



EEL For Engineering Services

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About Us

Since its inception in 2012 EEL for engineering services company is providing reliable and accomplishing service by means of our excitement, emotion, courage, enthusiasm and expert team, we aim to increase our support quality to our estimable customers about their needs of continues and low-cost energy.

EEL for Engineering Services is a company completely dedicated to the professional management of power plant services.

Since our start we have proved our professional quality and expertise in the sector with the successful job of heavy fuel oil power plant commissioning, supervision, operation and maintenance projects, which is carried out by our own team, being the first in Syria.

These successful works which were realized by EEL high skilled Engineers and Technicians within a very short time, became an important milestone to prove our capabilities, and to get a good reference from main suppliers and manufacturers.

PV Solar Power Services

EEL for Engineering Services, as a private sector market leader for Power EPC and O&M Services is proudly providing comprehensive power solutions for large scale projects, commercial, industrial and power sectors, our professional team supported by HIGH END engineering, know-how and operational international support that meets the latest updated and international standards of solar energy sector, which will ensure our clients satisfaction and high quality end of the follow, but not limited to, services:

1. Turn-Key Engineering Services for photovoltaic power stations (starting from 100 KW size and up)
2. Installation, testing, commissioning and QA/QC management and in field operations implementations.
3. O&M services' support to ensure the best methods and operations that will maintain the value of your investment and ensure the best power outputs of your project.
4. Procurement services considering the current market gap in supplying high efficiency products and solutions with stable performance rates.
5. Relevant Consulting Services: projects development consulting, turn-key solution, project management, feasibility and investment studies services.

Our Photovoltaic Power Solutions package of services is designed, developed and implemented to provide our clients with high performance ratios turn-key solutions and supported with systematic and best practices O&M services which will result as efficient ROI for your investment, long term and professional management of your investment's assets value.



Our Turn-Key solutions can be divided into two main categories:

I. On-Grid Photovoltaic Power Generating Stations (Solar Farms):

Our professional package of services responds to large-scale photovoltaic (PV) power stations, which are a PV systems designed for produce and supply electrical power to the electricity grid; The solar power source is based on converting light directly to electricity through PV modules, although these are several models of solar energy generating systems, still the PV generating technology is the much wider used in the field of renewable energy.

PV power stations is one of the most profitable, trusted and stable long term investments alternatives, where the local laws and regulation in the Syrian Arab Republic organized the private investment in Power Sector under the category of (Independent Power Provider IPP) with standard investment agreements and tariffs to sell the power to the relevant Syrian Agencies (Power Purchase Agreement - PPA). This will explain the importance of giving the maximum attention to the level of engineering design, defining the technical specifications and quality standards of the PV power station components, professional project management and QA/QC systems, and finally the O&M operations and monitoring and control operations, tools and equipments that will insure a professional and standardized management of the investment valuable assets and ensure the highest efficiency in producing and supplying electrical energy.



II. Off-Grid Solar Energy Systems:

This model system is widely used to generate the electricity power for meeting the internal mid-scale and large-scale consuming needs without connecting to the national grid utilities.

Which can be an efficient solution for wide category of users, industrial companies, universities and institutions, banks, hotels, hospitals, agriculture projects, commercial centers... etc., in addition to areas without national grid infrastructure.

The Off-Grid solar energy systems are a sustainable solution that will provide the mentioned potential users a stable power supply and long-term cost efficient solution, this system can include power storage solutions to meet the power demand and requirements during night hours (if needed).

EEL for Engineering Services is capable to provide efficient and applicable solutions to the interested investors/companies and our services package will include, but not limited to, EPC services, connecting, commissioning and testing, O&M services, where our packages are designed and developed and implemented as per updated international standards of quality and customized to match with the Syrian business environment requirements and regulations.

our services

1- Projects Development and Projects Management:

EEL for Engineering Services, and through the combination between our local professional team and our partnership with international capable and qualified partners specialized in the solar power sector, we are qualified and capable to conduct a standardized

package of consulting services relevant to projects development and project management to ensure a high quality management of the implementation of your investment. An important component of our services is the feasibility studies, where estimated cost of the project implementation is calculated during the EPC phase and the O&M phase, with consideration of the performance changes of the project power outputs and the financial forecasts based on the updated PPA agreements/electricity's tariffs and other local applied regulations.

2- EPC Services:

EPC services (Engineering, Procurement and Construction) are the most critical and cost consuming phase in Solar Systems Solutions, the importance of this package is exceeding the high-end design (concept design and detailed design) to reach to the proper definition of the solar system components and their quality standards/specifications and performance rates (PV solar panels, mounting solution, DC combiners and distribution boxes, DC to AC invertors, cables and switches, solar meters, AC distribution boxes, net power meters ...etc.). Our services are guided by value engineering method of providing the procurement component which will lead to select, purchase and use a high quality technical solution that is based on the value/cost scenarios.

All site construction works, installing, commissioning and testing phase is conducted by our expert team and our process manuals that was developed through several large scale projects and guided by our international partners and their experience in international PV solar solutions.

3- O&M Services:

We, at EEL for Engineering Services Co., are giving the O&M (operation and maintenance) package of service, our maximum interest and importance, as the high investment value will require a high quality and well-structured O&M model to ensure a professional management and maintenance of the investor's valuable asset.

Keeping the highest rates of performance during the operating years of the PV system solution provided is our main objective to minimize the variable factors that will effect on the performance of the investment and its income generating outputs.

EEL for Engineering Services Co. is proudly the Leading Engineering Co. of combining and customizing international quality standards and professional O&M know-how to serve the local power sector's needs; and as market leader in providing O&M services for private power sector in Syrian Arab Republic, our deep experience in this field leaded us to develop and deliver this important package of services through providing a unique combination between our professional and specialized team in O&M services for power sector and the international updated standards, practices, manuals and tools of the O&M services for PV power system solutions.

Heavy Fuel Oil Power Plant Services

EEL for Engineering Services, is a private sector market leader in Syria for HF Power stations EPC and O&M Services, established since 2012, and is proudly providing comprehensive power solutions for large scale projects, commercial, industrial and power sectors, our professional team supported by HIGH-END engineering, know-how and operational international providers that meets the latest updated and international standards of HF Oil Power Stations, which will ensure our clients' satisfaction and high quality end of the following, but not limited to, services:

1. Turn-Key Engineering Services for HF Fuel Power Stations supported by our international providers of technology and know-how in this field, whom are one of the international top companies in the HF Power Stations technology sector.
2. Construction Services: All civil and steel construction works, erection, all piping works, all HV, MV and LV cabling works, testing, commissioning and QA/QC management, safety management and in field operations implementations.
3. Best practice and standardized professional O&M services to ensure 7/24 plant operations the best methods and operations that will maintain the high value of your investment.
4. Procurement services considering quality VS cost scenarios.
5. Relevant Consulting Services: projects development consulting, turn-key solution, project management, feasibility and investment studies services.

Our HF Oil Power Stations Solutions' package of services is designed, developed and implemented to provide our clients with high performance ratios, turn-key solutions and supported with our team professional experience and know-how in providing systematic and best practices O&M services which will result as efficient ROI for your investment, long term and professional management of your investment's assets high value.

1- Projects Development and Projects Management

EEL for Engineering Services Co., and through the combination between our local experience and professional team and our partnership with international capable and qualified partners specialized in the HF Oil Power Stations sector, we are qualified and capable to conduct a standardized package of consulting services relevant to projects development and project management to ensure a high quality management of the implementation of your investment.

2- Technical Consultation and Support

Our technical support package covers all stages of your project, where our services include, but not limited to:

- Feasibility study and financial forecasts.
- Designing stages: concept design and detailed design.
- Relocation and refurbishment of the power plan.
- Supervisory Services: Provided for all civil and still works, disassembling, relocation, transport, assembly, erection, testing and commissioning, operation and maintenance.

3- EPC Services

EPC services (Engineering, Procurement and Construction) are the most critical and cost consuming phase in HF/Diesel Oil Power Station development, the importance of this package is exceeding the high-end design (concept design and detailed design); Our services are guided by value engineering methods of providing the procurement component which will lead to select, purchase and use a high quality technical solution that is based on the value VS cost scenarios. Our services cover all site construction works including, but not limited to:

- All civil and steel structure works.
- Generating units and other supporting units' erection, assembly, commissioning and testing works.
- All piping works, which includes welding, flushing, pickling, acid bath and all chemical and mechanical cleanings.
- All LV/MV/HV cabling works, which includes wiring, cable jointing / termination and instrumentation.
- Testing before starting up, which includes final checks of installed engines and all auxiliaries' systems, piping and cabling installations, performing safety and alarm tests, evaluation of all temperature and pressure values, application of shut down and emergency stop scenarios and delivery of all the power plant systems in systematic and standardized operation to customer.

4- O&M Services

We, at EEL for Engineering Services Co., are giving the O&M (operation and maintenance) package of service, our maximum interest and importance, as the high investment value will require a high quality and well-structured O&M model to deliver efficiently the following services:

- Power plant management,
- Spare parts management: budgeting, technical evaluation, supply and delivery.
- HSE training programs: firefighting, first aid, PTW, electrical safety rules.
- EEL management of business process SOFTWARE: a complete business process management system owned and developed by EEL for Engineering Services.
- 7/24 professional operations and maintenance management of the power plant.

Keeping the highest rates of performance during the operating years of the power station is our main objective to manage and minimize the variable factors that will effect on the performance of the investment.



Our projects

EEL for Engineering Services Co. gained over years of operating a solid experience and know-how capabilities in the power generating private sector through managing clients' valuable assets and creating solutions to face the extreme challenges that Syrian business environment faced during the crises, we kept our commitments to our clients and continuing providing them with our professional services. Since 2012, we are proudly providing our professional engineering services for the power plant owned by one of the leading industrial companies in Syria.



The power plant description and main components:

- Plant's Generating Capacity: 46 MW
- No. of Generating Sets: 6 sets (5 sets 8.44MW capacity each + 1 set 3.7MW capacity)
 Engine (Wartsila / W20V32, W9L750 ,32 rpm): The engine is a four-stroke HFO/LFO engine with direct fuel injection, equipped with turbochargers, intercoolers, engine driven cooling water and lube oil circulation pumps.
 Generator (ABB / AMG - 1120MP0900 ,08MK08 - DSE, 6.3KV): The engine drives a synchronous three-phase generator. The air-cooled generator includes a cooling unit with shaft-mounted cooling fans and air filters. The generator is also equipped with an anti-condensation heater.
 The excitation of the generator is controlled by an automatic voltage regulator, installed in the control cabinet of the generating set.
 Black start generator, 150kw, 400v, 3ph: includes a diesel engine and a generator. The four-stroke engine is equipped with a turbocharger and an intercooler, pumps and filters for fuel, lubricating oil and cooling water, cooled by a radiator with an engine-driven fan. A fuel tank is integrated in the unit, equipped with an electric starting motor and a charging dynamo.
- Operating Fuel: Heavy fuel oil as the main fuel, and light fuel oil as backup fuel.
- Auxiliaries Systems: The auxiliaries Systems can be described and summarized as per the following:

Auxiliaries System		Description
1	Fuel Handling System	<u>Components:</u> HFO day tank 300 m3; HFO buffer tank 80 m3; LFO storage tank 2500 m3; LFO day Tank 300 m3 ; HFO unloading pumps; HFO transfer pumps; HFO separation: 3x SA 871; ALFA LAFAL HFO separator unit; HFO feeder pumps; HFO auto & manual filters; LFO unloading pumps LFO transfer pumps.
2	Lube Oil Handling System	<u>Components:</u> New lube oil unloading pump; New lube oil tank 35 m3; New Lube oil transfer pump; Lube oil service tank 13 m3; Lube oil service tank transfer pump; Used lube oil tank 35 m3; Lube oil mobile transfer pump; Lube oil separators SA 871 Separation System Alfa Lava
3	Oily Water & Sludge Handling System	The oily water system collects oil-contaminated water and separates it into clean water and sludge. The collecting pits are emptied to the oily water buffer tank by transfer pump units. The transfer pumps operate according to signals from level switches in the collecting pits. The system also receives sludge from units equipped with separate sludge pumps. <u>Components:</u> Oily water feed pump unit; Oily water transfer pump unit; Oily water treatment unit, Sludge loading pump unit.
4	Water Treatment System	<u>Components:</u> Raw water tank; Raw water pumps, Multimedia Sand filter 6 m3/h; Active carbon filter 6 m3/h; Softener with auto flowing control, 2 parallel resin tanks; High pressure pump; Reverse Osmosis device with membranes; Pure water tank 3 m3, Pure water pumps; Daily concentrate water tank; Daily concentrate water pumps; Deaerator 5 m3; Feed water pumps.
5	Steam System	<u>Components:</u> Waste gas heat recovery; Boiler 3 x 150 kg/h, 8 bar, 175 C° EGS0.8-1.5NS; LFO Auxiliary boiler 150 Kg/h; HFO auxiliary boiler 200 Kg/h Condensate tank 3 m3; Condensate water pumps.

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Compressed Air System

The compressed air system includes two subsystems with separate compressor units.

a. The high-pressure air 30 bar needed for starting the engine is provided by the starting air unit.

b. The instrument air units supply air at lower pressure 7 bar to pneumatically operated devices on the engine and in the auxiliary systems. The starting air unit also has an outlet line with a pressure reducer, connected to the instrument air units.

This enables the starting air unit to be used as a backup for the instrument air compressors.

components: Starting air compressors; Starting air vessels, Instrument air compressors; Instrument air bottles.

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Control System

The generating set can be controlled in automatic and manual mode; The main functions of the control systems can be listed as the following:

- Start and stop of the generating set.
- Synchronization.
- Engine speed and load control.
- Generator output control.
- Control of auxiliary systems.
- Monitoring and alarm handling.
- Safety functions, such as start blocking, shutdown and load reduction.

Components:

- Local control panels.
- PLC: The PLC system controls the operation of the generating sets and some of the auxiliaries. It collects data, executes controls, generates alarms and performs measurement scaling for the WOIS terminal.
- WOIS (Wartsila Operator's Interface System) workstation.
- WISE (Wartsila Information System Environment) workstation.

8	Electrical System	Components: HV/MV/LV switchgear; HV/MV/LV switch board; AC / DC UPS system and batteries; Power Transformers; Variable frequency drives; HV/LV Electrical Motors; Electrical Protection Area and indoor lighting; EX electrical equipment.
9	Firefighting System	Components: Fire water (raw water) tank; Firefighting Jokey Pumps; Firefighting main pump; Firefighting diesel pump; Foam bladder tank; Water and foam hydrants; Fire extinguisher (powder, CO2); Storage tanks water rings; Storage tanks foam chambers; Electrically controlled valves; Fire detection and alarming system.



Our Professional Team

Our team is our most valuable asset, EEL for Engineering Services Co. has a permanent work force of 52 professional engineers and technicians supported by commercial and contractual specialists, administrative staff and build-up data communication network.

The activities of the EEL for Engineering Services are implemented by Specialized Departments. Each department is responsible for the technical aspects of its activities. Our company structure includes the following departments:

Department name		Main Functions and Responsibilities
1	Technical authority & OM manager	Power plant management, Technical support, Problem solving & technical solutions.
2	Operation Department	7/24 Operating, QA/QC management, Equipment condition monitoring, Operating tests, Material (fuel, oil, chemicals) consumption & SFC, Equipment operating values & alarm-trip setting, Plant equipment availability.
3	Maintenance Department	PM & CM maintenance, QA/QC management, Equipment overhaul and major maintenance, Mechanical, electrical, control & automation, workshop work, piping, welding, construction, Working tools handling, Safety equipment and protection setting tests, PTW system implementation, Maintenance records and history.
4	Support Department	Documents control, Procurement management, Inventory management, Planning: monthly, annual, 2 years, QA/QC management, O&M KPI's and procedures, Site management, Technical training, Revived spare parts technical evaluation, Commissioning and recommissioning, Projects' supervision.
5	HSE Department	Safety consulting, PTW, housekeeping monitoring and auditing, Lifting equipments test, Emergency response plan & procedures, Emergency drills, HSE training, PTW, firefighting, first aid and emergency response, PPE handling, Safety induction tours.
6	Administration and Finance Departments	Business Development Management, Finance Management, Accounting management, Logistics Management, HR management, Archiving and filing.

EEL for Engineering Services is your trusted services provider, where our customized services can cover the all lifecycle of your investment from concept stage till implementation stage, starting from feasibility studies, EPC turn-key solution and not ending with O&M services.



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