

Impact of Sustainable Energy Policies on Energy Security Risks

The Role of Financial Markets in Energy Security

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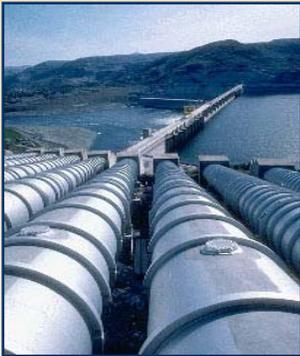
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Overview of Taylor-DeJongh

Taylor-DeJongh in Brief

- ◆ TDJ is an independent, specialist investment banking firm focused on energy, oil & gas and infrastructure.
- ◆ More than 25 years of successes in bringing the highest quality of independent, objective service to meeting its clients' capital needs.
- ◆ Ranked **#5 Global Financial Advisor** and **#1 Oil & Gas Financial Advisor** in 2007.

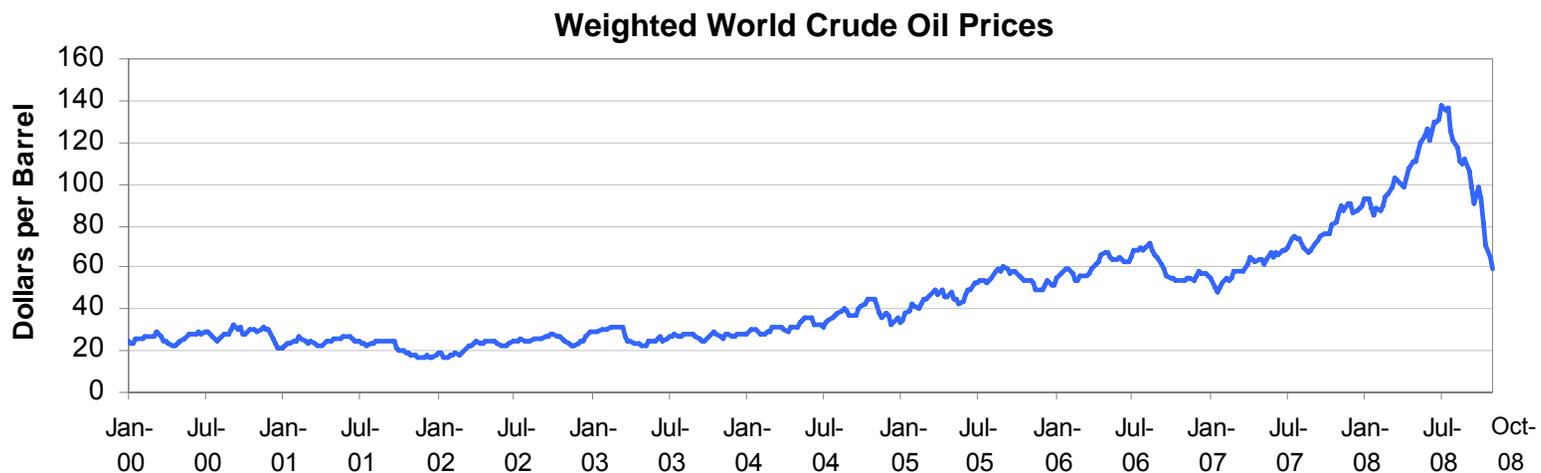
Core Expertise

	<ul style="list-style-type: none">◆ Oil & Gas◆ LNG◆ Unconventional Oil & Gas◆ Petrochemicals◆ Refineries		<ul style="list-style-type: none">◆ Pipelines◆ Power Generation◆ Metals & Mining
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Energy Security: Role of the Financial Markets

Definition of Energy Security

- ◆ Energy Security is defined as *availability, reliability, deliverability, and affordability* of energy supplies.
- ◆ The issue of affordability has gained in visibility due to the dramatic increase in oil prices over the past several years:
 - Although oil prices have fallen below US\$70 per barrel, they are well above historic levels.
 - High volatility makes oil prices difficult to predict; the NYMEX futures curve is currently pricing oil near \$90/bbl in 2016.
 - The IEA has recently projected that oil field output is declining much faster than previously thought and that the industry will need to invest more than expected just to maintain output.



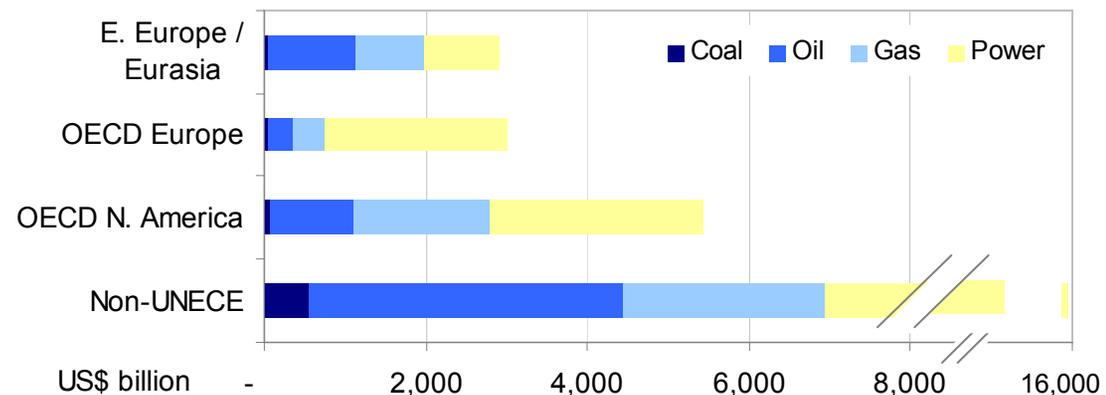
Source: EIA

Investing in Global Energy Security

- ◆ **Despite economic fears, long-term outlook is continued demand growth for energy.**

- Oil demand forecast to grow 1% annually through 2030.
- Natural gas demand to increase 1.8% annually.
- Demand growth from developing countries alone translates into an additional 21 million b/d of oil and 986 bcm of natural gas.

Energy Investment Requirements through 2030



Source: IEA

- ◆ **The IEA forecasts that global investments in energy supply infrastructure by 2030 will have to more than **US\$26,300,000,000,000** to meet demand growth.**
 - Total assets held by the world's top 20 energy companies are approximately 1/10th of this amount.
 - Over 40% of this investment will need to be made in UNECE member countries.
- ◆ **Failure to meet demand projections could result in continued upward pressure on oil prices.**

Sources of Capital

- ◆ **Given the magnitude of investment needs, no single source of capital will be sufficient. Various forms and sources of debt and equity must be mobilized.**

Equity

Strategic Investors
(IOCs, NOCs, major utilities)

- ◆ Participate in developing and operating energy projects.
- ◆ Able to mobilize capital based on the strength of their balance sheet.
- ◆ Full exposure to project upside and downside.
- ◆ Private equity funds represent a miniscule portion of available investment capital.

Debt

Commercial Banks

Capital Markets

Export Credit Agencies (ECAs)

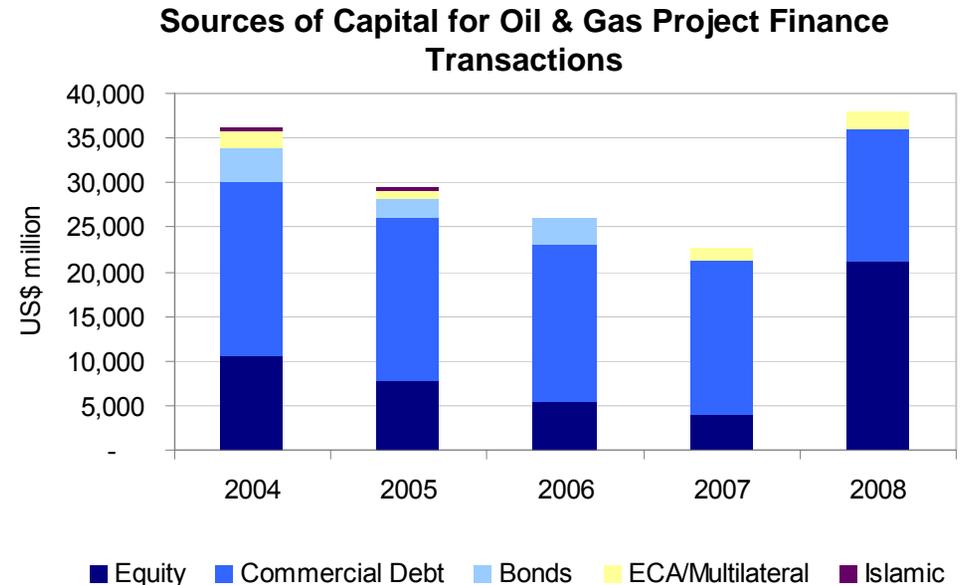
Multilateral Lenders

Islamic Finance

- ◆ Debt investors do not participate in the project's full upside – earn relatively fixed fees or interest rates.
- ◆ Traditionally up to 75-80% of total capital in projects. But debt lending capacity has been greatly affected by turmoil in financial markets.

Financing Trends

- ◆ **The availability of capital will vary according to each project's risk and return profile.**
 - All projects must be technically, commercially, and financially viable over long life (typically 20+ years).
 - Project Finance structures allocate risks contractually and increase availability of financing.
 - Government policies influence project risks and willingness of investors and lenders.



Source: ProjectWare through August 2008

- ◆ **Instability in financial markets and less attractive lending terms have led to greater use of equity, ECA and multilateral debt in project financings.**

Role of Governments in Encouraging Energy Investment

- ◆ **To increase investor and lender comfort and availability of capital, important government policies include, at a minimum:**
 - *Predictable legal and regulatory environment*
Reasonable certainty that these will not be subject to frequent and adverse changes over the life of the project (30+ years).
 - *Lender and minority shareholder rights*
Track record of protecting both equity and debt investor rights in case of dispute.
 - *Enforceable contracts on an evenhanded basis*
Recourse to host governments in case of breach of contract.

As IOCs say:

“We can manage the below-ground risks; it’s the above-ground risks that scare us.”

Private Financing Issues

- ◆ **Obstacles to securing private-sector financing for energy investments:**
 - ***Technology Risk:*** Necessity to “prove up” technologies before debt financing can become available, unless there is some sort of loan guarantee.
 - ***Position in the Value Chain:*** Lenders rarely take exploration risk.
 - ***Need for Long-term Supply & Offtake Contracts:*** Long-term agreements increase certainty about cash flows where counterparties are creditworthy.
- ◆ **Government policies determine the level of political risk (including regulatory risk) associated with projects. Within the UNECE region, a key political risk is uncertainty over carbon laws and liability.**

The Role of Alternative Energy In Filling the Hydrocarbon Gap

- ◆ **Renewable energy is promoted both for reasons of climate change and energy security.**

- Reduction of carbon emissions;
- Domestic source of energy supplies;
- Substitute for hydrocarbons in electricity generation; and
- Biofuels as an alternative to oil in transport.

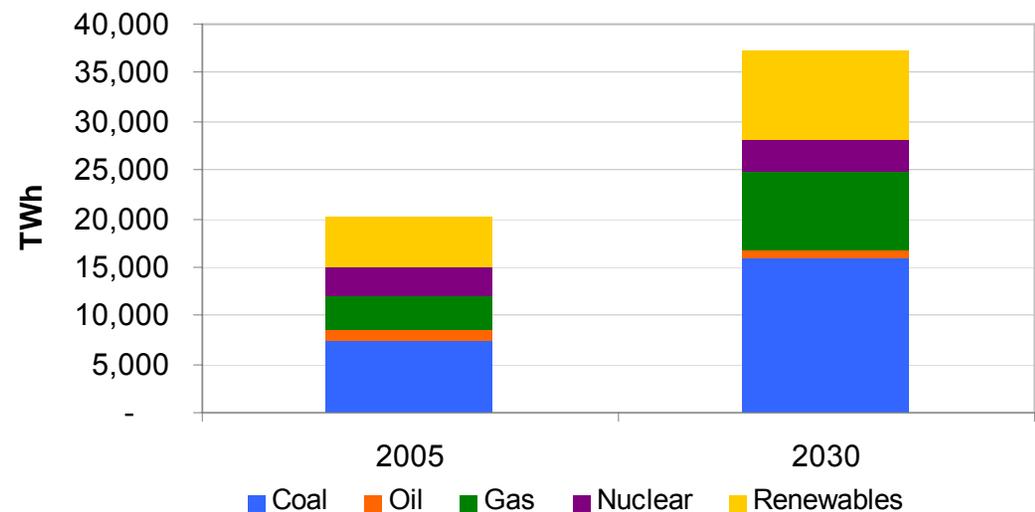
- ◆ **First generation biofuels are not a viable replacement for oil in transportation.**

- Food vs. fuel trade-off.
- Biofuels are projected to grow from only 1% of transport fuels in 2006 to 3.7% in 2030.

- ◆ **Renewables already account for one quarter of electricity generation.**

- Renewables are an important source of electricity for meeting demand growth and providing energy security through diversification.
- Although the use of all forms of renewable energy is projected to increase, the percentage of renewables in the overall electricity generation mix by 2030 is not expected to change.

Role of Renewables in Electricity Generation



Source: IEA

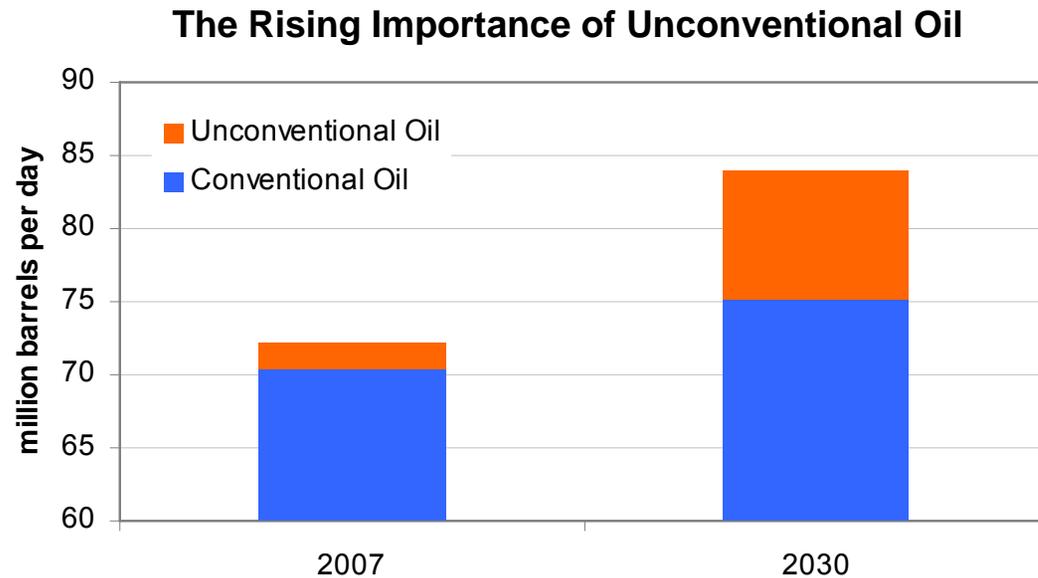
Stimulating and Implementing Alternative Energy

- ◆ **Government support remains critical to the growth and development of alternative energy supplies.**
 - Most renewable energy technologies remain heavily dependent on development incentives (subsidies, tax credits, renewables quotas) for their commercial viability.
 - R&D support and assistance with financing pilot projects for new technologies have been valuable tools for promoting innovation and commercial application of new forms of alternative energy.
- ◆ **Responding to government incentives, the private sector has been actively investing in and developing new alternative energy technologies.**
 - The private sector has been actively trading within the European carbon markets, and have used the existence of carbon prices to launch competitive renewables projects.
 - Private developers are pioneering the application of 2nd-generation biofuels in the United States.

Given the importance of government incentives for the economic viability of alternative energy, policy consistency over the long term is necessary for sustained private investment.

The Role for Unconventional Hydrocarbons

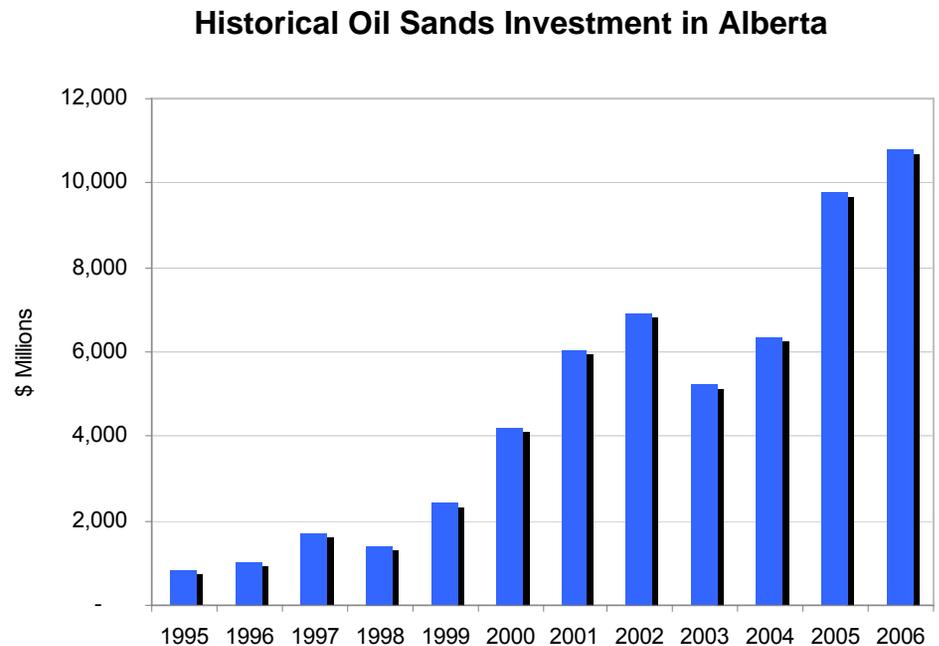
- ◆ **Maturing conventional oil and gas fields and slowing production are raising the importance of unconventional hydrocarbons as a source of energy.**
- ◆ **Some unconventional hydrocarbon technologies still face economic, environmental and technological challenges, which will need to be addressed both by the public and private sectors.**



Source: IEA

Case Study: Unconventional Oil

- ◆ 1.7 trillion barrels of **oil sands** reserves are located in Alberta, Canada.
- ◆ 2 trillion barrels of **oil shale** reserves located in the United States.
- ◆ Oil sands viewed as a “proven” source of oil with access to financing.
- ◆ Oil shale production process is similar, but not yet viewed as sustainable, economically viable technology.
- ◆ By 2011, oil sands will make up 80% of Alberta’s oil production, compared to 30% in 1996.
- ◆ Average annual investment in Canadian oil sands was **US\$10.3 billion in 2005 and 2006**. This level is expected to be maintained over the next 5 years.



Source: Statistics Canada

Case Study: Barriers to Unconventional Oil

- ◆ **The U.S. Unconventional Fuels Taskforce has identified the following high-priority areas:**
 - ***Technology readiness, performance and efficiency***

Oil shale technologies currently have limited scale. Oil sands overcame this problem with significant R&D and demonstration project support from the Canadian government.
 - ***High capital and operating costs***

Long payback periods can be mitigated with favorable taxation and royalty structures.
 - ***Assured markets for products***
- ◆ **Other key project risks and barriers to development include:**
 - ***Socio-economic impacts***
 - ***Regulatory regime***
 - ***Environmental concerns***

Case Study: Promoting Unconventional Oil

- ◆ **To mitigate development risks and enhance availability to financing, a long-term, sustainable approach towards unconventional oil would include:**
 - *Processes for “Proving Up” or Fast-tracking Technologies and Commercialization*
 - *Clear Environmental Regulations*
 - *Government Guarantees and Loan Programs to Mobilize Private-Sector Financing*

Conclusions

Recommendations for UNECE Countries

Governments can encourage the development of sustainable energy technologies and practices by providing investment frameworks that give lenders and strategic investors sufficient comfort to undertake long-term investments.

Such frameworks would incorporate:

- ◆ **Rule of Law: Predictable Regulatory Environment**
- ◆ **Openness to Foreign Direct Investment**
- ◆ **Technology Promotion and Support**
- ◆ **International Cooperation**

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