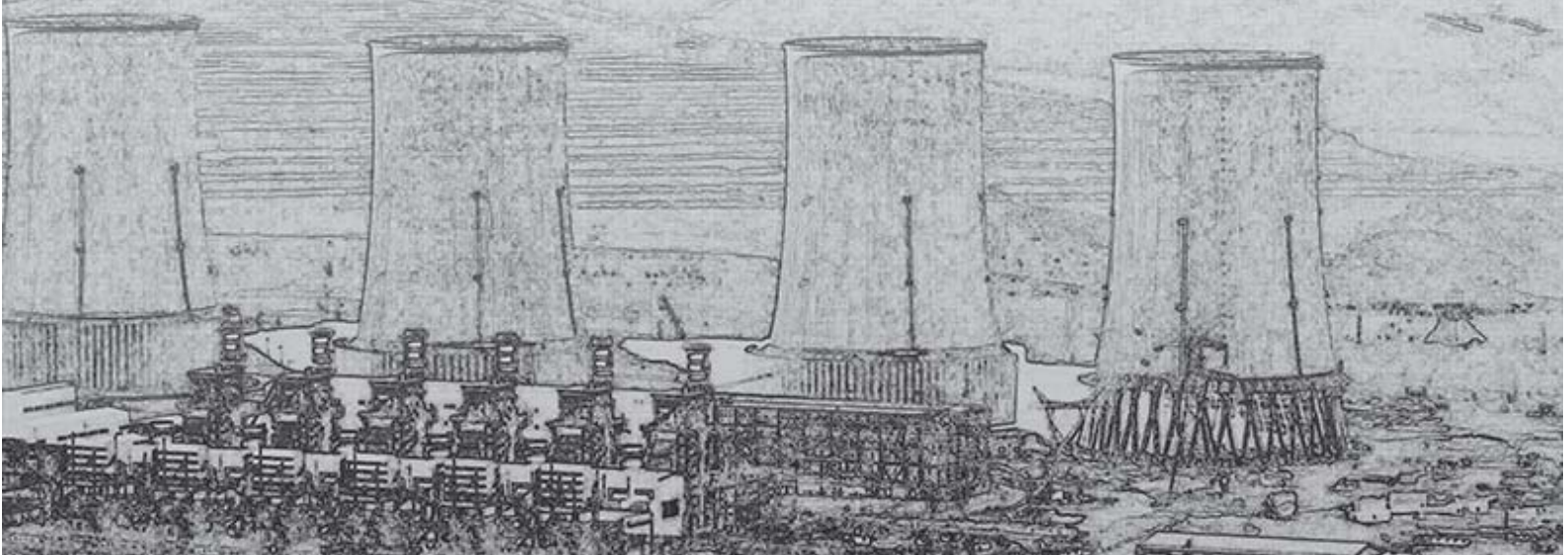
Monenco Iran

2017 Annual Report



Yazd: City of wind towers
One of the largest ancient cities built almost entirely out of adobe

Monenco Iran

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+1000
Employees

+200 Clients
in 16 Countries

+44 Years
Experiences

"**Exemplary Exporter**"
in the field of Engineering Consultancy 2017

1 Grade Consulting Engineer in ICT Sector in the Field of Exporting Knowledge Based Services, 2017

مـونـنـکـو ایـــران
Monenco Iran
Consulting Engineers

The only consulting engineering firm among Iran's **400** companies by Industrial Management Institute

Power Transmission Lines & Distribution Networks
SCADA & **D**ispatching Centers
Oil, Gas and Petrochemical
System and Energy Studies
Metro and Railways
Mining
Water and Wastewater
High Voltage Substations
Power Generation
Management **C**onsultancy
ICT

2 Representatives in Bangladesh and Canada

+450
Domestic ongoing projects

+50 Overseas ongoing projects

3 Subsidiaries in Oman, Nigeria and Germany

Monenco Iran International Presence:
Headquarter in Iran, Tehran
Local Branches in all Over Iran

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.

Considering the economic and technological challenges, Monenco Iran has kept its global approach; its ability to innovate, quality of services and expansion of industries' solutions with the intention of creating long term value for our stakeholders. This was based on Monenco Iran vision to be ranked among the top 100 engineering companies globally in 2021.

Highlights from the year: In 2017, we refined our business objectives; we are proud of being ranked as "Exemplary Exporter" by Iran Ministry of Industry, Mine and Trade, 1st grade consulting engineer in ICT sector in the field of exporting knowledge-based services by Iran Ministry of Telecommunication and Information Technology and the only consulting engineer firm among the 400 giant companies in Iran. It is worth mentioning that these achievements is a recognition of our employees' commitment and performance.

Business Development: In 2017, we were able to make major improvements in a business challenging conditions around the world.

In international market, we expanded our solutions into new areas such as ICT, LNG regasification, call-off projects in oil and gas sector, waste to energy and renewable energies. In terms of geographical expansion, due to the Company's diverse technical and management skills and knowhow we were successful to expand our presence in Europe, Eastern part of Africa, Middle East and South East Asia. Moreover we have signed strategic partnership in the form of long-term agreements with local and international partners due to our globalization strategy. The major projects include;

- Iran-Oman Grid Interconnection
- Supervision of water transmission and distribution in Oman
- Top-supervision, monitoring of techno-economic feasibility study and related works of consulting firm (Appointed by LNG Cell, Petrobangla) RPGCL in Bangladesh
- Oman water telecommunication architecture study

In the domestic market, the Company showed growth in the following projects:

- Engineering and Design services for F-Class Combined Cycle Power Plant
- Supervision services for design, procurement and installation of Smart Irrigation Systems
- Assessment & Design Services for Telecommunication Topology Stations
- Medical Imaging Integrated Management System
- Field studies & basic design for Cathodic Protection Systems
- Co2 Emission Reduction & Toleration
- Submarine cables implementation studies

Also, we were successful to expand our services globally in "Management Consultancy" according to our clients' needs and expectations which resulted to be involved in few projects.

Innovation and Growth: In today's world that is heading toward digitalization, Monenco Iran actively drives innovation to accelerate growth in rendering its services across its target markets. In 2017 we were successful to render smart solutions and apply technologies such as IoT, Big Data and … in our services to a wide range of industries such as electricity, telecommunication, oil and gas, water and waste water, ports as well as health and transportation.

Meanwhile, in 2017, Monenco Iran was appointed as the secretary of Cigre (International Council on Large Electric Systems) in Iran which will helps Monenco to be more involved in the latest technology development as well as bottlenecks of power industries in all countries globally.

Success through teamwork: In closing, I would like to warmly thank all our stakeholders for making 2017 a significant year and look forward to continuing our joint success in 2018. I believe, together with our progress, our people and our modern solutions provide a good platform for further growth in the years to come.

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 Transm ission 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 Universityof 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 1978 to 1990 Dr. Haji Javad worked as project manager at Fichtner Consulting Engineers in Germany. In 1990 Dr. Javad joined AF-Consult Switzerland. From 1995 to 2012 Dr. Haji Javad was Head of the Thermal Energy Plants Department. During 2012-2013 Dr. Haji Javad was as Vice President of AF Thermal Energy Department. 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.

Jalal Hosseini

Hosseini.Jalal@monenco.com

Obtained his B.Sc. from Sharif University of Technology in Computer Engineering in 1996. From 2001 to 2005 he worked in Iran Telecommunication Research Center and IT Department of Ministry of Education as Analyst & Programmer. 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 joined Monenco Iran in 2009 as Software Systems Supervisor and in 2014 he was appointed as Managing Director of MIR Engineering and Technology Management.

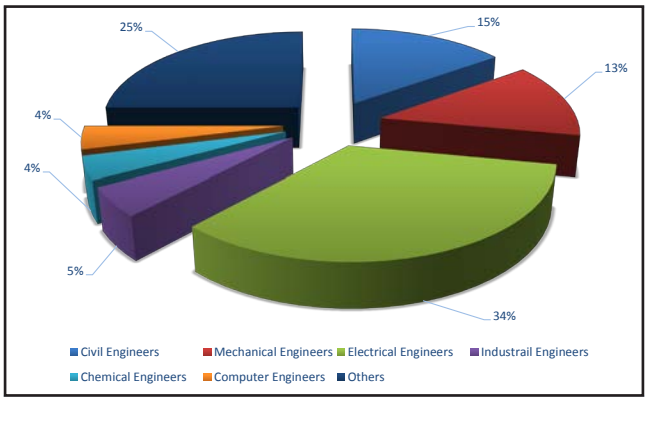
Major Experiences of Monenco

- Over 55,000 MW Power Plants
- 12 Renewable Energy Projects
- 18 Dispersed Generation Projects
- 38 Economical & Technical Feasibility Studies
- 2 Heat Recovery Project in Steel Industry
- 14 Heat Recovery & Energy Optimization Projects
- 50 National & Regional Dispatching Centers
- 64 Telecommunication Systems & Networks and Master Plans
- Smart Solution for Industries and organizations
- 53 Oil & Gas Complexes
- 17 Mining & Geology Projects
- Over 22,000 Km Transmission Lines & OPGW
- Over 43,000 MVA Substations
- 39 Kilometer Subway and Electrical Railway Projects (14 Stations)
- Master plan of distribution systems in major cities (such as Tabriz) and all of one province (such as Kordistan)

Overseas Projects

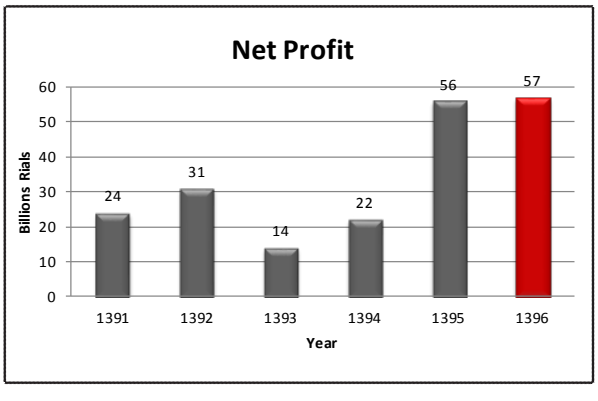
- 22 Projects in the field of transmission lines, distribution networks, high voltage substations and dispatching centers 9 Projects in the field of thermal power plants
- 2 Projects in the field of hydro power plants
- 2 Project in the field of wind power plant
- 2 Projects in the field of Small Scale Power Generation Plant
- 3 Projects in the field of Oil & Gas
- 1 project in the field of telecommunication master plan study

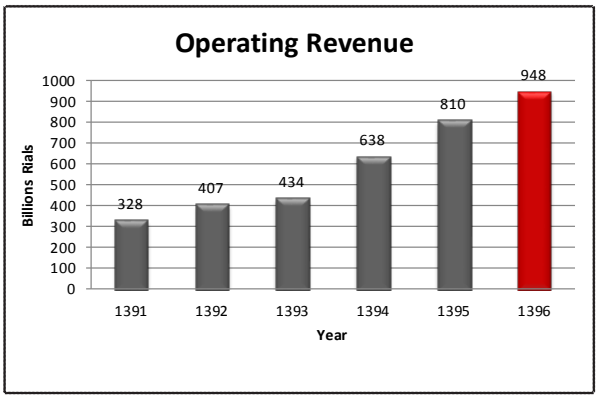
Composition of Experts in 2017

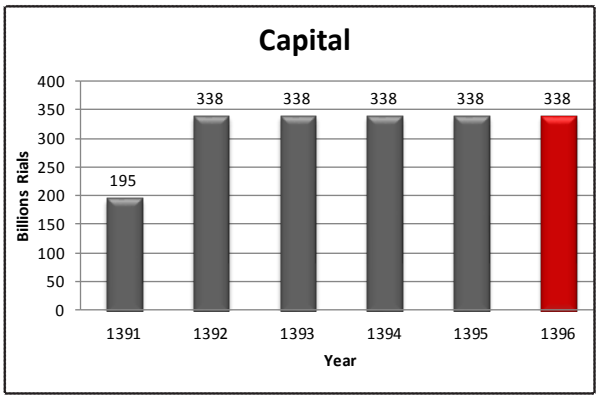


Expansion of Services

- 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
- MC, Consultancy, Engineering and Site Supervision Services for Wind Farm
- Consultancy, Engineering for Roof type PV
- Site Supervision Services for low grade geothermal
- Consultancy Services on E-Health in order to implement Cloud PACS (Picture Archiving & Communication Service) in some known hospitals
- Preparing Security Requirements in IT projects including FAHAM, PAEW and etc
- Services covered in submarine fiber optic field
- Master Plan for Smart Digital Utility (Smart Operation) in Regional Electric Companies
- IT Governance Evaluation and Development (COBIT)
- IT Service Management Evaluation and Development (ITIL)
- Enterprise Architecture and Process Modeling
- E - Government Studies (Services, Architecture, GSB, Integration)
- Intelligent Transport System (ITS) solution, for evolving smart cities
- Asset Management Projects for Enterprises
- Designing Cloud based architecture for Electric Distribution and Transmission networks
- Smart operation & maintenance
- Smart City Solutions (ITS, Smart Parking lots, etc.)
- National Smart Grid
- Land Based LNG Re-gasification







Geographical Expansion

Global Expansion has empowered Monenco Iran to be present in every significant market and to be a valuable resource for clients around the world. Commitments to international strategic planning for geographical expansion led Monenco to register a company in Germany (Monenco Germany) in 2016. This has significantly helped Monenco to support European companies active in the Middle East and to grow faster and stronger in the CIS and European markets. Consequently, our strong presence in Middle East, South East Asia, Africa and CIS countries has helped us to participate in various opportunities at several countries including Oman, Nigeria, Uganda, Kenya, Tanzania, Lesotho, Malawi, Ivory Coast, Ghana, Niger, Bangladesh, Iraq, Tajikistan, Kyrgyz Republic, and Armenia.

The successful geographical expansion has been added to knowhow qualification and resulted in being shortlisted in 21 projects in different countries around the world in various fields.

Domestic Market Penetration

In Monenco, development and growth will be followed by revising the goals, planning, prioritizing actions and constant 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 as specified below is fundamental:

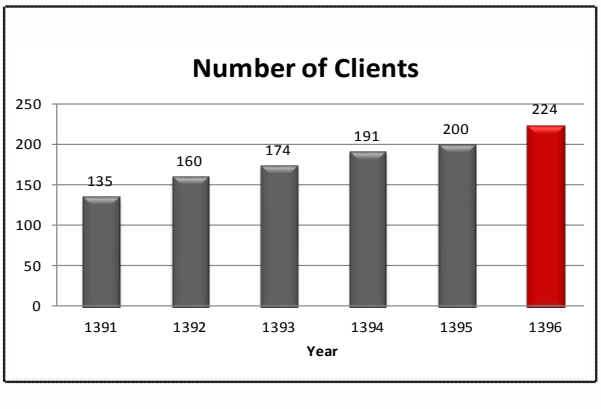
- Activity in all sectors for providing engineering
- Retain and development of the current position in the domestic market
- Being between 100 top global consulting firms

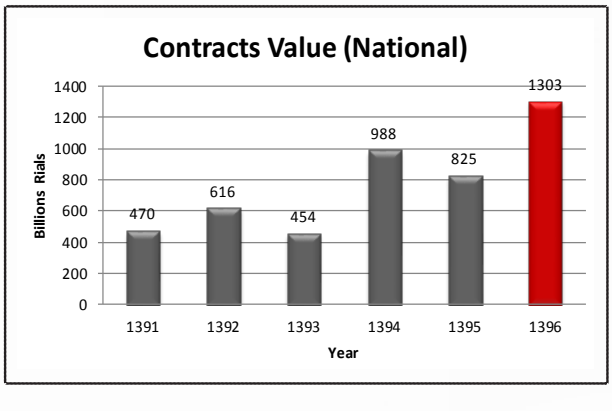
In 2017, Monenco was successful in expanding domestic market by getting awarded the projects in new national and strategic fields including:

- Engineering and Design services for F-Class Combined Cycle Power Plant
- Modification and upgrading the Power Plant Cooling Systems
- Consulting Services for Power Plants Generators Excitation System Renovation
- Engineering, Supervision and Site Supervision Services for Steam Power Plant
- Engineering, Supervision and Site Supervision Services for High Voltage Substation Construction
- RFP Preparation, Tendering, Contractor Selection, Supervision & Site Supervision for Design, Procurement and Installation Services for Smart Irrigation Systems
- Assessment & Design Services for Telecommunication Topology Stations
- Consulting & Supervision for Medical Imaging Integrated Management System
- Field Studies & Basic Design for Cathodic Protection Systems
- Engineering & Consulting Services for Completion of Designer Documents for Co2 Emission Reduction & Toleration
- Submarine Cables Implementation Studies

On the other hand, Monenco managed to get awarded projects from new clients as follow:

- Renewable Energy and Energy Efficiency Organization (SATBA)
- Ministry of Communication & Information Technology
- Sarooj pars Company
- Iranian Babak Copper Company
- Dorfak Shomal Melting and Casting Metals Company
- Ardabil Province Electric Power Distribution Company
- Ayande Negar Mehr Trading Services Company
- Nikroo Gostaresh Tire Company
- District 1 of Tehran Water and Wastewater Company
- Isfahan Power Generation Management Company
- Sefid Dasht Steel Company
- Pars Isotope Company (PICo)
- South Kerman Electricity Distribution Company
- Caspian Tamin Pharmaceutical Company (Caspian Tamin)
- Shazand Power Generation Management Company
- Parsa Energy Paydar Khorasan Company
- Lordegan Urea Chemical Fertilizer Company
- Azerbayjan Higher Education and Research Center
- Kazerun Petrochemical Company
- Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)
- Atiye Damavand Investment Group





Participation in Exhibitions

In 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. 22nd International Oil, Gas, Refining & Petrochemical Exhibition
2. Lateral Exhibition of 22nd Electrical Power Distribution Conference
3. Lateral Exhibition of 32nd International Power System Conference
4. 2nd International Logistics, Transportation and related Industries Exhibition

International:

1. International Exhibition of Energy, Electricity and Water, Oman
2. ESCAP (United Nations Economic and Social Commission for Asia and the Pacific), Bangladesh
3. European power strategy and systems summit, Vienna

European power strategy and systems summit, Vienna

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.

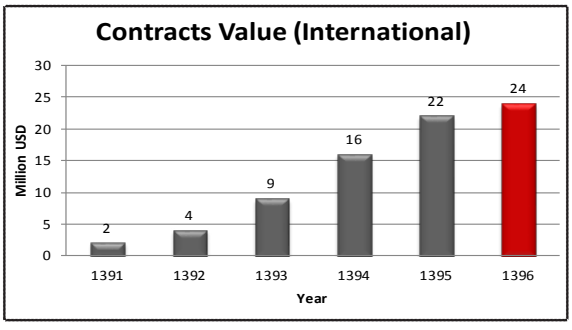
In addition, we have been successfully active in new areas such as LNG regasification, call-off projects in oil and gas sector, Waste to Energy and technical training, in which for the latter we have started partnership with high rank national and international universities.

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 many oil and gas companies, ICT consultancy, Technical training, and renewable energies.

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 awarded as the No. one exporter of the country. We have also earned high technical rank 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:



- Extension of consultancy services for the synchronous interconnection the Iranian-Iraqi grid connection
- Feasibility study for 650 MW Shahid Rajaee Power Plant (Power System Analysis)
- Iran- Oman Interconnection
- Extension of Siah Al kheirat power station at Dhofar governorate
- Supervision of water transmission and distribution in Oman
- Top-supervision, monitoring of techno-economic feasibility study and related works of consulting firm (Appointed by LNG Cell, Petrobangla) RPGCL
- Master plan for developing environmental friendly technologies in Iranian power sector
- 600 MW PV Power plant, Yazd
- EPC for rehabilitation Dhafrat existing power station in Al Wusta Governorate

Global Presence

Due to the Company's divers technical, management and financial skills and knowhow, Monenco had been capable to handle the challenges of global presence. Indeed globalization is our main growth strategy and our registered companies around the world reflects our focus on discovering new opportunities and delivering long-lasting value. As a result of internationalization strategy, we've started our official presence in Europe by registering our company in Germany on 2016 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 and Uganda Monenco achieved prominent success by creating powerful networks and Signed several Memorandum of Understanding with its local partners, moreover we've been technically ranked as first-Grade in most participated tenders.

Bangladesh still is an important hub in South East Asia region and Monenco was managed to get awarded some strategic contracts.

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 about 20 MOUs with world class companies from Germany, Italia, British, Spain, India and Bangladesh in different fields for Oil and Gas, Railway, Power Transmission, Power Generation, Communication and Mining.

Certificates and Awards

- Achieved 1st grade in providing consultancy services for “Railway” (Awarded by Iran Planning and Budgeting Organization)
- Achieved 3rd grade in providing consultancy services for “Airport” (Awarded by Iran Planning and Budgeting Organization)
- Achieved 3rd grade in providing consultancy services for “Preparation and Operation of mines” (Awarded by Iran Planning and Budgeting Organization)
- Gratitude Certificate from Ministry of Power as a Leading Company in Exporting of Engineering and Consulting Services
- Gratitude Certificate from Ministry of Industry, Mine and Trade as Exemplary Exporter Year 2017
- Gratitude Certificate from Ministry of Telecommunication and Information Technology as the 1st Grade Consulting Engineer in ICT Sector in the Field of Exporting Knowledge Based Services in Year 2017
- Gratitude Certificate from Ministry of Power as Approved Consultant by the Office of Management of Passive Defense
- Rank of 366th in the 2017 Annual Ranking of Top 500 Iranian Companies by Industrial Management Institute (IMI-100 ranking)

- 21 Satisfaction Certificates from clients in the fields of Oil & Gas, Power Transmission Lines, High voltage Substations, Dispatching & Telecommunication
- 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)

Publications and Presence in the Conferences

We believe that creation and sharing the new knowledge is essential to the survival of our business. Following our commitment to publish our knowledge constantly, we are finalizing Monenco 6th book with Human Resource Management theme which contains all the aspects in practical HRM.

In addition, Monenco published 35 accepted international and 16 national papers and researches in 2017. Furthermore, 51 technical reports were prepared to support our actual and potential clients of the latest technologies and services.

In 2017 we held more than 112 internal/external seminars and training courses to improve the technical and managerial knowledge of our experts and managers.

Corporate Social Responsibility

As an international consulting engineering firm, Monenco Iran is invested in, and committed to, the social responsibility of business. We believe in the benefits of corporate social responsibility and in building sustainable communities which helps us to create long-term shareholder value.

In 2017, by focusing on our vision, we have defined a corporate social responsibility policy in Monenco Iran which is based on three pillars that all three need to be in balance to be effective: social, economic and environmental.

Social Perspective;

- Monenco Iran considers the three below areas in respect of social activities
- Employees; Developing the CSR culture among them and creating them a safe, healthy and supportive work environment and so on. That will lead us to deliver exceptional solutions to our clients
- Learning: Developing an environment that supports learning and development
- Communities: Supporting different communities including non-profit and charitable organizations so as to have a positive impact on the society and culture

Economical Perspective;

Considering the long-term benefits for all stakeholders in carrying out the projects, at Monenco Iran, we focus on economical viability in order to increase the productivity, reduce costs, reduce use of resources and increase the income.

Environmental Perspective;

At Monenco Iran, we use sustainable design and engineering to minimize environmental impact. We strive to undertake all projects in an environmentally responsible manner, and to identify, manage and mitigate any risks that may impact negatively on the environment. Considering the life quality of the next generation is one of the important factors in Monenco Iran.

Below there are some major activities that have been done in Monenco Iran in line with CSR strategies in 2017:

- Getting involved in the projects concerning water and wastewater, energy efficiency and CO_2 reduction
- Getting involved in renewable energies projects such as wind and solar power plant
- Providing technical reports in terms of sharing knowledge
- Allocating scholarships for students from Sharif University of Technology
- Internships for university students
- Cooperation with 4 non-profit organization financially and non-financially in different cases such as natural disasters
- Sponsoring employees for educating in DBA and MBA
- Employee welfare programs such as restaurants, sports and shopping gift cards

We live where we work
care about our impact

"Car-free Day" Campaign at Monenco Iran

CSR meeting with Mapna Group

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 43000 MVA Substations from 33 kV up to 400 kV and 89 master plan & distribution network losses reduction studies, 13 projects in supervision of capital and mechanization projects as well as 39 kilometer (14 stations) metro and railways projects.

Power 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.

Power 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.

Power 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 Airport 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, civil 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 2017 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

- 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
- Lightning Effects on Electric Equipment and Effective Protection Method for Railway System
- Ventilation System in Subway Stations and Tunnels
- Technical Methods Used for Fault Detection and Diagnosis of Power
- Technical & Economic Concerns on Submarine HVDC Cables Connection to the Power Grids
- Automation Inspection and Maintenance for Power Overhead Lines
- Network Splitting Method for Fault Level Reduction
- Neuro-Fuzzy Techniques Application In Power Transformer Online Monitoring
- Application of UFES Method for Preventing of Explosion in Medium Voltage Switchgears

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
- Simultaneous optimization of energy consumption and service quality in electric railway system.
- Experimental investigation on ungrounded conductive objects effects approximate to power transformer during IVPD test
- Survey of Automatic Generation Control Development in Iran Power Grid And Presenting A New Controlling Approach

Major Ongoing Projects

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
- 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 being used in Iran have been designed in the past, but nowadays due to technology improvements, 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 project, Monenco Iran is responsible for designing the new towers for 63 kV overhead lines.

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

Start date: 2015 **Finish date:** 2018 **Location:** Abadan-Khoramshahr, Iran **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 follow:

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 & 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, services, 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 Services for Lordegan 132kV Substation

Start date: 2017 **Finish date:** 2019 **Location:** Lordegan, Isfahan, Iran **Client:** Lordegan, Isfahan, Iran

Scope of work:

- Identification and preliminary design
- Basic and detail design and preparation of tender documents for Construction
- assisting on holding of tender
- Inspection and test

Description: By considering the growth of electricity demands, Lordegan Urea Fertilizer Company decided to extend Lordegan 132kV substation. In this project Monenco Iran will be responsible for all engineering and supervision services during the construction.

Consultancy and Engineering Services of Tabriz Subway Stations 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 Stations - 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 stations. In this project, Monenco Iran is responsible to render consultancy and engineering services for detailed design of stations No 9, 10 & 14 of Tabriz Subway at Line 2 for Civil, Electrical and Mechanical Systems.

Consultancy Services for Implementation of Baghestan 400/230/63kV Substation

Start date: 2017 **Finish date:** 2020 **Location:** Tehran, Iran **Client:** Tehran 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

Description: By considering the increasing electricity demand in Tehran Province and capability and reliability requirements of Iranian electricity network, Tehran Regional Electricity Company decided to start to implement this project for the mentioned purposes. In this project, Monenco Iran will be responsible for all engineering and supervision services.

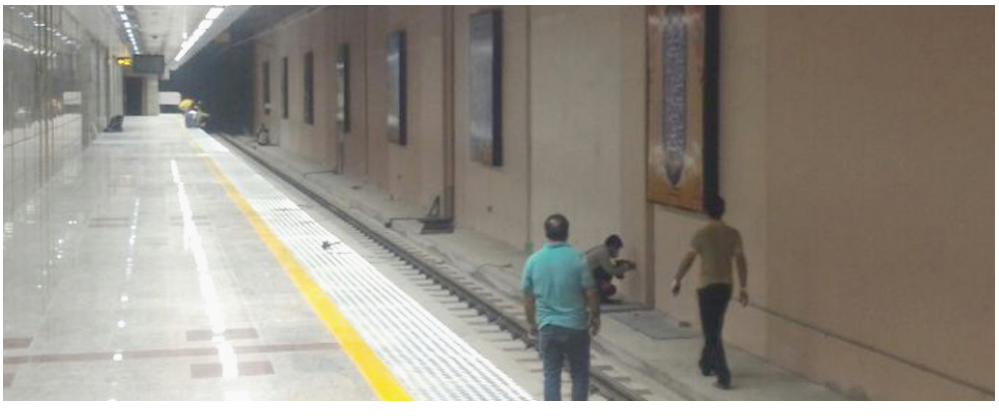
Engineering and Supervision Services on Civil, Electrical and Mechanical Systems for Vakil station of Shiraz Subway

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 Iran 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.



Consultancy Services for Implementation of Kharameh 400/66kV Substation

Start date: 2017 **Finish date:** 2019 **Location:** Fars Province, Iran

Client: Fars Regional Electrical Company

Scope of work:

- Surveying and selection of line feeders' optimal input & output
- Investigation for selection of site plan
- participating in value engineering meetings of project
- Preliminary design of all electrical and civil drawings required for the project
- Preparation of tender documents
- Holding tender and bid evaluation
- Preparation of technical and financial bid evaluation report and making contract
- To Review and approve the detail of technical specifications
- Control and approving of construction plan as well as factory tests
- Inspection, factory testing and ordering to deliver equipment
- Supervision on packing, care, shipment, transportation and unloading
- Progress reports
- participating in temporary and permanent delivery meetings
- Pursuit and approval of As-Built drawings

Description: Due to growth of energy consumption in Fars province and in order to meet the projected demand and develop the power transmission and distribution system in the region, Fars Regional Electric Company intends to construct new transmission substation (400/66 kV) in Shiraz, Kharameh. Kharameh High Voltage Substation will be one of the most important substations in Fars Regional Electricity Company (FREC) territory due to its consumers. In this project, Monenco Iran is responsible for engineering services for construction of this important substation.

Consultancy and Engineering Services for Implementation of Naghsh e Rostam and Dehram 66/20kV Substations

Start date: 2017 **Finish date:** 2020 **Location:** Fars Province, Iran **Client:** Fars Regional Electrical Company

Scope of work:

- Implement topographic operation of substation and soil Investigation
- Basic Design of Electrical documents and Detail Design of all Civil Documents
- Tendering in order to select civil contractor
- Tendering in order to select Installation and testing contractor
- Bid evaluation, and contracting
- Design review and checking of related invoices
- Inspection, factory test and ordering to deliver equipment

Description: Due to the prime role of Fars Regional Electricity Company (FREC) for electrification of Fars and Bushehr Provinces in respect of national welfare and economy improvement, Hence, Fars Regional Electricity Company (FREC) decided to construct Naqsh-e-Rostam and Dehram 66/20 kV substations which the benefits are as follow:

- Improvement of voltage level in above mentioned Province
- Reducing voltage sage of the regional and national network
- Availability of power with acceptable quality in the area
- Supply of electricity to infrastructure industrial and mining projects in the region
- Supply of electricity to agricultural and residential consumers in the area
- Creating job opportunities by providing electrical power to new industries and other sectors
- Improvement of voltage profile of the local network

Consultancy Services and Design Review of 67 Sub-Transmission Substation

Start date: 2017 **Finish date:** 2020 **Location:** Iran **Client:** Tehran Regional Electrical Company

Scope of work:

- Design review
- Factory Inspection and testing and project Monitoring
- Supervision of packaging, transportation of equipment
- General evaluation of the project

Description: Electricity consumption has grown at a steady and a higher growth rate than its GDP, due to reduction of real electricity prices over the years. In this regard, Sub-transmission substations is one of the important stations to respond to energy demand. By reduction of voltage level to 33 & 20 kV in these substations, the required electricity will be provided for medium industries, agriculture and household electricity consumption. Based on the increasing demand of energy in Iran, the existing Sub-transmission substations are not adequate to respond such a demand. Hence, Tehran Regional Electricity Company is responsible to procure the required equipment for these substations through financing. In this project, Monenco Iran will be responsible to render engineering & supervision services for construction of 67 high voltage substations.

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 ±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)

Consultancy and Engineering Services for Implementation of Sirik 400kV Power Plant GIS Substation

Start date: 2017 **Finish date:** 2019 **Location:** Hormozgan Province, Iran
Client: Thermal Power Plant Holding Company

Scope of work:

- Identification and preliminary design
- Basic design and preparation of tender documents
- assisting on holding the tender
- Design Review
- Inspection and test

Description: Huge mineral resources of Iran, strategic harbors in Persian Gulf and also recent technological development of Islamic Republic of Iran need electricity infrastructure to supply the power to industrial zones. Thermal Power Plant Holding Company which is responsible for implementation of power plants decided to construct the 400kV power plant substation. In this project, Monenco Iran is responsible for consultancy and engineering services.

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.

Engineering and Consultancy Services for Iranian Copper Industry

- 20kV Distribution center for Dare-Alou Mine
- 132/20 kV Substation of Meydook Copper Mine
- 132/20 kV Substation of Chah-Firouz & Eejo Mines
- 20kV Distribution center for Chah-Firouz & Eejo Mines
- Modification and Implementation of Distribution Network in Shahre Babak copper complex
- 132kV Switching Substation for Meydook copper complex

Start date: 2017 **Finish date:** 2020 **Location:** Kerman Province, Iran
Client: National Iranian Copper Industries Co.

Scope of work:

- Feasibility studies, selection, complication
- Provide documentation and take the necessary steps to purchase power and energy demands and monitors
- Basic and detail design
- Preparation of tender documents for the selection of contractors
- Design review
- Supervision
- Assist client in provisional project handover

Description: National Iranian Copper Industries Company, as the main Middle East copper company, has been focusing on construction of comprehensive electricity projects such as developing two 230 kV line feeders in Bardsir substation, construction of 230/20 kV substation of Bardsir-Darealu and construction of 20 kV distribution center for power supply projects in Darealu mine.

Consultancy Services for Procurement of 24 Sub-transmission Transformer (40MVA, 63/20kV) and 24 Earth and Auxiliary Transformer (250KVA, 20/0.4kV)

Start date: 2017 **Finish date:** 2019 **Location:** Isfahan Province, Iran
Client: Isfahan Regional Electrical Company

Scope of work:

- Preliminary study about Environmental conditions
- preparing technical specifications and data sheets
- Tender evaluation
- Design Review
- Inspection and FAT test
- Supervision and commissioning (if the client asks)

Description: Isfahan Regional Electric Company decided to renew the power transformers in sub-transmission network. Environmental condition of Isfahan Province is different and variable from the south to north and from the east to west. In this project, Monenco Iran is responsible to prepare tender documents and technical data-sheets in order to meet the requirements.

Consultancy Services for Implementation of Sanandaj-6 and Kermanshah-10 63/20kV GIS Substation

Start date: 2017 **Finish date:** 2020 **Location:** Kordestan and Kermanshah Province, Iran
Client: West 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

Description: The main purpose of this project is urbanization and commercial development of west area of Iran considering the special environment of the region as well as expensive lands throughout the cities. Therefore, West Regional Electric Company intends to enhance and develop the reliability of sub-transmission grid by implementation of the mentioned substations.

Consultancy Services for Construction of Arman & Samangan 400/132kV Substations

Start date: 2017 **Finish date:** 2020 **Location:** Khuzestan Province, Iran
Client: Khuzestan Regional Electric Company (KHREC)

Scope of work:

- Identification, Data gathering and preliminary design
- Providing Basic Design
- Providing Technical Specifications and Data Sheets
- Tendering, bid evaluation, assisting in selection of contractor and Contracting
- Design review inspection, factory testing and ordering to deliver equipment

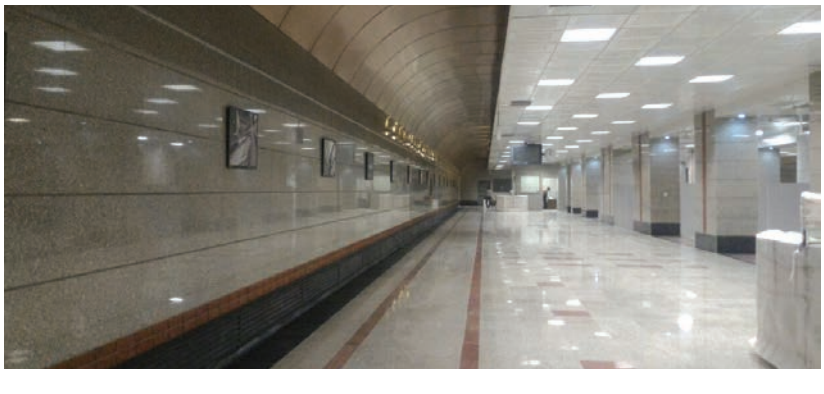
Description: The energy demands and loads have been increased in Khuzestan Province. Therefore, There is an urgent need for the construction of two 400 kV substations in Khuzestan Province. Arman & Samangan Substations are the most two important substations in Khuzestan Regional Electricity Company territory due to reinforcing the Power Grid and supplying power to other substations in Khuzestan Province.

Consultancy & Engineering Services of Phase I Stations and Imam Hossein Station of First Line of Shiraz's Metro

Start date: 2017 **Finish date:** 2018 **Location:** Shiraz, Iran **Client:** Shiraz Urban Railway Organization

Scope of work: Consultancy services of phase 3 supervision of the remaining of supervision of installation and test special equipment

Description: After the operation of phase 2 of first line of Shiraz's metro, Monenco Iran was chosen as a consultant for consultancy and supervision for the rest of construction and special equipment.



Consultancy & Supervision Services for Construction Tehran-Shomal Freeway (Part 1) – Mechanical and Electrical works

Start date: 2017 **Finish date:** 2018 **Location:** Tehran and Alborz Provinces, Iran
Client: Tehran – Shomal Freeway Company

Scope of work: Consultancy services of Engineering, programming, coordination, Design review, etc. comprising:

- Surveying and endorsement of technical report received from GEODATA Co.
- Preparation of tender document, bid evaluation and meeting with first approval bidder for finalizing the pre-contracting discussion
- Preparation of contract document and consult client for technical and financial issues
- Design review
- Quality Control of Equipment
- Equipment Procurement
- Witnessing factory acceptance test
- Preparation of Project Implementation plan, Monitoring Scheme and Cost Control
- Reviewing As-Built Documents
- Supervision on Project Construction Activities

Description: The project is mainly about Design endorsement and site supervision on operational plans for the Tehran- Shomal Freeway (Part 1). Tehran- Shomal Freeway is the freeway in Northern of Iran, connecting Tehran to cities of western Mazandaran Province. Currently section 4 is in service and section 1, 2 & 3 are under Construction. Section 1 is from interchange with Azadegan Expressway and Hemmat Expressway in Northwestern Tehran city to Doab, Shahrestanak, Alborz Province. This section is currently under Construction. This section is 32 km long length, with 28 tunnels having an overall length of 28.4 km on both sides. The longest tunnel is Talun Tunnel which is 4870 m long approx. The Tehran-Shomal Freeway Project Part 1 deals with performing all operations in the areas of electrical and mechanical, instrumentation, telecommunications, safety, utilities (except Civil Works), pre-commissioning and commissioning in North Tehran highway (between km 0 to km 32) until completion of the work. The objective of this project is design review, erection and commissioning of electrical and mechanical equipment and works for Tehran – shomal Freeway (Part1). In this project Monenco Iran Consulting Engineers is responsible for Electrical, and Mechanical systems; including preparing Master plan, tender document, contractor's design review, FAT Inspection, Site Supervision, project and contract management as well as design review of all the systems.

Consultancy Services for Preparation of Master Plan of Distribution Network (MPDN) in Great Tehran Electricity Distribution Company

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

Client: Great Tehran Electricity Distribution Company

Scope of work: Consultancy services for preparation of master plan of distribution network (MPDN) based on national & international standards, requirements & criteria, limitations of distribution networks development as follow:

- Data gathering and verifying
- Design philosophy preparation
- Network modeling
- Initial network studies
- Load forecasting
- Substation & feeder development studies in the long, medium and short term

Description: Tehran Distribution Network with over 4 million customers in 22 regions of Tehran is the biggest Distribution Network in Iran. Also, Tehran, as capital of Iran, has a very important situation in terms of economic. Therefore, quality and quantity of the electricity being delivered to the customers is an important matter for Great Tehran Electricity Distribution Company.

In this project, a long term development plan including substations, medium voltage feeders and distribution transformers with respect to network load, design, safety and reliability will be compiled for Great Tehran Electricity Distribution Company by Monenco Iran.

Consultancy Services for Master Plan Preparation for Distribution Network of South Kerman Electricity Distribution Company

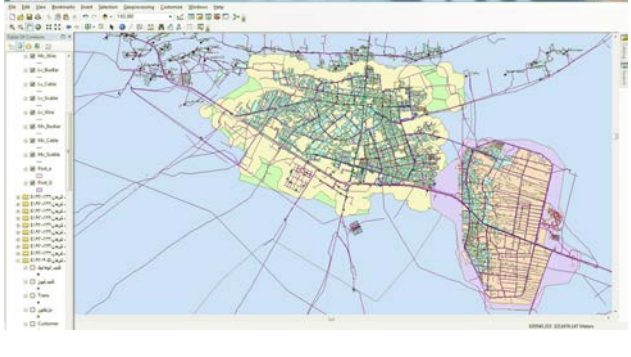
Start date: 2017 **Finish date:** 2018 **Location:** Kerman Province, Iran

Client: South Kerman Electricity Distribution Company

Scope of work: Consultancy services for preparation of master plan of distribution network (MPDN) based on national & international standards, requirements & criteria, limitations of distribution networks development as follow:

- Data Gathering and Verifying
- Preparation of Design Philosophy
- Network Modeling in Software
- Initial Network Studies
- Load Forecasting
- Substation & Feeder Development Studies in the Long, Medium and Short Term
- Distribution Transformers Location in the Short Term

Description: The main purpose of this project is to have guidelines for development of power grid structure. By specifying the location of installation, technical specifications and development plan of substations and feeders, the network performance will be optimized and electrical and economic indicators will be improved. Also, the inefficient technical structures in each section of the distribution network will be enhanced.



SCADA, ICT & Smart Solutions Division

SCADA, ICT & Smart Solution Division was formed in 1994 to provide engineering and Consultancy services to Energy industries. Today, after over two decades, we provide A-Z engineering and consultancy Services to a wide range of industries such as Power , telecommunication, oil and gas, water and waste water, ports, steel as well as health and transportation. It is one of the most important and fastest growing divisions in Monenco as a result of dealing with inter-disciplinary 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 (IT Governance, IT Strategic Planning, Enterprise Architecture, BPR, 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.

Smart Solutions Department

Smart Solution Department has an extensive knowledge in Smart Metering (AMI), Smart Grid, Smart Operation, Smart City, Smart Homes, Smart Applications (EMS, DMS, etc.), Smart Distribution Automation and any other concept regarding Digitalization and Intelligence of functions and equipment. It provides consultancy services within the Power industry including generation, transmission and distribution, Oil & Gas, Water and Waste water and other major industries.

SCADA & Automation Department

SCADA 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),Water & Waste Water Utilities, copper and steel production industries, metro & railway, oil & gas and other industries. In this regard this department has an extensive knowledge in the engineering of SCADA and telemetry systems, dispatching and distribution automation within the power sector. In 2016 Monenco was granted the first grade of expertise in SCADA and cyber security from the Ministry of Power of Iran .

ICT Department

The ICT Department of Monenco Iran has an extensive presence in different industries namely Power, Transportation, Oil & Gas, Steel, port, etc.

ICT as an enabler and transformer in national and enterprise level, has critical positon in economic development and making new opportunities for businesses. Smart business is mainly based on human and IT resources. Aligning IT with Organization's goals is achieved by making IT Governance more efficient and effective. Developing ICT Master Plans, Enterprise Architecture, IT Business Models, and Business Process Reengineering are main expertise areas of the department.

As a featured area, the department has a special experience in telecommunication industry. 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. ICT Department of Monenco is a reliable consultant in the fields of IOT, Smart solutions, Network design, mobile & fixed broadband ,IT Governance and E Government 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 2017 in order to introduce new technologies & systems to the clients. Below is a list of the mentioned reports:

- World Trend of Small Metering
- Smart Metering, A must for future power system, Iranian case study
- Interoperability in Smart Metering, IRAN case study
- Enabling Interoperability between AMI Application Systems and Data Centers
- Smart Metering Solutions in Management, Transmission and Distribution of Water Resources
- Metering System (Oil & Gas)
- Energy Storage in Smart Grid
- Block chain in the major Industries
- Application Of Trunked Radio networks in relief – security industries
- Distributed Optical fiber Sensors and their application in oil and gas industries

Major Ongoing Projects

Technical, Economical, Financial, Social, Cultural, Environmental and Passive Defense Feasibility Studies and Obtaining a License from PBO

Start date: 03/2017 **Finish date:** 09/2017 **Location:** Iran
Client: Ministry of Information and Communications Technology of Iran

Scope of work: Data gathering, Basic & detailed feasibility study , Writing feasibility reports in three levels, Considering economic, financial, social/cultural, environmental aspects in the project scope and design appropriate checklists

Description: Feasibility study on capital asset acquisition in order to verify the ministry public revenue budgeting by MPO (Management and Planning Organization). This project consists of 5 subproject as below:

- Development of Knowledge and Technologies of Information and Communication Technology
- Establish and develop platforms for improving internal power, intelligent government services and indigenous content
- Establishing and developing a regional service for information and communication technology
- Development of data exchange infrastructures and national information network
- Creating & developing infrastructures and applied services of the ICT section

Engineering Services and Supervision on Monitoring of Grid Meters in Medium and High Voltage Substations for Alborz Transmission Company

Start date: 2017 **Finish date:** 2018 **Location:** Alborz Province, Iran
Client: Tehran Regional Electricity Company

Scope of work:

- Monitoring and supervision of HV/MV Substation's Grid Meters for better management of Electricity Transmission Grid
- Enabling reliable Electricity Market by gathering accurate and near real time
- Capable of Integrating SCADA data from RTUs

Description: Providing consulting and engineering services for online monitoring of grid meters in medium and high voltage substations and feeders with capability of integrating SCADA information in order to read, gather and monitor data in central system and provide required information to legacy applications such as power market and other stakeholders. Data exchanges between meters and central system by DLMS/COSEM, Modbus and Multi-Drop Protocols.

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)

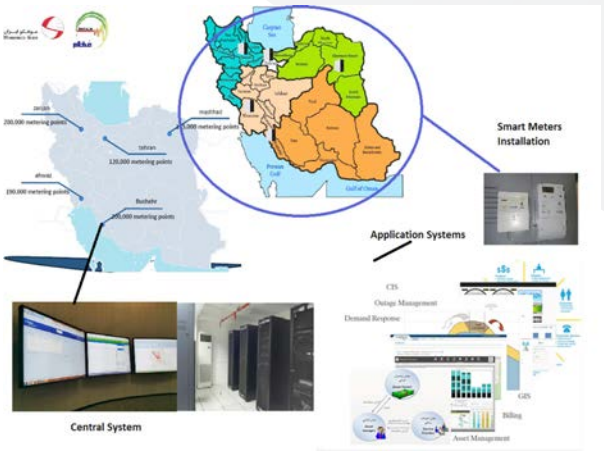
Scope of work:

- Defining FID1-Package, interoperability specification and massage structure between AHEs and MDM according to IEC 61968-9
- Defining FID1, implementation of interoperability among billing system and MDM
- Defining FID2-Package1, interoperability specification between AHEs and High Consumption Meters
- Defining FID2-package2, interoperability specification between DCU and Low Consumption Meters
- Defining FID2-package3, interoperability specification between DCU and AHEs

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.

Consultancy Services on E-Health in order to implement Cloud PACS (Picture Archiving & Communication Service) in some known hospitals

Start date: 12/2017 **Finish date:** 06/2018 **Location:** Iran **Client:** MAPNA Group

Scope of work: Basic Design, Detail Design, preparing Functional & Security System, Supervision on Implementing

Description: Today's Life styles, increased population, long distances and the need to empower patients to play a greater role in their own health and wellness, require sustainable health services in every country. Such services should provide integrated health infrastructures and systems together with concerning about the cyber security to help patients and medical staff benefit from the speed, integrity and accuracy of the health system. Benefiting from Information and communication technologies (ICTs), electronics and computer science, it has become possible to facilitate national e-Health Infrastructures to meet today's needs from prevention lo diagnosis, treatment, monitoring and management. Align with the fifth development program of Islamic Republic of Iran in the health sector, Mapna group had proposed a protocol to the Ministry of Health and Medical Education for implementation of this scheme. By signing this agreement, Monenco as the Engineering and Consultancy Company of the group, has become involved in this national project. At this stage, Monenco Iran has recommended Its studies in formulating the feasibility study (Phase 1) of the project. The vision is to be the pioneer Iranian consultancy company in this area in the next three years. The Importance of this project for Monenco is to have the experience of another national project together with entering into a new field of studies.

Consultancy services for Master Plan of GREC Sub-transmission Dispatching center

Start date: 2016 **Finish date:** 2017 **Location:** Gilan Province- Iran
Client: Gilan Regional Electric Company (GREC)

Scope of work: SCADA Master Plan for GREC sub-transmission network and substations including:

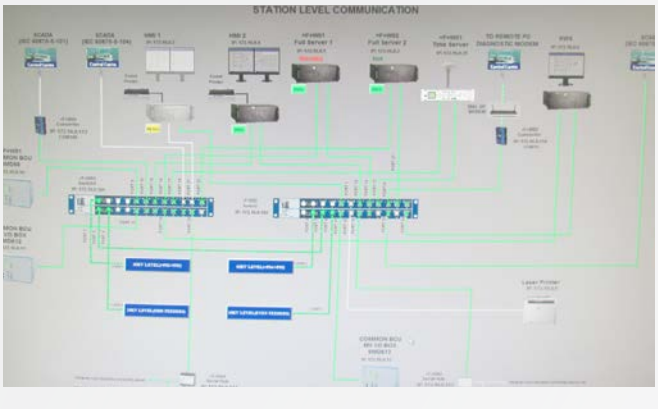
- Site survey
- Preparation of Gilan RDC SCADA master plan
- Preparation of basic design
- Preparation of tender documents

Description: In order to establish the necessary SCADA system to help operate growing RDC network and sub-stations, GREC awarded SCADA Master Plan for RDC level to Monenco Iran.

GREC has recently upgraded an existing RDC center covering a small portion of its network and is planning to construct necessary control centers and prepare necessary prerequisites in the substations to make all the sub-transmission observable.

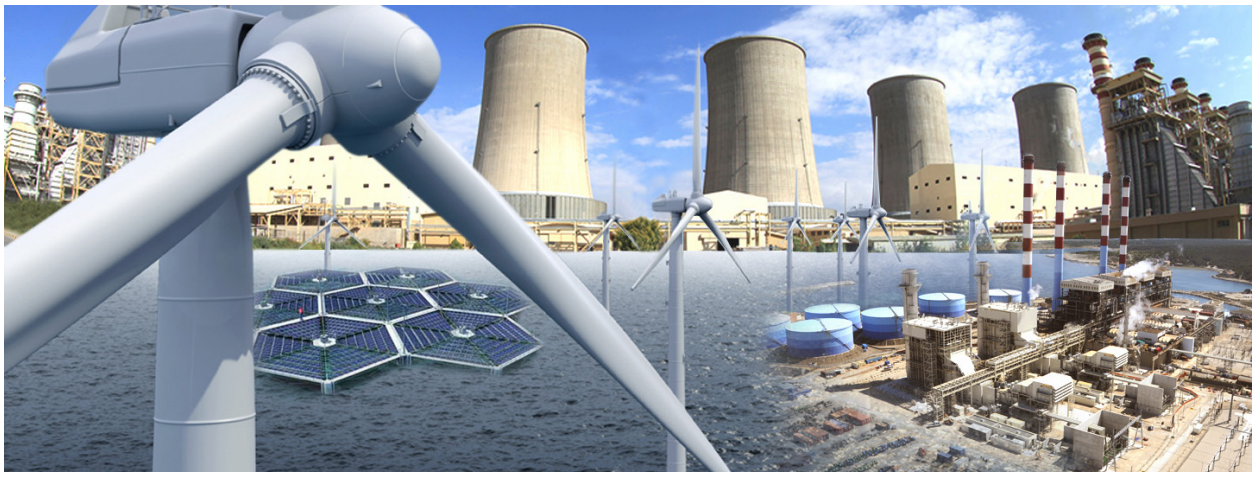
The scope of the project included extensive site survey and data gathering, preparation of conceptual and basic design and preparation of tender documents.

As part of the contract, the client has also been provided with the planning of projects to be implemented along with time schedules and budget requirements



Power Generation Division

Power Generation Division covers all types of power generation projects from Combined Cycle, Thermal Power Plant to Renewable and CHP, CCHP. More than 55,000 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 2017, Monenco Iran was involved in 5000 MW power generation projects globally.



Desalination

The 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

Monenco 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

Due 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 Rudshour Combined Cycle Power Plant

Project Type: Combined Cycle Power Plant **Start Date:** 2017 **Finish Date:** 2019
Location: Saveh, Iran **Owner:** Tolid Va Gostaresh Bargh Amirkabir **Capacity:** 1132 MW (3 GTG+1 STG)

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

Description: The plant is consisting of 1 steam unit. The portions of combined cycle power plant each consists of three (3) HRSGs, one Class F Siemens steam turbine generator sets, main & auxiliary cooling system ACC Type and 400 kV GIS substation for the existing simple cycle Class F gas turbine power plant including 3 GTG units to be converted to the combined cycle power plant in "3+1" configuration for the Rudshour site.

The purpose of this project is to increase the efficiency of Rudshoor Combined Cycle Power Plant to 58%.

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: Aqkend city in Mianeh, East Azerbaijan Province, Iran **Client:** Nasb Niroo

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 Hectare.

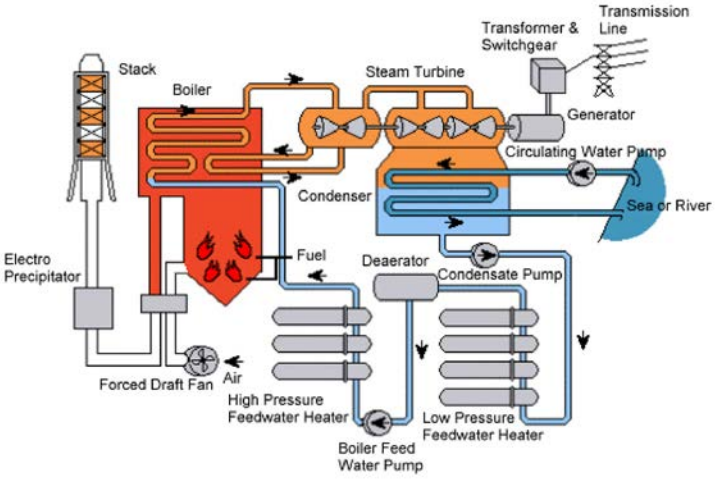
Hormozgan (Sirik) 1400 MW Thermal Power Plant

Project type: 4× 350 MW Supercritical Conventional Thermal Power Plant
Start Date: 2017 **Finish Date:** 2022 **Location:** Sirik City, Hormozgan Province, Iran
Owner: TPPHCompany **Capacity:** 1400 MW

Scope of work: Design Review, Supervision & Control for Construction of 1400 MW as well as 400 KV Substation

Description: The project is the construction of four units of Hormozgan Thermal Power Plant and 400 KV gas insulated substation, on a turnkey basis. In general the project includes design and engineering services and necessary studies, project control and management, preparation and procurement, manufacture and/or procurement of required equipment (from main equipment manufacturers in Russian, Western Europe, Japan, USA, and Iran) including boiler, turbine, thermal cycle, electrical system, control system and control instruments, factory tests, export packing, insurance, marine and inland transportation, customs clearance, transportation through the territory of Iran, unloading, handing over to site, site mobilization, temporary ware housing and necessary protection thereof, execution of civil work, including test of soil mechanics and topographical surveying, earth works, perimeter wall building, green area, landscaping, industrial and nonindustrial buildings, and as a whole, all works required for construction of 1400 MW TPP and 400 KV GIS.

The main purpose of this project is to supply required electricity to Mokran (Mokran coastal region in southeastern Iran) development plans, increase the employment, upgrade the knowledge of construction of Thermal power plants and provide drinking water to the surrounding villages by constructing desalination plants.



Thermal Power Plants Site Selection Studies in 20 Years Horizon

Project type: Consulting and Engineering Services **Start Date:** 2016 **Finish Date:** 2018 **Location:** Iran
Owner: TPPH Company

Scope of work:

- Determining suitable locations for the establishment of thermal power plants (steam, gas and combined cycle) 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 sites' database in GIS and Identification full details of each

Description: The main purpose of this project is to provide a comprehensive database for Iran Ministry of Energy and Thermal Power Plants Holding Company.

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 in near future will be updated.

Carrying Out the Survey of the Infrastructure of the Upgraded Candidate Power Plants

Project Type: Consulting and Engineering Services **Start Date:** 2017 **Finish Date:** 2018
Location: Iran **Client:** TPPH Company

Scope of work: Collecting the information of cooling system log sheets, gas and diesel fuel analyzes and the actual conditions of forwarding systems, cables, stimulation system, GCB, main transformers and electrical auxiliary systems.

Description: In order to convert the old V94.2 gas units into new MAP2B units, it is necessary to collect information of the condition of electrical and mechanical systems of 16 power plants and analyze the data consequently. Later, the collected data will be used as inputs by Mapna manufacturers. Monenco Iran has a vital role in the project, since the inputs has to be accurate in order to have the desired output.

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: Basic and Detail Design

Description: Due to water crisis in Iran, using various methods for water consumption reduction in industrial complexes especially thermal plants has become an important topic in recent years. Accordingly, this project by making changes in the existing Heller cooling system and adding a metal Heller tower space will be designed as described below and ultimately the water consumption will be reduced to 80 to 95 percent of the current usage.

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 re-cooled 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 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.

Basic Design and EPC Tender Preparation and Consulting for Installation and Start of CPP Mixed Bed in Steam Units of Kazeroun Combined Cycle Power Plant

Project Type: CPP of Combined Cycle Power Plant **Start Date:** 2017 **Finish Date:** 2018
Location: Kazeroun, Iran **Owner:** Ayandh Negar Company
Capacity: CPP with maximum capacity of 600 m3/hr for each module (power plant has three modules includes 6 gas units and 3 steam units with capacity of 1373 MW totally)

Scope of work: Basic Design, Cost Estimation, Vendor List Provision, Compilation of Evaluation Indices, EPC Tender Provision for CPP Design and Installation, Contractor Selection, Tender Preparation to Monitor Execution, Negotiation with Contractors until Contract.

Description: Supplying water has become one of the most important concerns of today's society especially in Iran. Therefore, treatment of unconventional water and its use in the industry is of great importance. Considering the urgent and growing need of industries, including the petrochemical industry, for water and the lack of local water resources, different scenarios are needed to provide process water. In this project, two options for supplying water from Kazeroun petrochemicals through wastewater treatment of the city of Kazeroun or the water of the Nargesi dam and its transmission to the petrochemical site, will be studied and the best option will be selected technically and economically.

Currently, the Heller cooling system is used in Kazeroun combined cycle power plant and CPP type is pre-coat which its resins will be saturated rapidly and the efficiency of the system will be decreased. As the efficiency drops, wastewater will be increased and consequently demin water consumption will be increased as well. In order to overcome with this issue, the CPP system have to be changed to the mixed bed type.

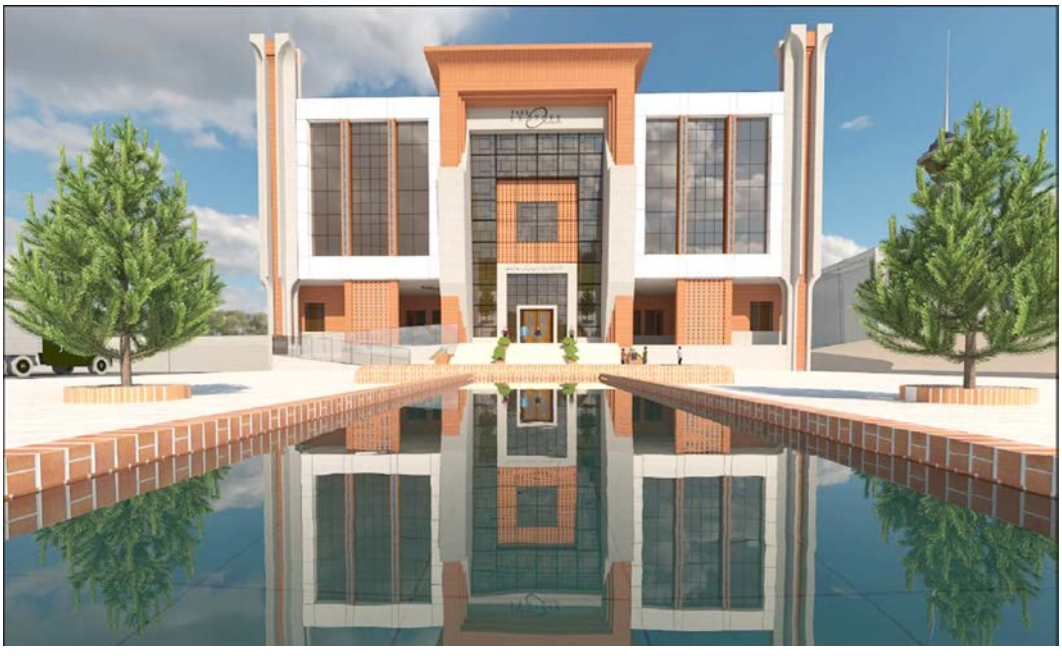
Consulting, Engineering Services and Design for Tetra Project (Iran Radiopharmaceutical Production & Development Center) Project

Project Type: Consulting And Engineering Services **Start Date:** 2016 **Finish Date:** 2018
Location: Tehran, Tehran - Iran **Client:** Pars Isotope Company

Scope of work:

- Architectural Conceptual, Basic & Detail Design
- Interior Detail Design
- Combined Heat & Power Generation Fusibility Study, Basic & Detail Design
- HVAC & Plumbing Conceptual, Basic & Detail Design
- Waste management & sewage treatment Design
- Electrical Conceptual, Basic & Detail Design
- I&C Conceptual, Basic & Detail Design
- Building Information modeling (intelligent 3D Model with Autodesk REVIT)
- Purchases Consulting services

Description: The project is 9 stories building and 25000 m2 in Tehran city to be constructed for Pharmacy & Radiopharmaceutical Production & Development Center (PET, PRP, CKP & R&D). In addition the official & services spaces will be considered. In this center two cyclotron will be provided the Radiopharmaceutical Production raw & initial material.



Design of Andimeshk Combined Cycle Power Plant

Project Type: Combined Cycle Power Plant **Start Date:** 2017 **Finish Date:** 2020 **Location:** Ahvaz, Iran
Owner: Thermal Power Plant Holding Company
Nominal Capacity: 451 MW (1 GTG * 309 MW + 1 STG * 144)

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

Description: The plant is located in Andimeshk city in Khoozestan Province consisting of gas and steam generation portions; One(1) cycle Class F GTG Siemens type + one(1) STG, one(1) HRSG generator sets & main and auxiliary cooling system ACC Type & 400 kV AIS substation.

Engineering Services and Preparing Tender Document to Determine Financer for 150 MW Solar Power Plant in Sistan and Balouchestan Province

Start Date: 2017 **Finish Date:** 2017 **Client:** SATBA

Scope of work: In this project Monenco Iran is responsible to provide engineering services and preparing tender document to determine financer for 150 MW solar power plant in Sistan and Balouchestan province.

Description: Currently, this project is the largest solar power plant under study in Iran. The purpose of this project is to develop an appropriate method for determining the purchase price of solar power guaranteed by the bidding procedure and the selection of the investor. By implementing this project, using the floating electricity tariffs, solar power market and appropriate situation for foreign investor presence in Iran will be provided.

Technical and economical feasibility as well as study over Sistan and Baluchestan power grid is being done in order to connect the power plant to the electricity grid which was the first step in this project.

Comparative Feasibility Study of Technical, Economic and Financial Supply of Electricity from Urban Network, Self-Sufficient CCHP Systems and Self-Sufficient DG Systems

Start Date: 2017 **Finish Date:** 2018 **Client:** Mahran Sanat

Scope of work: Marketing Feasibility Study, Technical Feasibility Study, Economical Feasibility Study, Financial Type and Investment Model Report, Technical and Economical Report submitting to Iranian banks

Description: Sarooj Pars Complex is located in the historical area of Kerman which makes it a unique project. Construction of this project will revive the area which has significnat affect to Kerman Great Market. This multipurpose complex includes business, administrative uses, hypermarket, recreational and sports facilities.

The general specifications considered in the design of the complex include:

- A land measuring 51,000 sq. m.
- The total infrastructure of the building project is approximately 196,500 sq. m.
- The green space is approximately 10,000 and approximately 38,394 sq. m. of parking
- Two underground floors each approximately 31,000 sq. m. area
- A ground floor of approximately 27,000 sq. m. area
- The first floor on the ground floor of approximately 24,000 sq. m. area
- The second floor on the ground floor of approximately 6,000 sq. m. area

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 2017. 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 and White Papers

Oil & Gas Division has issued following 6 technical reports in 2017 to introduce new technologies and systems for his clients:

- Gas Condensate Fractionation Plant (CFP)
- LNG Process and its regasification
- GTO/GTP
- Flare Gas Recovery
- Operation of Smart Wireless Control System in Oil & Gas industry
- Innovation in Electrical Heat Tracing

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

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

Consultancy Services & Site tests including Basic Design of Cathodic Protection System of Iranol Company

Start Date: 2017 **Finish Date:** 2018 **Location:** Tehran, Iran **Client:** Iranol Company

Description: The aim of this project is providing soil microbiological test report, soil resistivity report, basic design of cathodic protection for existing underground pipelines and bottom of tanks and preparation of EPC bid tender document.

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: 2013 **Finish Date:** 2018 **Locatin:** Bangladesh, Sylhet **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 by 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 (heavy & light), 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.

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.

Top-Supervision, Monitoring of Techno-Economic Feasibility Study and related Works of Consulting Firm (Appointed by LNG Cell, Petrobangla) and selection of Terminal Developer or Any other Designated Entity for Construction of land based LNG Terminals at Moheshkhali , Kutubdia of Cox's-Bazaar and Payra of Patuakhali of Bangladesh

Start date: 2017 **Finish Date:** 2021 **Locatin**: Bangladesh, Dhaka
Client: RPGCL (Rupantarita Prakritik Gas Company Limited)
First level consultancy: Tokyo Gas – Japon
Second level consultancy: Monenco Iran Comsulting Engineer
Capacity: 2× 7.5 MTPA @ Capacity 1000 MMSCFD, Land Based Terminals
Capacity: 2×3.75 MTPA @ Capacity 500 MMSCFD, FSRU plants

Scope of Works: Top-Supervision, Monitoring of Techno-Economic Feasibility Study and related Works of Consulting Firm (Appointed by LNG Cell, Petrobangla) and selection of Terminal Developer or Any other Designated Entity for Construction of land based LNG Terminals at Moheshkhali , Kutubdia of Cox's-Bazaar and Payra of Patuakhali of Bangladesh

Description: Natural gas is the only indigenous commercial energy resource in Bangladesh. Natural gas currently accounts for 72% of the commercial needs. Most of the natural gas is used in generation of electricity and production of urea fertilizer, with significant uses in industrial, commercial and domestic purpose as well as fuel for CNG operated vehicles. Gas demand is increasing sharply keeping pace with the economic development and diversified use of gas. In Bangladesh gas reserve is not increasing. Presently there is gas shortage in Bangladesh resulting less power generation, low gas pressure and no new gas connection in industrial, captive and CNG sector impeded in whole gas pipeline network areas. To meet up the upcoming energy supply challenge, Government of Bangladesh has planned to construction of land based LNG re-gasification terminals at Moheshkhali and Kutubdia under COX's Bazar district and payra under Patuakhali district each having 7.5 MTPA@ capacity 1000 MMSCFD.

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

Start date: 2016 **Finish Date:** 2018 **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: 2016 **Finish Date:** 2018 **Locatin**: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.

Project Management Services for Kermanshah Bio-ethanol Production Plant

Start Date: 2017 **Finish Date:** 2019 **Location:** Bisoton Industrial Zone (Kermanshah)
Client: Gostaresh Sokht Sabz Zagros (Zagros Green Fuel Development Co.)

Scope of work: PMC SERVICES for all phases of Bioethanol Production Project such as;

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

Description: The importance of project is on replacing of pollutant gasoline octane improver MTBE with bioethanol, which is a safe chemical. Accordingly, 200,000 liter/day Ethanol Alcohol (66 Million liter/year) and DDGS is based on raw material, corn and other cereal feeds will be produced in this project.

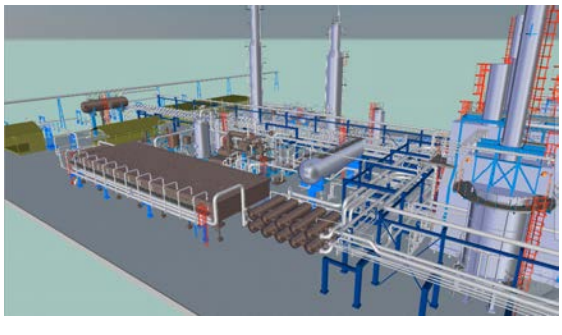
Engineering Services to provide as built and 3D Model (by laser scan technique) for Catalytic Reforming unit and interconnecting piping Abadan Refinery, updating and recalculation, heat and material balance of CRU and preparation of calculations, data sheets (P&IDS ,PDFS)

Start date: 2017 **Finish Date:** 2018 **Locatin:** Abadan, Iran **Client:** Abadan Refinery

Scope of work:

- 3dmodeling of interconnecting area and CR1 unit by laser scan in PDMS
- Piping PMS and Catalogue for Modeling
- Piping documents such as: Isometrics, Piping Plan and MTO's
- Process documents such as: P&ID, PFD
- Process Equipment Datasheet
- Instrument Equipment Datasheet
- Cause & Effect
- Emergency Shut Down Diagram
- Alarm Set Point List
- Utility Consumption List
- Flare Load List
- PSV Data Sheet

Description: The purpose of this project is to prepare 3D-Model of two units of Abadan oil refinery (CR1 & Interconnecting piping). Project consist of gathering all units' data and scanning all existing installation in these units such as: Equipment, Piping, Instrument & electrical devices and all structures by LASER SCAN technology. Data gathering and 3D-modeling of CR1 is finished and interconnecting piping is going on.



Design of Natural Gas Piping Network of Garmsar Special Economic Zone

Start date: 2017 **Finish Date:** 2017 **Locatin:** Garmsar's special economic zone, Semnan, Iran
Client: Garmsar's special economic zone company – National Iranian Gas Company (NIGC)

Scope of work: Design of gas distribution network including:

- Consumption distribution
- Node map drawings
- Piping plan drawings on a scale of 1:2000
- Calculation and design of cathodic protection
- Bill of quantities
- Standard civil, mechanical and electrical lighting drawings for TBS station
- Basis of design
- Plot plan
- Tender document

Description: Design and engineering services of natural gas network for sites 1 and 2 of Garmsar's special economic zone with an area of about 450 hectares and allocation of TBS (Town Board Station – gas pressure breaking station from 250 to 60 psi) based on the calculation of natural gas consumption.

Engineering Site Services of South Pars, Phase 14

Start date: 2016 **Finish Date:** 2018 **Locatin:** Assallouyeh, Iran **Client:** MAPNA (Neyr Perse) POGC

Scope of work:

- Review and completion of detail design documents
- Preparing Mark-up drawings
- Technical Query (TQ) resolving
- Site Supervision
- Technical Office services

All above scope of works will be done for the following units: 106, 108, 109, 120, 121, 122, 123, 124, 125, 126, 127, 129, 130, 131, 132, 144, 146, 165, and 176

Description: Production Capacity from the Reservoir in south pars phase 14 is 2BSCFPD. Offshore facilities includes 44 wells with 4 offshore Platforms each producing 500 MSCFPD.

Offshore Pipelines includes two 32" main pipelines transferring gas from the main Platforms to onshore processing units, 260km long in all, together with two 4.5" lines used for MEG injection and Infield Pipelines includes two 18" lines to transfer gas from satellite platforms to the outlets of the main platforms, totaling 18km along with two 4.5" pipelines for MEG injection. Gas and input liquids are processed in onshore processing unit, producing the following products:

- 50 MSCMPD of refined gas
- 1.1 MT/year of liquefied gas for export
- 77 thousand barrels/day of gas condensates for export
- 1 MT/year of Ethane gas to feed the petrochemical plants

By-Product is Sulphur (by product of gas sweetening process) as 400 MT/day for export.

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 so ware 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.

Major completed Projects

- Study and Detail Design of Pabdana Coal Mine, Iran
- Exploration engineering services and Supervision of in Central Alborz Coal reservoirs, Mazandaran, Iran
- Preliminary and Detailed Exploration study of Iron Ore Anomalies in Yazd, Iran
- Consultancy Services and Design of Coke Plant in Central Alborz Coal mines, Savadkoh, Mazandaran Iran
- Coal Exploration activities in Mazandaran, Zirab
- Detailed Exploration of Baba Ali 2 Iron Ore Deposit in the Hamadan
- Detailed Exploration of Galaly 2 Iron Ore Deposit in the Kurdistan
- Engineering Services, Site Supervision, Detailed Studies and Exploration Drilling of Water, Mining and Power Plant in Mazino-Tabas Coal Mine
- Preliminary Exploration in Takht Coal Mine in Golestan Province

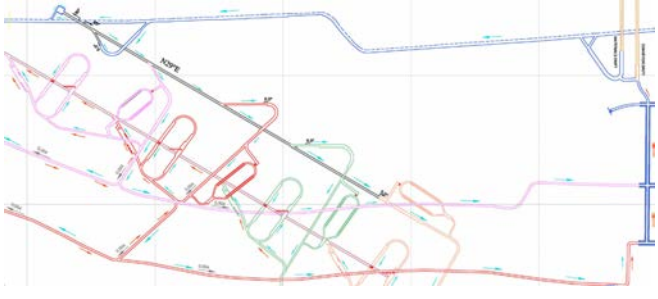
Consulting Services, Review of the Current Plans and Detailed Design from the lower level of +2400 to the Last Exploration Level of Main Pabedana Coal Mine

Duration: 24 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: Pabedana 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 opera on 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.



Consultancy Services and supervision of EPC Contractor Activities in Central Alborz Coal Mine

Duration: 40 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 and project documentation
- Topographical and geological mapping at 1:20000, 1:5000 and 1:1000 scales
- Development of 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.

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 safely, 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.

Electricity Market and Economic Feasibility Study Groupt

Economic 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.

Energy System Planning Group

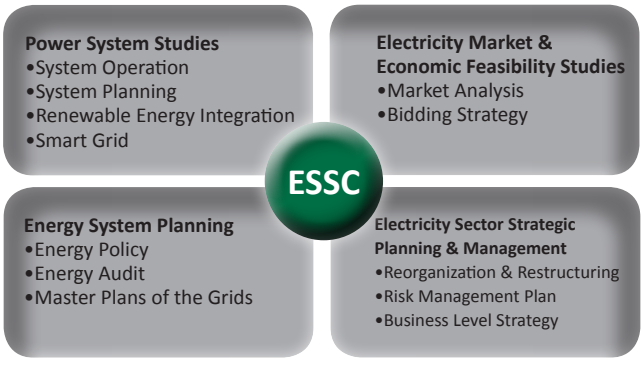
Energy System Planning Group has been responsible for comprehensive study of energy (Electricity, Oil and Gas, etc.), studying the effect of economic, environmental, and social aspects of using new technologies to optimize and reduce energy consumption, establishment of energy management system, providing 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.

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.

Power System Studies Group

Power 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.



Articles and Technical Reports

Energy and System Studies Center has published 1 Paper in the Journal of Electrical Power & Energy Systems, 5 Papers in international conferences and 1 paper in a national conference in 2017 in order to introduce new technologies and achievements to its clients. Below is the list of these papers;

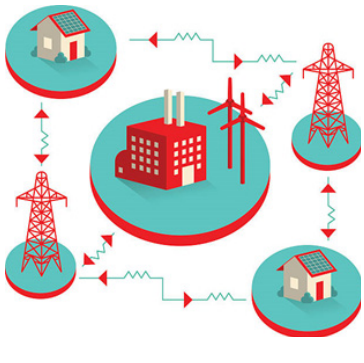
- "Incomplete Information based multi-port two layer active network equivalent for electromagnetic transient states studies in large power systems", Elsevier, Electrical Power & Energy Systems 99 (2018) 733-743
- "Operating Reserve Considerations in small size power systems", GCC CIGRE 2017
- "How Higher Voltage Level Improves Operation of Oman Power System", GCC CIGRE 2017
- "Technical and economic study for utilization of TCSC in order to improve transient stability of synchronous generators", International conference of Electricity and Computer, Iran
- "Double objectivized allocation of Private distributed generations and setting of bilateral tariffs between private sector and distribution companies using Pareto optimization technique", Hamburg International conference of science and Engineering
- "Improvement of efficiency and reliability of distribution grids in presence of islanded operation of distributed generation resources", Hamburg International conference of science and Engineering
- "A novel combined protection method for reduction of short circuit level", National Conference of Innovation and Research in Computer, Mechanical and Electrical Engineering, Iran

Major Ongoing Projects

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

Start Date: 2017 **Finish Date:** 2018 **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 2018-2023. 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

Feasibility Study of Iran and Oman Grids Interconnection

Start Date: 2017 **Finish Date:** 2018 **Location:** Iran
Client: Tavanir and Oman Electricity Transmission Company (OETC)

Description: This work aims at exploring the impacts of the interconnection between Iran and Oman electric power systems upon some important aspects. Iran and Oman interconnection can be a fruitful project; because of the possibility for Iran grid to interconnecting GCC via Oman and also providing this chance for Oman grid to interconnecting overseas countries via Iran. Access to other markets will be an excellent opportunity from technical and economic point of view for both of Iran and Oman.

This project was defined to do five main tasks. Main Task I is data gathering and system modeling. At this stage, required data including technical, economic and financial data for modeling of Iranian and Omani grids are gathered. Moreover, in this phase, literature survey is carried out in order to review international experience and technical considerations of HVDC interconnection. In Main Task II, detailed economic studies will be done. This phase comprises of assessment of value drivers for Iran and Oman interconnection, estimation of investment costs, calculation of benefits, and measuring economic feasibility of alternatives. In the third phase of the project, technical studies will be accomplished on both Iran and Oman grids in order to evaluate the impact of interconnection between these power systems. In this regard, the main studies which will be conducted are power flow analysis, contingency analysis, total transfer capability analysis, short circuit analysis, transient stability analysis and frequency stability analysis in 2023.

Task IV deals with route survey, environmental assessment and technology specification. The main objective of this phase is to develop an environmental feasibility study for the interconnection between Iran and Oman, considering alternative sea cable routes and selecting the more suitable one(s) from the environmental point of view.

In the final task, economic studies will be updated and operational agreement will be done on the commercial and financial aspects of the interconnection.

Feasibility Studies of Constructing New Power Plants in Iran

Start Date: 2016 **Finish Date:** 2017 **Location:** Yazd, Tehran, Kerman, Iran
Client: 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

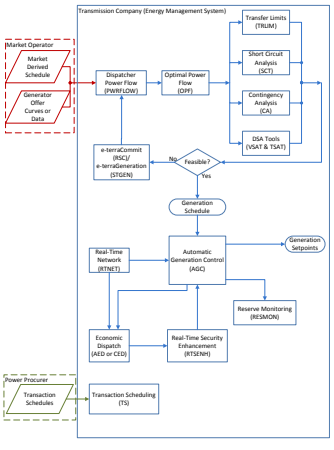
Some of these projects which were performed in 2016 are as the follow:

- Feasibility study of construction 500 MW combined cycle power plant in Bafgh region (YazdProvince)
- 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 (KermanProvince)

Security Constrained Economic Dispatch Considering Market Obligations in Oman Power System

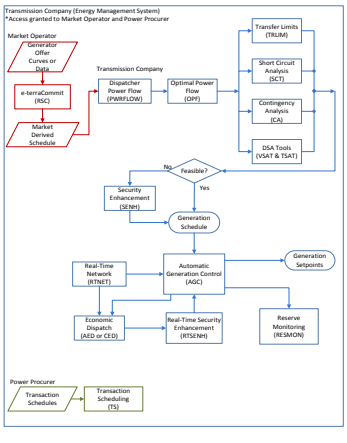
Start Date: 2017 **Finish Date:** 2018 **Location:** Muscat, Sultanate of Oman
Client: Oman Electricity Transmission Company (OETC)

Description: With the deepening of the electric power industry's market-oriented reform process, the electric power generation economic dispatch has gradually transformed into a market-based economic dispatch problem. The best solution to consider Security-Constrained Economic Dispatch (SCED) together with electricity market is to have real-time control with the capability to consider a significant number of generation resources and transmission network elements together with load demands. Therefore, it is essential to have a reliable and secure EMS\SCADA system which responds rapidly to system changes for maintaining power system reliability, while selecting the lowest cost generators to dispatch. In this regard, the overall performance of the system operator can be reflected by how well available generation resources are utilized to meet the demand in the most efficient manner.



Based on the client's expectations, capabilities, existing and current practices and experience in this field, the services provided in this project are:

- Investigate the existing EMS\SCADA system of Oman and evaluate its existing capabilities and expectations for future developments, focusing on SCED functionality in market environment (Software-wised and Hardware-wised)
- Recommend new features which must be added to existing system (upgrading solution) or propose new package (replacement solution)
- Thorough revision and evaluation of the existing policies, procedures and practices in economic generation scheduling and dispatch
- Propose new economic dispatch procedures to ensure full compliance with OETC obligations under the Grid Code and Market Rules



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

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

Significant Ongoing Projects

- Feasibility Study of Iran and Oman Grids Interconnection
- Development of Contingency Plan and Restoration Plans in MIS and Dhofar Grids
- 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 for Parsiloun Company to identify best investment alternatives

Significant Completed Projects

- Security Constrained Economic Dispatch Considering Market Obligations in Oman Power System
- Technical and Economic Feasibility Study of Retrofitting Excitation Systems of Abadan Refinery Power Plant
- 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 Valua on 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

Research 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

Research and Development Division has published 5 papers in 2017 in order to introduce new technologies and systems to its clients as follow;

- Comparison between Benson-type HRSG and drum-type HRSG in combined cycle power plants
- Thermodynamic and numerical analysis of tangential firing boiler for increasing efficiency and decreasing environmental pollution
- Standard drawing for nozzle plates of power plant pressure vessels
- Implementation of technology management in Monenco Iran business units
- Study of modern technologies for efficiency enhancement and cost reduction of hydrogen generation

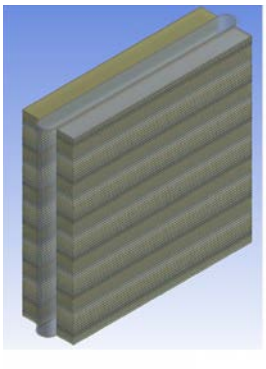
R&D also has published one technical report papers in 2017 as follow;

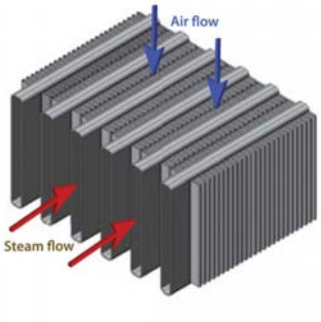
- Desalination and Reuse; two options for water resource management

Major Ongoing Projects

Study of Steam Condensation in ACC SRC Tubes

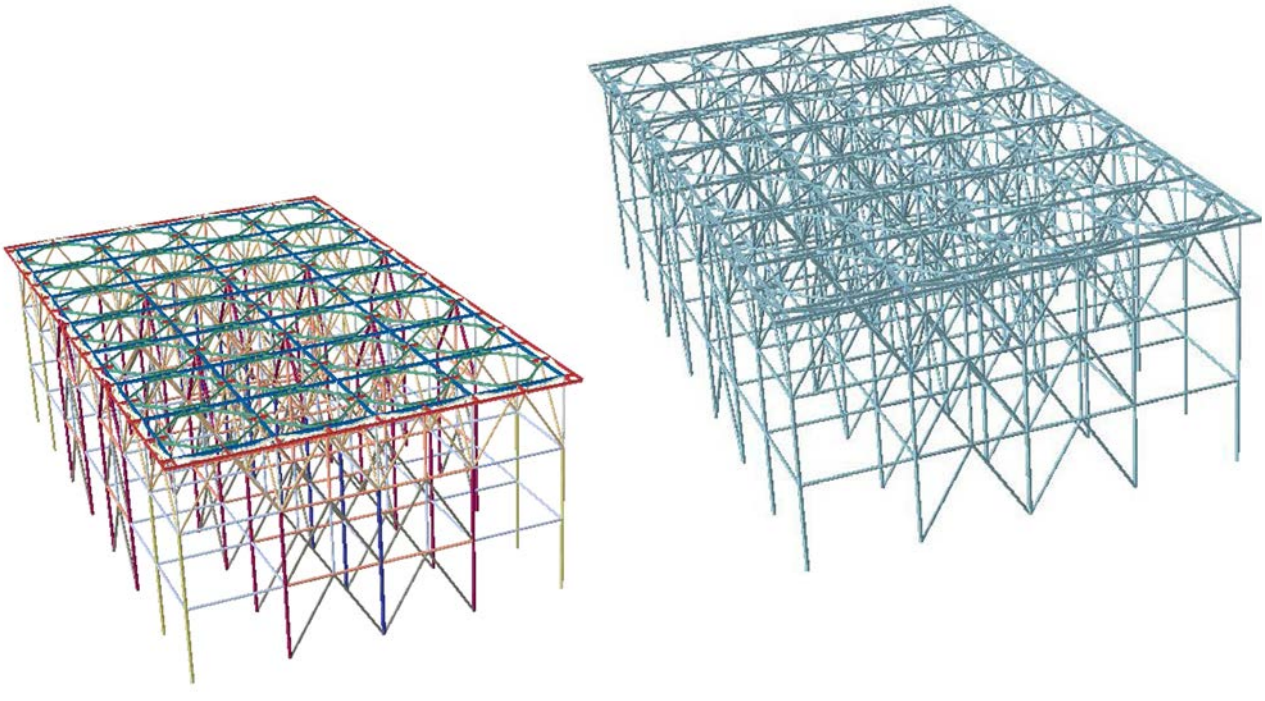
Design parameters of ACC tubes (length of tube, number of tube per bundle) have been changed in new combined cycle due to increase in heat dissipation. The nature of condensation in ACC is very complicated and simplified correlations are used in ACC sizing software. The aim of this project is to survey the process of condensation in ACC (steam side and air side) and evaluate the result with new plant configuration.





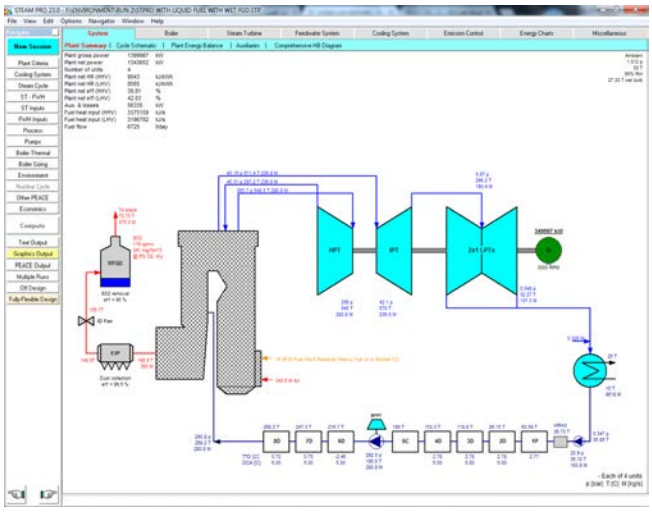
Modal Analysis of ACC Fan Bridge

Air Cooled Condenser (ACC) fan bridge vibration may cause serious problem in ACC structure and ACC performance. Design parameters have been changed in new combined cycle due to increase in heat dissipation. The aim of this project is to model new system with larger fan diameter and concrete structure under the platform. Structure will be modeled in a finite element modeling software and modal analysis will be done in order to ensure that the structure response is acceptable according to design criteria.



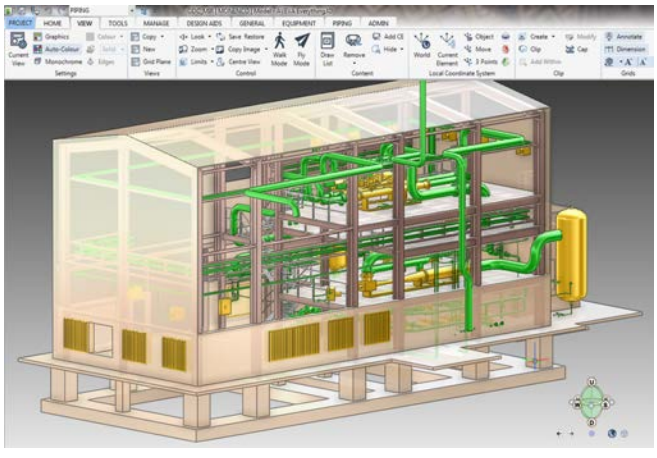
Study of Flue-Gas Desulfurization Systems for Power Plant Exhaust Gas

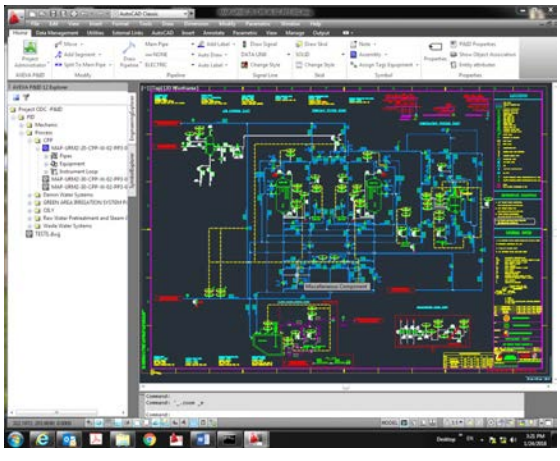
Flue gas desulfurization is commonly known as FGD and is a set of technologies used to remove sulfur dioxide (SO2) from exhaust flue gases of fossil-fuel power plants, and from the emissions of other sulfur oxide emitting processes. As sulfur dioxide is responsible for acid rain formation, stringent environmental protection regulations have been enacted in many countries to limit the amount of sulfur dioxide emissions from power plants and other industrial facilities. The aim of this project is to study of different technologies of FGD system and their effects on capacity, thermal efficiency and cost for Cirik power plant.



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 13 technical reports in 2017 in order to introduce new technologies or design to its clients as follow:

- Feasibility study of applying high efficiency osmosis (HERO) for water pretreatment system in power plants
- Technical and economic study of utilizing steam instead of hot water for HVAC systems in power plants
- SIL study for safety systems equipped with instrumentation in industrial plants
- Feasibility study of deleting of auxiliary boiler in combined cycle power plants
- New technology for fire distinguish in hazard areas with optical fiber
- Each power plant, one symbol; Rule of legibility on design of power plants
- Optimum design of auxiliary transformers layout in order to reduce losses during operation cycles
- Application of geotechnics and geomechanics in civil engineering projects
- Applying common tunnel for cabling and piping of BOP systems in power plants
- Study of online condition monitoring systems for improving efficiency and diagnosis in power plants
- Technical and economic comparison of LED and traditional lighting in power plants
- Comparison of steam duct design in side-exhaust and bottom-exhaust steam turbines
- Applying CESAR II and FEP softwares for support design of ACC cooling systems in power plants
- Engineering Division has also published the following national and International papers in 2017
- Numerical analysis of yield of metal layer in fiber metal laminated cylindrical shell under vibrational loading, the 2nd Conference on Mechanics and Aerospace Engineering, Tehran, 2017
- Verification on centrifugal pump design and selection algorithm based on life cycle cost, the 3rd Conference on Rotating Machinery in Oil and Power Industries, Tehran, 2017
- Determination of centrifugal pump efficiency based on real specific velocity, the 8th Conference on Rotating Equipment, Tehran, 2017

- Failure of composite laminates in fiber metal laminated cylindrical shell, the 2nd Conference on Mechanics and Aerospace Engineering, Tehran, 2017
- Basic and detail design of F-class gas turbine foundation and HVAC system
- Load balancing and reactive power compensation based on distributed generation compensation in smart distribution grids, International Journal of Emerging Technology and Advanced Engineering, 2017
- Study of velocity control of IPM motors derived by photovoltaic system in wide range with BELBIC controller, National Conference on Power Technologies, 2017
- Study of stability Improvement of a single- machine system connected to an infinitive busbar with serial controllable capacitance, National Conference on Power Technologies, 2017
- Windscreen effects on performance of air-cooled condenser (ACC), 25th Conference of Mechanical Engineering Association, 2017
- In 2017, 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
- 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 12.1 to E3D. Using this software causes integration among engineering data plus reduces the time and cost of the projects. Below is the description of main softwares
- Aveva E3D: 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

Monenco Iran, IT division recently completed improvement projects that significantly increased the resiliency integrity, security, availability and capacity of its national and international activities by:

- Implementing and exploiting System Center Configuration Manager
- Launch of Syslog Server
- Implementing the Network monitoring system
- Migration from Exchange 2010 to Exchange 2016
- Providing HTTPS secure protocol for most websites

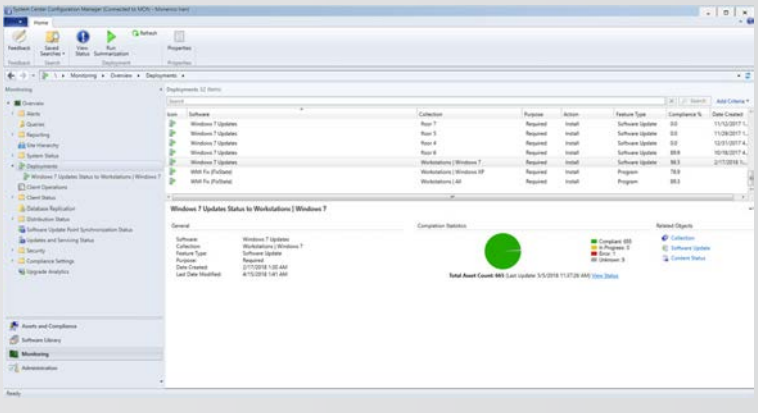
A tremendous amount of effort went into completing technology research and installations in the 3D-modeling sector including:

- Developing macros paragon module
- Developing admin and catalogue management system
- Globalization PDMS projects
- Conducting feasibility studies of new software and methods in order to utilization in engineering units (i.e. AVEVA E3D, AVEVA Insight, Virtualization Reality…)
- Developing comprehensive catalogue to apply in all power plant and oil & gas projects

In a global consulting company, IT Department understands the importance of information security and is thus taking various measures to realize a safe, secure digital society. The rapid growth of ICT has also provided us with some new issues. In preparation for the constant increase in cross border cyber-attacks, ensuring robust protection of personal and confidential information has become a matter that must be dealt with immediately. Under this vision, we adhere to our internal policies based on the ISMS code of conduct as a way of optimally managing and utilizing the information. At the same time, we equipped all Monenco offices around the world with latest generation of antiviruses.

Our software group delivered numerous new programs in 2017, such as new version of Monenco website and “Transmission and Dispatching” projects dashboard for predictive metrics on technical project data.

We provided an E-Learning software with various learning subjects.



Budgeting

In 2017, reports were published quarterly in order to illustrate and analyze the variation of actual revenue and cost with the budget. Actually settlement of budget is provided in order to control and monitor the budget. The report include:

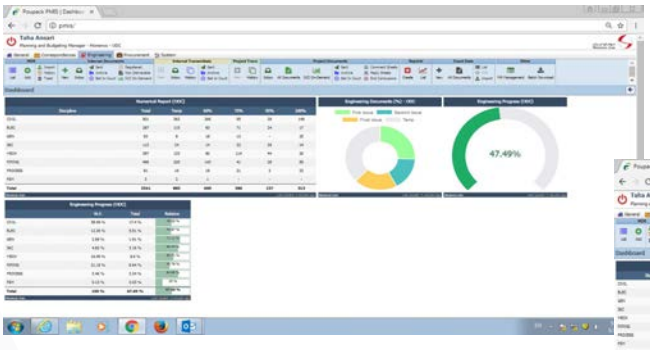
- Comparison charts of actual revenue, cost and benefit with budget for the company and departments
- Charts of revenue and cost percentages for company and departments
- Comparison of the actual costs with the budget items, so we are clear on what money is coming in, how it goes out, and where it is going to
- Identify the items of deviation from the budget and mention the reasons

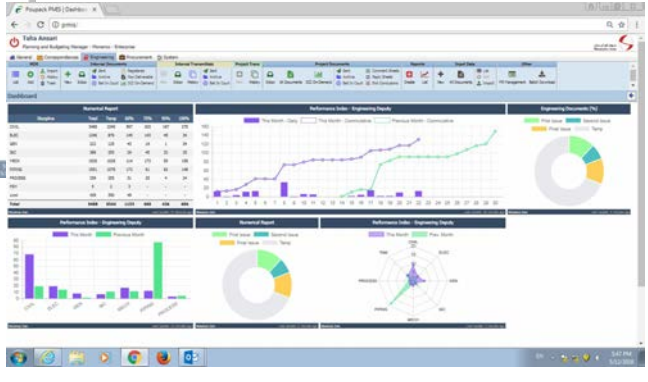
Budgeting is the most basic and effective tool for us to manage our income and costs.

Developing Systems and Methods

System Improvements:

In order to mechanize and improve processes, two new systems were introduced in Monenco in 2017. The first one is EDMS (Electronic Document Management System) software to automate the process of preparing, reviewing, submitting documents, which was implemented in all new power generation projects. This system supports an online dashboard which shows each project/division parameter and project/division progress percentage.





The other software is the E-QHSE (Electronic Work Flow for Quality Assurance and HSE Management System) system, which was analyzed, implemented and executed in 2017 to streamline the circulation of QHSE forms, such as corrective action, accident and incident reporting, revising of work procedures and instructions and so on in 2017.

Risk Management:

In order to improve processes in 2017, changes have been made in the process map and new processes including Organizational Risk Management. The organizational risk management process has been designed, implemented and executed at three levels of process, stakeholders, and strategic objectives based on ISO 31000, ISO 31010, ISO 9001: 2015 and its new requirements. After defining the risks, we will develop the response plan, scheduled review and risk evaluation.

Strategic Planning

In order to achieve Monenco's vision on 2021, to become a company in the top 100 engineering companies globally, the strategies should be reviewed based on results of internal and external factors of organization evaluation. Therefore, in the strategic planning scheme due to Monenco's diversification of consulting fields, we determined strategic situation of each division in IE matrix and defined their business strategies in SWOT matrixes. To formulate corporate level strategies and policies we used QSPM matrix to choose repetitive and high priority strategies of each division.

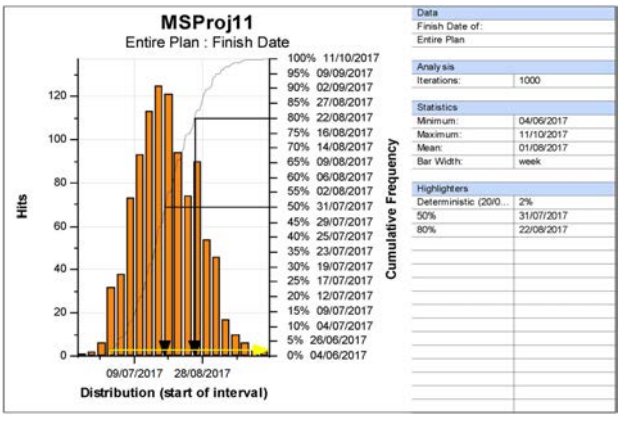
Finally we reviewed our strategy map according to new strategies of Monenco to provide multiple perspectives for evaluating our company based on Balanced Score Card (BSC) model and visualizing goals and sharing them with the rest of the company. For each goal in the strategy map, detailed Key Performance Indicators identified and their targets determined based on vision of Monenco in 2021.

Project Control & Monitoring Department

The monitoring and controlling process oversees all the tasks and metrics necessary to ensure that the approved and authorized project is within scope, on time, and on budget so that the project proceeds with minimal risk. This process involves comparing actual performance with planned performance and taking corrective action to yield the desired outcome when significant differences exist.

This process is continuously performed throughout the life of the project. So Project planning, Monitoring and controlling can play a very important role in the success and prosperity of any organizations.

Monenco Control & Monitoring Department consisting of 27 experienced experts is one of 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 to do scope verification and change control, schedule control, cost control, performance reporting, risk control, develop budgets and schedules to meet project requirements, control project progress on its right track, participate in meetings to discuss exactly what is needed based on procedures developed in updated methodologies such as PMBOK and ISO 21500 and project control software like MSP, P6 and Pert MASTER.

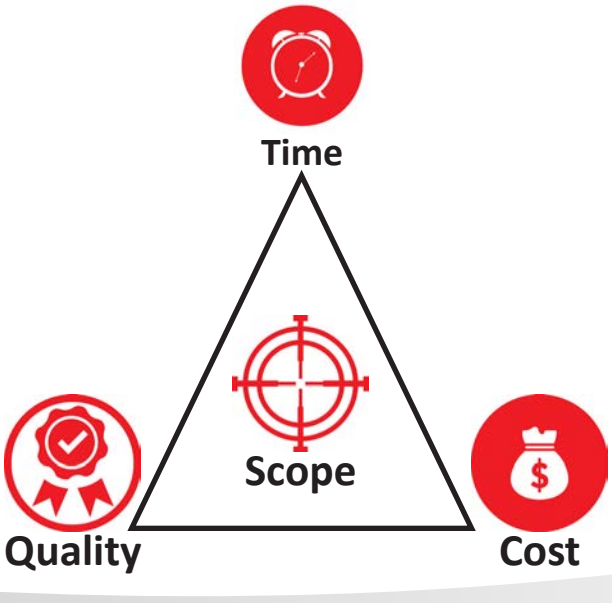


In 2017, the team concentration was on optimizing project planning and control processes especially in the area of risk analysis which many different meetings were held and finally after identification of the main risks of projects, the risk mitigation plan presented for combined cycle power plant projects and analyzed by Pert MASTER software. Also the studies have been done on concept of Organization Project Management Maturity Model (OPM3) and especially on Berkeley model, agile management and ISO 21500.

Following, two papers submitted in international conferences. The first one was a case study on claims which may be raised in a combined cycle power plant project which was presented in the 1st project claim management conference in July 2017 and the second one was a cases study on process standardization for a combined cycle power plant which was presented in International Project Management Conference.

The main goals of our team for 2018 can be summarized as below:

- Identify main areas of improvements and ensure that the organization processes comply with international standards
- Creating required infrastructure for making automation of action plans which leads to quicker and more accurate planning. The main tasks for this job has recognized and the related activities for it have started and hope to be finished during 2018
- Study on delay analysis according to Society of Construction Law Delay and Disruption Protocol (SCL 2017)
- Implementing a project Management information system (PMIS) to integrate the whole information of projects for different users



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 2017 are as follow:

- Improving procedures to control actual and potential non-confirming products to define and eliminate root causes
- Ranked first technical score in 18.13% of tenders in all fields including new businesses
- Obtaining the client's letter of appreciation for 21 projects. This item increased 40% during 2017
- Increasing the revisions of approved issued drawings and technical documents by 0.11 (5.47%) 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
- Passing the external surveillance auditing
- Revising and performing sites technical feedbacks procedure

Health, Safety & Environment

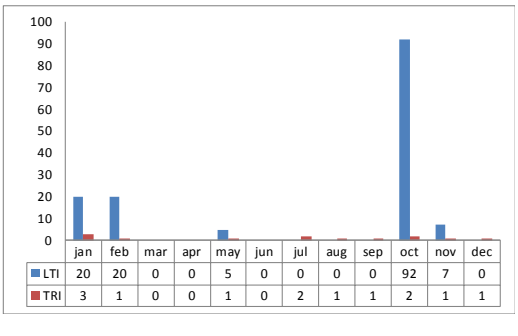
In 2011, Monenco established HSE Management system and got certified according to ISO 14001:2004 and OHSAS 18001:2007 in order to maintain and increase personnel health, safety and environmental requirements. Change of Certification Body from BV to IMQ was done in 2014. HSE-MS certificate for engineering consultancy and supervision services was gained in 2015. The main achievements of HSE management system in 2017 are as follow:

- E-learning courses and exams were implemented for site supervisors and newcomers employee at office.
- 6 man-days HSE audit were executed at sites
- HSE training for all supervisors and new employees (Total Man-Hours: 1468)
- Health, Safety & Environmental risk evaluation review was done in and sites (According to FMEA approach)
- Measuring environmental factors considering Department Of Environment and performing corrective or preventive actions
- Performing relief maneuver
- Monitoring employee health
- LTI, TRI & vehicle crashes

Health, Safety& Environment

	LTI	TRI		Vehicle crashes
		near miss	accident	
2017	144	5	11	2

moth's 2017	LTI	TRI
jan	20	3
feb	20	1
mar	0	0
apr	0	0
may	5	1
jun	0	0
jul	0	2
aug	0	1
sep	0	1
oct	92	2
nov	7	1
dec	0	1
SUM	144	13

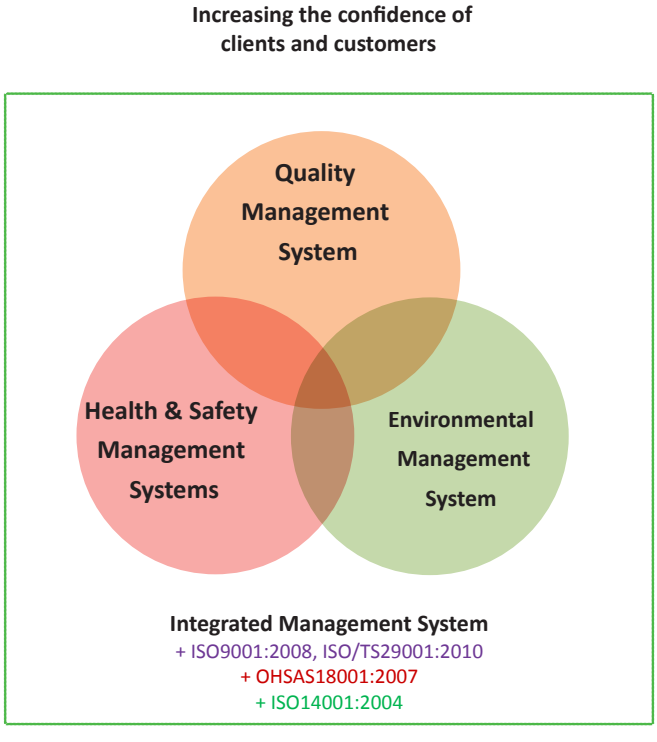


Integrated Management System

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

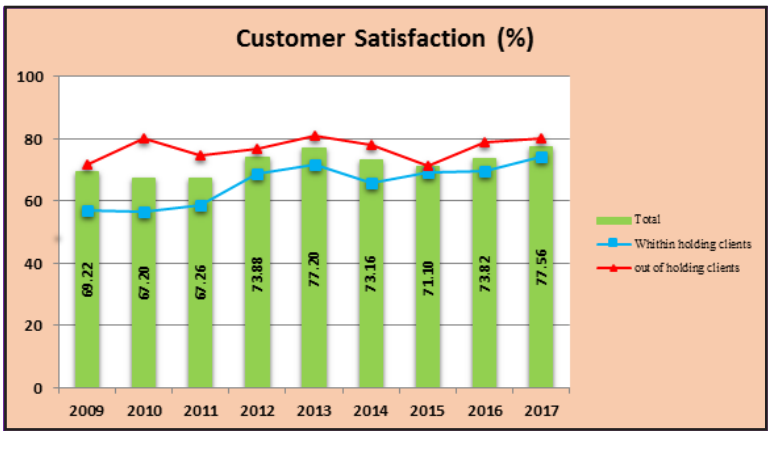
Gap analysis on IMS and preparation of related documents was done in 2017 according to ISO 9001:2015 and ISO 14001:2015 in order to upgrade our systems in compliance with new version of ISO 9001 and ISO 14001.



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 a new methodology for a better communication based on ISO 10002 and ISO 10004 has been planned for 2018.



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 2017, 63% of company's objectives have been met.

Excellence Model

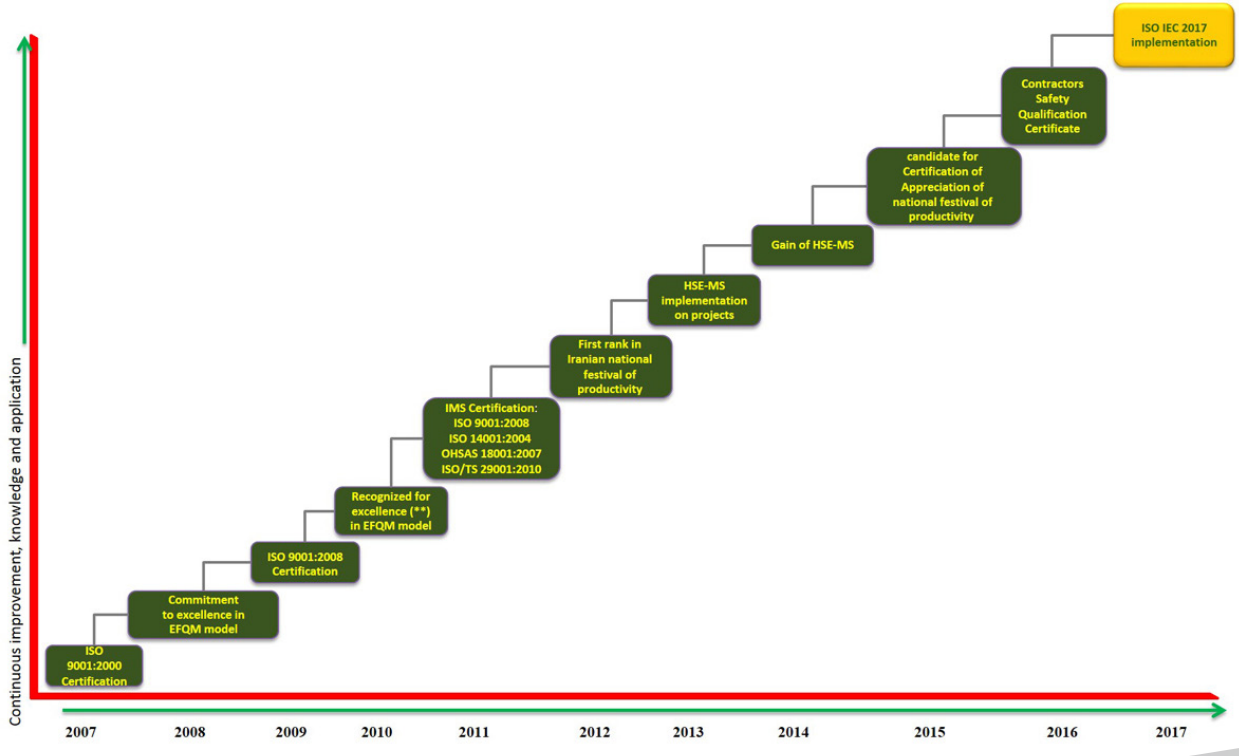
In order to provide sustainable excellence and achieve balanced results in all sectors of organization, Monenco performance has been assessed based on EFQM excellence model and awarded "Committed to excellence" level in 2009. In 2011, Monenco has been awarded "Recognized for Excellence", based on EFQM 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 2017 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 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
- Consultancy Services, Basic Design and Tendering for Construction New Siah Al Kheirat Power Plant for (RAECO)
- Consultancy Services for Design and Supervision of New 132/33kv Halban Grid Station

- Consultancy Services for Design and Supervision of New 132/33kv Airport Height Grid Station
- Consultancy Services for Design and Supervision of New 132/33kv ASalam Grid Station
- Detailed Engineering Services for Construction of Construction Dhafrat Power Plant for (RAECO)

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 MWA Siah Al-Kheirat Power Plant
- 132/33 kV Al-Saada Grid Station
- Consultancy Services for Design & Supervision of New 132/33 kV Jebreen Grid Station
- Consultancy Services for Design & Supervision of New 132/33 kV Dil Abdusalam & Suaiwq Grid Stations

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)
- DCRP Certificate – Distribution Code Review Panel (DCRP)

Number of projects with each Client	
Client	**No. of Project in 2017**
Oman Electricity Transmission Company (OETC)	8
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)	2
Atlas International Engineering Consultants Co.	2
Bahwan Engineering Company (BEC)	2
Larsen & Tubro Company (LTO)	1
Global Chemical Industries (Global)	1

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 warmest climates in 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.

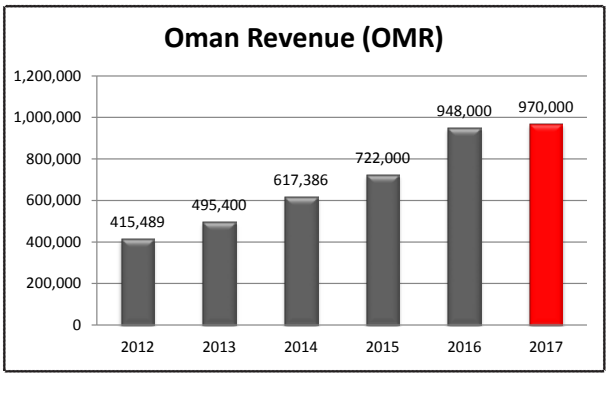
3 Years Framework Agreement with OETC for Power System Studies

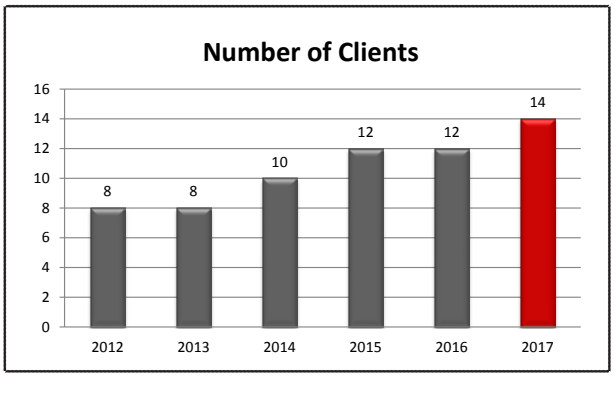
Start Date: 2015 **Finish Date:** 2018 **Location:** Muscat, Oman
Client: OETC (Oman Electricity Transmission Company)

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.





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

Start Date: 2016 **Finish Date:** 2019 **Location:** Oman **Client:** Oman Electricity Transfer Company (OETC)

Scope of Services: Data Gathering, Conceptual Design, Basic Design, Detail Design, Recommending Design, Project Management and Supervision

Description: OETC Oman decided to constuct 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

Start Date: 2016 **Finish Date:** 2019 **Location:** Oman **Client:** Oman Electricity Transfer Company (OETC)

Scope of Services: Data Gathering, Conceptual Design, Basic Design, Detail Design, Recommending Design, Project Management and Supervision

Description: OETC Oman decided to construct upgrading of Seeb Grid Station, adding 3rd and 4th transformers at Mobella (2) & construction of Mobella (3) with 4X125MVA transformers.

Monenco Germany Outlook

In May 2017, the Monenco Germany GmbH has been officially registered according to German Law and started its business activities as a consulting engineering company. The main shareholders of Monenco Germany are Monenco Iran in Tehran with 51 % of shares and PUT GmbH in Stuttgart with 25 % of shares. The business activities of Monenco Germany GmbH for planning and implementation of energy and environmental projects 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

Monenco Germany provide services for national and international clients. A main aim of the company is the cooperation with the main shareholders Monenco Iran and PUT GmbH for implement of national and international projects. The provided services of Monenco Germany GmbH to his clients are 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

Monenco Engineering Ltd. (MEL) provides consultancy and engineering services with focus on energy sector since 2010 and despite being new in Nigeria has contributed significantly in developing projects within the country as a strong and professional consulting engineering company. Consequently, at the very beginning of its operation, two projects were awarded to the company from different Nigerian clients. As part of MEL business development strategy and 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 in various sectors. For example, in order to expand its services in the field of telecommunication and smart metering, MEL has negotiated with related organizations such as NCC & Galaxy. In order to achieve 100% client's satisfaction MEL has always focused on its services' quality from very beginning to the end and have assisted them from investment to the commissioning.

Monenco Nigeria has won and completed following tenders:

- 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

Certificate Of Appreciation

Rural Areas Electricity Company is Pleased to Grant

M/s. MONENCO Consulting Engineers

As a Client Consultant

his Certificate in recognition for their project excellence in provision consultancy Services in Basic Design, Tender Preparation, Detail Design w and Construction Supervision at New Saih Al Khairat Power Station In Dhofar Governorate (Tender no. 58/2012)

National Environmental Standards and Regulations Enforcement Agency (NESREA)

Certificate of Accreditation

CERT: NO. 369

Monenco Engineering Ltd

with CAC Registration No RC: 901432

1. Environmental Audit
2. Environmental Management Systems
3. Environmental Studies

1st July, 2013

30th June, 2014.

Professional Affiliations

- Consultancy certificate for Oil & Gas sector: With regards to field development and international investment in Nigeria Hydrocarbon Sector, MEL has put on 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 has been granted
- 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

MIR

Engineering Management and Technology Company

MIR Engineering and Technology Management Company

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)
- 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 Niroo Company, Kharazmi Information Technology Development Company,Zarrin Company, Pars Switch Company and Monenco as well.

In order to raise quality of service, MIR has signed an agreement with WTS Energy (Netherland) 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 60 industrial courses for about 1200 students in various fields
- Held 30 courses for different organizations and companies such as Petroleum Engineering and Development Company (PEDEC), Iranian Gas Transmission Company (IGTC), Moshanir, Daneshmand Co., Monenco Iran, AmirKabir University, Tehran University, 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 based in Paris 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 Iran

In line with the missions of Iran Electricity Industry, Iranian National Committee for Electric Power Studies, Cigre-Iran, was established in 1989. In view of that, in 2016 Mr. Falahatian, 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 promote Cigre in Iran and increase involvement of Iranian members in CIGRE.

Executive Congress

- Mr Homayoun Haeri, Deputy Minister of Energy ---- Chairman
- Mr Alireza Shirani, Managing Director of Monenco Iran ---- Executive Chairman
- Mr. Mohsen Arabani ------ Secretary
- Ms Nasim Nematollahi -------The Administration Office Manager

Major Activities in 2017

- Approval of board members and executive congress members
- 4 technical committees have been organized as follow:
  - System Operation and Control
  - System Development and Economics
  - Information System and Telecommunication
  - Electricity Market and Regulation
- Over 100 Iranian memberships in Cigre
- Sponsoring two conferences as follow:
  - 32nd International Power System Conference & Exhibition: in this conference, Vice president of Finance of Cigre were invited as a key note speaker
  - New approaches in Power Industry
- 2 papers approved to be presented in Cigre Session 2018
- 2 papers were presented at GCC Cigre
- 10 Iranian memberships in Cigre international working groups
- 16 Iranian were introduced to Cigre International technical committees
- 1 distinguished member was approved by Cigre

Cigre-Iran, Board Member Meeting

Profit (Loss) Statement at 20 March 2018

	1395 (at 20 March 2017) Million Rial	1396 (at 20 March 2018) Million Rial
Services Income	810,576	948,586
Services Finished Price	-661,281	-794,062
Gross Profit	149,295	154,524
General & Administrative Costs	-66,670	-76,804
Operating Profif	82,624	77,720
Financial Costs	-21,265	-17,448
Other non-operating income	2,148	5,182
	-19,117	-12,266
Profit Before Tax	63,507	65,454
Tax on Income	-7,325	-7,955
Net profit	56,181	57,499
Accumulated Profit/Loss Account Turnover		
Net profit	56,181	57,499
Accumulated Profit in the beginning	242,844	239,895
Annual Modifications	-68,115	-14,907
Accumulated Profit in the beginning-modified	174,728	224,988
Profit Dividend	-3,112	-5,650
	171,616	219,338
Profit Distribution	227,797	276,837
Appropration of Profit		
Legal Reserve	-2,809	-2,875
Accumulated Profit in the Final Period	224,988	273,962

Draft

Monenco Head Quarter

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Monenco global networking and project food prints:
Monenco Subsidiaries and Representatives Internationally
Monenco International Presence

Designed by: Fariba Rajabpour

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