (Tehran Province)
- ▶ Feasibility study of construction 600 MW combined cycle power plant in Kahnooj region (Kerman Province)



## Development of a Master Plan for Transmission and Sub-Transmission Network of Gilan Regional Electric Company

**Start Date:** 2015 **Finish Date:** 2016 **Location:** Iran **Client:** Gilan Regional Electric Company

**Description:** This project aims at provide a development planning for transmission and sub-transmission network of Gilan Regional Electric Company for the period of 2017-2026. Planning for new power generation to accommodate rise in demand and power grid expansion to transfer the increased generation to new customers is among the most objectives of regional electric companies. To achieve this goal, the following phases are followed in this project:

Data Gathering, updating and authentication including:

- ▶ Analysis for evaluating the existing network
- ▶ Load forecasting studies
- ▶ Planning for reinforcement and expansion of transmission and sub-transmission networks



## Technical and Economic Studies of Practical Solutions to Reduce Short Circuit Level in Yazd-1 Substation

**Start Date:** 2016 **Finish Date:** 2017 **Location:** Iran **Client:** Yazd Regional Electric Company

**Description:** With the expansion of generation and transmission networks and increased interconnection between transmission lines, short circuit current of the network is increased. This increased current causes more transient overvoltage, rising dynamic forces, increased flow of heat from power network equipment and also reduced system reliability. It will also impose costs of replacing or updating equipment such as circuit breakers. Therefore, it is important to reduce short circuit level in order to reduce harmful effects of fault current on the system and its stable performance.

One of the most important substations in Yazd Regional Electric Company is Yazd-1 which has two 400/63 kV and one 132/63 kV transformers. Short circuit current in 63 KV side of Yazd 1 substation in 2018 will be about 41 kA which is more than breaking current of circuit breakers in Yazd 1 substation. Therefore a few proposed solutions for reducing short circuit currents were evaluated from both perspectives of reducing the fault current and their cost to find optimal solution.

## Development of a Master Plan for Transmission and Sub-transmission Network of Bakhtar Regional Electric Company

**Start Date:** 2017 **Finish Date:** 2017 **Location:** Iran **Client:** Bakhtar Regional Electric Company

**Description:** This project aims at provide a development planning for transmission and sub-transmission network of Bakhtar Regional Electric Company for the period of 2018-2022. Planning for new power generation to accommodate rise in demand and power grid expansion to transfer the increased generation to new customers is among the most important objectives of regional electric companies. To achieve this goal, the following phases are followed in this project:

Data Gathering, updating and authentication including:

- ▶ Analysis for evaluating the existing network
- ▶ Load forecasting studies
- ▶ Planning for reinforcement and expansion of transmission and sub-transmission networks

## Significant Ongoing Projects

- ▶ Synchronous Interconnection of Iran-Iraq Grids
- ▶ Security Constrained Economic Dispatch Considering Market Obligations in Oman Power System
- ▶ Feasibility Study of Iran and Oman Grids Interconnection
- ▶ Development of a Master Plan for Transmission and Sub-transmission Network of Bakhtar Regional Electric Company
- ▶ Feasibility Study of Thermal Power Plants Site Allocation in Iran for the Time Period of 2017-2037
- ▶ Technical and Economic Feasibility Study of Retrofitting Excitation Systems of Abadan Refinery Power Plant



## Significant Completed Projects

- ▶ Operating Reserve Management in the Main Integrated System (MIS) and Dhofar Power Systems of Omani Power System
- ▶ Assessment of 400 kV Voltage Level Impact on Operation of MIS Grid
- ▶ Development of a Master Plan for Transmission and Sub-transmission Network of Gilan Regional Electric Company
- ▶ Feasibility Study of Constructing New Wind Power Plants in Qazvin, Bafgh, Kahnooj and Rude-shour
- ▶ Reliability Study of Bangladesh Power Grid System
- ▶ Technical and Economical Studies of Practical Ways to Reduce Short Circuit Level in Yazd-1 Substation
- ▶ Studies on Static Voltage Stability Improvement and Reactive Power Compensators Placement in Khuzestan Power Grid
- ▶ Feasibility Study of Exporting Electricity to Iran's Neighboring Countries
- ▶ Master Plan Development for Transmission and Sub-transmission Networks of Tehran Province
- ▶ Consultancy Services for Connection of Abadan Refinery to National Power Grid
- ▶ Power Quality Improvement of Modern Steel Mills (MSM) in Oman
- ▶ Feasibility Studies and Engineering Services for Super Grid (765 kV Transmission Lines and Associated Substations) in Nigeria
- ▶ Economical Analysis of the Coal Mine and its Coal-Burning Power Plant in Tabas
- ▶ Economical Analysis of Carbon Dioxide Capture in Gharbe-Karoun and Genaveh Power Plants
- ▶ Economical, Technical, and Market Studies for Stock Valuation of Power Distribution Companies
- ▶ Feasibility Studies of 750 MW Wind Farm in Iran
- ▶ Island Simulator Design and Manufacturing
- ▶ Feasibility Studies of Constructing New Power Plants in Iran
- ▶ Supervision of SVC Designing & Manufacturing of Looshan Project
- ▶ Feasibility Study for Allocation of PST in Iran Power System
- ▶ Assessment of Using Magnetically Controlled Shunt Reactor in Iran Grid
- ▶ Detailed Design of Rules and Tools for Day-ahead Spot Market Pricing
- ▶ Iran Power Industry Restructuring
- ▶ SAVEX Feasibility Studies

## Research and Development

**R**esearch and Development (R&D) in Monenco aims to apply new ideas in energy industries in order to enhance efficiency, reliability and productivity. We meet the present and future demands of industries, while helping clients to make a better use of available resources to reduce the environmental impact and maintenance costs by developing the systems and products. The main goals of R&D office are as follow:

- ▶ Exploring research capabilities and capacities in different sections of Monenco
- ▶ Developing technical and scientific knowledge in new areas
- ▶ Know-how transfer of the new technologies to the design disciplines of Monenco
- ▶ Communication with academic and research centers in order to define and execute necessary research projects

## Articles and Technical Reports

**R**esearch and Development Division has published 5 papers in 2016 in order to introduce new technologies and systems to its clients as follow;

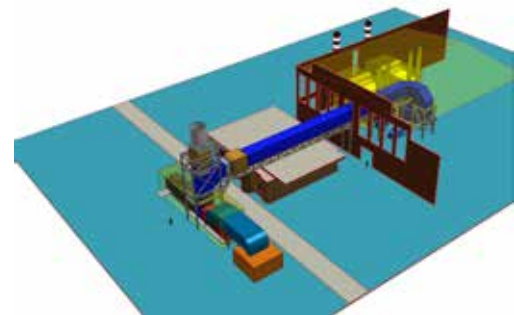
- ▶ Modeling of boiler combustion in Tarasht power plant repowering using hot wind box
- ▶ Using low Nox burners in Montazer Qaem power plant to reduce emissions and derates
- ▶ Feasibility study for using class F and H gas turbines in 500-600 MW Bafgh CCPP
- ▶ Investigation of boiler performance improvement methods in Montazer Qaem power plant
- ▶ Analysis of thermal storage system design simulation for Yazd Integrated Solar Combined

## Main ongoing R&D projects

### %100 Gas Firing of unit 4 of Montazer Qaem Steam Power Plant

**Client:** Montazer Qaem Power Generation Management Co.

Montazer Qaem power plant is consisting of 4 steam units of 156 MW. It was designed for fuel oil and natural gas firing in 1970. From the commissioning time till 10 years ago, the power plant used to work with fuel oil. However, after Natural Gas (NG) supply, the plant used to work with two fuels. For the time being, the owner of power plant intends to reach the maximum load by %100 NG firing. For this purpose, it is necessary to change old burners and install Low-NOx burners and BMS. In this project, the conceptual design for required modifications was implemented.



### Study of Desalination Opportunities in South Coast (Persian Gulf and Oman Sea) of Iran

**Client:** MAPNA (Investment Projects Division)

This project concentrates on a feasibility study on desalination opportunities in Iran according to different site conditions, water demand, economical situation etc. The project consists of four phases (18 technical reports).

First phase consists of literature survey, water and desalination statistical study (especially in MENA and Iran), governmental studies in water and desalination, activities of other companies in the region and the history of desalination in MAPNA.



Second phase is about evaluating conventional and non-conventional water recourses, water demands, future development plans, water crisis parameters and evaluating of 30 provinces of Iran considering civil and electrical infrastructures, fuel, electricity and water transmission lines, environmental issues, intake and outfall issues, etc. 16 Specific locations are proposed for constructing power and water cogeneration plants in selected region and final ranking has been done by collection more detail information for these locations.

Third phase concentrates on techno-economical analysis of various power and water cogeneration plants. 48 scenarios have been configured based on variety of gas turbines, power block types, desalination types (MED, MSF, SWRO, Hybrid). Technical and economical models have been developed and final cost of water is estimated in each scenario.

Finally the fourth phase focuses on studying water market, evaluating water costumers, evaluating investments in different desalination technologies and proposing a development plan for client (MAPNA group) based on the last three phases of the study.



## Design of Membrane Desalination Systems

The aim of this project is to get know-how of membrane desalination systems' basic design. Project consists of seven reports. First report is introduction on membrane systems and their application. Three reports concentrate on designing RO desalination system by different intake water characteristics (Brackish water, High brackish water and saline water). The fifth report focuses on designing NF system. Next report is about application of RO systems for treatment of hyper saline intakes. The last report title is designing RO treatment plant for sewage intake by MF/UF pretreatment.



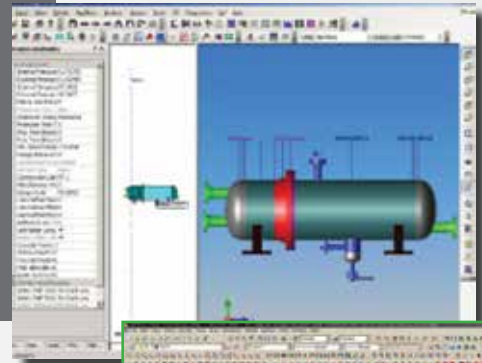
## Feasibility Study of Bafgh CCPP (Capacity and Power Generation Technology)

This project is a part of Feasibility Study of Bafgh CCPP. The main activities are determining power plant capacity and power generation technology using class F and H gas turbines, determining main equipments specifications, determining auxiliary systems specifications, selecting cooling main technology, determining main cooling specifications, determining common systems specifications and preparing primary site layout.



## Engineering Capability

Engineering Division is a significant division in Monenco that provides engineering services for a wide range of projects carried out in this company. Seeking for the latest science and technologies keeps this division up to date in its tasks, providing services to the other divisions in a matrix-based structure.



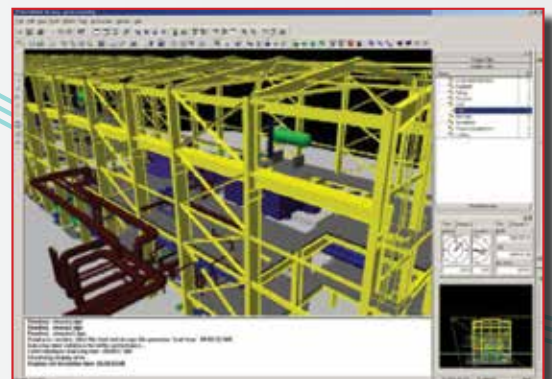
## Articles and Technical Reports

Engineering Division has published 11 technical reports in 2016 in order to introduce new technologies and systems to its clients as follow:

- ▶ Study of advanced EDI water treatment systems for power plants
- ▶ Technical and economic comparison of polishing plant systems for condensate cycles including cartridge filter, precoat and mixed bed methods
- ▶ Feasibility study of waste water recovery in power plants with utilizing of advanced ZLD methods
- ▶ Study and comparison of different alternatives for exchanging of wet cooling towers with dry or hybrid systems
- ▶ Study of new and advanced firefighting technologies for fuel storage tanks in power plants
- ▶ Technical and economic comparison of auxiliary transformer with Cable and Busbar plans
- ▶ Reducing of short-circuit voltage and nominal current of ACC cooling towers with changing of voltage level in order to reduce operation costs
- ▶ Improvement and optimization of power plant building with architecture design tools
- ▶ Technical comparison of F-class single shaft combined cycle power plants and E-class double shaft CCPP from layout and general arrangement point of view
- ▶ Study of advanced tank-gauging methods in refinery plants
- ▶ Study of smart methods for leak detection in oil and gas pipelines

Engineering Division has also published 5 national and International papers in 2016 as follow:

- ▶ Selecting optimum dry cooling system (ACC or Heller) based on ambient air temperature and wind condition Impact, International Symposium on Industrial Chimneys and Cooling Towers, Rotterdam, Oct. 2016
- ▶ Optimization on pump design and selection algorithm based on life cycle cost, the 7th Conference on Rotating Equipment, Tehran, 2016
- ▶ Study of power plants waste water decreasing via HERO methods, the 39th Conference on Power plant Chemical Systems, Isfahan, Dec. 2016
- ▶ Numerical analysis of geometry influence on burner area and efficiency of premixed flat multi-hole burners, the 3th National Conference on Fluid flow, Heat and Mass Transfer, Isfahan, Feb. 2017
- ▶ Study of important parameters for design, manufacturing, O&M of MED-TVC water desalination plants, the 8th National Conference on Environmental Engineering, Tehran, 2016



In 2016, this division besides giving services for all projects of the company, it was successful to extend its knowledge to the following fields and subjects:

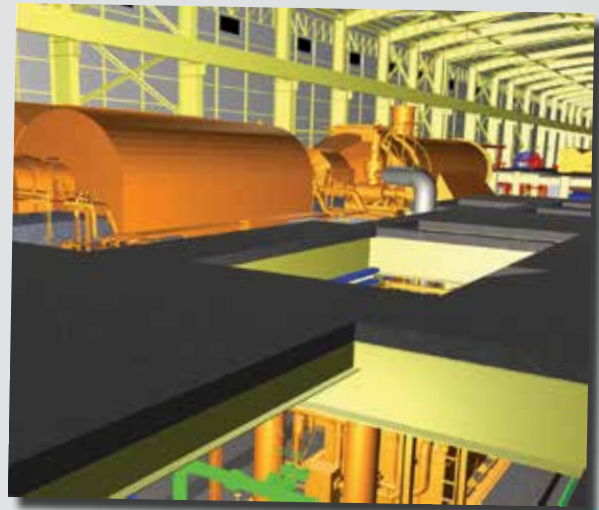
- ▶ Basic and detail design of IP-based Closed Circuit Television (CCTV) systems for power plants
- ▶ Automation and monitoring of water distribution systems
- ▶ Basic and detail design of F-class gas turbine foundation and structure
- ▶ Design of advanced EDI water treatment systems for power plants
- ▶ Optimization of power plant design with utilizing of 3D model review
- ▶ Direct Contact (DC) jet condenser process and mechanical design
- ▶ Design of steam duct for three-pressure steam turbine

Moreover, this division has collaboration with R&D Department as well as several outstanding international companies in order to stay strong and innovative in the energy market. This division consists of seven professional departments; Civil & Structure, Piping, Mechanical, Process & Environment, Electrical, Instrumentation & Control (I&C) and General. The specialized experts of this division, design, review, endorse and modify all engineering documents if needed, based on Monenco contractual scope of work, project specification and client technical requirements.

## Design Engineering Software Tools

Monenco, by relying on its experienced personnel and valuable experiences in the field of three-dimensional design software, has launched a number of engineering software of AVEVA Company while upgrading the PDMS 11.5 to PDMS 12.1. Using this software causes integration among engineering data plus reduces the time and cost of the projects. Furthermore, Monenco uses AMETANK software for design of atmospheric tanks. Below is the description of the mentioned software:

- ▶ PDMS Global: It provides automatic project synchronization and sharing work processes between Monenco office locations while retaining project and system control
- ▶ Aveva P&ID: A P&ID design system which stores intelligent engineering data onto graphical entities in an AutoCAD drawing while the designer draws and annotates the P&ID
- ▶ Aveva Instrumentation: Instrument and systems engineering, design, documentation and management for the en re asset lifecycle
- ▶ Aveva Electrical: Electrical engineering and design system, documentation and management for the entire lifecycle
- ▶ Aveva Engineering: It creates schematics, diagram, datasheets, engineering lists and indexes
- ▶ Aveva Bocad: A powerful software for structural steelwork design and detailing for different plants
- ▶ AMETANK: An applied software for atmospheric storage tank that automates the process of 3D modeling, mechanical and structural design, manufacturing detailing, and generation of production components and assemblies, material purchase list, and costing data.
- ▶ PLAXIS: A powerful and user friendly finite element package intended for two-dimensional as well as three-dimensional analyses of deformation and stability in geotechnical engineering and rock mechanics. PLAXIS is used worldwide by top engineering companies and institutions in the civil and geotechnical engineering industry. Applications range from excavations, underground construction, embankment and foundations to tunneling, mining and reservoir geomechanics.



## Information Technology Management

The Information Technology Division is committed to delivering strategic advantages to Monenco Iran by fostering creative and innovative use of technology. Change continues to be a characteristic of technology and our division continues to be at the forefront in the implementation of these technological advancements to achieve the Monenco's objectives and strategies.

As data is one of the most valuable resources for us, we try to use data management solutions which provides enormous benefits and is a cornerstone of an effective enterprise data strategy. Data management is the development and execution of architectures, policies, practices and procedures in order to manage the information life cycle needs of an enterprise in an effective manner.

To improve the ability for archiving, security, compliance and storage optimization which itself include data availability and virtualization, an EMC storage solution became a part of our infrastructure.

Following our information technology master plan, we managed to do the below important items in 2016:

- ▶ Upgrading the network infrastructure by adding new core switch to improve redundancy, reliability, security and overall performance
- ▶ Implementing UTM appliances defense strategy to provide additional layer of security and enhance redundancy
- ▶ Implementing redundancy for automation on virtual environment
- ▶ Upgrading filtering software on virtual environment and antivirus software
- ▶ Implementing Veritas Backup Execl software for running centralized backups and organize jobs on SAN
- ▶ Conducting disaster recovery plan testing
- ▶ Designing and implementing information self-service and local fair E-book on portal
- ▶ Developing sophisticated systematic project reports to calculate final project cost
- ▶ Updating content on the P6 Professional Project Management
- ▶ Upgrading to Microsoft SharePoint 2010
- ▶ Finding an ingenious method for MGD issue on smartphones after upgrading to SharePoint 2010
- ▶ Developing and maintaining all portal projects and improving management dashboards
- ▶ Designing the <http://germany.monenco.com> website to support Monenco's new branding with more interactive and easier navigation architecture
- ▶ Conducting video conference meeting for collaborating with clients in real time
- ▶ Implementing more efficient method for communicating with Monenco Oman Branch using VOIP solution

## Budgeting

To replace the traditional budget process with a more flexible system that enables us to be more agile and adaptive, we are planning a more dynamic process each year.

We estimated the revenue and cost by reviewing the entire current and forecasted projects. Therefore, now we know each project's income and costs (regular and specific extra costs) in our budget calculations. By the periodic reports or online financial dashboard (which is available for the managers) we know what is changing and why? It's traceable to find the source of budget deviations.

In addition, the cost of each development plan such as creating new departments, employing experts, infrastructural expenses (IT, internal systematic projects and ...) has been considered in the budget.

Last year we succeeded in achieving %95 income and %93 cost realization rate. Also we had %26 growth for current year target income in comparison with the last year.

Here, we can scrutinize the groups budget to meet their financial goals specified.

## Knowledge Management (KM)

We consist on compliance knowledge management as a vital requirement in Monenco. Accordingly, we had a great integration on the library portal to facilitate access of our experts to the knowledge. Also, many of the DGLs (Design Guide Lines) were reviewed. We are planning to attend in a national KM award this year to improve our KM processes.

## Developing Systems and Methods

### EDMS:

In 2016, we had a great improvement in implementing Engineering Document Managements System (EDMS) for circulating the documents, after a successful trial period. Now we are able to do Internal Document Checking (IDC), collect variable reports and archive the documents automatically.

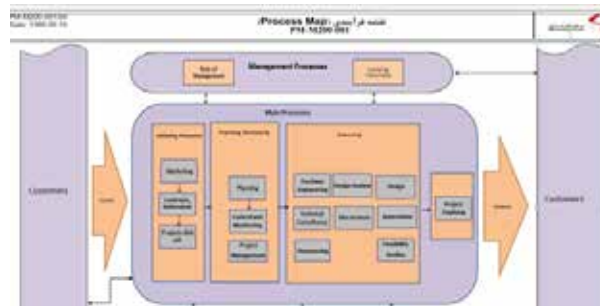


### Improving Instructions:

As always, defined methods for evaluating the best projects and the best departments were executed with new and improved indicators. In comparison with the previous results, we had remarkable improvements in all indexes.

In order to deploy new systems, the first phase of EQHSE system emphasized on the HSE sector was completed and became operational.

Also, reviewing process map of the company and its indexes was another important action during the past year.



## Strategic Planning

After receiving economic sanctions relief, Iran experiences ability to trade more freely globally. Therefore, in order to expand our international market presence, we began to reform by adding some new fields of services and agile changes.

We defined a project to review and cascade upstream strategic planning to all Monenco's divisions and departments. This project has begun on January and will be probably accomplished on September 2017.

Accordingly, we used PESTEL and Porter analysis based on Braison Model to determine and monitor new macro-environmental marketing factors that could impact on our organization. New SWOT, CPM matrix and Monenco's competitors situation was generated as the result. Finally, detailed KPIs for each division based on Balanced Score Card (BSC) model will be identified and monitored.

The project is being executed by our planning experts jointly with MIR Engineering and Technology Management Company as the consultant. Now we are sure that the way to achieve our strategic goals will be scrutinized/monitored.

## Project Control & Monitoring Department

Project planning, Monitoring and controlling can play an important role in the success and prosperity of any organizations. A company that can fulfill customers' needs on time, with competitive cost and superior quality in its projects, can easily dominate its competitors. In order to achieve this goal, Monenco Control & Monitoring Department consisting of more than 25 experienced experts is one the most vital contributors In order to successfully implement the projects. With above mission in mind, all of the members are committed to work in maximum efficient ways in all over the project life cycle to collect and analyze project information, develop budgets and schedules to meet project requirements, control project progress on its right track, participate in meetings to discuss exactly what is needed, assist in draw up a detailed plan for how to achieve projects goals, supervise project quality and risk management, progress reporting and ... based on procedures developed in updated methodologies such as PMBOK and ISO 21500 and project control software like MSP, P6 and Pert MASTER.

In 2016, as previous years, our team concentration was on optimizing project planning and control processes especially in the area of cost control and value engineering, risk analysis, resource allocation and claim management. In the former area, a pre-developed nonlinear formula for EV was intensively implemented on all active projects with accurate analysis in its acquired results. In the second area, the process of risk management, including the risk registration and risk analysis was accomplished more seriously in some selected projects using PERT MASTER software. In the third area, in order to use the company resources efficiently and increase client's satisfaction, we applied priorities on our projects activities with considering all aspects of work. Consistent with the assigned priorities, the human resource allocation is done and daily tracing is running to ensure that the projects are on-track. Finally for the latter field, an integrated procedure was defined which in, all claimed items including payment for additional effort have been recorded and documented in a traceable system. Moreover, documentation of all required procedures for MC (Managing Contractor) projects have been prepared and deployed in organizational processes. In general, in our department, training is seen as an important and integral part of the drive towards further success and continuous improvement. Hence, each staff member is allocated a training schedule and also encouraged to attend courses, conferences and become involved in technical publications. As the result, two papers have been submitted at international conferences and all staff have been qualified with the basics of PMBOK 5th edition standard.



The main goals of our team for 2017 can be summarized as below:

- ▶ Identify main areas of improvements and ensure that the organization processes comply with international standards
- ▶ Incorporating risk management steps including registration, execution and control of key risks in one selected comprehensive power plant project with concentration on taking on-time corrective actions as well as preventive ones
- ▶ Focusing on OPM3 model for developing capabilities in executing projects and achieving organizational maturity
- ▶ Creating required infrastructure for making automation of action plans which leads to quicker and more accurate planning

## Quality ASSURANCE

In 2007 Monenco established and implemented a Quality Management System (QMS) and got certified according to International Standard ISO 9001:2000 in order to improve the quality of its engineering services and enhance the customer satisfaction. In 2011, Monenco upgraded ISO 9001 standard from 2000 edition to 2008 edition and got certified in accordance with ISO/TS 29001:2010 for petroleum, petrochemical and natural gas projects. Furthermore, change of Certification Body BV to IMQ was accomplished in 2014.

The main achievements of QMS in 2016 are as follow:

- ▶ Improving procedures to control actual and potential non-confirming products to define and eliminate root causes
- ▶ Ranked first technical score in 29.67% of tenders in all fields including new businesses. This item increased 3.19% during 2016
- ▶ Obtaining the client’s letter of appreciation for 15 projects
- ▶ Increasing the revisions of approved issued drawings and technical documents by 0.06% (3.08%) in comparison to the last year
- ▶ Improving data analysis system to coordinate all activities in the company
- ▶ Collecting key quality indicators and completing QHSE dashboard in cooperation with IT center in order to make a general view of QHSE office, therefore, whoever is checking it can judge how good/bad our performance is
- ▶ Passed the external surveillance auditing
- ▶ Revising and performing sites technical feedbacks procedure

## Health, Safety & Environment

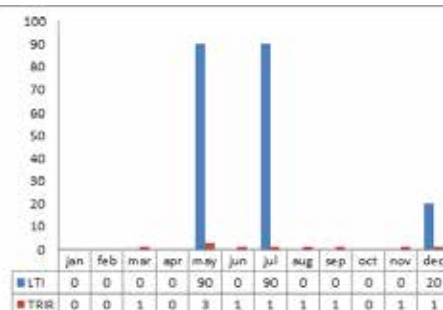
In 2011, Monenco established HSE Management system and got certified according to ISO 14001:2004 and OHSAS 18001:2007 in order to maintain and increase personnel health, safety and environmental requirements. Change of Certification Body from BV to IMQ was done in 2014. HSE-MS certificate for engineering consultancy and supervision services was gained in 2015. The main achievements of HSE management system in 2016 are as follow:

- ▶ Achieving contractors’ safety qualification certificate from Ministry of Labor & Social Affair
- ▶ E-learning courses and exams were implemented for site supervisors
- ▶ 30 man-days audit were executed at sites
- ▶ HSE training for all supervisors and new employees (Total Man-Hours: 1800)
- ▶ Health, Safety & Environmental risk evaluation review was done in office (According to HEMP approach) and sites (According to FMEA approach),
- ▶ Measuring workplace harmful factors considering threshold limit values and performing corrective or preventive actions
- ▶ LTI, TRIR & vehicle crashes

### Health, Safety & Environment

	LTI	TRIR		Vehicle crashes
		near miss	accident	
2016	200	1	6	3

moth's 2016	LTI	TRIR
jan	0	0
feb	0	0
mar	0	1
apr	0	0
may	90	3
jun	0	1
jul	90	1
aug	0	1
sep	0	1
oct	0	0
nov	0	1
dec	20	1
SUM	200	10

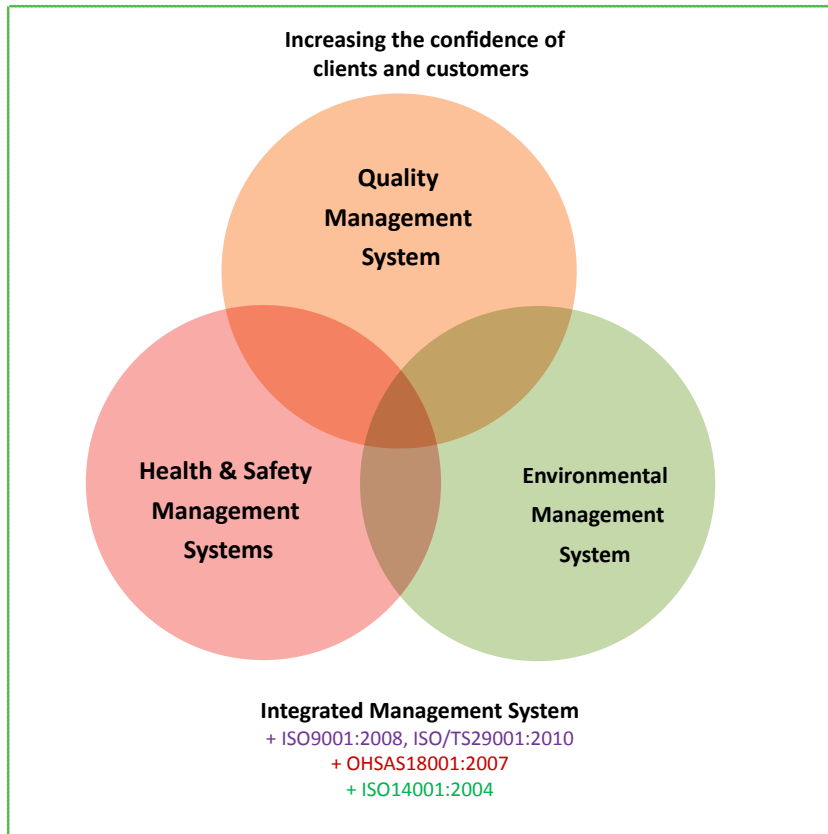


## Integrated Management System

In 2014, Integrated Management System (IMS) in Monenco was implemented in order to achieve:

- ▶ Reduction of planning cost, establishing and maintaining QHSE management systems
- ▶ Increasing the productivity and efficiency of the systems
- ▶ Avoiding repeated tasks and omitting reworks
- ▶ Optimum usage of resources LTI, TRIR & vehicle crashes

Gap analysis on IMS was done in 2016 according to ISO 9001:2015 and ISO 14001:2015 in order to upgrade our systems in compliance with new version of ISO 9001 and ISO 14001.



## Customer Satisfaction

To ensure meeting customer requirements and perform corrective & preventive actions in appropriate time and efficient manner, QM section independently communicates with customers according to Monenco CRM method through face to face meetings, phone calls and sending questioners.

Implementation of ISO 10002 and ISO 10004 and getting certified by a well-known CB has been planned for 2017.





## Objectives & Development plans

Based on IMS policy & Monenco strategies, objectives and development plans of each department are determined yearly by “Monenco Enhancement Work-Group” established by “QHSE & Productivity Office”. Each department is responsible for performing the relevant plans & reporting the progress monthly. QHSE & Productivity Office is responsible for controlling progress plans and defining appropriate corrective & preventive actions to achieve objectives. In 2016, 64.81% of company’s objectives and 47.09% of quality, HSE and productivity’s objectives have been met.

## Excellence Model

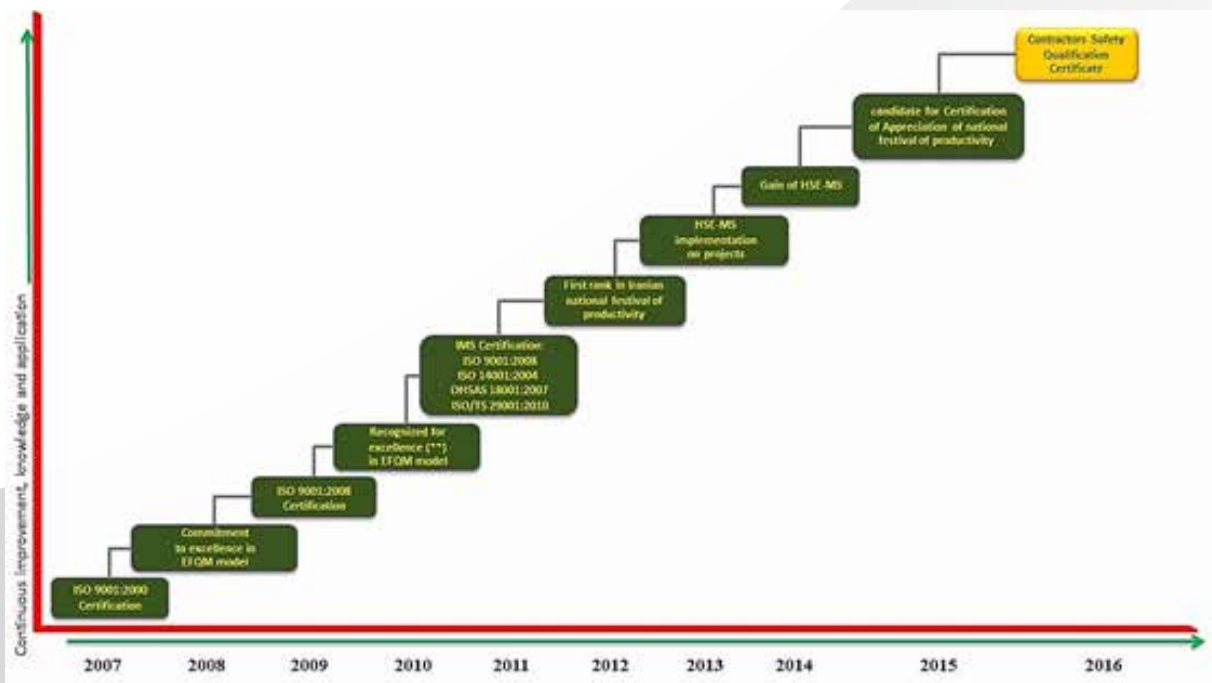
In order to provide sustainable excellence and achieve balanced results in all sectors of organization, Monenco performance has been assessed based on EFQM excellence model and awarded “Committed to excellence” level in 2009. In 2011, Monenco has been awarded “Recognized for Excellence”, based on EFQM model (2010 version). Improvement of projects has been continuously defined and developed in Monenco based on EFQM framework.

Self-Evaluation of sites and the office was performed based on “EFQM model” since 2014.

Key performance indicators has been planned to be integrated in 2017 in order to have a better data analysis and finding more chances for improvement.

## Continuous Improvement

The effectiveness of implemented models & systems yearly is being controlled by QHSE and Productivity Office. The trend of Monenco’s Continuous Improvement is demonstrated as shown in the picture below.



## Monenco in the Middle East

We served clients globally across the energy and power sectors and provide local services in our core markets. In past year Monenco has been very active in Oman as one of leading companies in that region; our focus sectors were power generation and transmission & distribution. Across several successful bidding in last year we won new three years contract with OETC providing various engineering services right across the Sultanate. Also Monenco was able to penetrate new markets in fields of Oil and Gas and Water by serving the major clients such as Petroleum Development Company (PDO) and Public Authority for Electricity and Water (PAEW) as per our defined mission. Previously, we were awarded a prestigious Certificate of Appreciation for 4.5 Million Safe Man hour from Dhofar Power Company (DPC) and being shortlisted as one of the recognized consultant providing consultancy engineering services in field of Oil and Gas by achieving JSRS Certificate. Some of our projects in 2016 are as follow:



- ▶ Detailed Engineering Services for Construction for Upgrade Shinas 33/11kV Primary Substation from 2X20 to 3X20 MVA (Majan Electricity Company (SAOC))
- ▶ Detailed Engineering Services at MEP (Mechanical, Electrical and Piping) parts for Engineering, Procurement & Construction of 2 X 10 MVA, 33/11kV Step Down Primary Substation for Gumdah at Musandam Governorate (RAECO)
- ▶ Consultancy Services for Construction and Supervision of Water Supply Scheme to Ye , Al Hsen and Bander Jissah in Muscat Governorate
- ▶ Detailed Engineering Services for Construction for New 3X20 MVA, 33/11kV Primary Substation at AlKhuwair South – Muscat Electricity Distribution Company (MEDC)
- ▶ Consultancy Services for Construction and Supervision of Upgrading of 33/11 kV Qairoon Hairi PSS from 2x10 MVA to 2x20 MVA Capacity
- ▶ Consultancy Services for Design & Supervision of New 132/33 kV Jebreen Grid Stations
- ▶ Load Cycle Study of Electric Arc Furnace (EAF) for Modern Steel Mills
- ▶ Consultancy Services For Design and Tendering Services for Construction of 3X20 MVA Primary Substation at Rusayl-08 in Knowledge OASIS Muscat
- ▶ Consultancy Services for Design & Supervision of New 132 kV Grid Stations at Dil Abdusalam (DAS) & Suwaiq
- ▶ 3 Years Framework Agreement with OETC for Power System Studies
- ▶ Comprehensive Analysis, Strategy Development, and Business Planning for Global LLC
- ▶ Consultancy Services for Construction and Supervision of Construction of 11kV Outgoing Cable feeders from Salalah Port-GCT Primary Substation
- ▶ Consultancy Services for New 132kv Double Circuits Lines from Rustag-Alawabi-Nakhal With A New 132/33kv GS at Al Awabi
- ▶ Detailed Engineering Services for Construction for of 132/33kV Liwa Grid Station
- ▶ Detailed Engineering Services for Construction 132/33kv Mulladha Grid Station
- ▶ Consultancy Agreement for LNT Strategic Marketing Plan
- ▶ Consultancy Services for Design and Supervision of New 132/33kv Bousher-2 and Addition of Third and Fourth Transformer at Ghala Grid Station, Amerat Grid Station and Airport Heights Grid Station
- ▶ Consultancy Services for Design and Supervision of Upgrading of Seeb Grid Station, Adding 3rd and 4th Transformers at Mobella (2) & Construction of Mobella (3) with 4X125MVA Transformers
- ▶ Request for Proposals for the Engagement of a Consultant for the Realization of a Telecommunication Architecture Study throughout PAEW Service Area

## Commissioned Projects:

- ▶ Construction of Madinat Nizwa 132/33 kV Grid Station and Associated Transmission Line
- ▶ Upgrade of 33/11 kV Qairoon Hairity Primary Substation from 2 x 10 MVA to 2 x 20 MVA Capacity
- ▶ 33/11 kV, 20 MVA Primary Substation, designated as Salalah Port GCT PSS
- ▶ Consultancy Services for Preparation of Network Asset Maintenance Standards & Associated Asset Management Documentation
- ▶ 33/11 kV, 20 MVA Primary Substation, designated as Rusail
- ▶ 33/11 kV, 20 MVA Primary Substation, designated as Alkhuwair South
- ▶ 33/11 kV, 20 MVA Primary Substation, designated as Shinas
- ▶ 132/33 kV Jaalan-Bani Buhamid Grid Station
- ▶ 48 MVA Siah Al-Kheirat Power Plant
- ▶ 132/33 kV Al-Saada Grid Station



## Monenco Certificates in Oman

- ▶ Oman Ministry of Commerce and Industry
- ▶ Oman Chamber of Commerce and Industry
- ▶ Professional Indemnity Policy
- ▶ Oman Tender Board
- ▶ Oman Ministry of Defense
- ▶ Muscat Municipality for Issuing Permit Building
- ▶ Oman Oil & Gas Industry's Joint Supplier Registration System (JSRS) Ministry of Oil & Gas
- ▶ Vendor Approval – Petroleum Development Oman (PDO)

### Number of projects with each Client

Client	No. of Project in 2016
Oman Electricity Transmission Company (OETC)	7
Muscat Electricity Distribution Company (MEDC)	3
Modern Steel Mills (MSM)	2
Majan Electricity Company (MJEC)	2
Modern Light Trading & Contracting Co. LLC (MLTC)	1
Dhofar Power Company (DPC)	4
Public Authority for Electricity & Water (PAEW)	3
Oman Power and Water Procurement Company (OPWP)	1
Rural Areas Electricity Company (RAECO)	1
Atlas International Engineering Consultants Co.	2
Bahwan Engineering Company (BEC)	2
Larsen & Tubro Company (LTO)	1

## Ongoing Project:

### Oman Water Telecommunication Architecture Study

**Start Date:** 2017 **Finish Date:** 2017 **Location:** Oman

**Client:** Public Authority for Electricity & Water (PAEW)

#### Scope of Services:

Data Gathering, Conceptual Design, Basic Design, Detail Design, Recommending Design and Methodology for Implementation and Financial and Economic Study

**Description:** Oman as one of the hottest climates of the world needs to manage the optimal use and supervise the water sources, particularly in arid areas. As Oman faces the shortage of water, the “Telecommunication Architecture Study” project is defined to improve and expand the telecommunication network of water industry.

### 3 Years Framework Agreement with OETC for Power System Studies

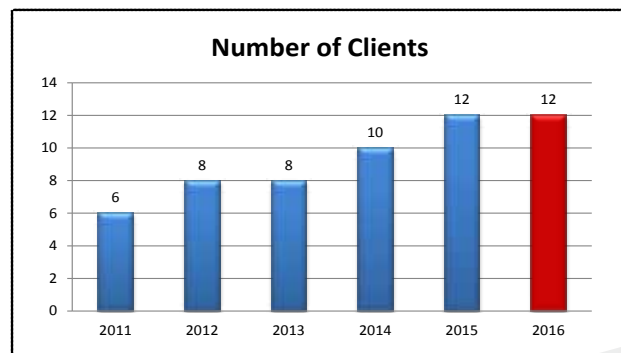
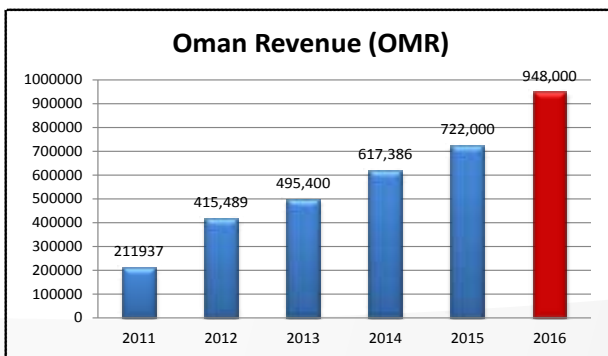
**Start Date:** 2015 **Finish Date:** 2018 **Location:** Muscat, Oman

**Client:** OETC (Oman Electricity Transmission Company)

#### Scope of Services:

- ▶ Dispatch scenario when any new power plant connects to the system
- ▶ Operational effects of new major loads connected to the system
- ▶ Economic dispatch requirements
- ▶ Spinning reserve management
- ▶ Under frequency settings
- ▶ Islanding procedures
- ▶ Black start procedures
- ▶ Preparation and modification of system Operation Procedures
- ▶ System operation studies
- ▶ Study the system behavior for any new connection
- ▶ Study the difficulties in the international connection
- ▶ Study the voltage issues in winter time
- ▶ Study the major incidents and partial blackouts
- ▶ Help to prepare the contingency plan
- ▶ Advice for real time operation
- ▶ Study n-1 criteria by modeling the network system
- ▶ Study the PDO-MIS and PDO-Dhofar connections
  - Risks of the interconnection
  - Risk of inter-area oscillations
  - Specific issues linked to energization (overvoltage, resonance)
  - Tuning of system protections to face emergency conditions like loss of synchronism, evaluation of maximum power transfer

**Description:** As preferred consultant for all operating requirements in 3 years of OETC and wide projects in operating fields show the capabilities of Monenco in system studies.



## Monenco Germany Outlook

During 2016 the necessary preparatory works for foundation of Monenco Germany GmbH has been finalized. The Company is now notarial registered according to German Law and shall officially start consulting and engineering services beginning of 2017.

In addition to German and Iranian clients, Monenco Germany shall offer also consulting and engineering services to other international clients, e. g. private investors, financial banks, contractors and governmental authorities. Through a close cooperation with the main shareholders Monenco Iran in Tehran and PUT in Stuttgart, particularly in the developing phase, the company shall be able to offer and to implement all kind of highbrow international projects on a competitive price basis.



### The consulting and engineering services provided by Monenco Germany GmbH shall cover the following sectors:

- ▶ Thermal coal-, oil- and gas-fired power and heat plants
- ▶ Gas turbine and combined cycle power plants
- ▶ Combined Heat and Power Generation (CHP Plants)
- ▶ Biomass heat and power plants
- ▶ Waste incineration plants
- ▶ Renewable energy sector and energy storage systems
- ▶ Flue gas cleaning system
- ▶ Water and waste water treatment system
- ▶ Power transmission systems
- ▶ Projects in oil and gas sector
- ▶ Projects in infrastructure sector

### The provided services of Monenco Germany GmbH shall be as follows:

- ▶ Project management and coordination services
- ▶ Expertise, due diligence and project appraisal reports
- ▶ Technical, environmental and financial reports
- ▶ Feasibility studies and business plans
- ▶ Conceptual design reports
- ▶ Repowering and efficiency improvement reports
- ▶ Environmental Impact Assessment reports (EIA)
- ▶ Tender documents (e.g. for EPC) and tender evaluation reports
- ▶ Design review of contractors engineering documents
- ▶ Site supervision and quality assurance services during implementation phase
- ▶ Assistance in settling disputes and supervision of guarantee works



## Monenco in Africa

In 2016 Monenco Engineering Ltd. (MEL) finished the 6th year of operation. Combination of the international expertise with local experiences led us to become a strong and professional company. As a result at the very beginning of operation, two projects were awarded to the company from different Nigerian clients. Our goal is to achieve 100% client's satisfaction, so our focus would be on service quality; We will be by the side of our clients from very beginning to the end and assist them from investment to the commissioning. At MEL we focused on delivering life of asset support to our clients' assets and deploy both international and local expertise in order to meet clients' needs. MEL provides consultancy and engineering services to infrastructure with focus on energy sector.



Despite being new in Nigeria, MEL has contributed significantly in developing projects within the country and became a well reputable consulting Company. As part of MEL business development strategy also in order to extend business opportunities, MEL has entered into partnership agreement with different international and local companies and participated in several pre-qualification and bidding exercises within Nigeria. Also, in order to expand its services in the field of telecommunication and smart metering, MEL has negotiated with related organizations such as NCC & Galaxy. Feasibility Studies and Engineering and Design of 765 kV Nigeria Super Grid project including 4600 Km Transmission Lines and 11 Substations.

Monenco Nigeria has won the following tenders and expected to be awarded in near future:

- ▶ Feasibility Studies and Engineering and Design of 765 kV Nigeria Super Grid project including 4600 Km Transmission Lines and 11 Substations
- ▶ Consultancy Service, Project Management & Site Supervision of 132kV Transmission Line and associated Substations
- ▶ Little Gombi – Mubi – Gulak 132 kV Double Circuit Transmission Line (125km)
- ▶ 2 × 60MVA, 132/33 kV Substation at Mubi
- ▶ 2 × 132 kV Line Bay Extension at Mubi Substation
- ▶ 2 × 60 MVA, 132/33 kV Substation at Gulak



## Professional Affiliations

- ▶ Consultancy certificate for Oil & Gas sector: With regards to recent field development and international investment in Nigeria Hydrocarbon Sector, MEL has put on place necessary provision in order to initiate its business in Oil & Gas sector. As the first step MEL has been granted a Consultancy Certificate for Oil & Gas Sector from Department of Petroleum Resources (DPR) of Nigeria. This certificate identifies MEL as a consultant and authorizes the company to engage in Oil & Gas Projects.
- ▶ General Consultancy Certificate: MEL has applied for a Consultancy Certificate under Council for Regulation of Engineers in Nigeria (COREN), the Individual Certificates has been secured and the Corporate Certificate will be granted in near future.
- ▶ Environmental Consultant: MEL is accredited as Environmental Consultant with Nigeria National Environmental Standards and Regulations Enforcement Agency (NESREA) in the following category:
  - Environmental Management System
  - Environmental Audit
  - Environmental Studies

## Projects

- ▶ Feasibility Studies, Engineering Design and Preparation of Contract Documents for 34MW Dadinkowa Hydro Dam: The engineering service was completed and relevant bankable feasibility study report submitted to the client. Job Completion certificate was granted.
- ▶ Engineering Services for Kabompo Gorge Hydro power plant in Zambia: MEL received job satisfaction certificate from the client
- ▶ EPC Bid evaluation (PHCN-TCN): Satisfaction certificate was issued by the client



### Jalal Hosseini

Hosseini.Jalal@monenco.com

Obtained his B.Sc. from Sharif University of Technology in Computer Engineering in 1996. From 2001 to 2003 he worked in Iran Telecommunication Research Center as Analyst & Programmer. From 2003 to 2005 He worked in IT Department of Ministry of Education as Analyst & Programmer and in 2005 he joined Douran Software Technologies as Software Architect & Analyst. In 2007 he joined Aban Software Company as Project Manager & Software Analyst and in 2008 at Software System Group Co as Project Manager. He started working at Monenco Iran from 2009 as Software Systems Supervisor and in 2014 he was appointed as Managing Director of MIR Engineering and Technology Management.

## A brief introduction about MIR Engineering and Technology Management Company up to now (2017)

For over 11 years, MIR Engineering and Technology Management Company, as a fully owned subsidiary of Monenco Iran Consulting Engineers has been dedicated to making a better world through diverse businesses that today span the following services:

- ▶ Management Consultancy (Strategic planning, Restructuring, Human Resource Management, Governance model)
- ▶ Information and Communication Technology (ICT)
- ▶ Energy Consumption Management and Services
- ▶ General and Professional Training Services

Experienced qualified personnel and using modern systems led us to provide high quality services in the field of Management Consultancy services. More specifically we have focused on Designing Strategic Plans, Business Plans and ICT Master Plans. For instance, we designed and implemented Strategic Plans for Behpak Industrial group, Modje Niroom Company, Kharazmi Information Technology Development Company and Monenco as well.

In order to raise quality of service, MIR has signed an agreement with WTS Energy (Netherlands) for a global strategic partnership in the fields of; Management Consultancy, Information technology, Training and Technology Transfer and Man Power Supply. WTS Energy's head quarter is in Netherlands and has 15 established companies all around the world and is active in providing world class services to the clients globally. It is worth mentioning that one of the world leaders in the Management Consultancy field Arthur D. Little (ADL) Company will be supporting this collaboration as well.

In 2016, MIR Company rendered various services in the field of training such as training courses which some of them are as follow:

- ▶ e-Learning course designed and implemented for newly hired staff
- ▶ e-Learning course designed and implemented for in HSE Concepts
- ▶ e-Learning course designed and implemented for simulation of software system that used in Monenco Iran
- ▶ Held 50 industrial courses for about 1000 students in various fields
- ▶ Held 20 courses for different organizations and companies such as Petroleum Engineering and Development Company (PEDEC), Iranian Gas Transmission Company (IGTC), Moshanir, Daneshmand Co., Monenco Iran, Tafresh University and Isfahan University of Technology.

## Cigre, International Council on Large Electric Systems

Founded in 1921, Cigre, the Council on Large Electric Systems, is an international non-profit Association for promoting collaboration with experts from all around the world by sharing knowledge and joining forces to improve electric power systems of today and tomorrow.

Cigre counts more than 3500 experts from all around the world working actively together in structured work programs coordinated by the Cigre Study Committees. Their main objectives are to design and deploy the Power System for the future, optimize existing equipment and power systems, respect the environment and facilitate access to information.

Cigre Central Office which is based in Paris France, counts 58 National Committees to enhance its relationship and get closer to its Members. National Committees provide updated information on their national power systems.

### Cigre Iran

Considering the missions of the Power Industry of Iran, in 1989, Iranian National Committee for Electric Power Studies, Cigre – Iran, was established. In view of that, in 2016, Deputy Minister of Energy of Iran also chairman of Cigre-Iran, appointed Monenco Iran to act as the Secretariat of Cigre-Iran. Cigre -IRAN's mission is to increase involvement of Iranian members in CIGRE and to promote Cigre in Iran.

### Executive Committee

- ▶ Mr Houshang Falahatian, Deputy Minister of Energy ---- chairman
- ▶ Mr Alireza Shirani, Managing Director of Monenco Iran ---- Executive Chairman
- ▶ Mr. Mohsen Arabani, ----- Secretary
- ▶ Ms. Nasim Nematollahi, ----- Administration Office Manager

### Major Activities

- ▶ To contribute in development of research on high-voltage electrical systems
- ▶ To organize Technical Committees in various fields of electric power industry
- ▶ To hold national conferences to be participated by international companies
- ▶ To arrange for national companies to participate in international conferences
- ▶ To organize the representation of Iran in Cigre Session, Symposia and exhibitions
- ▶ To create Technical Committees in Iran who will work with Study Committees of Cigre
- ▶ To distribute the Call for Paper of Cigre to all organizations, research centers, universities and selected utilities as well as electric consulting engineers
- ▶ To provide technical brochures and papers of Cigre for students and technical institutes upon their request.



**Nasim Nematollahi**

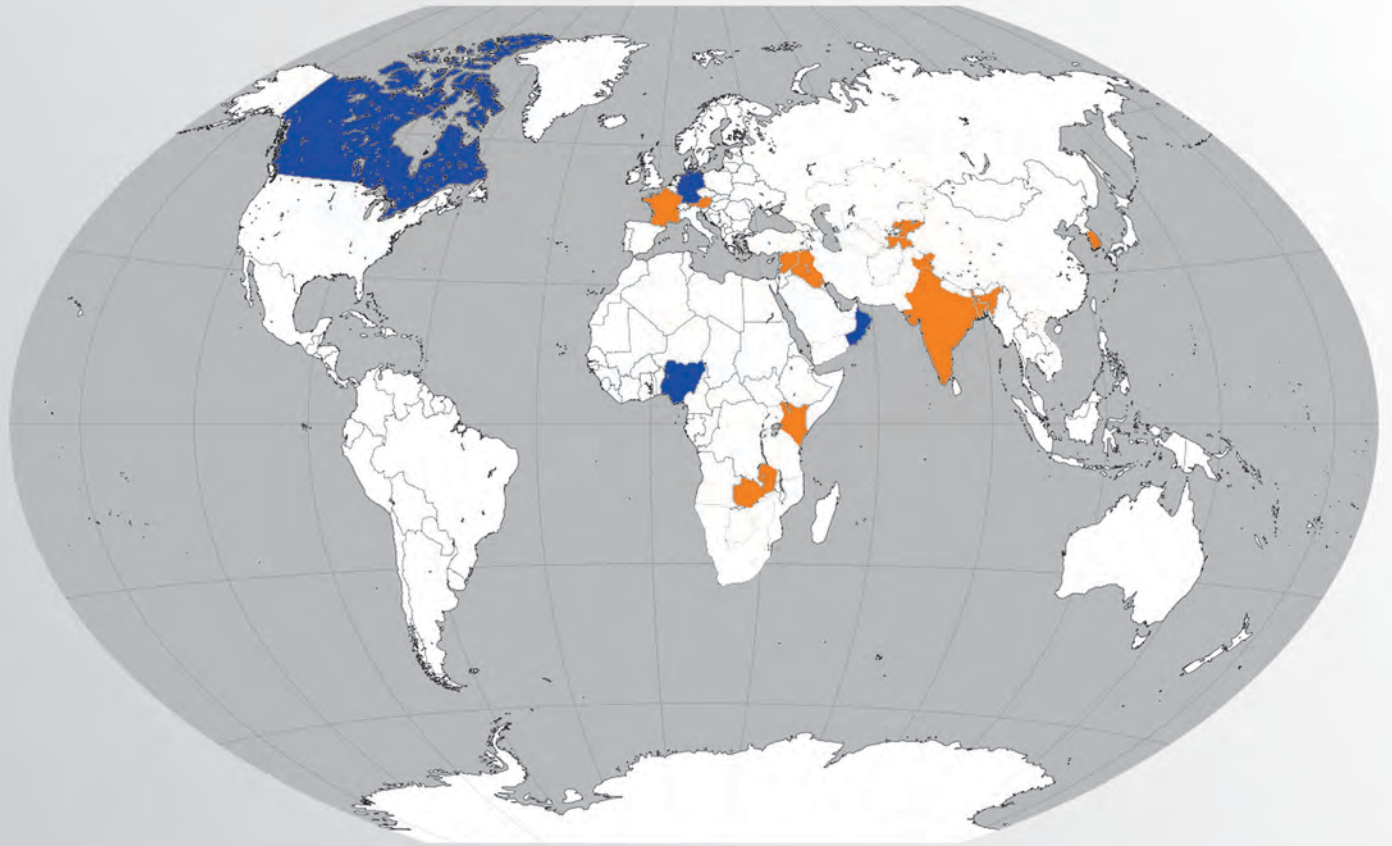
Administration Office Manager of Cigre-Iran  
[info@cigreiran.com](mailto:info@cigreiran.com)  
[www.cigreiran.com](http://www.cigreiran.com)





<b>Profit(Loss) Statement at 20 March 2017</b>		
	1394 (at 20 March 2016) Million Rial	1395 (at 20 March 2017) Million Rial
Services Income	643,610	810,576
Services Finished Price	-534,862	-661,281
<b>Gross Profit</b>	<b>108,748</b>	<b>149,295</b>
General & Administrative Costs	-56,813	-66,670
<b>Operating Profit</b>	<b>51,935</b>	<b>82,625</b>
Financial Costs	-24,051	-21,266
Other non-operating income	3,064	2,148
	-20,987	-19,118
<b>Profit Before Tax</b>	<b>30,948</b>	<b>63,507</b>
Tax on Income	-4,000	-7,326
<b>Net profit</b>	<b>26,948</b>	<b>56,181</b>
<b>Accumulated Profit/Loss Account Turnover</b>		
Net profit	26,948	56,181
Accumulated Profit in the beginning	168,659	242,844
Annual Modifications	-2,930	-53,209
Accumulated Profit in the beginning-modified	165,729	189,636
Profit Dividend	-1,489	-3,113
	164,240	186,523
Profit Distribution	191,188	242,704
<b>Appropriation of Profit</b>		
Legal Reserve	-1,552	-2,809
<b>Accumulated Profit in the Final Period</b>	<b>189,636</b>	<b>239,895</b>

**Note:**



Monenco global networking and project foot prints:  
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