WORLD ENERGY RESOURCES MARKETS OVERVIEW AND DEVELOPMENT TRENDS

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Subject 1. General description of mineral and fuel resources

- **Natural resources** - resources supplied by nature, not by men
- **Mineral resources** - natural resources in the form of minerals
- **Energy resources** – all main fuels: oil, natural gas, coal etc. + uranium resources
- **Fuel energy resources** – include only fossil fuels

Features of fuel resources markets

- Fuel resources are non-renewable
- Resources are limited
- Uneven placement of fuel resources and mining industries
- High degree of concentration and monopolization of production and marketing

- International associations of producers and consumers play a large part in the market
- Rental principle in pricing and considerable role of direct fuel price regulations
- Political and economic problems in fuel production, consumption and international trade

Total resources

- **Discovered** or **undiscovered**
- **Commercial** (recoverable) or **non-commercial** (unrecoverable)
- **Initial** or **remaining**

Discovered or **undiscovered** categories of resources

- **proved** or estimated - estimated with degree of accuracy up to ± 20% judging by results of analysis of samples in wells (in Russia – category A)
- **probable** or contingent resources - quantities of petroleum which are estimated, on a given date, to be potentially recoverable from known accumulations, but which are not currently considered to be commercially recoverable (in Russia category B)
- **prospective** - resources which are estimated, on a given date, to be potentially recoverable from undiscovered accumulations (in Russia categories C1 and C2)

Commercial (recoverable) and **non-commercial** (unrecoverable)

Commercial – only part of potential resources, which may be recoverable at existing price levels and technology

Initial or **remaining**

Remaining (current) reserves = initial reserves – cumulative production

Fuel reserves – proved, recoverable and remaining part of resources from known accumulations

Oil security

(or reserves-to-production ratio)

Oil security (years) = V commercial reserves / average annual production level

Reserves-to-production (R/P) ratio – the length of time that remaining reserves would last if production were to continue at that level

The role of new technologies in fuel markets

Positively (increases supply)

- Advanced technology permit to develop previously noncommercial wells
- Geological exploration works and extraction in previously inaccessible places
- New consuming industries

Negatively (relatively decreases consumption)

- Non-waste technology of oil processing (continuous factor)
- Energy-saving technologies
- Production of substitute goods
- Alternative energy and recycled raw materials usage

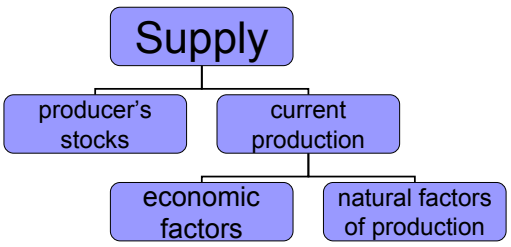
Factors affecting oil security

- Volume of production or extraction
- Fuel price level
- Developments of geological exploration
- Technological developments

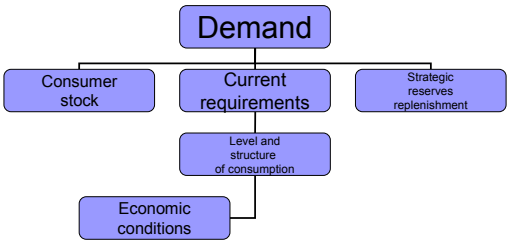
Economic factors

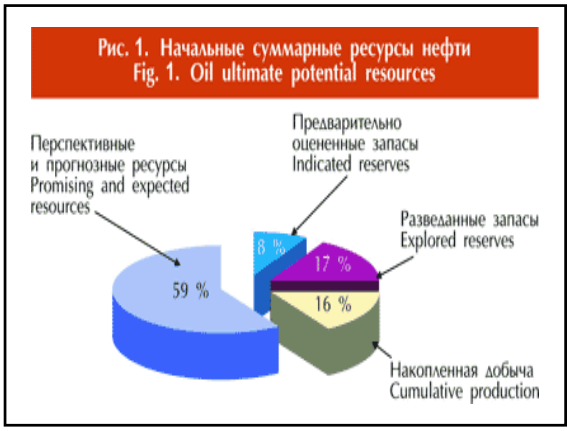
- Technology progress in prospecting and extraction
- Phase of business cycle
- State regulation (direct or indirect)
- Inflation processes
- Monopoly regulation (production, price and marketing policy)
- Transportation conditions

Main factors affecting fuel market's supply

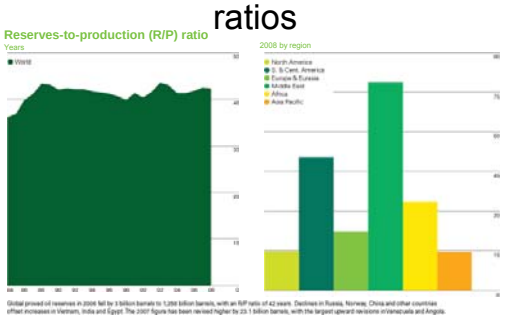


Demand factors on fuel markets





Oil reserves-to-production (R/P) ratios



1. Characterization and evaluation of the nature of oil market conditions.

- The second half of XX century. In the structure of fuel and energy consumption there have been major changes. In the 50's and 60's. to replace coal in phase of the World Energy history oil and gas come. But since the 70s share of coal, oil and gas in primary energy consumption were changed significantly.
- According to the forecast, the share of all these major energy sources will be reducing - up to 76% by 2020. Reduce the proportion of these energy resources occurs due to an increase in energy consumption in nuclear and hydropower. Share of coal, oil and gas in primary energy consumption changes little.

Energy resource	1970	1980	1990	2010
Coal	25,32	24,04	23,85	24,43
Oil	**37,97**	**38,46**	**39,23**	**33,46**
Natural gas	21,52	19,23	21,54	24,26
Nuclear energy	0,5	2,88	3,85	6,53
Waterpower	3,3	4,81	3,85	6,3
Others	11,39	10,58	7,68	5,02

World proved oil reserves at end 2010

BP, 2010

Characterization and evaluation of the nature of oil market conditions

- Oil, despite a slight decline of its share in energy balance remains at the beginning of the XXI century. Leading source of energy. Capacity share of oil in the structure of energy consumption occurred until the early 80s. Subsequently, however, this share gradually reduced, and in the period until 2020 can expect it tofurther reduction in consumption of energy.
- At the beginning of the XXI century, oil remains the world's most important energy resource and a major in international trade. At the same time oil is a finite resource and at the current level of production world supply of oil is about 60-70 years.
- The world oil market is traditionally characterized by a high degree of monopolization: the 18 largest oil companies about 60% of global oil production, but only 5 of them are private companies, and the rest - the state.

Characterization and evaluation of the nature of oil market conditions

- Characteristically, the biggest oil producing state companies tend to have significantly higher levels of availability of oil reserves, while the major private level of security companies is 8-13 years, which is from their point of view of cost, more reasonable.
- On the world market annually sold about half of total oil. Such a significant involvement of the oil industry in international economic relations due to the fact that the main regions of oil production and oil consumption geographically do not coincide, since almost all developed countries do not have major geological reserves of this fuel.
- The depletion of oil reserves, the demand for alternative fuel – biological, environmental degradation and extreme meteoyavleniya caused by climate change – all in the complex creates huge problems for foodin the world.

2. The state oil resource base.

- Oil resources - it "Oil iceberg" the visible part of which - the proved and probable stocks that make up the assets of the oil companies; they accounted for at cost in accordance with standard procedures (U.S., UK) and to a large extent determine the level of capitalization companies.
- A huge resource base of non-uniformity - Only 1% of deposits in the world is 75% of the total oil reserves. 2

Country	Reserves
1 Saudi Arabia	**264,6**
2 Venezuela	**172,3**
3 Iran	**137,6**
Iraq	115,0
Kuwait	101,5
UAE	97,8
Russia	**74,2**
Libya	44,3
Kazakhstan	39,8
Nigeria	37,2
Canada	33,2
USA	28,4
Qatar	26,8
China	14,8
Angola	13,5
Total World	**1333,1**

Tab. 2. Countries with largest oil reserves 2010. (billion barrels). 1

1 "The economic problems of the energy complex" K.N. Milovidov

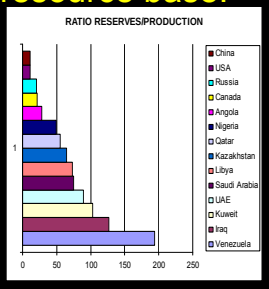
THE STATE OIL RESOURCE BASE

country	Reserves 2010 (billion barrels)		Reserves 2000 (billion barrels)
Saudi Arabia	**264,6**		**275,2**
Venezuela	**172,3**	**80,5**	
Iran	**137,6**		**97,5**
Iraq	115,0		**177,8**
Kuwait	101,5		**102,4**
UAE	97,8		**102,4**
Russia	**74,2**		**58,7**
Libya	44,3		37,7
Kazakhstan	39,8		no data
Nigeria	37,2		30,4
Canada	33,2		9,5 (1,30 billion.tons)
USA	28,4		22,8
Qatar	26,8		13,8
China	14,8		25,1
Angola	13,5		5,6 (0,77 billion.tons)
Total World	**1333,1**		**1121,4**

Tab. 5. Summaries of world oil reserves in 2000 and 2010.

2. The state oil resource base.

Country	Number of years
1Venezuela	194
2 Iraq	127
3 Kuwait	112
UAE	103
Iran	89
Saudi Arabia	75
Libya	73
Kazakhstan	65
Qatar	55
Nigeria	49
Canada	28
Angola	21
13 Russia	20,1
USA	11
China	11



6 BP Statistical Review of World Energy 2010

Chart 2. How many years have enough oil (reserves / production) 6

Proved oil reserves by countries in the world 2010

country	Thousand tons	Share of total
world	192,2	100
US	3,7	2,4
Canada	4,4	2,3
Mexico	1,6	0,9
Total North America	9,7	5,6
Argentina	0,4	0,2
Brasil	1,7	1,0

continuation

Ecuador	0,5	0,3
Peru	0,2	0,1
Trinidad & Tobago	0,1	0,1
Venezuela	14.3	7.0
Total S.&Cent.America	17,6	9,8
Saudi Arabia	36.3	21.3
Iran	19.0	11.2
Iraq	15.5	9.3
Kuwait	14.0	8.2
United Arab Emirates	13.0	7.9
Qatar	2,9	2,2
Oman	0,8	0,4
Syria	0,3	0,2
Yemen	0,3	0,2
Total Middle East	102	59,9
Azerbaijan	1,0	0,6

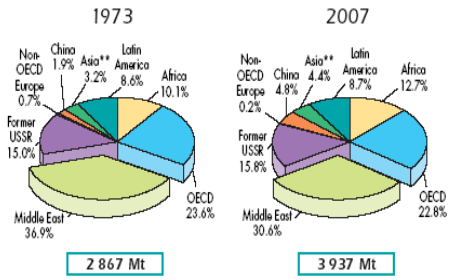
continuation

Norway	0,9	0,6
Russia	**10.9**	**6.4**
Kazakhstan	5.3	3.2
Denmark	0,1	0,1
Italy	0,1	0,1
United Kingdom	0,5	0,3
Total Europe & Eurasia	19,2	11,3
Libya	5.4	3.3
Nigeria	4.9	2.9
Algeria	1,5	1,0
Angola	1,8	1,1
Sudan	0,9	0,5
Chad	0,1	0,1
Egypt	0,6	0,3
Gabon	0,4	0,3
Republic of Congo	0,3	0,2
Equatorial Guinea	0,2	0,1

continuation

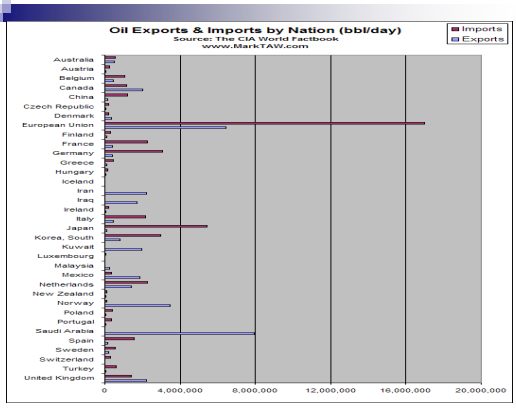
Total Africa	16,6	10,0
Australia	0,5	0,3
Brunei	0,1	0,1
China	2,1	1,2
India	0,8	0,5
Indonesia	0,5	0,3
Malaysia	0,7	0,4
Vietnam	0,6	0,4
Other Asia Pacific	0,1	0,1
Total Asia Pacific	5,5	3,3

1973 and 2007 regional shares of crude oil production



Producers of crude oil, 2010

Producers	Mt	%
World	**3 937**	**100.0**
Russia	**487**	**12.4**
Saudi Arabia	483	12.3
United States	320	7.9
Islamic Rep. of Iran	215	5.5
People's Rep. of China	189	4.8
Mexico	169	4.4
Canada	154	4.0
Venezuela	134	3.5
Kuwait	132	3.5
United Arab Emirates	131	3.3



Demand for petroleum products

	Global demand mb/d					Growth rates % p.a.		Shares %	
	2009	2015	2020	2025	2030	2009–2015	2015–2030	2009	2030
Light products									
Ethane/LPG	8.5	9.0	9.4	9.7	10.1	1.1	0.7	10.0	9.5
Naphtha	5.5	6.2	6.9	7.7	8.4	2.1	2.1	6.5	8.0
Gasoline	21.2	22.4	23.4	24.2	25.0	0.9	0.7	25.1	23.7
Middle distillates									
Jet/kerosene	6.3	6.8	7.2	7.6	8.0	1.3	1.1	7.4	7.6
Gasoil/diesel	24.3	27.4	29.8	32.0	34.1	2.0	1.5	28.7	32.4
Heavy products									
Residual fuel*	9.5	9.4	9.4	9.2	9.1	-0.1	-0.2	11.2	8.6
Other**	9.3	9.8	10.2	10.5	10.7	0.7	0.6	11.1	10.1

Источник: World Oil Outlook 2010

Oil and gas complex

Table 1. Elemental composition of oil from different fields (%)

Field	Density, g/cm3	C	H	S	N	O	Ash
Ukhta (RF)	0,897	85,30	12,46	0,88	0,14	-	0,01
Grozny (Russia)	0,850	85,95	13,00	0,14	0,07	0,74	0,10
Suruhanskoe (Azerbaijan)	0,793	85,34	14,14	0,03	-	0,49	-
California (USA)	0,912	84,00	12,70	0,40	1,70	1,20	-

Oil and gas complex

CHINA

•This year it is expected that demand for oil in China will increase immediately by 10% - up to 370 million tonnes.
•By 2020, oil imports in China is expected to reach 450 million tons.
CHINA'S INTERESTS
•As an importer of energy resources, China is in an unenviable position. It is critically dependent on the Persian Gulf, where the lion's share of energy is purchased. Route for oil from this region is long, includes a passage through the few sea straits are controlled by other states. Moreover, Persian Gulf is controlled by United States besides Iran. United States are the strategic competitor of China because of which it's difficult for Chinese companies to get minig rigths in this region.

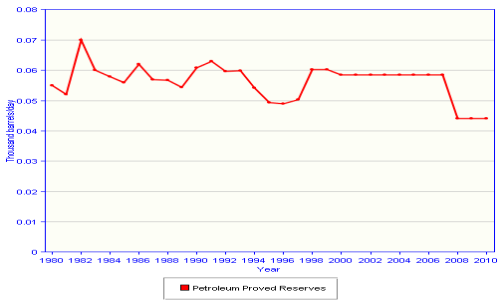
Subject 2.

Development trends of main types of fuel resources

The world's largest companies

Market Cap ($bn)		Company
371	1	Exxon Mobil
362	2	General Electric
281	3	Microsoft
238	4	Citigroup
233	5	BP
211	6	Bank of America
211	7	Royal Dutch/Shell
196	8	Wal-Mart Stores
196	9	Toyota
196	10	Gazprom
196	11	HSBC
190	12	Proctor & Gamble
189	13	Pfizer
183	14	Johnson & Johnson
175	15	Saudi Basic Industries

Source: Financial Times 31 March 2006



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