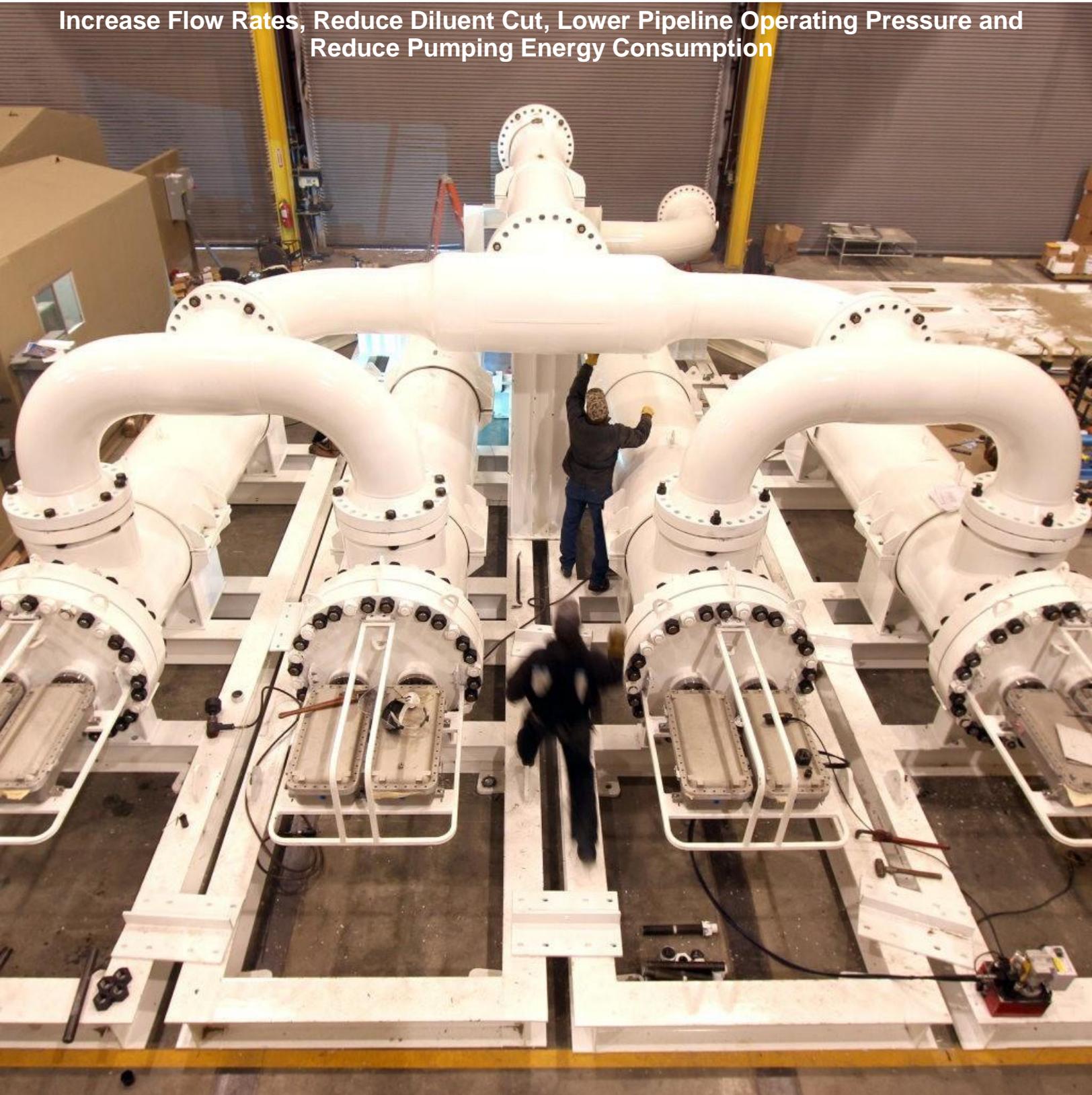


# AOT

(APPLIED OIL TECHNOLOGY)  
Viscosity Reduction System

**Increase Flow Rates, Reduce Diluent Cut, Lower Pipeline Operating Pressure and Reduce Pumping Energy Consumption**





## AOT: OPTIMIZES CRUDE OIL PIPELINE PERFORMANCE FOR GREATER OPERATIONAL EFFICIENCIES

In response to the accelerated growth of upstream production due to the use of enhanced oil recovery techniques, QS Energy has commercialized its proprietary AOT (Applied Oil Technology). The AOT is an industrial-grade viscosity reduction system for petroleum transporters. Engineered specifically to address the industry's severe transportation capacity challenges, the AOT technology delivers field tested and proven performance gains in the movement of petroleum products through existing pipeline infrastructures as well as rail cars and semi tanker unloading.

AOT is a patent-protected, 100% solid-state system that reduces the viscosity of petroleum by applying a high intensity electrical field allowing pipelines to operate at a lower pressure and transport crude oil more efficiently.

By causing particulate matter within the petroleum to agglomerate together, the AOT decreases drag resistance, speeding the flow of oil and increasing takeaway capacity. Once AOT is deployed on pipeline pumping stations, oil production and transportation companies benefit from the safer, more cost-effective delivery of greater volumes of oil while reducing energy consumption and lowering CO<sub>2</sub> emissions.

### How AOT Works

The AOT is the result of a multi-year research and development program conducted at Temple University with extensive design, fabrication and testing protocols involving over a dozen leading companies from all sectors of the energy industry. Harnessing the principles of electrorheology, the application of a high strength electrical field to change the mechanical behavior of fluids, the AOT system decreases the viscosity of petroleum by causing particulate matter such as paraffin, asphaltene and other impurities to agglomerate together into nanoscale clusters thus reducing their surface volume. By reducing the surface volume the friction/drag is reduced of the bulk fluid. Dr. Rongjia Tao, chairman of Temple University's Physics Department and a leading expert in the study of electrorheological fluids and magnetorheological suspension, is co-developer of the proprietary AOT viscosity reduction technology and has supervised laboratory testing of hundreds of petroleum samples, ranging from heavy bitumen to superlight condensates, in order to prove its efficacy.



### AOT Benefits

By significantly reducing viscosity on a wide spectrum of petroleum products, AOT delivers a variety of measurable operational efficiencies:

- Increases maximum flow rates
- Reduces operating pressure
- Eliminate or minimize bottlenecks
- Reduces pump station power consumption and CO2 emissions
- 100% solid-state construction for maximum uptime with minimal maintenance
- Provides opportunity for carbon credit and carbon tax benefits through decreased emissions and improved energy efficiencies
- Turbulence suppression
- Reduces pipe cleaning / pigging frequency
- Increases safety margin
- Reduce tanker truck unloading durations
- Reduce railcar unloading durations

AOT has been inspected, certified, and approved to meet or exceed the specifications and quality control requirements of all applicable industrial testing and certification laboratories, leading midstream producers, and transportation entities, and has been deployed on multiple, high-volume pipelines.

### Clean Technology, Green Benefits

The use of carbon credits and carbon tax incentives is growing in importance within the industry, providing a positive financial impact for companies deploying “clean tech” equipment such as AOT. By improving operational efficiencies and measurably reducing their carbon footprint, energy companies stand to benefit from each ton of CO2 (carbon dioxide) or CO2e (carbon dioxide equivalent gases) they remove or prevent from entering the atmosphere.

QS Energy’s software package provides global producers and transporters of petroleum with accurate projections, as well as full case study analyses, of the pipeline benefits they can capture by implementing the AOT solution in their operations.

### Modular Design, Configurable to Your Specifications

Comprised of an ASME-rated pressure vessel, AOT treats petroleum with a proprietary array of stainless steel components that apply a precisely controlled electrical field to the flow.

Adhering to the highest standards of safety and reliability, AOT systems are powered by robust, dedicated power supplies, connected via Class I Div. I explosion-proof junction boxes and related hardware. AOT has been deployed on a variety of SCADA (supervisory control and data acquisition) infrastructures and data collection, controls and automation is compliant with all industry-standard systems and program-mable logic control (PLC) systems.

AOT can be scaled to suit many different types of installation requirements, including upstream production facilities, large-scale midstream pipelines, and mobile transportation and gathering systems. Additionally, QS Energy predicts that AOT can be utilized for offshore production facilities in the future.





## CONTACT INFORMATION

Please contact QS Energy for further information. AOT Design Control Drawings, Certifications, Specifications, Protocols and Procedures are available upon request by qualified customers.

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## COMPANY PROFILE

QS Energy, Inc. (OTCQX: QSEP) provides the global energy industry with patent-protected industrial equipment designed to deliver measurable performance improvements to petroleum pipelines. Developed in partnership with leading petroleum production and transportation entities, QS Energy's high-value solutions address the enormous capacity inadequacies of domestic and overseas pipeline infrastructures that were designed and constructed prior to the current worldwide surge in oil production. In support of our clients' commitment to the responsible sourcing of energy and environmental stewardship, QS Energy combines scientific research with inventive problem solving to provide energy efficiency "clean tech" solutions to bring new efficiencies and lower operational costs to the upstream, midstream and gathering sectors. More information is available at: [www.QSEnergy.com](http://www.QSEnergy.com).

Safe Harbor Statement:

<http://www.qsenergy.com/site-info/disclaimer>