About Purvin & Gertz, Inc.

- Company founded in 1947
- Independent firm owned by the active employees
- Provide technical, commercial and strategic advice in crude oil, natural gas, and gas liquids industries
- Offices in Houston (HQ), Calgary, London, Dubai, Moscow and Singapore
Global Crude Oil Market Outlook

- Global focus examining supply, demand and trade of crude oil streams
- Production forecasts for greater than 400 marketable crude oils and condensates
- Trade balances for over 80 streams to 10 primary regions (plus Canada, US, India, China, Korea, Japan and Singapore)
- Price forecasts for over 60 different grades/destinations
The impact of the world recession in 2009 was dramatic – with global petroleum demand declining by nearly 2 million B/D vs. 2007.

The corresponding rebound in 2010 was equally astounding! – with global petroleum demand increasing by over 2.5 million B/D vs. 2009.

Demand growth expected to moderate post-2011 to below 2% per year.
Economic crisis largely a developed country concern – although non-OECD saw a slowing in growth

Future petroleum demand expected to concentrated in developing regions (non-OECD demand strength)

Consistently higher energy prices likely puts downward pressure on OECD growth
Global Oil Supply Outlook

Global Production by Development Type
Million Barrels per Day

Global Oil Production: New Developments
Million Barrels per Day

- Canada
- CIS Region
- Iraq
- Brazil
- Nigeria + Angola
- Other Non-OPEC
- Other OPEC
Reserve Growth Needed to Meet Global Supply Requirements

Billion Barrels

<table>
<thead>
<tr>
<th></th>
<th>1990 - 2009</th>
<th>2010 - 2029</th>
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<tbody>
<tr>
<td>Current OPEC</td>
<td>398</td>
<td>412</td>
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<tr>
<td>Non-OPEC</td>
<td>440</td>
<td>483</td>
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</table>
Heavy Sour Crude Oil Production Outlook

Million Barrels per Day

- Rest of World
- Canada
- Saudi Arabia
- Brazil + Colombia
- Iraq

COQA – San Antonio 2011
Evolution of World Crude Qualities

2009 Crude Quality by Region

- API Gravity
- Sulfur (wt%)

- Middle East
- CIS
- Europe
- North America
- Asia
- Africa
- Latin America
- World

Change in Quality by 2020 by Region

- Change in API Gravity
- Change in Sulfur (wt%)

- Middle East
- CIS
- Europe
- Africa
- Latin America
- North America

COQA – San Antonio 2011
Global Overview Highlights

- Petroleum demand’s recovery from the 2009 recession was impressive
  - Driver for current price response
  - Continued strong growth expected – driven primarily by non-OECD countries

- Crude supply challenge achievable, but dependent on pace of new developments and future discoveries

- Global crude oil quality will evolve to a heavier, more sour barrel
North American Crude Production Outlook

![Graph showing crude production outlook from 1995 to 2020 for Canada and the U.S.](image-url)

- **Canada**: Production trend from 1995 to 2020, showing a decrease overall.
- **U.S.**: Production trend from 1995 to 2020, showing an increase overall.

**Million Barrels per Day**

**X-axis**: Years from 1995 to 2020

**Y-axis**: Million Barrels per Day, ranging from 0 to 10

*Image and data courtesy of CoQA – San Antonio 2011*
**Crude Output Response to Rig Activity**

*Source: Rig count information from Baker Hughes*
U.S. Lower 48 Crude Production Outlook

**Note:** PADD III includes U.S. Gulf of Mexico
Canada Crude Production Outlook

Million Barrels per Day

- Conventional (incl. Pentanes +)
- Bitumen
- Synthetic Crude Oil

Chart showing the projection of crude production in Canada from 1995 to 2020, with bars representing conventional, bitumen, and synthetic crude oil.
Major Latin America Crude Production Changes

5-Year Change in Crude Output

Million Barrels per Day

-1.5 -1.0 -0.5 0.0 0.5 1.0 1.5


Mexico Venezuela Colombia Brazil

COQA – San Antonio 2011
U.S. Heavy Sour Crude Import Sources

5-Year Change in Supply Volumes

* Approximately 150,000 B/D of coking capacity tied to Canadian supply due online by 2015.

Note: Heavy Sour defined as < 28°API and > 1.0% sulfur.

COQA – San Antonio 2011
North America Crude Supply Highlights

- Healthy increases in crude supply from North America anticipated in the near term.
  - Oil sands development expected to remain strong
  - Domestic E&P response to price and success in horizontal shale plays will overcome GOM woes

- Additional heavy crude to the rescue, but changes in traditional sources
  - Output troubles from Mexico and Venezuela make way for new Colombia and Brazil supplies
  - Refinery conversion tie-ups and additional pipeline capacity result in strong growth of Canadian supply
Major Africa Crude Production Changes

5-Year Change in Crude Output

Million Barrels per Day

-0.5 0.0 0.5 1.0 1.5 2.0 2.5


- Nigeria
- Angola
- Libya + Algeria
- Other West Africa
- Rest of Africa
CIS Crude Production Outlook

Note: CIS – Commonwealth of Independent States
European Light Sour Crude Import Sources

5-Year Change in Supply Volumes

Thousand Barrels per Day

Note: Light Sour defined as > 28°API and > 1.0% sulfur.
Atlantic Basin Crude Trade to Asia

Million Barrels per Day

- Latin America
- CIS (BTC, CPC & Urals)
- Africa

2005 2010 2015 2020

COQA – San Antonio 2011
Outside N.A. Crude Supply Highlights

- Offshore developments in Africa expected to drive near term output growth
  - Long-term developments may be fueled from frontier areas

- East Siberia production and ESPO pipeline will become game changers for Urals common stream
  - European refiners will be faced with significant changes in light sour availability

- Oversupply situation in Atlantic Basin to continue – feeding robust demand growth in Asia