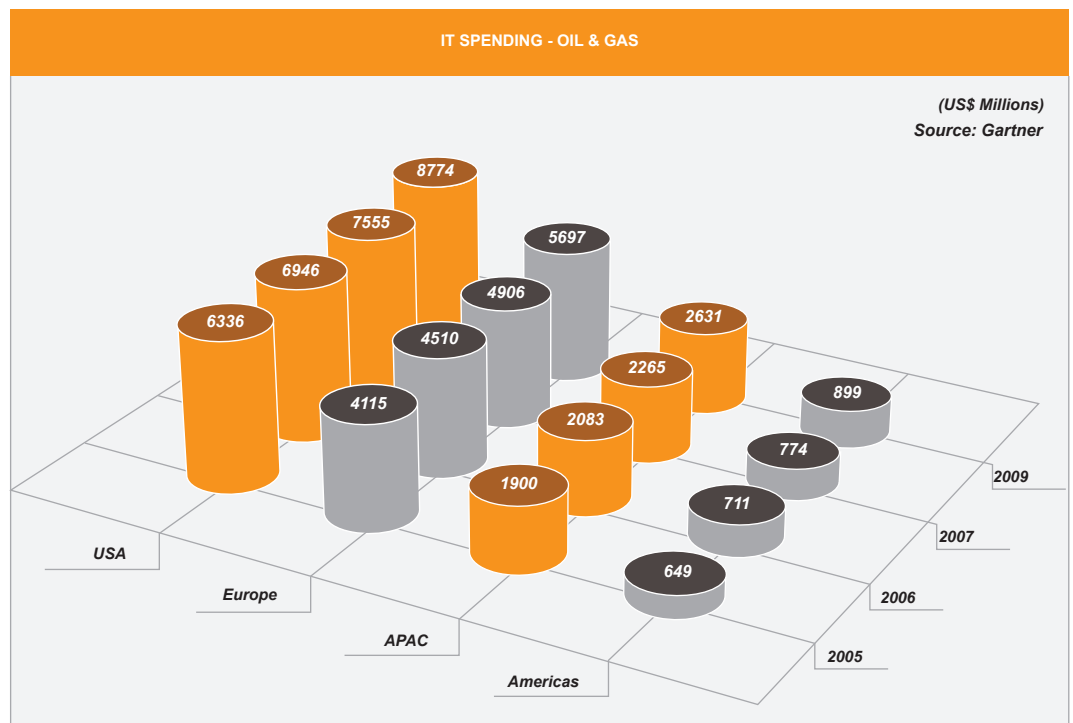
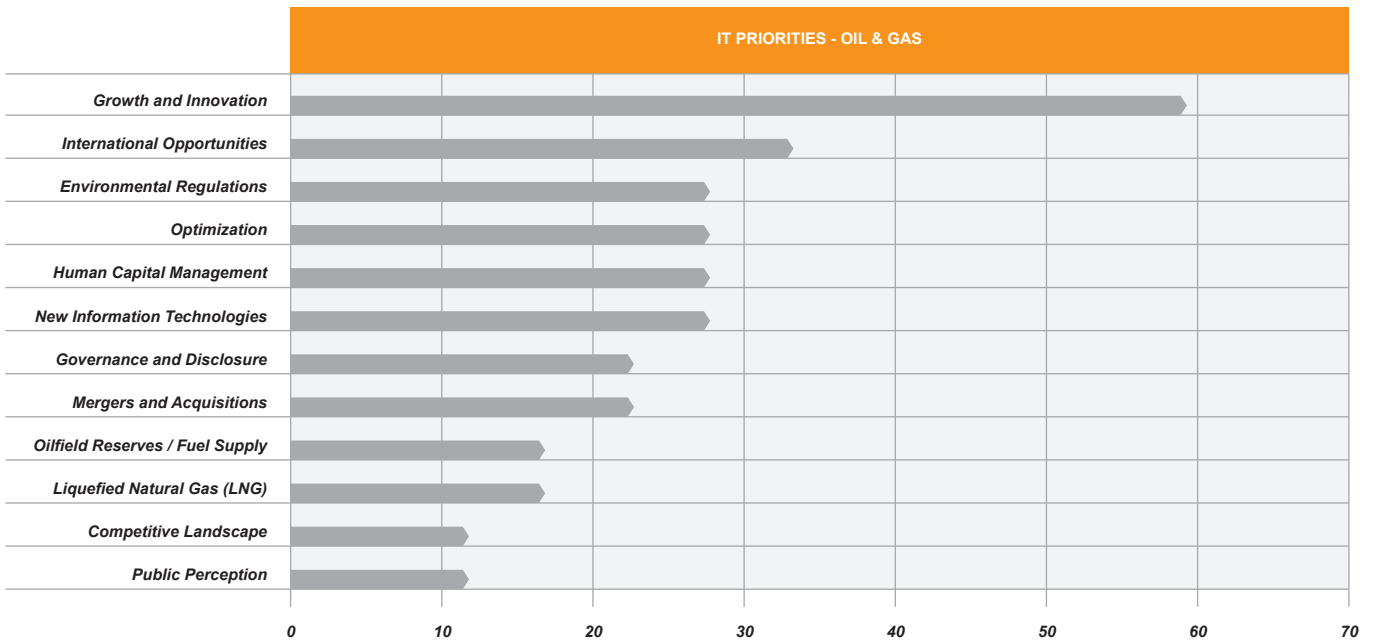


A BUSINESS CASE FOR RFID IN THE OIL & GAS INDUSTRY

MARKET OVERVIEW

An underlying priority of the Oil & Gas Industries investment in technology is to support growth and innovation in a very dynamic and volatile market space. Global petroleum prices have explicitly provided a foundation for a sturdy market growth and implicitly driven demand for technologies that can streamline the increasing complexity of product procurement, distributed site locations, increase production volumes, and other factors intrinsic to the increase in exploration, drilling, and production because of this market growth.



TECHNOLOGY OVERVIEW

RFID technology within the market space is still at its infancy, however the cost-points, memory size, and read range potential of this technology, can enable visible and important benefits to a variety of different application areas. These include:

OIL & GAS PRODUCT MANUFACTURER

- ◆ **Quality Control (more granular / automated)**
- ◆ **Dynamic KPI Data (items/hr; downtime; yields)**
- ◆ **Inventory & Asset Control (increased visibility, quicker processing)**
- ◆ **Proactive Maintenance / Product Lifecycle Management (usage control, real-time status feedback)**

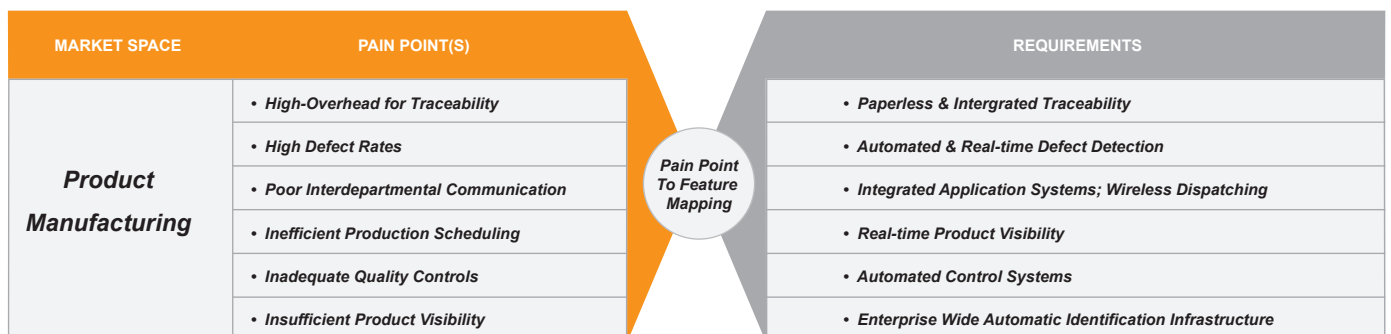
OIL & GAS RIGS

- ◆ **Drill String Validation (improved integrity, decreased downtime, improved maintenance model)**
- ◆ **Down hole Actuation (low cost actuation, multi-state capability)**
- ◆ **Proactive Maintenance & Control / PLM (usage, status)**
- ◆ **Construction Management (decreased rig assembly time, improved integrity)**

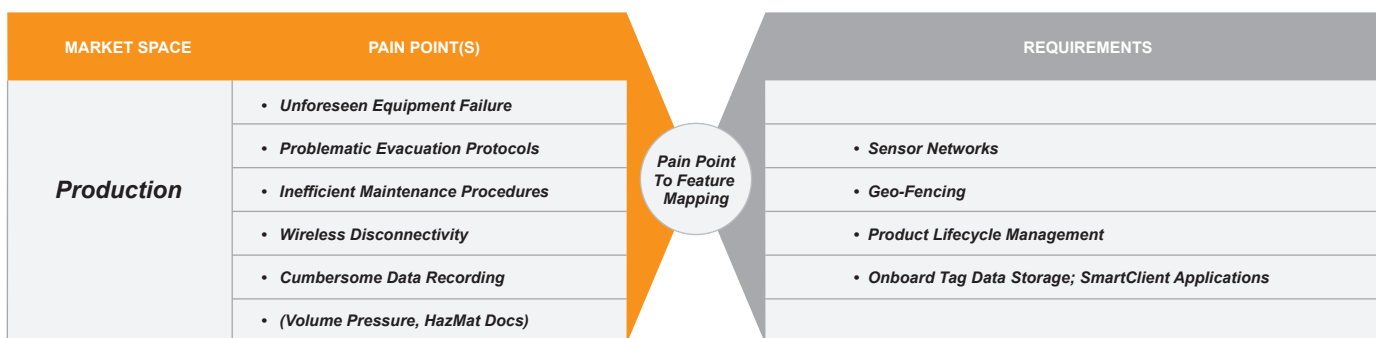
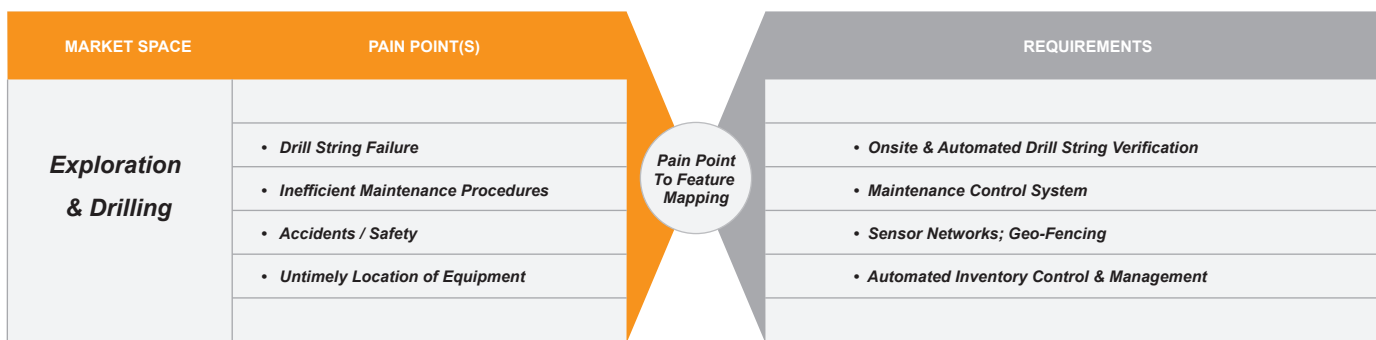
REFINERIES

- ◆ **Hazardous Material Disposal Management (correct disposal, traceability, onboard safety/disposal information)**

PAINPOINT TO REQUIREMENTS MAPPING



PAINPOINT TO REQUIREMENTS MAPPING



VALUE PROPOSITION

The Oil & Gas RFID (OGR) Solution Group brings together select industry subject matter experts, academic researchers and technology service providers to identify, define, develop, and deploy cutting edge solutions for Exploration, Production, Drilling, and Product Manufacturing in the Oil & Gas market. By educating and refining the customers understanding of what the technology can do for them, and developing systems with the help of a consolidated effort of Oil & Gas professionals, the solutions group is creating scalable application systems and data standards, and helping generate understanding and adoption of Radio Frequency Identification within the Oil & Gas Industry.

This group and its underlying activities are aimed and generating launching pads for commercialization within the market space. Its marketing and research & development activities are fundamental components of its success.

RFID technology is an indispensable component of the product offering of the OGR Solution Group. Application areas, such as drill string assembly offer an untapped market space for procurement and production control systems powered by RFID.

DRILL STRING

- ***5+ million metric tons of oil field tubing consumed yearly in the United States***
- ***Equivalent to 11 billion pounds of oil field tubing***
- ***Equivalent to 30+ million tubing products per year***
- ***Controlling drill string assembly to prevent failure is critical to the industry.
Loss of production can cause millions of dollars of loss per day***

OIL RIG

- ***2000+ Oil Rigs actively drill/exploring for oil or gas in the United States***
- ***Thousands of Gauges, Wrenches, and oil field equipment used on each rig***
- ***Millions of different types pieces of equipment that require product lifecycle and/or location management.***

These are just two of the application areas of RFID technology that offer a completely un-tapped market space. Furthermore, even consumable oil field tubing products are valued at a few hundred dollars per unit and the return on investment that is gained from improving product visibility, control drill string integrity, and streamlining procurement by investment in RFID technology far outweighs even the highest cost-points associated to RFID tags.

Such that:

- ◆ ***Tags within this market space, if properly presented to the end-user community can easily be sold for \$1.00+/unit, something that is not feasible with consumer goods or apparel.***
- ◆ ***Return on investment can clearly and easily be justified***