Energy and the Economy
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Energy Demand Simplified

Population, economic growth, and energy intensity

Global Energy Demand = Population × Per Capita Income × Energy Demand / Dollar of Output

Source: Deutsche Bank
The world population increased from 3 billion in 1959 to 6 billion by 1999, a doubling that occurred over 40 years.

The Census Bureau's latest projections imply that population growth will continue into the 21st century, although more slowly, about 0.8%/yr 2000-2050 vs. 1.8%/yr 1950-2000.

Source: US Census Bureau, International Database, December 2009 update
Many academic studies put the long-term growth in global per capita income at about 2% per year. Growth in per capita income has accompanied the processes of urbanization, increased access to education, improved health care, longer life expectancies, and improvements in economic, legal, and social institutions. Although most nations in the world have policies to reduce population growth rates, virtually every nation seeks to achieve rapid growth in per capita income.
Energy intensity tends to decline over time as a function of underlying efficiency gains and the transition to a more service-based economy.

The long term trend in intensity has been -1.3%/yr.

Government policies can play a crucial role in how energy intensity changes.

**Energy Intensity**

Less energy needed to generate GDP …but per capita use giving mixed signals

Energy intensity

- Tends to decline over time as a function of underlying efficiency gains and the transition to a more service-based economy.
- The long term trend in intensity has been -1.3%/yr.
- Government policies can play a crucial role in how energy intensity changes.

**Outlook**

- As described by BP, energy intensity measures the amount of energy used to generate a unit of economic output (dividing energy consumption by a measure of economic activity, such as GDP).
- BP observes that energy intensity is not the same as energy efficiency: changes in energy intensity are the product of changes in both the efficiency of energy consuming equipment and the structure of economic output. Energy intensity varies from country to country and over time. Higher levels of energy intensity are often found in emerging economies.
US Oil Demand May Have Already Peaked

US oil intensity (oil used per unit of GDP)

Outlook

- US oil intensity has been declining at about 2% per year, but we believe that is accelerating toward an annual drop of 2.5-3.0% per year.
- If GDP growth averages only 2.5% per year (a typical long-term estimate), US oil demand will not grow.

Source: DOE/EIA, IMF, DB Global Markets Research
Twenty five years ago, South Korea and Taiwan were where China and India are now.

One third of the world's population is just entering the middle class and want the oil-consuming lifestyle that goes with that.

Source: IMF, IEA DB Global Markets Research
Timing the Next Recession

The duration of every US expansion since 1954 has been directly proportional to the amount of time it takes the US Federal Reserve to start tightening monetary policy after a recession.

Outlook

- Although it has not been officially declared yet, the latest recession appears to have ended in June 2009. According to our US Economics Team, the Fed will embark on a new monetary tightening cycle in Aug-2010.
- Based on our calculations, this would imply the next US recession will begin in November 2012, which would represent one of the shortest economic expansions in the last 55 years.
World Economic Growth

World economy had a strong growth plateau near 5%/year over 2004-2007 period

Was the 1973-74 oil crises really a demand shock?

Source: IMF World Economic Outlook Database, DB Global Markets Research
Can Oil Prices Be Too High or Too Low?

Oil's share of world GDP (nominal oil price x demand volume / nominal GDP)

- At 5-6% of global GDP, oil absorbs too much income -- and provides too much incentive for substitutes.
- At 1-2% of global GDP, end use demand grows rapidly and upstream investment does not.
- The “sweet-spot” appears to be somewhere near 3-4% - which translates into a current WTI price near $70/bbl.

Outlook

Source: US DOE/EIA, IMF, DB Global Markets Research

5.5% Avg 1979-1985
1.8% Avg 1986-1999
4.7% 2008
$150 Oil 6.5%

Oil Demand Growth as a Function of GDP Growth

Assuming that the 1980-2009 historical relationship continues, world economic growth of 4.1% should translate into a 1.7% rise in oil demand. On a base of 84.9mmb/d of demand in 2009, this amounts to circa 1.4mmb/d of oil demand growth in 2010.

Examining the major forecast assumptions of the DOE/EIA, IEA, and OPEC against our own, we note that if the EIA were using our macro demand model, the EIA’s 2.7% GDP growth would generate only 0.5mmb/d of oil demand growth, bringing their absolute forecast more in line with OPEC’s view that oil demand will only rise by circa 0.8mmb/d in 2010 than either the IEA or DB forecasts which use higher GDP assumptions.
Non OECD oil demand in 2009 averaged about 39.5 mmb/d.

GDP growth in the non-OECD region should be about 6% in 2010.

The regression equation implies about 3.5% oil demand growth, or circa 1.4 mmb/d in the non-OECD nations in 2010.

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Source: IEA, IMF, DB Global Markets Research

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Appendix 1 – Disclosures and Certification

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Additional information available upon request

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Appendix 1 – Disclosures and Risks

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Appendix 1 – Global Disclaimer

Global Disclaimer
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