



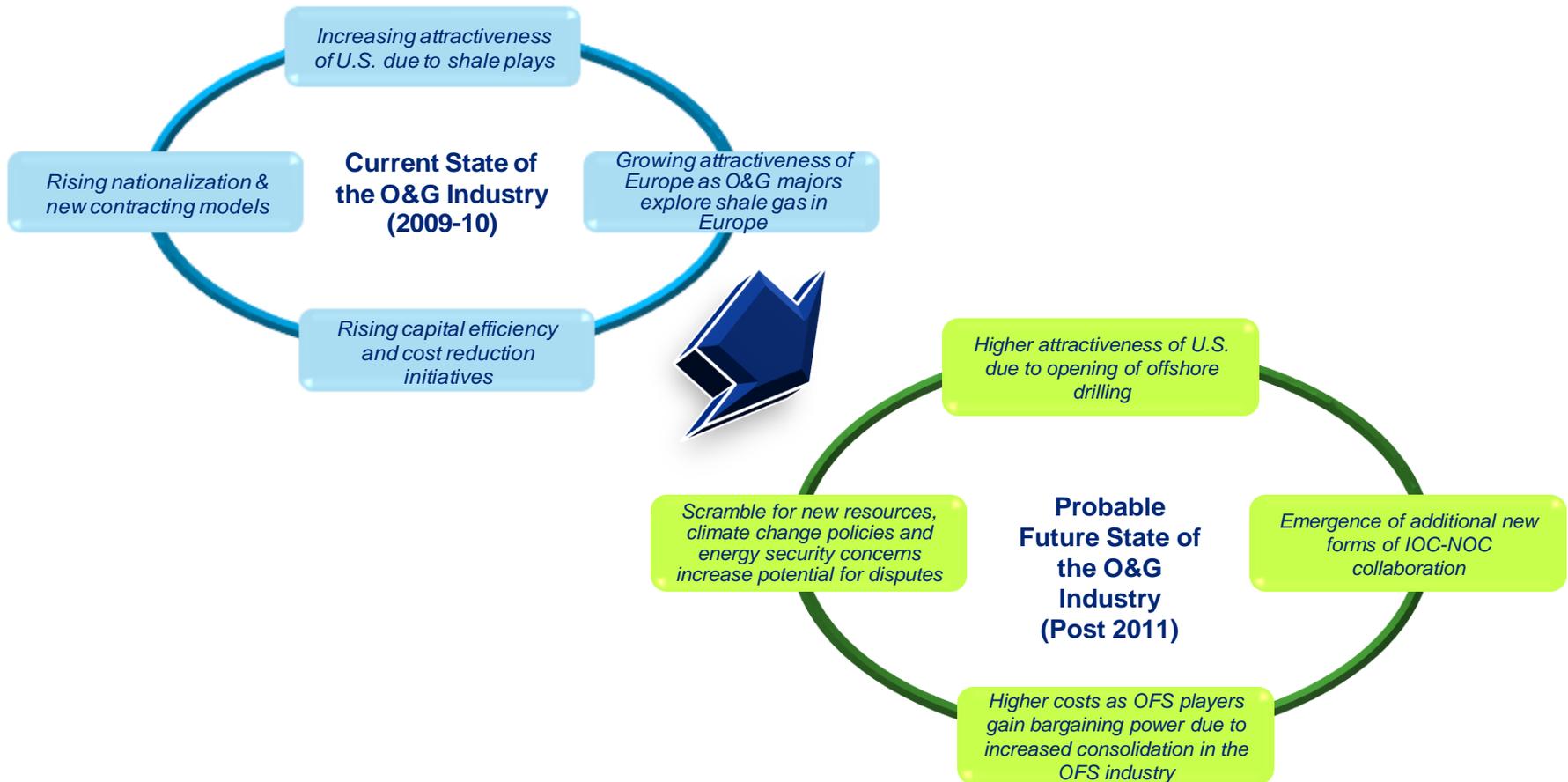
Follow the Money: E&C Opportunities in a Shifting Energy Landscape

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The Dynamics of the Energy Industry Continue to Evolve

The current state of the O&G industry is characterized by a rise in shale gas attractiveness, and a focus on capital efficiency and cost management, and the emergence of new contracting models,. The convergence of climate change and energy security along with new forms of IOC-NOC collaboration may shape the overall industry dynamics in the future.



The IOC's Are Modestly Increasing Upstream Capex, But With Significant Differences Among the Super Majors

Parent Company (Stock Ticker)	FY09 Upstream Revenue (\$ B)	Revenue Growth (YoY)	FY09 Capex (\$ B)	FY09 Capex Growth (YoY)	FY10 Projected Capex (\$B)	FY10 Capex Growth (YoY)
BP Plc. (BP)	\$57.63	-33.12%	\$14.90	-1.32%	\$15.00	0.7%
Chevron Corp. (CVX)	\$51.33	-37.65%	\$17.10	-2.06%	\$17.30	1.2%
ConocoPhillips (COP)	\$37.09	-46.87%	\$9.70	-43.64%	\$10.00	3.1%
ExxonMobil (XOM)	\$64.46	-37.89%	\$20.70	4.90%	\$21.20	2.4%
Royal Dutch Shell Plc. (RDSA)	\$55.14	-37.55%	\$21.27	-26.53%	\$22.50	5.8%

Note:

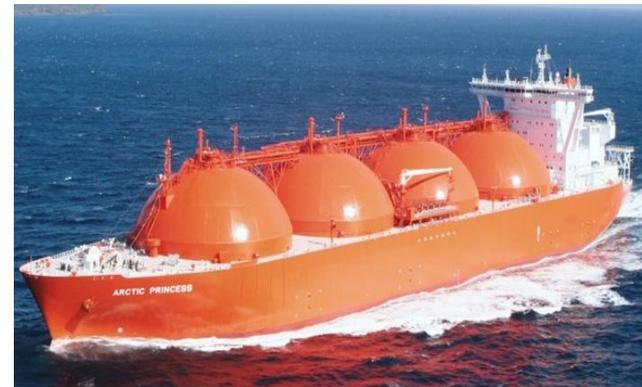
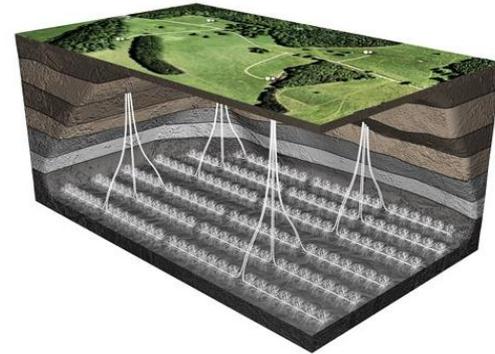
1. BP's Capex figures exclude TNK-BP and Pan American Energy
2. FY10 CapEx numbers are estimated numbers and rounded off to nearest decimals.

A Word About O&G Investment in China

- While foreign investment in China's upstream sector (especially onshore) is dwindling, it is accelerating in the refining, petroleum retail, and petrochemical sectors
- U.S. and European integrated oil majors differ in strategies to advance into China's oil and gas market.
- U.S. majors are focused on exporting to China from operations in less-risky countries such as Australia and Singapore.
- Unlike U.S. majors, European majors are active producers and marketers with a strong commitment to grow downstream business in China, despite the country's high business risk.

Three Big Money Plays

- Shale Gas
- LNG
- Petrochemicals



Shale Gas Reserves Drove Joint Venture (JV) Deals and Acquisitions in the U.S. ...

O&G Firms Evaluating Shale Gas, Globally

The re-entry of super majors into the U.S., due to the large potential and cost competitiveness of shale gas, is likely to change domestic gas market dynamics.

- **The O&G super-majors re-entered the U.S. with announcements of acquisitions and asset deals in the onshore natural gas market.**
 - U.S. M&A upstream activity for 4Q09 totaled nearly \$52.9 billion in 53 separate deals, up from \$5.1 billion in 45 deals in 4Q08, largely led by ExxonMobil's \$41 billion all-stock bid for U.S. shale gas expert XTO Energy.
 - BP's chief executive, Tony Hayward, described unconventional gas as a "game-changer" that will transform the outlook of U.S. energy. Unconventional gas is now commercially viable due to lower extraction costs, commented the chief executive officer (CEO). BP struck a \$200 million JV with Lewis Energy to exploit Lewis's Eagle Ford shale gas assets.
- **The emergence of shale gas as a cost competitive source is likely to supplant some U.S. LNG imports and maintain near-term pressure on natural gas prices.**
 - According to a J.P. Morgan report, Qatar planned to supply 25 million tons per annum (mtpa) to U.S. but is now likely to look for new demand centers. In such a scenario, Qatar will have to direct LNG cargoes toward Asian markets where the Australian LNG is already in play. In addition, Russian LNG projects previously targeting U.S. markets will also most likely look to Asian markets. The end result will be a pressure on natural gas prices.

Sources:

... And Ignited a Land Grab in Europe

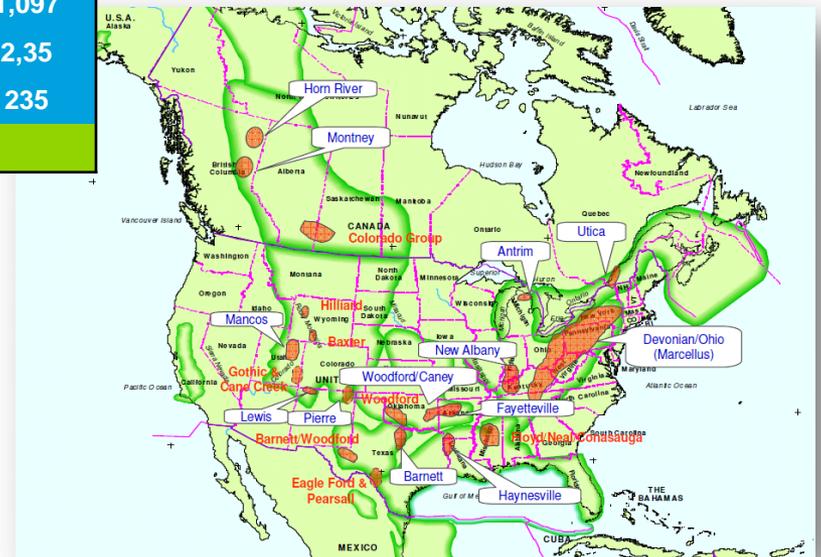
O&G Firms Evaluating Shale Gas, Globally

The majors are looking beyond the U.S. at the potential of shale gas in Europe and Asia.

- **Although the potential for unconventional reserves in Europe may not be as significant as in the U.S., they will probably reduce Europe's energy dependence on Russia.**
 - ExxonMobil has access to shale gas reserves in Germany, Hungary, and Poland; ConocoPhillips, Chevron, and Marathon have positions in Poland; and Shell is in southern Sweden. According to J.P. Morgan, ExxonMobil has approximately 8 million acres of shale gas acreage globally and “it can expand its shale gas business by five years by applying expertise gained from its XTO acquisition.”
 - Europe's shale gas reserves are anticipated to be one-third of U.S. reserves. Europe is dependent on Russia, Norway, and north Africa for natural gas supplies, and significant shale gas finds can make the continent less reliable on imports. This is likely to put pressure on Russia to lower its gas prices for Europe. According to an article in *Seeking Alpha*, the Russian gas giant, Gazprom, is likely to sell 15 percent of gas sales to Europe at spot prices (lower than the long term contract prices).
- **O&G companies are also venturing outside of Europe and U.S. for shale gas acreage.**
 - Statoil has formed a JV with Chesapeake to evaluate 200 shale gas basins in 15 countries. These countries include India, China, South Africa, Australia, Romania, Ukraine, and Poland. In addition, Shell signed a JV with PetroChina to evaluate shale gas in southwestern China's Sichuan province.

Shale Gas? It's Everywhere!

World Unconventional Resource Estimates (in trillion cubic feet)				
	Coalbed Methane	Shale Gas	Tight Gas	Total
North America	3,017	3,842	1,371	8,230
Central Asia & China	1,215	3,528	353	5,096
Middle East & North America	0	2,548	823	3,371
Pacific (OECD)	470	2,313	705	3,488
Latin America	39	2,117	1,293	3,449
Former Soviet Union	3,957	627	901	5,485
Western Europe	157	510	353	1,020
Other Asia-Pacific	0	314	549	863
Sub-Saharan Africa	39	274	784	1,097
Central & Eastern Europe	118	39	78	2,35
South Asia	39	0	196	235
Total	9,051	16,112	7,406	

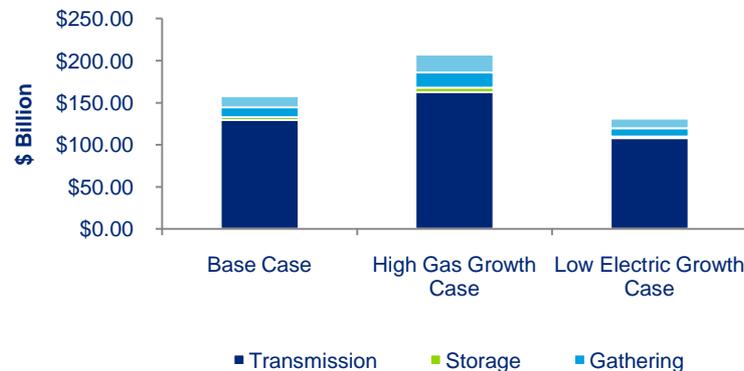


New U.S. Shale Gas Infrastructure Investment Needs = \$6-10B/yr

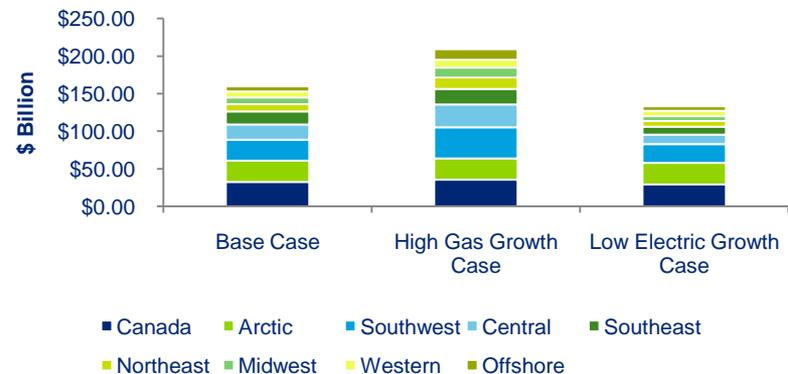
Shifts in natural gas supply sources from conventional source regions to new unconventional supply regions, such as Marcellus and Barnett shale, necessitate investment of \$6-10 billion per year in U.S. natural gas infrastructure over the next 20 years

- According to a report published by the Interstate Natural Gas Association of America* (INGAA), from 2009 to 2030, a total of \$133 billion (low electric growth case) to \$210 billion (high gas growth case) or approximately \$6-\$10 billion per year will be required to build new midstream natural gas infrastructure.
- Approximately 80 percent of the expenditure will be spent on natural gas transmission pipelines. New processing investments will account for 8-10 percent and storage and liquefied natural gas (LNG) infrastructure is projected to account for 2-3 percent of the total future investment.
- Shifts in natural gas supply sources will be the key driver for midstream investments. Regions with greatest projected growth in gas production will account for the maximum midstream infrastructure expenditure. Unconventional natural gas comprises over 50 percent of total U.S. natural gas resources, with shale gas accounting for about 25 percent.

Total Expenditures for Natural Gas Pipeline, Storage, and Gathering Infrastructure, 2009 – 2030



Total Expenditures for Natural Gas Pipeline, Storage, and Gathering Infrastructure, By Region: 2009 – 2030

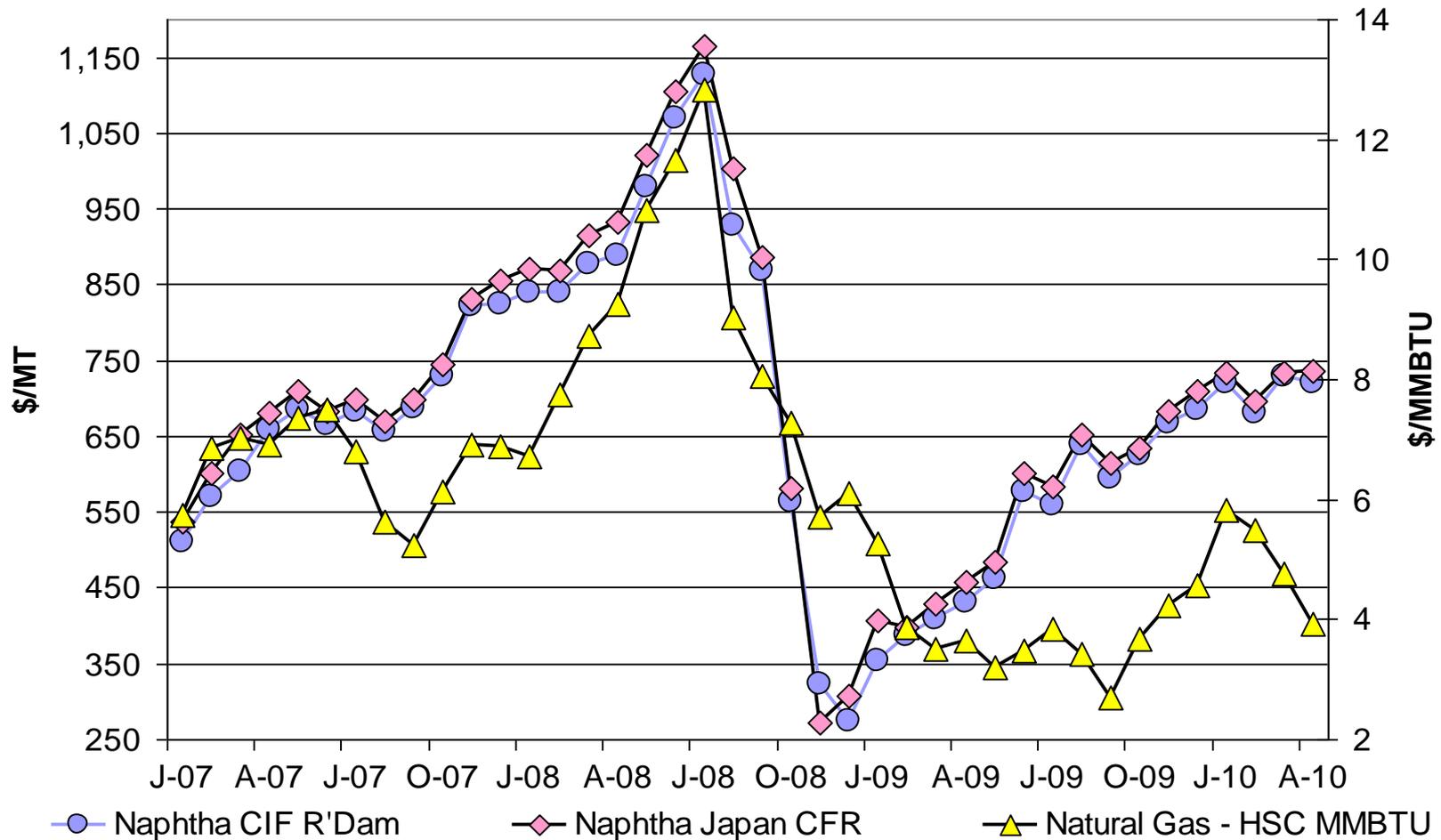


Note: **Base Case** represents an expected or most likely view of the future; a **High Gas Growth Case** accounts for the markets and policies which may lead to greater growth in natural gas consumption; and **Low Electric Growth Case** represents relatively lower electricity sales growth in the future.

LNG: Coming to America?

- **LNG Supply-Demand:** A surge in LNG supply and a slow down in LNG demand growth is expected to render a supply glut in the global LNG market until at least 2012. While LNG maximum supply ability is expected to increase 67 percent, LNG demand is expected to increase 37.3 percent by 2012 [based on the U.S. Department of Energy's (US DOE) forecasts].
- **U.S. LNG Imports:** The U.S. will likely remain the market of last resort and will attract spot cargoes (when prices in Europe and Asia are low) due to its size, liquidity, and significant regasification and storage capacity. The cheap LNG that flows into the U.S. will compete with domestic shale gas resources in the market, further reducing gas prices and resulting in cancellations or delays in development of higher cost domestic fields.
- **U.S. LNG and Natural Gas Infrastructure:** Development of new LNG import terminals continued in 2008 (albeit, at a slower pace) and several proposals were approved in anticipation of increased shipments in the future. In the beginning of 2009, approximately 200 projects representing a potential 10,100 miles of new gas pipeline and 103 billion cubic feet per day (Bcf/d) of capacity, were planned or approved by regulators. However, the US DOE Energy Information Administration (US DOE/EIA) expects cancellation of certain proposals due to the current economic recession.
- **The Likelihood of a Gas Cartel:** The formation of a gas cartel, similar to OPEC, between the largest natural gas resource holders is unlikely due to divergent interests.
- **Potential Impact of a Climate Deal:** A global climate deal is expected to benefit the LNG market, as natural gas is relatively clean-burning compared to other fossil fuels. Natural gas will likely be used as an interim fuel as economies transition from fossil fuel dependent-economies to those with increased renewable energy in their energy mix. The abundance of natural gas resources and prospects of being a 'transition fuel' will likely drive natural gas to be the next globally traded fuel.

Today, Petrochemical Investment = Asia/Middle East. But ... Industry Resurgence in the U.S.?



New Perils and Promises for EPC Companies

EPC contracts shift in terms of contract risk-sharing and inclusion of price escalation and performance guarantee clauses due to dramatic changes in the worldwide economy and oil and gas prices

- **Rapid changes in the global oil and gas (O&G) project marketplace necessitate a shift to unconventional and innovative risk-sharing mechanisms including hybrid/convertible contracts that are a mix of cost-reimbursable and lump sum contracts.**

- **Decline in contractor prices and material costs is helping companies negotiate and secure EPC contracts at lower prices.**

- **Skilled-labor shortages and local-labor hiring requirements are forcing contractors to ensure inclusion of adequate labor clauses to avoid assuming labor-related risks.**

- **A large number of oil and gas mega capital projects (MCP) are compromised by large budget and schedule overruns; a fundamental change in thinking and approach by all parties is needed.**

- **Korean and Chinese contractors are leveraging their low price strategy to gain traction in the EPC market. Owners are looking to balance the price advantage provided by Asian contractors with the risk in terms of quality, performance, and meeting budget and schedules.**

And EPCs in China Are a Strategic Wild Card, Long Term

Chinese EPC companies are heavily dependent on their parent NOCs. However, they are expanding internationally by developing niche capabilities and entering into alliances with global EPC players.

- The captive EPCs of the Chinese NOCs are heavily dependent upon their parents and follow them wherever they acquire assets. The parent provides them with a sizeable market , international projects, and credible expertise to enter into international markets.
 - Chinese NOCs such as CNPC, CNOOC, and Sinopec have large international presence with assets in Middle East, Africa, South America, and Asia Pacific. Moreover, in terms of investments between 1992 to 2009, Central Asia and Russia have received the maximum investments followed by Africa.
 - Each of the Chinese NOCs have an EPC subsidiary which carries out most of their engineering and construction work. Some of the prominent ones include: COOEC, CPECC, and Sinopec Engineering.
- Most of the projects undertaken by the Chinese EPC firms are contracted by their NOC parents. However, lately they have started looking for contracts from non-Chinese companies as their domestic contracts end by 2010.
- Increasing partnerships between Chinese NOCs and international oil and gas companies provide the Chinese EPC companies the opportunity to expand their EPC capabilities and expand globally.
- Chinese EPC companies plan to develop their deepwater capabilities and partner with various international EPC firms to develop their technical knowledge and gain access to other markets. They are also partnering with various universities and hiring international experts.
 - Over the past few months, COOEC formed alliances with various international EPC firms such as Fluor, Aker, and Norske to develop offshore technological capabilities. The agreements give the foreign partner access to China and other South Asian markets.
- Chinese EPC companies primarily struggle in the areas of quality, safety, health, and environment, and enterprise brand and international experience.



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