

aramco
Power



Saudi Aramco Power Company Service Catalog





Introduction

Saudi Aramco Power Company (SAPCO) was established in 2016, as a wholly-owned subsidiary of Saudi Aramco, to house Saudi Aramco's investments in the Kingdom's utility sector and provide electrical power services to Saudi Aramco Affiliates and other industrial and commercial entities within the Kingdom.

SAPCO builds upon four decades of proven experience of Saudi Aramco's Power Systems organization that has been providing world-class power planning, engineering, operations and maintenance services safely and reliably for all of Saudi Aramco's critical hydrocarbon facilities across the Kingdom.

SAPCO's power services portfolio covers the full spectrum of services for greenfield projects and existing facilities including power network planning and feasibility consultation, detailed technical engineering studies, safe and reliable operations and maintenance of equipment and systems and specialized training & development services.

With the rich experience we built since inception, SAPCO has become one of the most competent and dependable power suppliers and service providers across the Kingdom with its diverse and balanced portfolio, SAPCO is ideally positioned to meet the customers' demands; where the services are not limited to ordinary power operations and maintenance support, but are extended to performing detailed engineering investigations, evaluations of highly complicated and sophisticated system designs, project development, power generation, emergency readiness, energy management and training services.



Table Of Contents



Power Systems Analysis

4

Power Management System (PMS) and Load Shedding Studies

5

Arc Flash Protection Studies

Electrical Asset Management

6

Power System Protection Studies

Project Development and Support Services

7

Power Systems Cyber Security Assessment

Economic Evaluation and Consultation

8

Electrical System Master Planning Studies

Power Operation & Maintenance Services

9

Renewables, New Energy & Applications

10

11

12

13

14

15

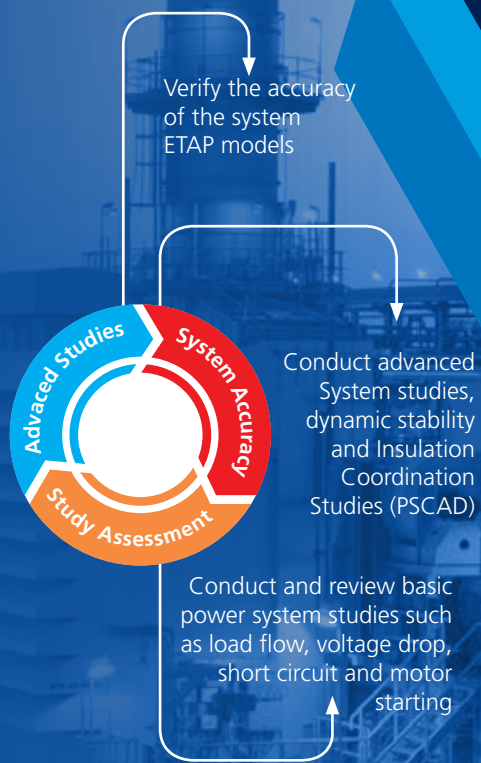
Training and Development Services



Power Systems Analysis

Our power studies team has vast experience in project design review and operational problem troubleshooting. The team continuously conducts reliability assessment study that aims to provide an integrated approach to reliability assessment addressing the issues of equipment's condition, Arc flash compliance, robustness and the reliable operation of the entire electrical power system network. It also ensures compliance with the design parameters and to identify unforeseen problems through simulation studies. The conducted study highlights findings, corrective actions and recommendations to identify power optimization opportunities and accelerate the implementation of identified safety, reliability and power system concerns. Using Electric Transient Analysis Program (ETAP), Power Systems Simulator for Engineering (PSS) and Power Systems Computer Aided Design (PSCAD), SAPCO actively conducts the following:

- Verify the the accuracy of the system ETAP models
- Perform basic power system studies such as load flow, voltage drop, short circuit and motor starting.
- Conduct advanced system studies, dynamic stability and Insulation Coordination Studies.



Arc Flash Protection Studies



Arc Flash is an electrical breakdown of the resistance of air resulting in an electric arc which can occur when there is sufficient voltage in an electrical system and a path to ground. An AF with 1000 amperes or more can cause substantial damage, fire, injury, or even death in some cases. The massive energy released during the fault rapidly vaporizes the metal conductors involved, blasting molten metal and expanding plasma outward with extreme force. The result of the violent event can cause destruction of equipment involved, fire, and injury not only to the worker but also to nearby people. Our subject matter experts are well trained to:

- Calculate the accurate incident energy levels which the electrical workers can be exposed to while working on the electrical equipment.
- Identify the required personal protective equipment (PPE) for each primary electrical equipment.
- Identify any abnormalities of incident energy levels which exceed the maximum allowable limits.
- Recommend the appropriate methods to limit these abnormal cases of energy levels (if applicable)
- Design the required warning labels to be posted on all primary electrical equipment at the substations to warn work-ers of the potential electric Arc Flash hazard available on each part of the system.





Power Management System(PMS) and Load Shedding

The long experience in operating Power Generation allows SAPCO to be one of the limited entities in the Kingdom to design islanding and load shedding system to ensure sustainability of the power generation during either incidental islanding or sustained shortage of power generations in the grid. Services in this area include:

- Conducting pre-feasibility and feasibility studies for PMS taking into consideration plant power and other process requirements
- Designing, reviewing and implementing power management and load shedding systems
- Supporting PMS commissioning



Power System Protection Studies



- SAPCO's team has the capabilities and wide reference list to design, implement and manage power system protection for companies' complex power network to provide isolation of a problem area in power system quickly so that the shock to the rest of the system is minimized and as much as possible is left intact. Our subject matter experts are well trained to:
- Conduct the short-circuit studies in compliance with international standards and best engineering practices to determine the magnitude of the currents that flow during faults conditions and compare these magnitudes against the equipment rating in order to ensure that the power system is safely protected.
 - Perform the relay coordination studies in compliance with international standards and best engineering practices to make sure that protection system will safely isolate the minimum portion of the power system in order to isolate an abnormal condition detected to avoid nuisance tripping and minimize the disruption of normal operations.





Electrical Asset Management

The support for planning, design, operation, maintenance and reliability analysis of high voltage assets such as transformers, power cables, power lines, gas insulated switchgears (GIS), metalclad switchgears, motor control centers and ring main units (RMUs) is widely provided by SAPCO Services include:

- Prepare, review and develop Standard Operating Procedures (SOPs) for equipment operation and repairs to improve operation and maintenance,
- Investigate electrical incidents and conduct root cause analysis (RCA) of HV equipment failure,
- Develop scenarios and participate in emergency drills for special HV electrical equipment,
- Develop equipment condition assessment programs and evaluate preventive maintenance test procedures.
- Test, verify and recommend new techniques and technologies for High Voltage networks asset management.



Power Systems Cyber Security Assessment



SAPCO, through its highly skilled team, consistently reviews the cybersecurity specifications and designs to ensure full compliance with the international standards. To protect the Power System Automation (PSA) against cyber attacks, SAPCO have implemented stringent procedures for periodic testing, verification and certifications. These high standard services include:

- Reviewing design packages for all electrical control and monitoring systems both for transmission and distribution networks to ensure compliance with the international cybersecurity standards.
- Ensuring all security measures in compliance with organization's security procedures and standards are fulfilled.
- Evaluating and deploying cybersecurity industry procedures such as NERC-CIP to ensure the security of all operating systems and applications systems for all electrical control and monitoring system.
- Developing and implementing Disaster Recovery Plans.



Project Development and Support Services

Highly qualified professionals of SAPCO with international industry experience are fully capable to provide comprehensive project support from the conceptual stage all the way to energization of power generation systems. The team supports companies in:

- Providing full value engineering and technical support associated with new projects construction and design upgrades,
- Supervising new equipment commissioning and energization activities,
- Evaluating local manufacturers' facilities to assess their capabilities and standards before purchase of products and services,
- Reviewing design packages against standard requirements and determining the discrepancies,
- Power projects tender, contract negotiation,
- System reliability and robustness studies
- Demand side management and energy efficiency
- Regulatory Services on Environment Protection
- Power offtake management and
- Power project management from business case initiation up to financial close



Electrical System Master Planning Studies



An experienced workforce in development and implementation of power systems' strategies, capital projects' scopes and energy optimization plan and agreements in coordination with national electricity sector stakeholders including industries, utilities, government agencies and electricity, water, fuel and environment protection regulators; the team capacity extends to supporting the following business opportunities:

- Developing master plans for facilities including analysis to improve reliability and integrity of power system.
- Planning and developing network interfaces with utilities.
- Planning for small scale captive power generation projects for self-consumption.
- Studies of new generation projects including renewables.
- Short- and long-term demand forecasting.
- System reliability and robustness studies.
- Demand side management and energy efficiency.
- Regulatory Services on Environment Protection.



Economic Evaluation and Consultation

A competent team is capable to explore power business opportunity and manage project development cycle starting from initiation, technical and economic evaluation, and execution. The services include, but not limited, to the following:

- Economic analysis to help evaluate alternative project options.
- Financial model to estimate profit, revenue, NPV, break-even point, IRR, etc. This would include a comparison of possible options.
- Technical evaluation/ comparison of possible technologies using different software programs such as Thermo-Flow.
- Consultation services for plant energy management solutions.
- Development and contractual optimization of conventional and renewable power projects.
- Consultancy expertise in regulation and market analysis.
- KPI Audit process for cogeneration plants.
- Electricity services licensing.
- Advisory services for Grid and Distribution codes compliance.
- Regulatory requirements for interconnecting new generation projects/demand centers to grid.



Renewables, New Energy & Applications



A dedicated team is capable of leading, reviewing, managing and conducting new or retrofit renewable projects right from design to operation and maintenance. The services include:

- Renewables projects techno-economic feasibility studies including site surveys, cost estimation, energy yield estimation, financial analysis.
- Project Scope of work development including PPA or non-PPA.
- Renewables development and project management services.
- O&M scope of work development.
- Managing full O&M contract and performance management.
- Renewable technical training services.



Power Operation & Maintenance Services

SAPCO team is using state-of-art tools and technologies to safely and reliably install, operate and maintain Transmission and Distribution networks in both onshore and offshore facilities. This includes:

- Developing and executing preventive, routine and corrective maintenance for power transformers, Gas Insulated switchgear (GIS) and Metal Clad switchgear, protective and control devices, under ground cables and overhead power lines up to 230 kV, in addition to subsea power cables of all voltages.
- Performing testing, applying and calibrating of new and existing relay settings. This includes investigating and troubleshooting of failures and major interruptions.
- Locating in service faulty cables and performing high voltage cable splicing to all voltage levels up to 115 kV.



Training and Development Services



In-house and partnered arranged courses, training and development services are offered for customers to meet the requirements of the power industry, which shows the dedication for knowledge transfer in the Kingdom. Some of the partners in this area are National Power Academy (NPA), GCC Lab and leading international institutions. We provide training in the following areas:

- Substation automation.
- Cybersecurity.
- Power system protection.
- Power system studies.
- Cable testing.
- Electrical safety training.
- Electrical system operator training.
- High voltage equipment testing.
- Asset management.
- Renewable Development Management.





Contacts

Email : info@aramcopower.com

Website : <https://www.aramco.com/en/creating-value/products/power-systems>

Tel : 013-876-6655

Copyright ©2022 Saudi Aramco Power Company