



## Application Note: Oil & Gas - Upstream

The upstream sector of the oil and gas industry focuses on exploration and production (E&P). This is where product is searched for, potential assessed, exploratory wells drilled, and where operational efforts bring crude oil and raw natural gas to the surface from underground or underwater fields. Processes, systems and services found in the upstream sector often involve electronic and computer instrumentation and controls. These include:

- Geological tools – imagery systems, meters, sniffers, thumpers, explosives, vibration sensors
- Core sampling equipment
- Rigs – mobile, land-based, semi-mobile
- Compressors, generators, engines
- Drilling, shaker, BOP and pressure control systems
- Mud systems – pumping, circulating, filtering, additives
- Welding systems
- Casing, tubing, wellhead, perforation processes including sand and cement supply and distribution systems
- Pumping, reclamation, fracking piping and pumps
- Water supply and distribution systems
- Chemical supply and distribution systems
- Tanks and storage systems
- Plug and abandonment equipment



### Using Beijer HMIs in Upstream Oil/Gas Applications

Globally, crude oil production and consumption have tripled since 1965. However, in late 2015, the International Energy Agency stated global demand for crude oil should see a slight, steady decline through 2020. Couple this with the recent decline (since mid-2014) in the price of oil, most companies in the upstream sector have changed their focus from exploration to efficiency. Conversely, although the price of natural gas has declined slightly since 2014, the demand will rise around 2% per year for the next few years. For modern original equipment manufacturers (OEMs), this signals an opportunity. Beijer HMIs are positioned to support new OEM projects for oil/gas applications that are intended to improve productivity at less cost. Beijer HMIs are designed to integrate into OEM devices that need to operate flawlessly in the harsh, upstream oil/gas environments. The equipment must support the following deployment requirements:

- Extreme mechanical stress – vibrations, shock, shaking, pressures
- Extreme heat and cold –  $-30^{\circ}\text{C}$  /  $+70^{\circ}\text{C}$
- Direct sun – readability and UV durability
- Dust – minerals, metals, ash, sand
- Water – rain, snow, ice, fog, humidity, high-pressure wash-down
- Chemicals – saltwater, fuels, gases
- Hazardous – gases & vapors (Class I Div 1 or 2, ATEX / IECEx Zone 1 or 2)

**Beijer**  
ELECTRONICS

#### Americas HQ

Beijer Electronics, Inc.  
1865 West 2100 South  
Salt Lake City, Utah 84119-1303 USA  
www.BeijerInc.com / +1.801.466.8770

#### Global Headquarters

Beijer Electronics Products AB  
P.O. Box 426  
201 24 Malmö, Sweden  
www.BeijerElectronics.com / +46 40 35 86 00

AN2157 - page 1

November 2015 - Jeff Hayes

Copyright © 2015 Beijer Electronics. All rights reserved.

The information at hand is provided as available at the time of printing. Beijer Electronics reserves the right to change any information without updating this publication. Beijer Electronics does not assume any responsibility for any errors or omissions in this publication.



## Controls Applications in the Upstream Oil/Gas Sector

- Speeds – motors, drills, engines, conveyors
- Flows – valves, meters, regulators
- Electrical – voltages and frequencies
- Temperatures, pressures and fluid levels
- Performance indicators & warnings
- Emissions monitoring, measuring, recording
- Time settings – operating time, preventative maintenance

## Configuration, Sizing & Integration for Upstream Sector

HMIs must be sized for the applications. HMI displays range in size from 3'-5" on the low-end, 7"-12" in the mid-range, and 15"-24" on the high-end. Upstream oil/gas equipment can use all sizes, depending on the application, operator requirements and cost of the OEM machine. HMIs must understand the controls intelligence in the OEM devices. Some machinery will use standard controls protocols like Modbus, others use proprietary ones. HMIs most often communicate to PLCs. Historically this communication has been through serial protocols – RS232/422/485 – but more and more communication is over Ethernet.



## Why Rugged HMIs from Beijer Electronics?

Beijer's iX HMIs are advanced operator terminals that provide remote access and control, log events and activities. Logs can be pushed or pulled into standard formats for analysis, trending and long-term storage. The alarm viewer provides real-time awareness of abnormal conditions. Operators can view system and component manuals, videos and web pages for quick and accurate access to pertinent information. The operator interface terminals provide the control, data repository, and drill-down capabilities required by administrators and technicians.

Much of the electronic and controls equipment deployed in upstream oil and gas environments require certifications and approvals. Equipment usually must meet IP 66, NEMA-4X, and UL 50E Type 4X outdoor ratings. They must have key certifications such as UL 61010-2-201 (replacement for UL 508), CE (EN61000-6-4, EN61000-6-2), ISA 12.12.01 (Class I Division 2) (replacement for UL 1604), and ATEX (Zone 2) / IECEx (Zone 2). Beijer's [rugged iX operator terminals](#) address most of the requirements needed by upstream oil/gas OEM devices, providing maximum configurability, flexibility and durability.

## References

- Oil & Gas Financial Journal – Upstream, <http://www.ogfj.com/upstream.html>
- World Oil, <http://www.worldoil.com/>
- U.S. Energy Information Administration, <http://www.eia.gov/>
- International Energy Agency, <http://www.iea.org/>
- Organization of the Petroleum Exporting Countries, <http://www.opec.org/>

**Beijer**  
ELECTRONICS

### Americas HQ

Beijer Electronics, Inc.  
1865 West 2100 South  
Salt Lake City, Utah 84119-1303 USA  
[www.BeijerInc.com](http://www.BeijerInc.com) / +1.801.466.8770

### Global Headquarters

Beijer Electronics Products AB  
P.O. Box 426  
201 24 Malmö, Sweden  
[www.BeijerElectronics.com](http://www.BeijerElectronics.com) / +46 40 35 86 00

AN2157 - page 2

November 2015 - Jeff Hayes

Copyright © 2015 Beijer Electronics. All rights reserved.

The information at hand is provided as available at the time of printing. Beijer Electronics reserves the right to change any information without updating this publication. Beijer Electronics does not assume any responsibility for any errors or omissions in this publication.