

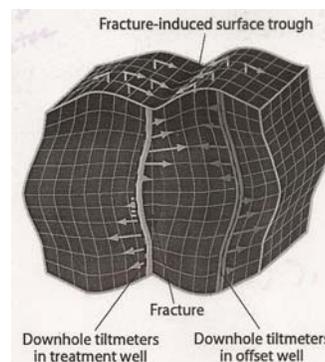
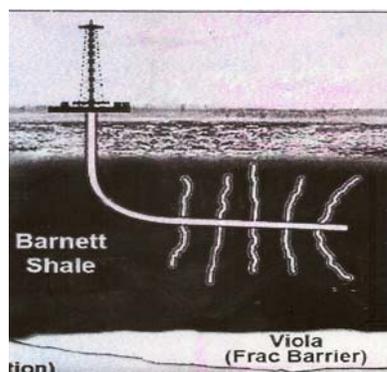
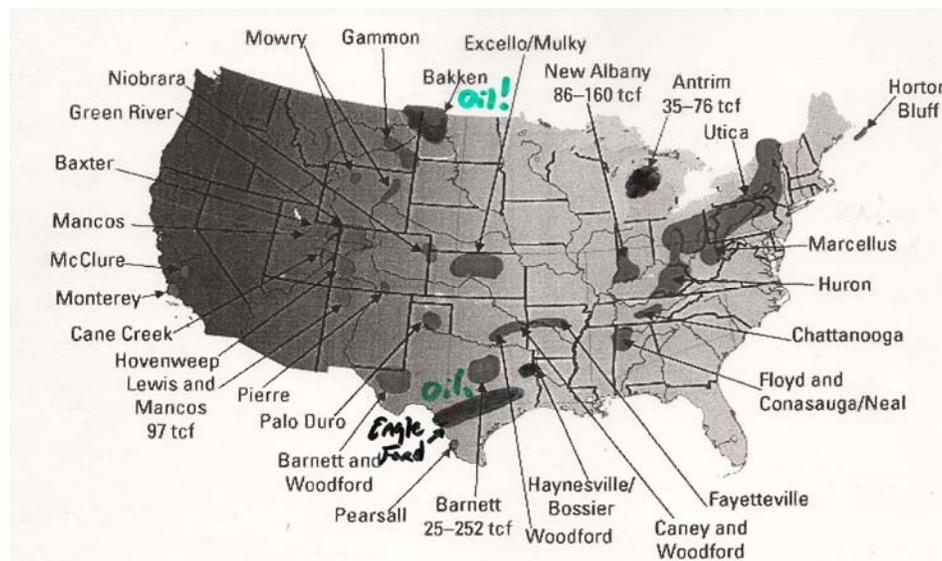
## Career Opportunities in the Energy Sector

The energy sector has seen remarkable changes over the last decade – and most operations have substantial environmental impacts. While working at a law firm or agency would be an ideal job for graduates, the market for graduating attorneys is the worst in at least two decades - so alternatives might be worth examining.

In a recent interview Bill Gates noted that two sectors of the economy have a very bright future and should provide good careers for young graduates: (1) health care, and (2) the energy sector.

Few outside the energy sector realize the opportunities (and wealth) that have been created over the last decade. If you understand these changes you will understand the huge opportunities. Two massive changes – remarkable in fact – have occurred, and both have substantial environmental components:

1. Developments in technology has allowed us to develop low permeability shale formations that a decade ago were considered uneconomic and non-productive of oil and gas by drilling horizontally (instead of vertically) and conducting 'hydraulic fracturing' operations. Each horizontal well will cost \$4 to \$12 million to drill and complete, injecting hundreds of millions into the Texas economy and creating jobs:



These operations can have substantial environmental impacts. Massive amounts of water are injected into the shale formations to ‘fracture’ the formation so the oil or gas can flow back to the wellbore. A massive amount of water is recovered from this operation and the return water can become quite salty. Pipelines have to be built. Drilling wastes must be managed. Air quality and air toxic issues arise. Noise and dust are also issues. Surface owners are usually not pleased with operations near their property. Groundwater can become contaminated.

2. Energy demand from China, India and developing countries is skyrocketing – and our major existing fields are old, depleting, and the ‘cheap oil’ has for the most part been found:

- Energy use and economic growth are closely correlated
- China’s economy has grown at roughly 10% per year for the last decade
- India has grown at roughly 6% per year for the last decade
- China is now the largest energy consumer globally (as of this year)!
- China will account for 1/3 to 1/2 of incremental crude oil demand growth this year!
- China is the largest auto producer in the world (as of last year)!

To get an idea of the long term trends look at these charts:

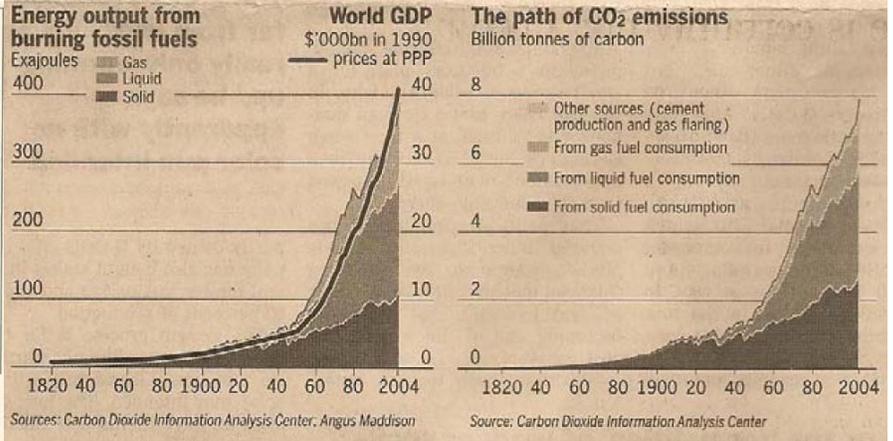
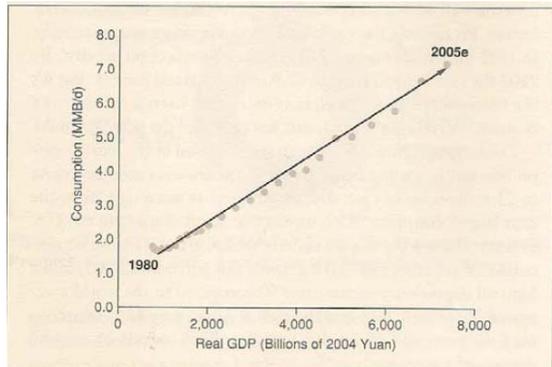
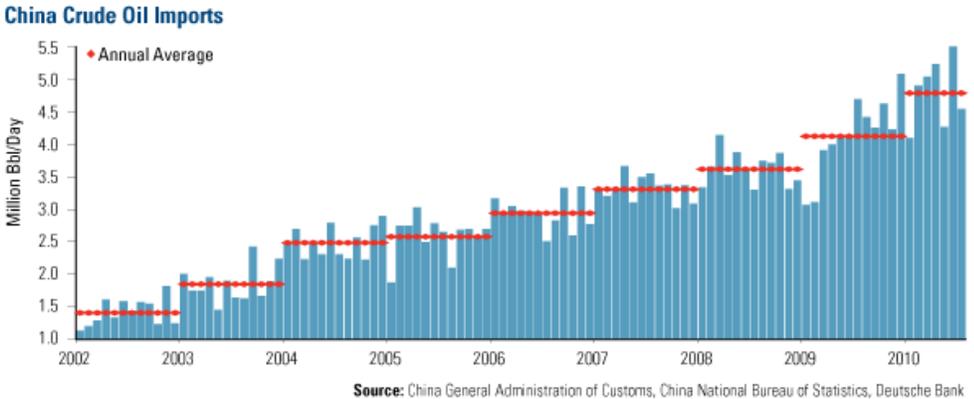
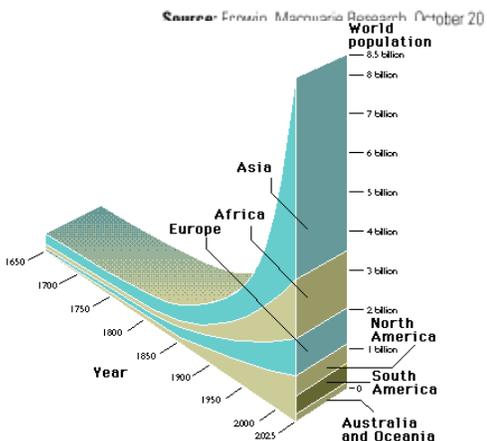
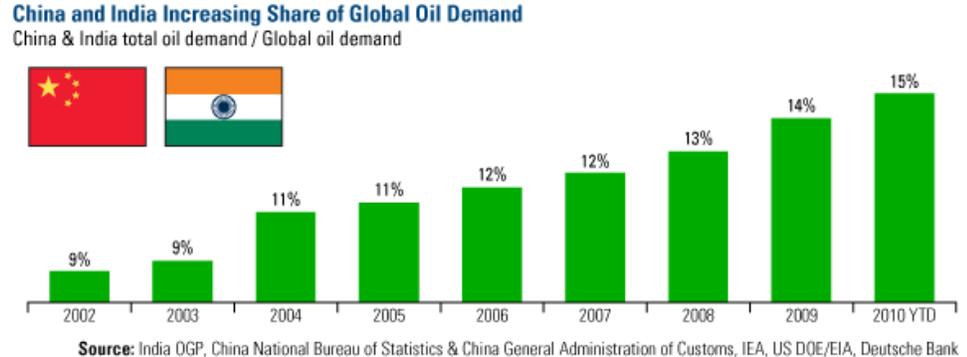
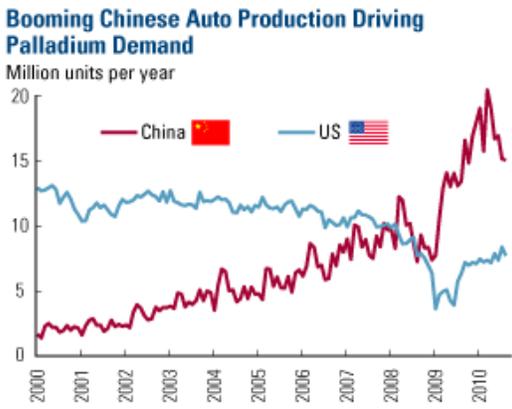
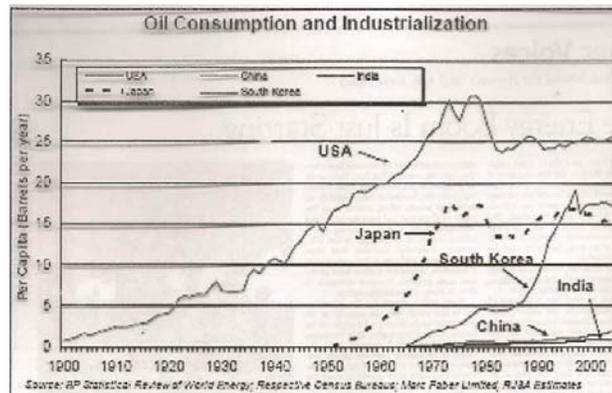


Figure 4.5 Accelerating Growth, Dependency, and Industrialization: China’s Oil Consumption Cross Plotted Real GDP, 1980-2005e (Source: Adapted from IMF World Economic Outlook Database and BP Statistical Review 2005)

Energy is a global market and demand is growing – while supplies have been constrained and existing fields are aging (and depleting). Higher prices allow the development of marginal properties and resources like the tar sands – properties that usually have severe environmental issues that need to be addressed.

As economies develop the per capita use of energy expands in a very robust manner. Note the per capita use of crude oil in India and China versus that of the US and Japan – and you can see a tremendous opportunity for those supplying the global energy markets (or a tremendous problem)! This is also a global agricultural problem – ethanol will use 37% of the corn grown in the US this year!



Due to SEC requirements public companies must disclose ‘material’ environmental liabilities in their periodic financial reports. As such they have an elevated concern about the environmental impact of their operations. Some public companies in the energy sector include the following (note the number of Texas based firms). If the companies are not hiring they probably farm out their legal work – and if you can find the law firms doing their work you might find an opportunity:

**Public Energy Companies - Producers, Pipelines, Refineries, Biofuel**

Larger Oil & Gas Producers:

Stock Symbol	Company	Main Office
APA	Apache Corporation	Houston, TX
DVN	Devon Energy Corpora	Oklahoma City, OK
APC	Anadarko Petroleum	Woodlands, TX
EOG	Eog Resources Inc	Houston, TX
CHK	Chesapeake Energy	Oklahoma City, OK
NBL	Noble Energy Inc.	Houston, TX
PXD	Pioneer Natural Reso	Irving, TX
CLR	Continental Resource	Enid, OK
NFX	Newfield Exploration	Houston, TX
DNR	Denbury Resources	Plano, TX
UPL	Ultra Petroleum Corp	Houston, TX
CXO	Concho Resources Inc	Midland, TX
XEC	Cimarex Energy Co	Denver, CO
RRC	Range Resources Corp	Fort Worth, TX
HK	Petrohawk Energy Cor	Houston, TX
WLL	Whiting Petroleum	Denver, CO
COG	Cabot Oil & Gas Corp	Houston, TX
XCO	Exco Resources NI	Dallas, TX
KWK	Quicksilver Resource	Fort Worth, TX
ATLS	Atlas Energy Inc.	Moon Township, PA
SD	Sandridge Energy Inc	Oklahoma City, OK

Oil Refineries

VLO	Valero Energy Corpor	San Antonio, TX
SUN	Sunoco Inc	Philadelphia, PA
TSO	Tesoro Petroleum Cor	San Antonio, TX
FTO	Frontier Oil Corpora	Houston, TX

Biofuel/Ethanol Producers

GPRE	Green Plains Renewab	Omaha, NE
RTK	Rentech Inc	Los Angeles, CA

Tar Sands/Integrated Oil

SU	Suncor Energy I	Calgary, Alberta
IMO	Imperial Oil Limited	Calgary, Alberta
COP	Conocophillips	Houston, TX
OXY	Occidental Petroleum	Los Angeles, CA
MRO	Marathon Oil Corpora	Houston, TX
HES	Hess Corporation	New York, NY
MUR	Murphy Oil Corporati	El Dorado, AR

email: [jdancy@smu.edu](mailto:jdancy@smu.edu) if you have questions.

Smaller Oil & Gas Producers:

SFY	Swift Energy Company	Houston, TX
CRK	Comstock Resources	Frisco, TX
PVA	Penn Virginia Corpor	Radnor, PA
PQ	Petroquest Energy	Lafayette, LA
TRGL	Toreador Resources	Dallas, TX
GEOI	Georesources Inc	Houston, TX
MHR	Magnum Hunter Resour	Houston, TX
EPM	Evolution Petroleum	Houston, TX
CXPO	Crimson Exploration	Houston, TX
IOC	Interoil Corp	Houston, TX

Pipelines

ENB	Enbridge Inc	Calgary, Alberta
WMB	Williams Companies	Tulsa, OK
EP	El Paso Corporation	Houston, TX
UGP	Ultrapar Participaco	Houston, TX
STR	Questar Corporation	Salt Lake City, UT
WPZ	Williams Partners	Tulsa, OK
PAA	Plains All American	Houston, TX
OKS	Northern Border Part	Tulsa, OK
BWP	Boardwalk Pipeline	Owensboro, KY
MMP	Magellan Midstream	Tulsa, OK

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Last, try to find a job that you find interesting and challenging that will develop your skills – that way you will put in the hours but will never have to ‘work’.