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1 About Us

Narag Energy Solutions is an oil and gas services provider to clients in the areas of asset determination studies and planning and associated services, production facility optimization, engineering design services, project management and IT & information management. The management and technical teams consist mainly of individuals in the technical fields of Geosciences, Petroleum Engineering, Oil and Gas Project Management, Health Safety and Environment (HSE), Computer & Information Technology, Chemical and Production Engineering. The company is private, delivering High Quality, On-time, Right Cost Projects.

- Innovative and Technology Based Engineering
- Effective Alliance and Coalition of Service Providers
- Project Management and Service Integration
- World Class Suppliers & OEMs
- Strong HSE Commitment – Safety First, Zero Tolerance Good Service Quality

Our vision . . .

To be a reliable and uncompromised source of technical solutions to the Energy Industry such that clients continue to confidently depend on our products and services for their safety, effectiveness and cost savings.

Our mission . . .

To profitably provide dependable and uncompromised technical solutions to the Energy Industry using the best available motivated personnel and local resources such that clients continue to depend on our products and services for their safety, effectiveness and cost savings.
2 Our Services

2.1 Engineering, Procurement and Construction

We provide a vital link between strategic decisions and front-line implementation.

We provide life-of-asset engineering capabilities for brownfield and greenfield projects; from consultancy services through concept and FEED into detailed design, procurement and commissioning. This capability extends into late life and decommissioning.

We strive to deliver value-adding engineering solutions so you can unlock increased value from your oil and gas assets.

We are proud to support projects of any size and scale, onshore, offshore, subsea or subsurface; from small brownfield modification projects to large subsea tiebacks, and from major facility upgrades through to greenfield mega projects.

We leverage on Narag Energy Solutions partnership capability in delivering lump-sum turnkey EPC and its operating and maintenance expertise to enhance our early engineering solutions, allowing us to recommend best-fit, constructible and operable solutions that are benchmarked against real time procurement data and schedules. Our extensive procurement benchmark database means that we can identify the most accurate prices currently available.
Our EPC Services include:

- **ENGINEERING**
  - Engineering Consultancy
  - FEED
  - Facility Engineering
  - Design – PFD, P&ID
  - Project Management
  - SEWOP Services

- **PROCUREMENT**
  - Local and international

- **CONSTRUCTION**
  - Turn-Key Solution
  - Early Production Facility (EPF)
  - Process Re-modification and brownfield construction

### 2.1.1 FEED

In execution of FEED, we are committed to delivering security of cost and schedule with designs that are implementable and operable. We use our execution experience and operations knowledge to optimise these outcomes.

Our engineering team has a broad mix of skills, including subsurface and surface expertise, that can support concept development through to FEED for brownfield and greenfield developments, offshore and onshore; from drilling and production technology to topsides modifications and subsea tiebacks through to export options and downstream processing.
This skills base is augmented by our wider capabilities across fabrication and operations, enabling solutions that address constructability at outset.

Our multidiscipline engineering capability spans:

- Civil engineering
- Cost and schedule estimation
- Electrical engineering
- Flow assurance
- Information management
- Instrument engineering (control systems, field instruments, metering)
- Long lead items verification and procurement support
- Pipeline engineering
- Piping layout design
- Process and facilities engineering

Metering Solutions:

**Meter Installation and Maintenance**

Whether gas, electricity or water, Narag Energy provides a comprehensive range of services to ensure trouble-free metering.

Delivering an efficient programme starts with planning. Narag Energy utilises detailed modelling techniques to optimise a smart installation programme. We also use an experienced workforce for the installation of meters, sub-metering and communications, so we retain control of the entire process, ensuring that the highest standards of quality are met at all stages.

Our installation and maintenance services include:

- **Meter Procurement** – Provision of meters using global procurement arrangements to ensure best prices and supplied on a rental or sale basis. Plus, in-house testing or with the use of partners is performed to guarantee quality.
- **Meter Installation** – An experienced in-house national workforce undertakes comprehensive meter installation replacement and safety review activity. An automated field data capture system is employed to validate data and ensure its accuracy, eliminating future billing irregularities.
• **Communications Installation** – The selection and installation of the most appropriate communications (GPRS, OSISoft, Ethernet, Hart, Modbus, FFbus or IP) is tailored to your requirements and to the site conditions.

• **Meter Maintenance** – An on-going maintenance service ensures continuous data provision from your smart and other meters.
Calibration

Most flowmeter manufacturers maintain their own facilities for initial calibration of flowmeters before they are shipped. Many also offer recalibration services to their own customers, and some offer these services more broadly. End-users who need a flowmeter recalibrated may choose to go back to the company the flowmeter was purchased from to perform this service. Variables to consider include where the company is located, turnaround time, and whether there are independent flow labs more conveniently located. The type of flowmeter is also a consideration, along with the cost of calibration.

Narag Energy Calibration and Recalibration Services

Narag can offer companies calibration services that make it possible to recalibrate a flowmeter at our lab or onsite. Onsite calibration has the advantage of being able to most closely duplicate the actual operating conditions of the meter during the recalibration process. These services work especially well with smaller meters for liquid applications, including petroleum liquids. They do not work as easily with large size megameters, or with large ultrasonic and turbine meters.

In Narag we carry out calibration of the following:

- Flow meters (Liquid, Gas)
- Transmitters
- Valves & actuator
- Gauges (pneumatic & electronic) etc.
2.1.2 SEWOP Vessel

Our SEWOP vessel support production, well intervention and drilling activities.
2.1.3 Well Intervention / Slickline Services
We provide well intervention through design-optimisation-and-implement program. Narag Energy Solutions provides both the design and implementation of recommended well intervention services, including the following services:

- Gas lift design and operations, including production optimisation and gas lift valve change out
- Matrix Stimulation & Nitrogen lifting services
- Dewaxing
- Swabbing
- Sand clean-out
- Sand control repair services
- Electronic Memory Gauge Rental
- Pressure and Temperature Surveys (with DHSIT)
- Repair, recalibration and testing of gas lift and chemical injection valves
- Safety Devices
Narag Energy Solutions is a leading provider of services to the Oil & Gas Industry. Our Engineering Design & Construction Division is positioned to provide first class engineering solutions. We are committed to delivering high quality projects on time, at the right cost and in a safe manner.

With innovative ideas, process control and proper planning, we are able to handle complex engineering and logistical challenges in various sectors of the industry including Flow Stations, Flow Lines, Gas Processing, gathering & Transport, Marine, Platforms, Power etc.

Our Services include

- Front End Engineering Design (FEED)
- Engineering Material Procurement
- Engineering Fabrication & Installation
- Facility Maintenance and Upgrade
• Facility Inspection, Surveys and Project Management
• Instrumentation, Calibration and Control
• Cathodic Protection Services
• Equipment Leasing, Manpower Supply and Operation
• Early Production Facility

**Structure:** Narag EPC is structured to provide Discrete or Integrated services as may be required to ensure complete solutions to our customers. This relieves our customers from the challenges of project management and the headache of dealing with different vendors or associated operations. Our structure helps to ensure that there is accountability for project delivery.
2.3 Production Optimization

Production Optimization
Critical for effective Asset management

- Collecting and analysing data from wells to identify optimal wells.
- Performing engineering simulations to determine well and asset performance.
- Adjusting set points to increase production.
- Communicating key well performance information to operators to reduce downtime.
- Simultaneous tracking and analysis of production and field service information in one common system.
- Production forecasting and Back Allocation Solution.
**Integrated Field Management.**

**OPERATIONS**
- Field visualization
- Activity monitoring
- Alarms
- Lift analysis
- Task scheduling
- Asset scheduling
- Process evaluation

**ENGINEERING**
- Well and network engineering
- Well data acquisition
- Reservoir monitoring
- Reservoir simulation
- Nodal analysis
- Lift simulation
- Well test analysis
- Flow assurance
- Surface Network optimization.
- Productivity forecasting

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**Our Approach: For Asset Optimization**

- **Field Visit Data Gathering, Validate Data & Build Well Model**
  - Well Test Data: WHP, WHT, Oil Flow Rate, GOR, WCT.
  - Real Time Data: WHP, BHP, DTS
  - Tune Well Model: Flow Correlation, Productivity Index, IPR Model
  - Petrophysical Data: Review Well Lithology Logs, Production Logs analysis, Interpretation of Production Well Test, Reservoir Simulation & Material Balance.

- **Integrate well model & Surface Network Model**
  - Production Data: Choke Settings, Manifold Pressure, Separator Pressure & Temperature, etc.
  - Tune Surface Network Model: Flow Correlation, Choke Model, Heat Transfer Coefficient

- **Run Optimization Scenarios & Plan Field Execution**
  - Tuned Model: Production Allocation, Target Monitoring

*Possible conditions for additional measurement points at well level or @ Manifold, modification of Flow lines, GL Hardware review by Narag expert, Reservoir decline analysis & Economic forecast, Well Test Analysis & Interpretation and Project technical training for users.*
Process Optimization - FEED

What size tubing should I install?

What size pump do I need for my export line?

What liquids handling capacity will be adequate?

Horizontal or Vertical Completion?

When do I drill new wells?

Should I plan for artificial lift system?

Will I need a subsea multiphase booster?
2.4 Hydrocarbon Accounting and Back Allocation

Narag Energy Solutions provides hydrocarbon accounting and back allocation solutions through implementation of Production Allocation Solution Services. Clients are provided with production allocation application tools or a hosted application services with local implementation and support services.

Our production allocation tools provide role-based security & workflows, auditing & notifications reporting. Solution is built on industry standard third-party databases (Oracle™ or Microsoft SQL Server™). Solution ensures proper monitoring of the following:

- Daily field production data capture at well, facility, field or company levels in hierarchical order
- Capture of field consumption and flare and theft
- Capture and instantaneous analyses of field production events
- Automated data capture from production SCADA system
- Automated production alarm systems based on programmed scenarios and artificial indigence algorithms
- Generation of actual field network systems and inclusion of artificial/derived meters at any production network node

When implemented, our production allocation and reporting services ensures:

- Standard daily allocation by specific rules
- Hierarchical allocation of production, export, sales streams back to field-groups, fields and wells
- Hierarchical allocation of consumed streams (fuel, flare etc.)
- Based on well tests or wellhead measurements

Our production allocation solution is ideal for producing companies that want to respond effectively to the constant changes of our industry. The result is the ability to make the right decisions quickly, based on accurate production data. No massive investment is required - low cost of ownership and operations. Most importantly, rapid
implementation, up to 75% faster than traditional solutions, meaning our solution will be available for corporate-wide and field use within few days, not months or years.
2.5 IT Support Services

Narag Energy Solutions has been delivering cutting-edge IT Solutions in the implementation of Hardware, Software, Networking, Storage and e-Business solutions with our well-equipped technology labs, service centres and training facilities, manned by highly competent technical personnel to leverage service delivery to customers. We translate these solutions into value for customers through our professional services and consulting businesses.
Process Innovation

Our innovation and core process redesign, driven by our zeal for proven bespoke implementation processes, strategic transformation, has led to changes in the way we do business and how we meet customer needs.

We focus on:

1. Providing the key technology components of enterprise ICT infrastructure that enhance business agility, including enterprise servers, enterprise storage solutions, servers, middleware disaster recovery solutions software, backup/recovery strategy and a variety of printing and imaging solutions, with associated accessories.

2. Offering systems integration and business management solutions that cover Web services, data management, supply chain management, business intelligence,
enterprise resource planning, and the provision of services that cuts across various sectors of the industry with the deployment of specialized staff who have been certified in relevant industries such as oil and gas, telecoms and government parastatals.

Network Technologies for transporting data, video and voice. Our network design and deployment capabilities cover local area network, gigabit and Wi-Fi networks; metropolitan and wide area networks via VSAT and radios; and Wimax networks. This group also specializes in the provision of corporate intranet and extranet as well as network management solutions.

3. Bespoke ICT service solutions including business continuity integration and management, infrastructure, data centre services, and ICT related business process outsourcing.

4. Partnering with Global companies and strategically positioned domestic partners, to deliver innovative solutions, and offer design, build and operate services.
2.6 Training and Man Power Development

Narag Energy Solutions has been in the business of providing services and solutions to oil and gas companies around the world for over 10 years now. The goal and vision of the company’s research, training and development arm is primarily to utilize local and international resources in providing solutions to the problems in the oil and gas industry. Narag Energy Solutions is committed to training fresh graduates and experienced personnel, equipping them with the requisite skills to work in the industry.

Narag Energy Solutions is into Manpower Supply and Outsourcing and, in addition, provides training for students, graduates and company employees in the oil and gas upstream sector.
2.8 Well Completions Supply Services

Figure 5: Wireline Unit

Figure 6: Wireline tools

In addition to our services we provide well completions equipment which comprises of Valves, Christmas Tree, Wellhead, Thru-Tubing Inflatable Packers, Steel Pipes, Inflatable Packers, Casing, Digital Flow Meter, Skids, Dispenser, Flanges, Elbows, liner Hanger Systems, Seating & Landing Nipples, Sleeves, Adjustable Union and Joint, Hydraulic Set Retrievable Production Packers, Testing & Treating Packers and locks to our esteem clients in the oil and gas industry.
Narag Energy Solutions is structured to provide discrete or integrated services as may be required to ensure complete solutions to our customers. This relieves our customers from the challenges of project management and the headache of dealing with different vendors or associated operations. Our structure helps to ensure that there is accountability for project delivery. Based on the high quality of our service delivery while ensuring the environment is protected, we have been certified by DQS with ISO 9001 2008 & ISO 14001 2015.
Safety, Health and Environmental Policy

Safety in operations, materials, men and the environment is vigorously pursued by the management, supervisors and all employees in all undertakings.

Narag Energy Solutions management accepts totally its legal, human and societal obligations as conferred on it, as an employer of labour. Therefore every necessary step is taken to safeguard all who work for, and by us, including third parties; who may not be immediately connected with our operations.

Our obligations are not hampered by cost considerations for we believe that the only way to efficient operations is through safe operations. All supervisory cadres are accountable for the safety behaviour of staff under their charge.
Training of subordinate staff is the duty of supervisors while management gives the necessary back up for effective leverage. At Narag Energy Solutions, it is the duty of all employees to positively influence the safety behaviour of their colleagues. In this regard every one of us owes it as a duty to ensure that safety and health of all is not jeopardized through acts of omission or commission.
Narag Energy Solutions is proud of its community and social responsibility activities. Over the years we have demonstrated our belief in the engagement of our host communities through the following program:

- Local personnel recruitment and training programmes
- Compliance with Local Content Development initiatives and other local regulations within host communities
- Training and internship program for youths and fresh graduates
- Provision of academic scholarships to students
- Sponsorship of undergraduate and graduate research initiatives in partnership with NAPE
- Participation in other local initiatives within the host communities to encourage safe-driving and safer neighbourhoods
We believe that it is the responsibility of Narag Energy Solutions to conduct its business in such a way that negative impact to the communities and environment is minimised and brought down to as low as possible and within local and international standards. The company will continue to utilise local personnel and material resources preferentially in all its businesses as much as possible without compromise to safety, environment and business continuity.
5 Partners

Some of our alliance partners are

- **MTC Engineering SDN BHD**: Deep Offshore and Onshore Facility Maintenance, Engineering Design, Planning and Loss Prevention
- **Pantheon Engineering**: Fabrication, Construction & Installation, Corrosion Services
- **SMAR Instrumentations**: Instrumentation Design and Supply, Facility Automation, Systems Integration, Telemetry and Remote Monitoring and Control
- **Sny Valves**: World class valves of all kinds.
- **Feng Long Petroleum Engineering Co., Ltd (FLOPEC)**: Delivering SEWOP vessels for production, well intervention, offshore fabrication and drilling support projects.
6 Our Clients