

# Osinergmin 10 years Camisea

“The Future of Global Petrochemical Industry”

Mike Cleveland Latin America VP

Lima, August 20th 2014



**UOP**

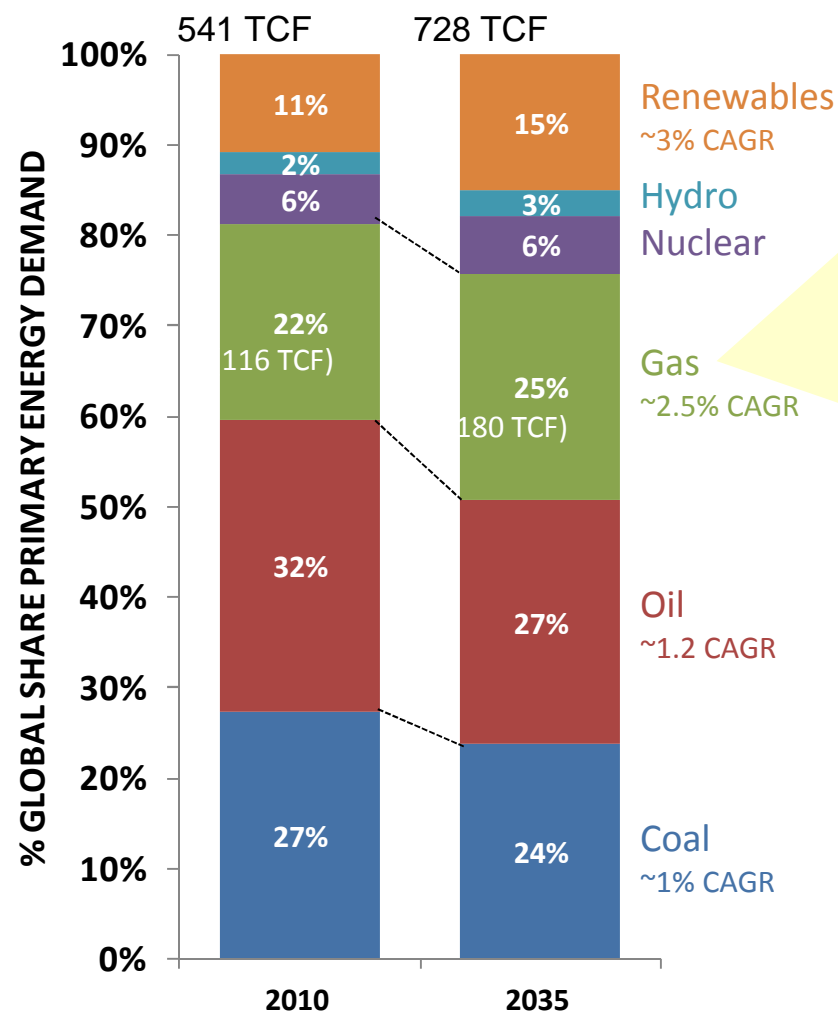
A Honeywell Company

# Agenda

---

- **Global Energy Outlook**
- **US Shale Gas Experience**
- **Global Propylene & Ethylene Overview**
- **Peru Business Fundamentals**
- **Peru Natural Gas & Petrochemical Analysis**
- **UOP Company Profile**
- **UOP Natural Gas Solution**
- **Natural Gas Monetization**
- **Honeywell UOP can make it happen**

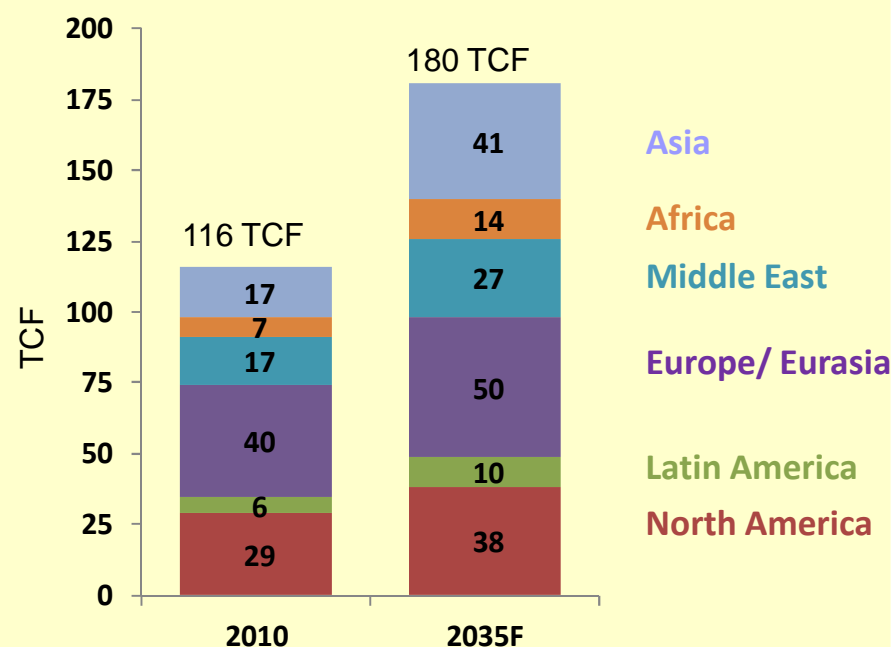
# Global Energy Outlook



## Gas Growth Drivers

- 1. Economic Incentive**
- 2. Environmental Benefits**
- 3. Geopolitical Drivers**

## Geographic Supply Growth



Source: IEA 2012 Golden Rules for a Golden Age of Gas report

Source: IEA 2012 Golden Rules for a Golden Age of Gas report

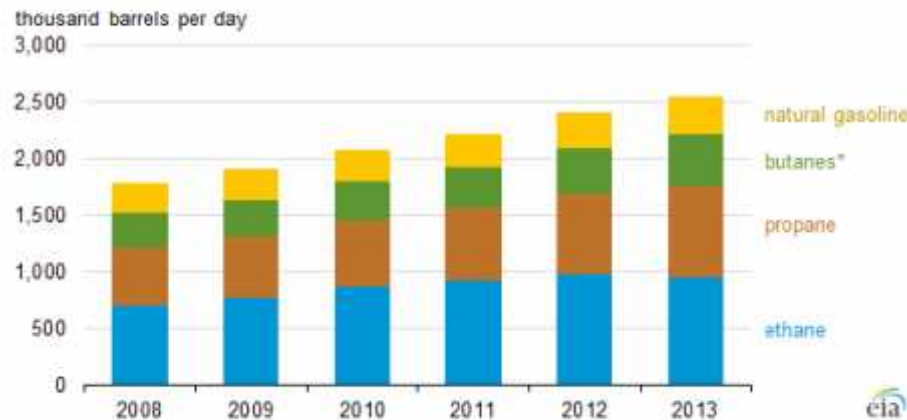
**Natural Gas the Fastest Growing Fossil Fuel, Supply Growth All Regions**

# US Shale Gas Experience



Monthly spot prices of crude oil, natural gas, and natural gas plant liquids composite, January 2007—April 2014. (Credit: Source: WTI and Henry Hub spot prices from Reuters, NGPL composite price from EIA via Bloomberg)

- In 2009 NG prices decoupled from crude due to shale production
- In 2012 decouple from crude due to “wet” shale gas production
- Gas at US\$ 2.50/MBTU = US\$ 15 BOE vs US\$ 100/Barrel
- NGL’s (ethane, propane, butanes and natural gasoline) volumes grew 7% per year over the last 5 years.



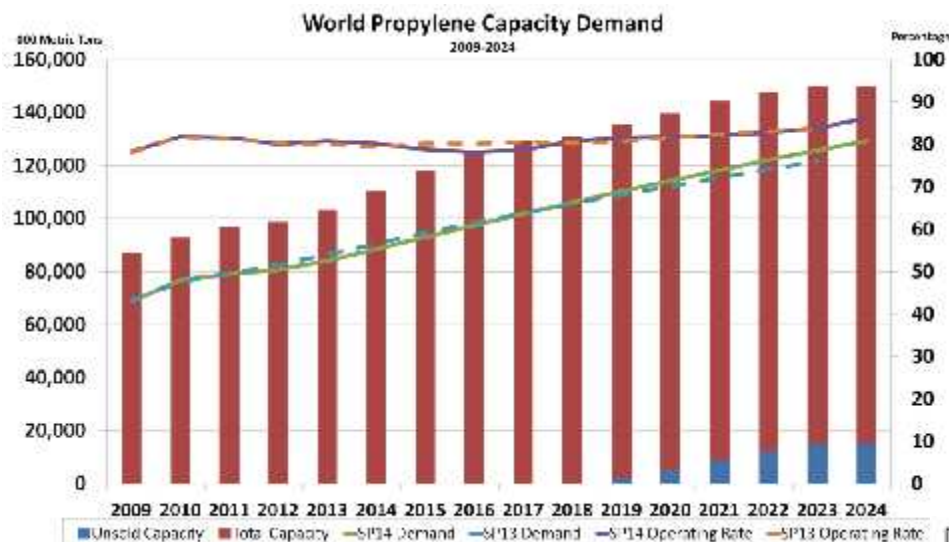
Annual production of natural gas liquids from natural gas processing plants. (Credit: Source: U.S. Energy Information Administration, Form EIA-816, Monthly Natural Gas Liquids Report)

- NGL liquids production up to 45% in 5 years (aprox. 800 KBPD)
- Ethane pricing below natural gas due to over supply drives **Ethane Cracking** expansion

**Direct and indirect jobs supported 1.7 M US jobs, reducing energy costs and revitalizing industries (i.e.: PCs)**

**Market changed very fast in US....**

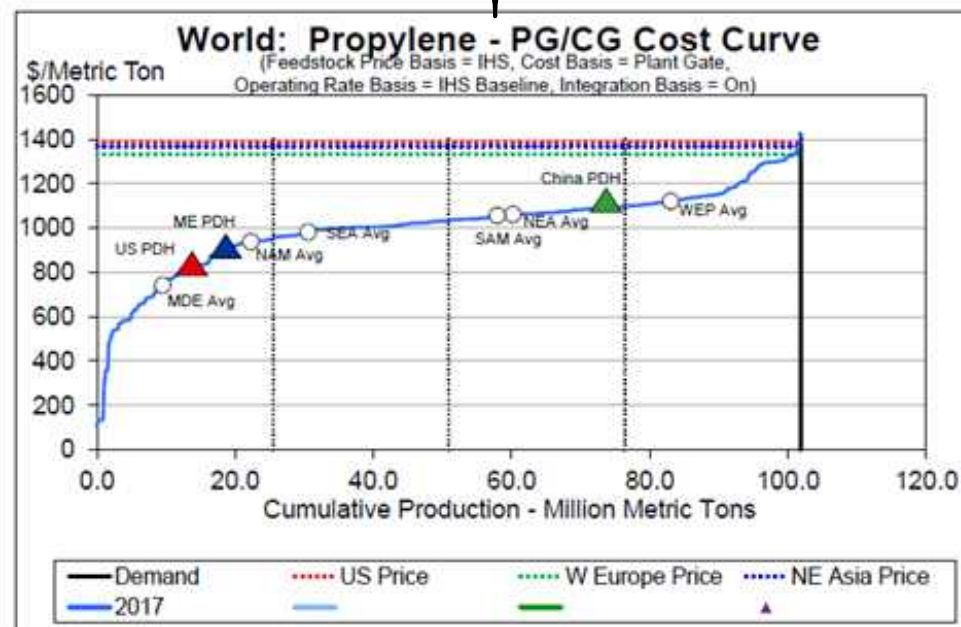
# Global Propylene Overview



## Latin America Trade

- **Main products S/D gaps (2013):**
  - ⇒ PE: (3,110) KMT
  - ⇒ PP: (1,071) KMT
  - ⇒ Styrene: (817) KMT
- **Imports / Exports:**
  - ⇒ PE imports into the region are set to grow 6-7% per annum (2013-2018) reaching 3.5 MT by 2017.
  - ⇒ North America PE producers supplying Latin America.

- ⇒ On-purpose propylene additional capacity of 3.5M MTA through 2019.
- ⇒ Propylene demand growth 4.5% CAGR.
- ⇒ Strong demand for most propylene, derivatives fueling growth.
- ⇒ Health growth across propylene value chain.
- ⇒ US and Middle East cost-advantages feedstock ⇒ net exporters.
- ⇒ Price makers/takers



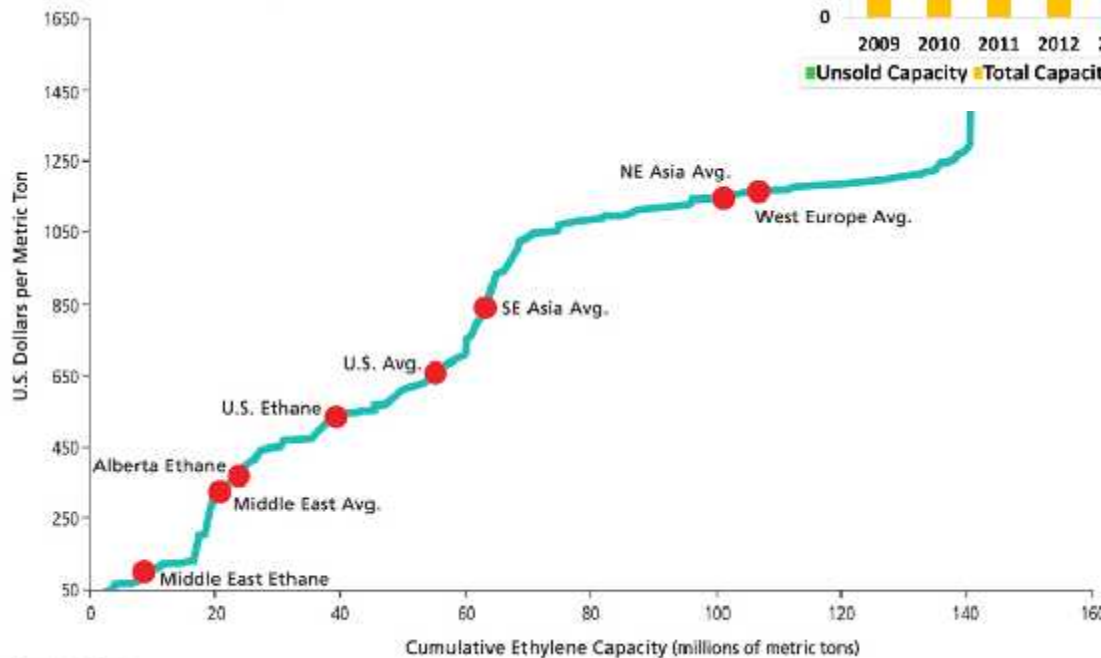
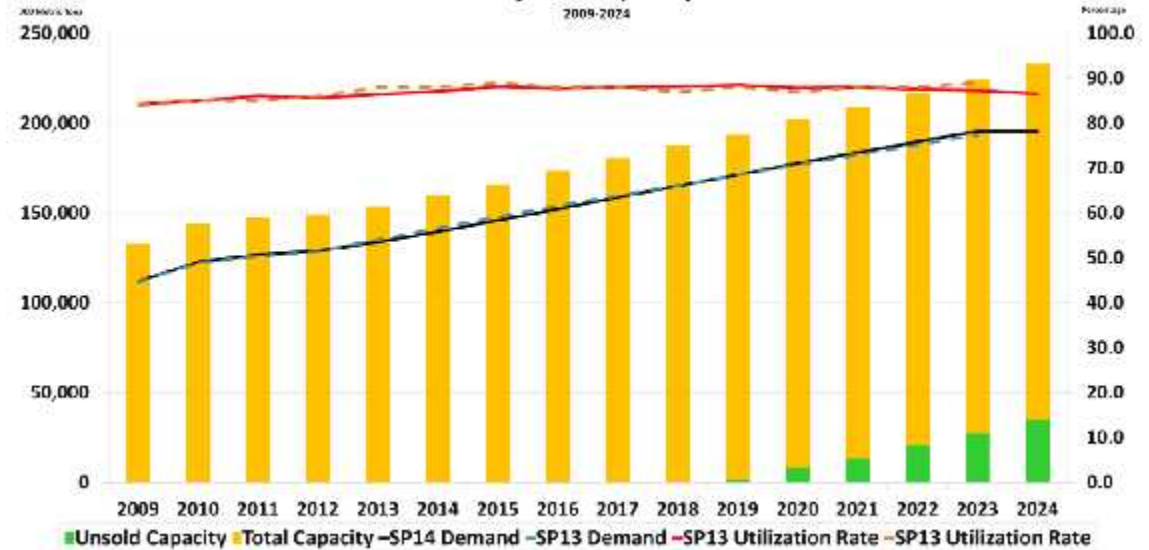
**Propylene remains a preferred polymer with strong global demand**



# Global Ethylene Overview

- ⇒ Ethylene demand growing at 4.2% CAGR.
- ⇒ US forecasting additional 7M MTA in shales capacity over next 5 years.
- ⇒ China expected to continue adding naphtha crackers.

World Ethylene Capacity Demand  
2009-2024



Source: IHS, Dow

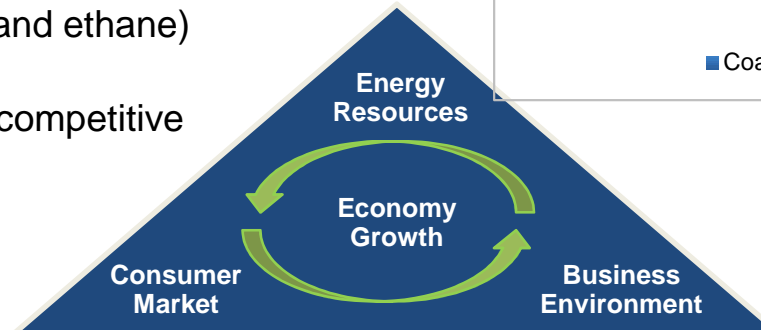
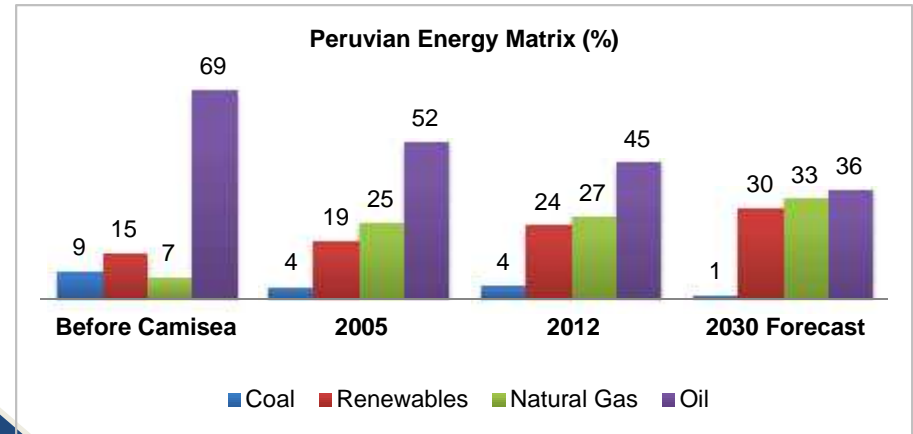
- US cash costs US\$ 500/MT advantage versus high-cost Asia and Europe current capacity.
- Ethane Cracker Economics:
  - ✓ US\$ 2B investment generating 24K direct and indirect jobs during construction phase and 325 forward
  - ✓ US\$ 1B employee compensation during construction period
  - ✓ US\$ 840M total output at full operation

**Cost Advantage (feedstock) changed US position on cost curve**

# Peru Business Fundamentals

## ① Energy Resources

- ⇒ Peru consistent Natural Gas and LNG growth in energy matrix.
- ⇒ Variable source of natural resources (Hydro, Biomass).
- ⇒ Proved natural gas reserves of 15.4 TCF (third largest in Latin America).
- ⇒ High quality (methane and ethane) natural gas resources.
- ⇒ Natural Gas worldwide competitive price of US\$ 3/MBTU.



## ③ Business Environment

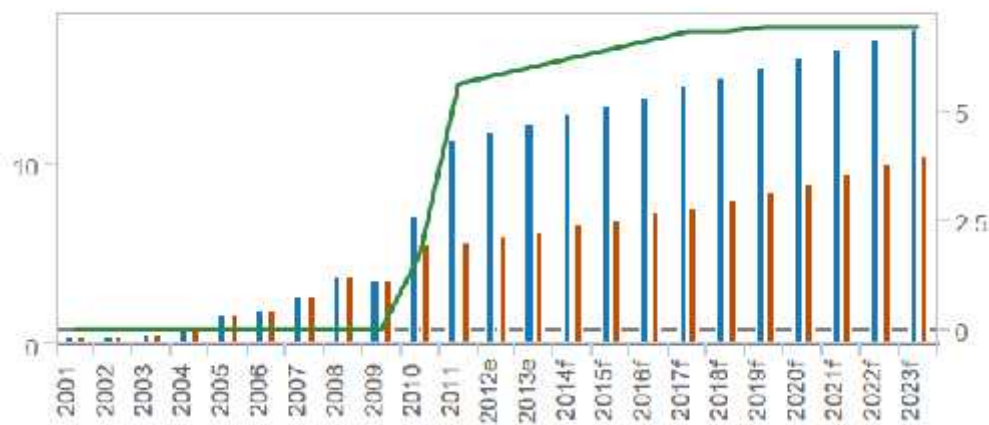
## ② Consumer Market

- ⇒ Investment grade economy with 30M consumers, average GDP growth of 6% per year (US\$ 7K/GDP per capita - 2013).
- ⇒ Upper income class society, low inflation and good level of education.
- ⇒ Energy demand growing (2013): fuels 4%, petrochemical 5%, natural gas 5.5%, electricity 3.5%.
- ⇒ Well established industries supporting economy growth: mining, oil & gas and fishing.
- ⇒ Open market economy: free trade agreement with USA, China, South East Asia and Latin America.
- ⇒ Exports from US\$ 28B (2007) to US\$ 45B (2014).
- ⇒ Oil & Gas production:
  - ✓ Oil: 174 KBPD (2013) to 195 KBPD (2018) - balance
  - ✓ Gas: 11.5 BCM (2013) to 15 BCM (2018) - export
- ⇒ Peru Oil & Gas investment plan (2014-2024): US\$ 23B (70% in upstream).

**Positive environment for oil and gas industry growth**

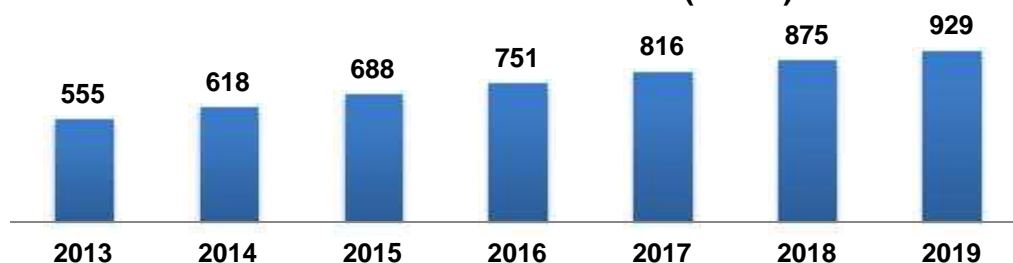
# Peru Natural Gas & Petrochemical Analysis

Peru Natural Gas Production, Consumption and Net Exports (2001-2023)



- Pipeline expansions will increase natural gas consumption (power, industry and transportation).
- Monetize natural gas into high value product (Petrochemicals).
- Regulations in place to promote oil and gas industry development attracting new investments.
- NGLs production growing from 106 KBPD to 140 KBPD by 2023.

Peru Petrochemical Demand (KMTA)



**67% demand increase in 7 years!!!**

- Country will eventually turn over from importer to exporter to Andean countries (Chile, Colombia and Ecuador) => 2MTA polyolefins domestic market.
- PC complex (south region) to enable Peru's competitive advantage position.
- Competitive gas supply (price and quality) will potentially boost peruvian's petrochemical industry.
- 80% of a PC plant cost of production is feedstock!

**Basis for natural gas and petrochemical growth in place**



# UOP Company Profile

(UOP is part of Honeywell Performance Material Division)

Serving the Refining, Petrochemical, Gas Processing & Renewables Industries



## Profile

### Business Units:

- Gas Processing and Hydrogen
- Refining & Petrochemical Process Technology & Equipment
- Catalysts, Adsorbents & Specialties
- Renewable Energy and Chemicals

### Offering:

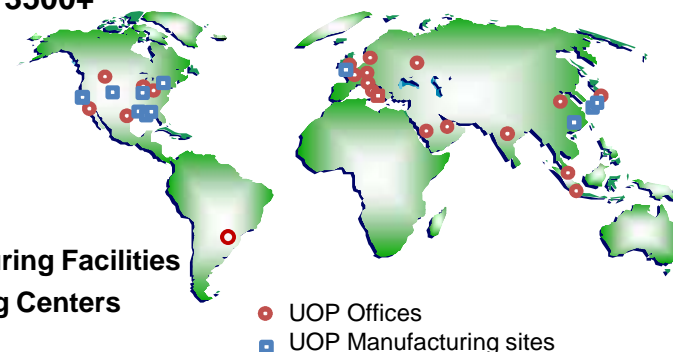
- Technology, Catalyst & Services to the Refining, Petrochemical and Gas Processing Industries
- Supplier of molecular sieve adsorbents to process and manufacturing industries

**Significant Technology Position**

## UOP Facilities - HQ: Chicago (USA)

Employees: 3500+

- 19 Offices
- 16 Countries
- 12 Manufacturing Facilities
- 5 Engineering Centers



**Global Footprint**

## Upstream

Exploring for, drilling for and producing crude oil and natural gas



UOP technology, materials and services enable monetization of natural gas resources

## Midstream

Processing, storage and transportation



## Downstream

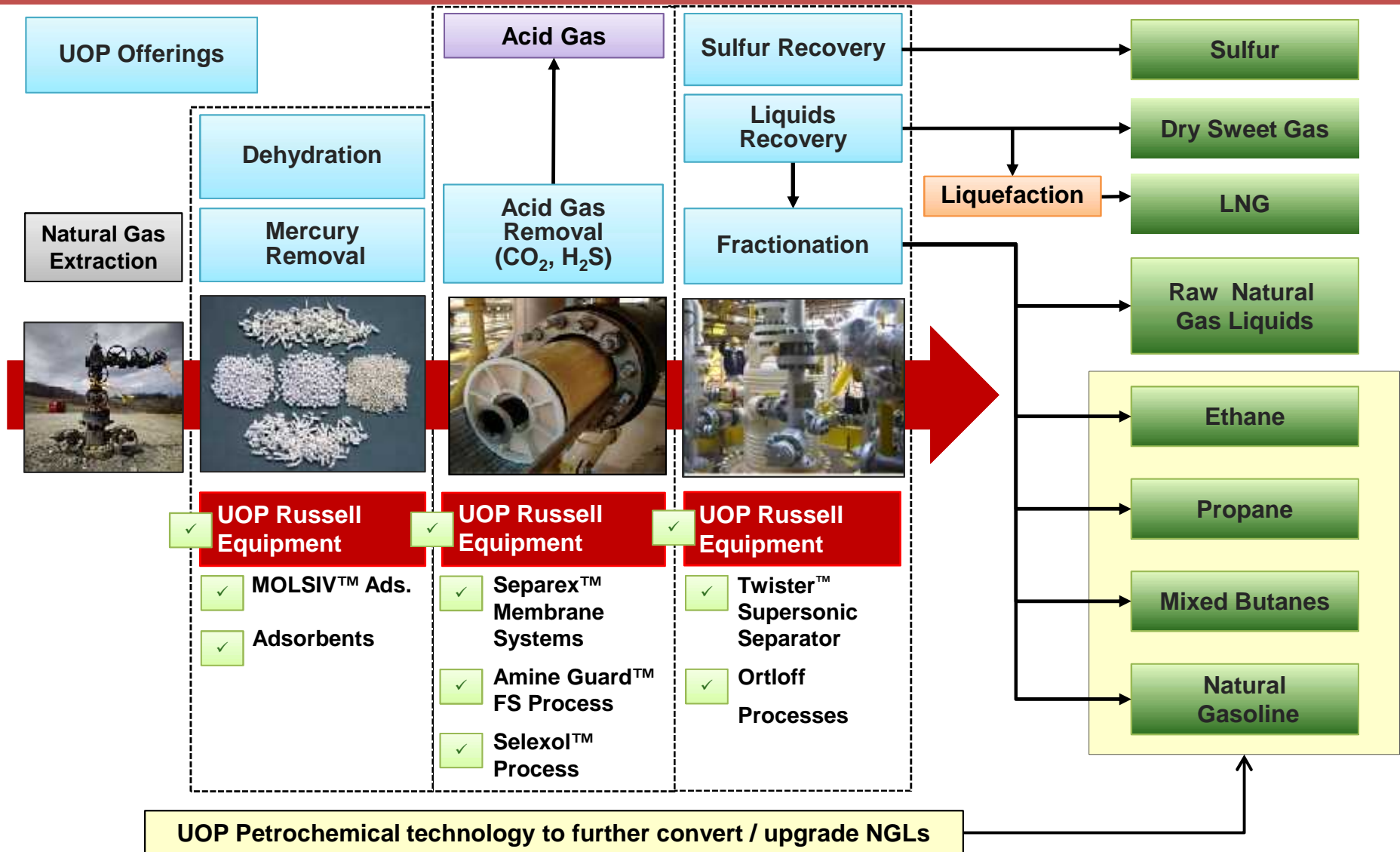
Refining and converting oil / gas into end products such as fuels and chemicals



UOP processing technology, equipment, materials and services









**UOP manufactures over 60% of World's Gasoline and 85% of Biodegradable Detergents**

# UOP Natural Gas Solutions Flow Scheme



UOP Has Solutions to Maximize Gas Monetization

# Natural Gas Monetization

				UOP Technology (US\$ CAPEX)	Simple Payback (Years)
Methane		<p>UOP Advanced MTO process</p> 	<p>Ethylene Propylene</p> <p>Scaled down from 1MM to 500Kta.</p>	700	3 – 3.5
Propane		<p>UOP Oleflex™ process</p> 	<p>Propylene Hydrogen</p> <p>Scaled down from 650 to 500Kmta.</p>	470	2 – 2.5
Butane		<p>UOP Oleflex process</p> 	<p>Ethers &amp; Chemicals Gasoline &amp; Diesel Hydrogen</p> <p>Scaled up from 380Kmta to 500Kta.</p>	365	3 – 3.5
Propane Butane		<p>UOP Cyclar™ process</p> 	<p>BTX Hydrogen</p> <p>Scaled up from 175Kmta/140Kmta product to 500Kta.</p>	290	3.5 - 4

**Leverage a natural gas play of your own with UOP**

# Honeywell can make it happen



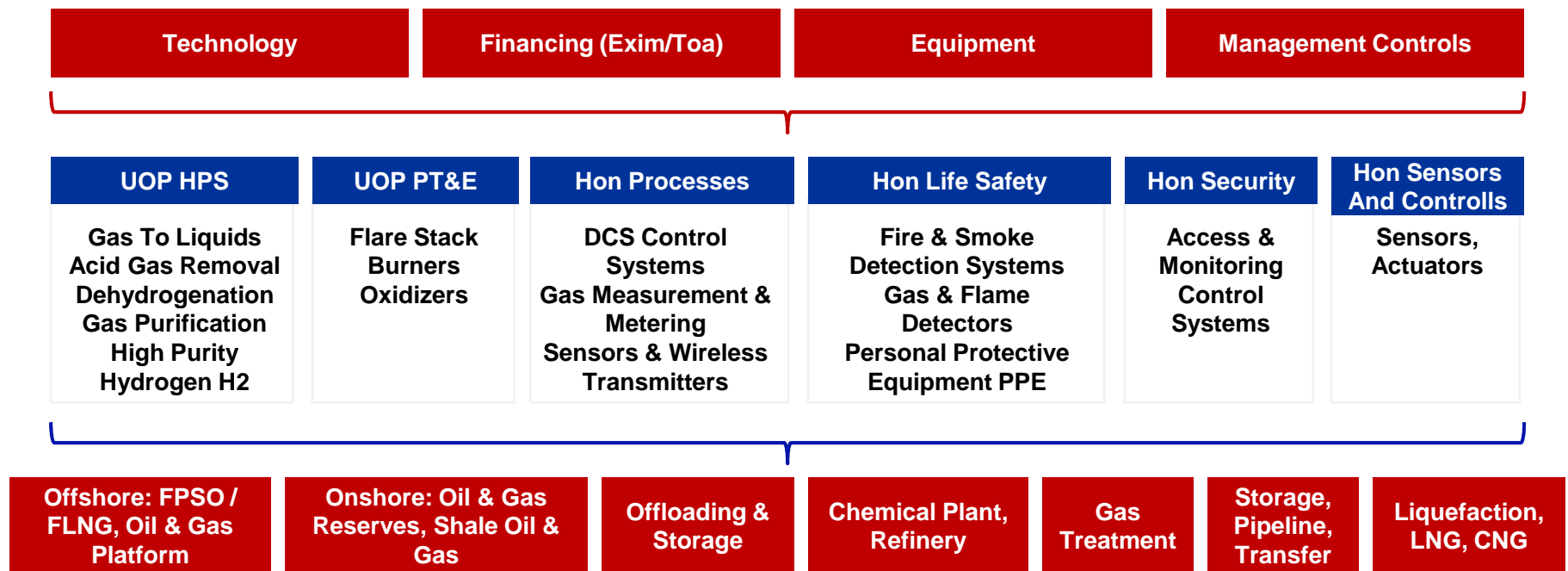
## Honeywell Worldwide

- \$ 39.1B in sales \* (54% outside USA)  
⇒ Aerospace, Automation/Control and Performance Materials
- 1,300 sites (70 countries);
- 132,000 employees;
- Headquarter USA (Morristown, NJ);
- Fortune 100.

\* Base 2013, April 2013.



>14k employees in Latin America



**Experience Delivers Results**

# Q & A