OCTG Heat Treating, Threading, and Coupling Analysis and Proposal

Summary

- Market forces and drilling programs are beginning a shift to an increased usage of higher grade tubing and casing with premium connections.
- There is room in the market for an additional third party heat treating and finishing servicer if that servicer has the proper capabilities
- ENGT is well positioned as an inspection and safety leader to capitalize on this trend

Proposal

Energy & Technology, Corp. proposes the construction of a new, scalable, high-grade heat treating and finishing plant in the Middle East to capture this market and/or the addition of heat-treating and the expansion of premium threading services at its Houston, Texas facility.

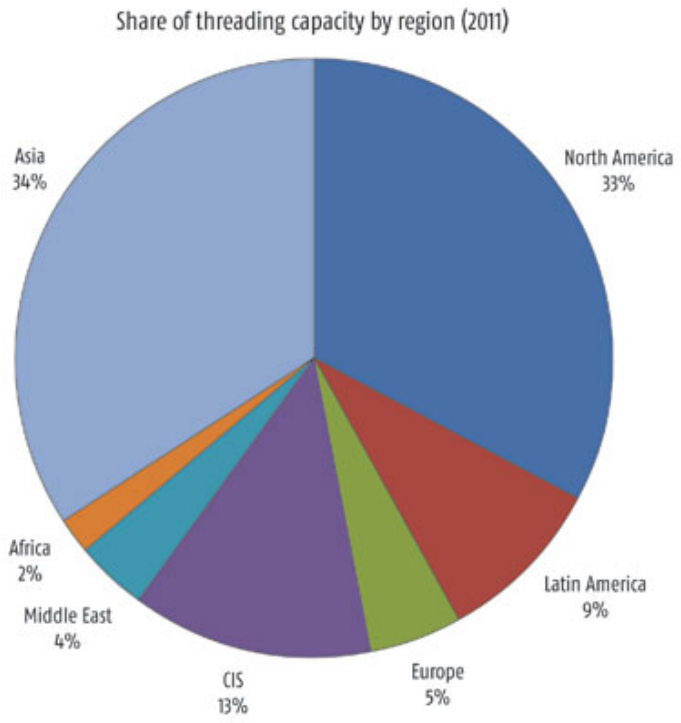
Investment Profile

Initial Investment of Construction Cost	$29.9 Million USD
Construction Period	9-12 months
Net Income/FCF	$850,000 USD/month
Payback Period	44 months
5 Year IRR*	36%

* assuming sale/exit at end of year 5 at 4xEBITDA

Market Analysis

We have identified well over 300 companies that thread pipe to produce OCTG. These firms have a combined nominal threading capacity of almost 43 million tons per year. Individual operations vary from workshops with a few lathes undertaking mainly repair, capable of processing a few thousand tons per year, to producer affiliated facilities with multiple lines capable of processing in excess of 1Mill tons per year of pipe. Threaders that are non-affiliated to producers also play an important part in the overall supply chain. By our estimates, they account for over 30% of total capacity. In areas such as Africa and Latin America they are dominant, while they are losing their dominance in the Middle East. They are far less important in producer-dominated regions such as the CIS and Asia. Even in the USA and Europe, they retain around one-third of capacity.



When we turn our attention to the current situation with heat treatment capacity, estimates are that global heat treatment capacity in 2011 was 24 million tons per year. Capacity (with the exception of North America) is dominated by integrated steel pipe manufacturers. This makes sense as this is a high proportion of the value-add of OCTG.

In the near term, global OCTG consumption was estimated at 15.8 million tons in 2011. After growing rapidly up in 2012, we believe that consumption growth will slow out to 2016/17. We are forecasting growth of just less than 4% per annum out to 2017. The fastest areas of growth will be Latin America and Africa. This is fueled by increased development of offshore fields, along with higher amount of directional and horizontal drilling as well as increasing development of sour grades resulting in a significant shift towards heat-treated demand over the next five years.

While non-heat treat material accounted for over a 50%share of consumption in 2008, this will significantly fall by 2017. The growth in both heat treat and premium thread consumption will far outstrip total OCTG consumption going forward .

On the supply side, there will be increases in capacity for both threading and heat treatment. The majority of these in the short term (2013-14) are likely to be from integrated plants being developed in North America (TPCO, V&M Star) and the Middle East (ArcelorMittal, JESCO).

We believe that the total proportion will rise from an estimated 27% of tonnage in 2011 to 37% by 2017. This shift towards heat treated and higher-strength grades will reduce the realistic capacity utilization of existing and future planned threading capacity.

As such, we believe that there will be a need for additional capacity going forward.

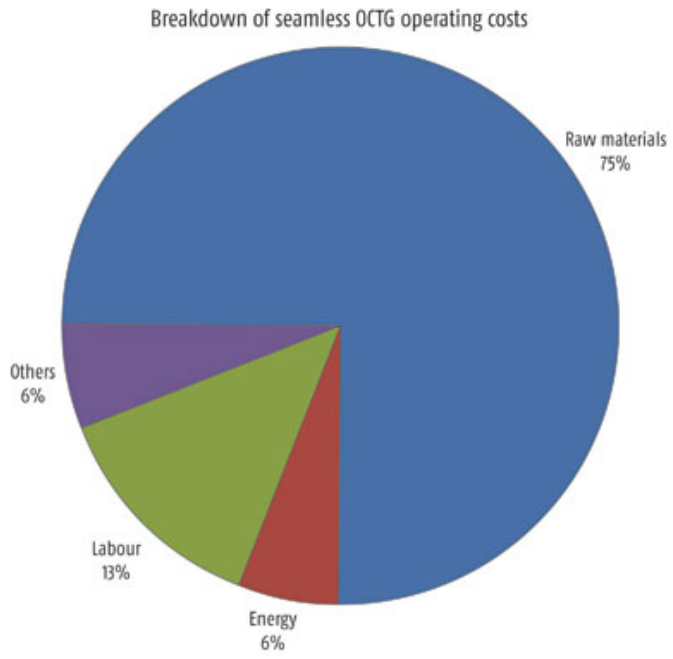
The majority of capacity expansion will be undertaken by OCTG tubular manufacturers, both directly via new tubular and finishing capacity or the development of arms-length threading units. This will be undertaken in Latin America, North America, the Middle East and the CIS. We expect the proportion of material threaded by independents to fall as the leading OCTG producers will increasingly be marketing multiple premium connection brands. However, there will be opportunities for growth for independents in select niche markets.

Premium connections provide an absolute seal on the connections between pipes. We suggest that the proportion of wells utilizing premium connections will increase over time. This reflects the higher proportion of off-shore drilling where deep wells in difficult conditions make repairs expensive and time-consuming. It also reflects the increased environmental concern globally with spills. There is also a geographic diversity. With little experience of premium connections, the CIS and China for example utilize only a small proportion of premium connections (although growing).

Pricing

Our analysis suggests that prices are related to costs plus mill profitability and in our opinion, this is a key factor for future green pipe costs. Based on current raw material prices, we produce a breakdown of the cost structure of a seamless mill to produce J55 green pipe. Shown here, input raw materials account for up to 75% of the overall cost structure. However, the other costs are somewhat steadier (power, labor etc.), so as raw material prices fall, the proportion of total operating costs fall. Depending on location and operating efficiencies, these other costs account for around $150-250/ton.

Given this scenario it has been common for margins on green pipe and margins on finishing services to remain relatively steady, with the price of finished OCTG fluctuating with the supply and demand of the underlying commodities



With raw materials playing such a big part in the cost structure of green pipe, we summarize our views in providing a long term outlook for raw materials for iron ore prices and hard coking coal. Scrap prices are likely to move down in line with an average $325/ton cif Turkey in the long-term. Under this scenario, billet costs for seamless pipe will be $500/ton ex-works **with plain-end pipe at approximately $700/ton ex-works on a cash basis.**

Farther up the value-add chain, margins for finishing services have been strong. Increased demand for more durable grades of pipe and proprietary threads have produced backlogs in some markets with respect to premium connections and heat treating services. While finishers incur additional licensing costs for these connections and power demands are higher, profit remains greater farther up the grade ladder. **Net profits on moderate to high grade heat treating and threading services are in the $150-200/ton range.**

The value-chain will be increasingly skewed towards finishing

Based on a 2011 average price for plain-end pipe and a 2011 average price for threaded and coupled and heat-treated pipe, we estimate that the total value of the global OCTG market in 2011 was $31.6bn.

We believe the OCTG market will be valued at $39.8bn by 2017*.*

The market for OCTG finishing will grow much faster than the value of OCTG green pipe. This is therefore where we expect to see the bulk of investment in the sector over the next five years. However, it will likely not be in commodity threading and low grade tubular, but rather in the high-value heat treatment and premium threading segment.

Competition in the Middle Eastern Market

Existing Tubular Plants:

JESCO, Saudi Arabia
ArcelorMittal – Jubail, Saudi Arabia
Gulf International Pipe Industry (GIPI),Oman
Saudi Steel Pipe Company, Saudi Arabia
Luleh Gostar Esfarayen Company (LGECO), Iran
Erdemir-Celbor
Borusan Mannesmann

Existing Independent Threaders:

Vallourec-Zamil Pipes, Saudi Arabia
Tenaris Dammam, Saudi Arabia
Abzar Barghi, Iran
United Engineering Services (UES),Oman
Abu Dhabi Oilfield Services, United Arab Emirates
Alnasr Technical Trading Agencies (ATTA), United Arab Emirates
MEOS Workshop Services, United Arab Emirates
Middle East Tubular Services Ltd, United Arab Emirates
Abdullah Al-Suwaiket Trad & Cont Est, Saudi Arabia
Weir Arabian Metals Company (AMCO),Saudi Arabia
Manweir, Qatar
Venture Gulf Engineering, Qatar
Erbil Pioneer

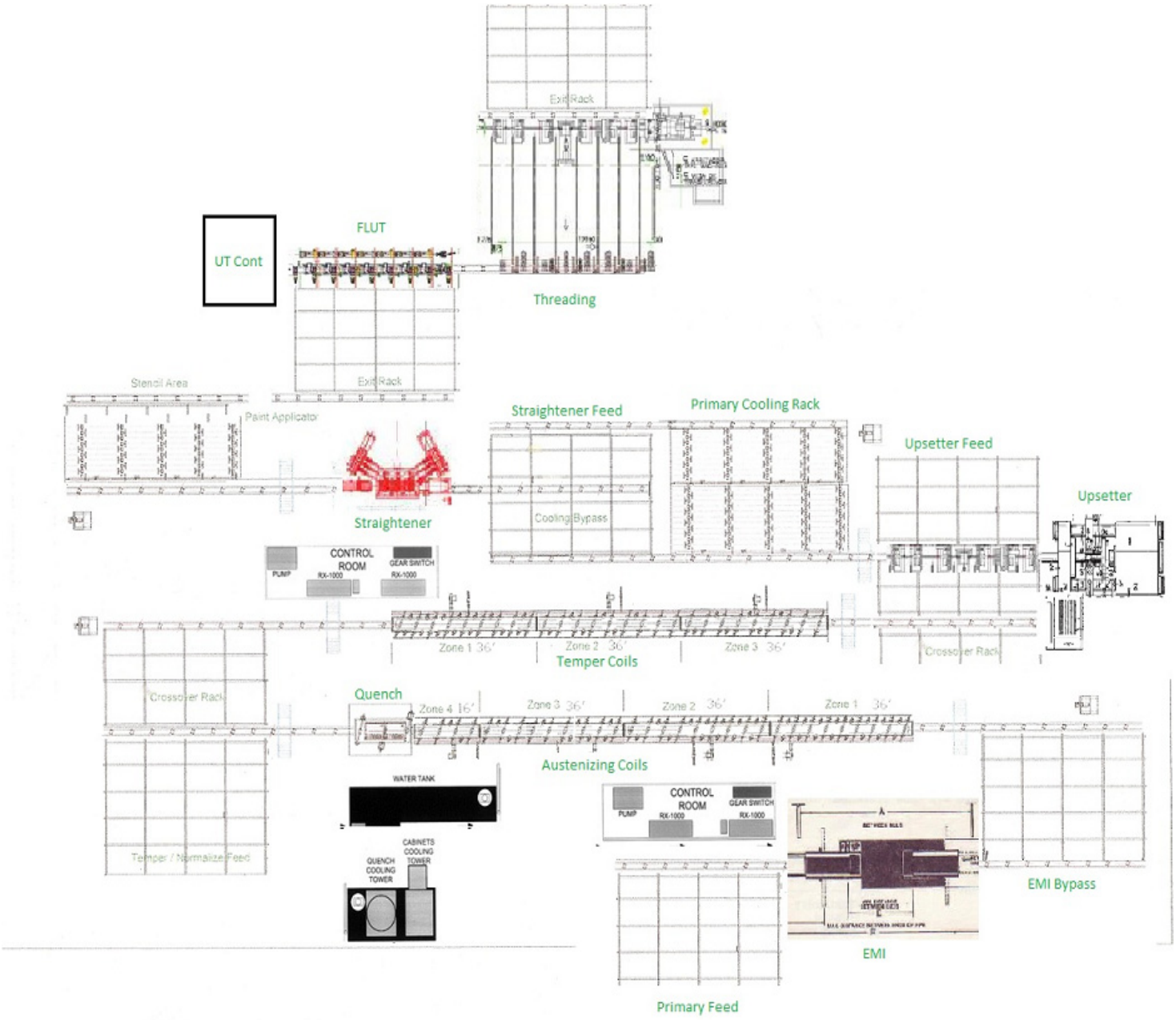
Facility Details

Plant Description

The ENGT facility would be a full service heat treating, threading, finishing, and inspection plant:

- Processing of both Seamless and ERW pipe
- Initial production rate 25,000 lbs/hr or 70,000 tons annually at maximum
- Austenizing/Tempering lines utilizing Induction Heating Coil technology
- OD 2" to 10"
- Wall thickness from 0.19" to 0.75"
- Specifications: API and ASTM
- Product mix : 70% 2"-6" N80 and L80 grade and 30% P110 grade and larger diameters
- EMI and FLUT inspection as well as hydrostatic as required by API
- Threading of standard API 5CT threads and premium connections
- Pipe Coating

Simplified Production Layout



Equipment Listing for ENGT Facility

Heat Treating Line Induction Coils

One (1) New Power Parts RTX1500, 1500 kW, 300 Hz solid state power supply, pre-heat unit.	incl below
One (1) New Power Parts RTX1500, 1500 kW, 1.2 kHz solid state power supply, final heat unit.	incl below
Nine (9) New coils, 8 coils for upset tubing ranges 2-3/8” x .190 wall, 2-7/8” x .217 wall, and 3-1/2” x .254	incl below
wall to 1750 degrees F. One spare coil is included.	incl below
Two (2) New Bus Bar Assemblies, consisting of water cooled copper bus bar with rigid fiberglass housing.	incl below
The bus bars are to bring power from the power supplies to the coils.	incl below
One Lot—new water cooled leads for connecting coils and bus.	incl below
One (1) New Inline 4 bag Water Filter with 4” flange—includes 60 filter bags	incl below
One (1) Recold Fluid Cooler. rated for 400 GPM. Main motor—one 40 HP, 3 phase, 1800 RPM.	incl below
One (1) New Duplex pump set with control panel. Features: (2) Taco Centrifugal Pumps	incl below
One (1) Quench Systemdesigned for a quench rate	incl below
of 30,000 #/Hr with a start temp of 1,800 F and finish temp of 100F:	incl below
One Stainless Steel Quench Ring to accommodate the above casing sizes.	incl below

Temper Line:

One (1) New Power Parts RTX1500, 1500 kW, 300 Hz solid state power supply.	incl below
One (1) New Power Parts RTX500, 500 kW, 1.2 kHz solid state power supply.	incl below
Nine (9) New Coils for the temper line—tubing ranges 2-3/8” x .190 wall, 2-7/8” x .217 wall, and 3-1/2”	incl below
x .254 wall to 1350 degrees F. Also included is 1 spare coil.	incl below
Two (2) New Inline Water Filters with 3” flange—includes 60 filter bags	incl below
One Lot—new water cooled leads for connecting coils and bus.	incl below
One (1) Recold Fluid Cooler. rated for 250 GPM. Main motor—one 25 HP, 3 phase, 1800 RPM	incl below
One (1) New Duplex pump set with control panel. Features: (2) Taco Centrifugal Pumps	incl below
	incl below
Also included is One (1) Remote Control panel that includes Wiliamson temperature sensors, Yokogowa	incl below
paperless recorder, start-stop controls for power supplies, lights, E-stop, meter boards, potentiometers and	incl below
selector switches.	$1,475,000

Additional Larger Coils to Run Larger Casing

18 each New coils (includes two spares) for 4-1/2’ to 5-1/2” casing.	incl below
18 each New coils (includes two spares) for 6” to 9-5/8” casing.	incl below
Upgrade to Quench Equipment	$545,000

Upsetter Heating Coils

New Power Parts RTS500 – 500 kW, 3 kHz Solid State Induction Power Supply with IGBT	incl below
Four New #20 water cooled leads – not to exceed 20 feet in length	incl below
Large Recold fluid cooler and duplex pump station (to accommodate 2 500KW units	incl below
One Inline water filter with 4” flange and 20 filter bags	incl below
One Pump Set— Duplex Pump Set - Two Taco Centrifugal Pumps— rated at 85-125 GPM	incl below
One specialty channel coil	$538,000

Upsetters

Ajax 6" upsetter - 2 units	$650,000

Heat Treating Ancillaries

Dephosphorizing Equipment	incl below
Roll Type Straightener	incl below
Press Straightener	incl below
14" Band Saw	incl below
Air Compressor system - 80cm capacity	incl below
Auxiallary Equipments	incl below
Bale Press	$1,820,000

Handling Equipment (includes PLC)

Handling Tables	$900,000
Conveyor Lines	$450,000
Crossover Racks	$320,000
Storage Racks	$160,000
Cooling Racks	$400,000
Stencil Rack	$200,000
Feed Racks	$180,000

Finishing Equipment

Puma 800 Lathe 2- 2/8" to 11-7/8" four units	$1,600,000
14" Band Saw four units	$120,000
Bucking unit x 4	$1,200,000
Hydro Test bed	$400,000
Marking machine	incl below
Measure and Weight station	incl below
Mark Jetting Machine - four units	incl below
Scaling Machine	incl below
Leak Test Machine	incl below
Label	incl below

Binder	incl below
Air compressor 10 cm capacity - two units	incl below
10 ton indoor crane	$2,600,000
Gauges, Tooling	$360,000
Inspection Equipment	
EMI	$1,200,000
VisonArray FLUT (includes handling table and control system)	$3,000,000
Installation Labor	$5,435,400
Yard Equipment	$1,400,000
Physical Plant	
Building Shell	$2,260,000
Mechanicals	$1,050,000
Booths,Interior buildout,washout stations, etc	$340,000
Site Prep	$500,000
Misc.	$830,000
TOTAL COST	**$29,933,400**