Elmar Altvater

International Conflicts at the End of the Fsil Energy Regime

Mexico D.F., Nov. 2005

- Why is oil indispensable?– The Energy-Regime and its Coherence
  - The Congruence of Fosslism und Capitalism
  - Time and Space Compression
  - Fuelling Growth
- The Limits of the Availability of Oil: „Peakoil“
  - The Disputes on the Reach of Oil Reserves
  - Geo-economic and geo-political conflicts on the Access to Oil: Oil-Imperialism
- Greenhouse Earth and the Misery of Global Climate Policy
  - Katrina, Rita, Stan and Wilma etc. and the costs of the Warming-up of the Atmosphere
  - The Insufficiencies of the Kyoto-Protocol
  - Conflict Preparations: The Pentagon Scenario
- The only Exit: Opening the Energy System by Establishing a Solar and Solidary Economy Based on Renewable Resources

The Great Transformation in the fossil-industrial Revolution of the Late 18th Century: The **„Trinity“** of

1. Fossil Energy and adequate Technologies, to transform them into useful labour (Nicolas Georgescu-Roegen)
2. Money, Capital, and the Social Forms of a Capitalist Society (Karl Marx)
3. The „European Rationality of World Domination“ (Max Weber) and:
4. The „Great Transformation“ to a Market Economy, disembedded from the Society (Karl Polanyi)

This **Trinity** is Responsible for the historically Unique Dynamics of Capitalist Societies

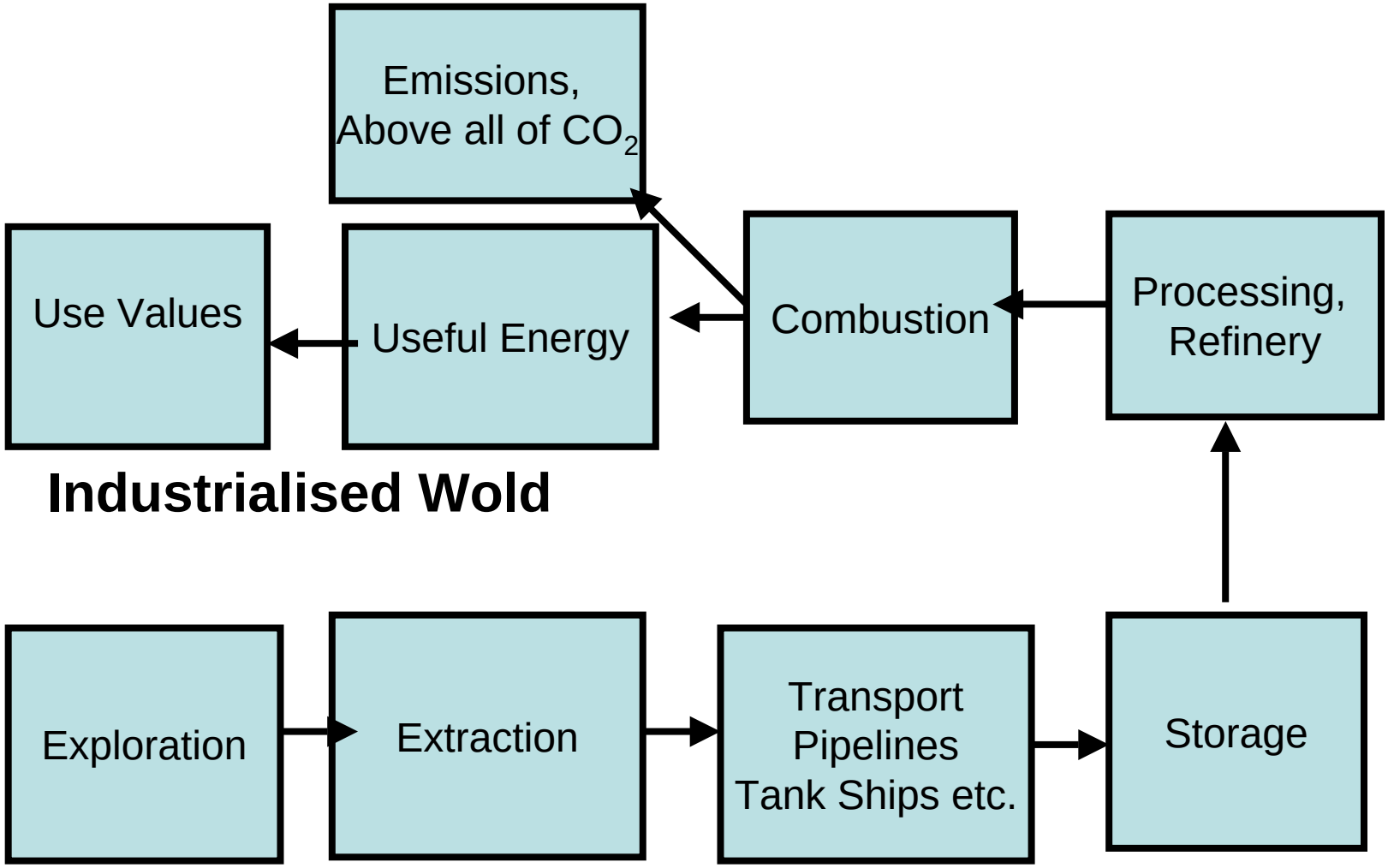
Compression of Time and Space

- Independence of fossil fuels on space
  - Simple Transportation
  - Decisions on Locations independent on the local availability of energy
- Independence on time
  - Fossil fuels can be used at day and at night, independent on seasons
- Their potential of acceleration
  - Acceleration of processes is increase of productivity (more products in less time)
  - This is the “mission” of modern capitalism (Marx&Engels), the prerequisite of an increase of the “Wealth of Nations” (Adam Smith)
- The potential of concentration of capitalist production
- The potential of miniaturisation (Electromotor)
- The potential of flexible use
- The Annihilation of time and space is independence on nature

The Consequences for the **Societal Relation of Human Beings to Nature**

- **Industrialisation and Urbanisation become dominant models of development in all parts of the world**
  - Eric Hobsbawm (in: „Times of Extremes“): The only Revolution in the 20th Century is the Disappearance of the Farmer. First Time in History less than 50% of the World Population are working in Agriculture
  - The Increase of Productivity; the Multiplication of Productive Forces
- The Emergence of a Difference between **natural riches** (of raw materials) and the „**Wealth of Nations**“
  - The **Ideology of Free Trade** is the predominant Model and Promise of Wealth Increase; it is beneficial for the powerful and the rich: Friedrich List, Chan etc.
  - The **Automobile** and the Privatisation of Mobility
- The Increase of Destructive Forces;
  - The changing Character of Wars

The global Energy-chain: From Extraction to Emissions



Oil countries

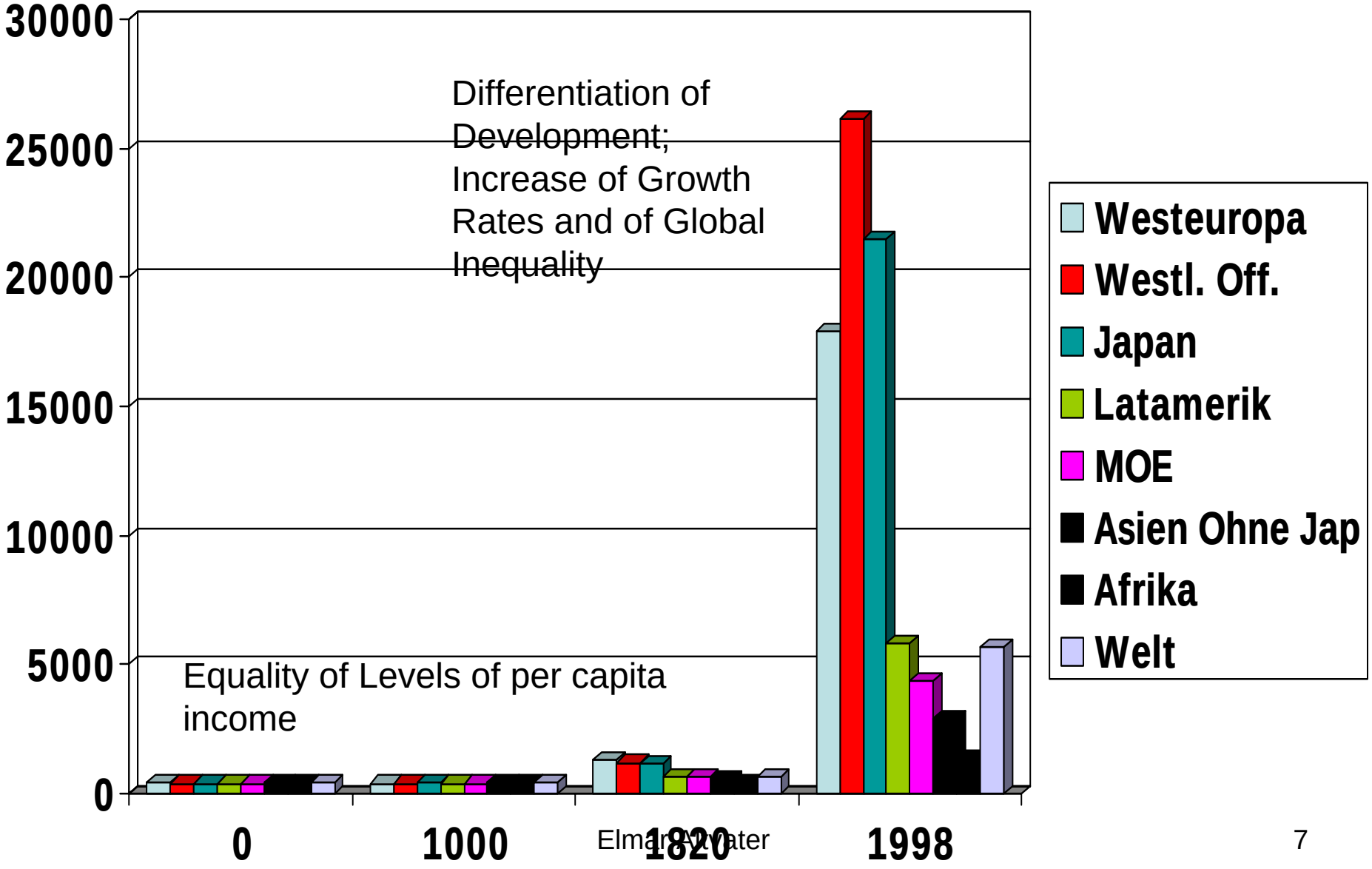
Free Trade

→ Deepening and Widening of the Division of Labour
→ Increase of Productivity
→ Due to the massive use of Fossil Energy

And:

→ The Fossil Energyregime makes possible a decisive Increase of Economic Growth Rates
→ This is the Basis of the Emergence of a Growth Discourse Predominant in Academic as well as Political Discourses

Per-Capita-Income; World and most Important Regions
(in 1990 International Dollars)
Source: Maddision, Angus (2001): The World Economy – A Millenial Perspective, (OECD) Paris: 28



The Centrality of the Growth-Discourse

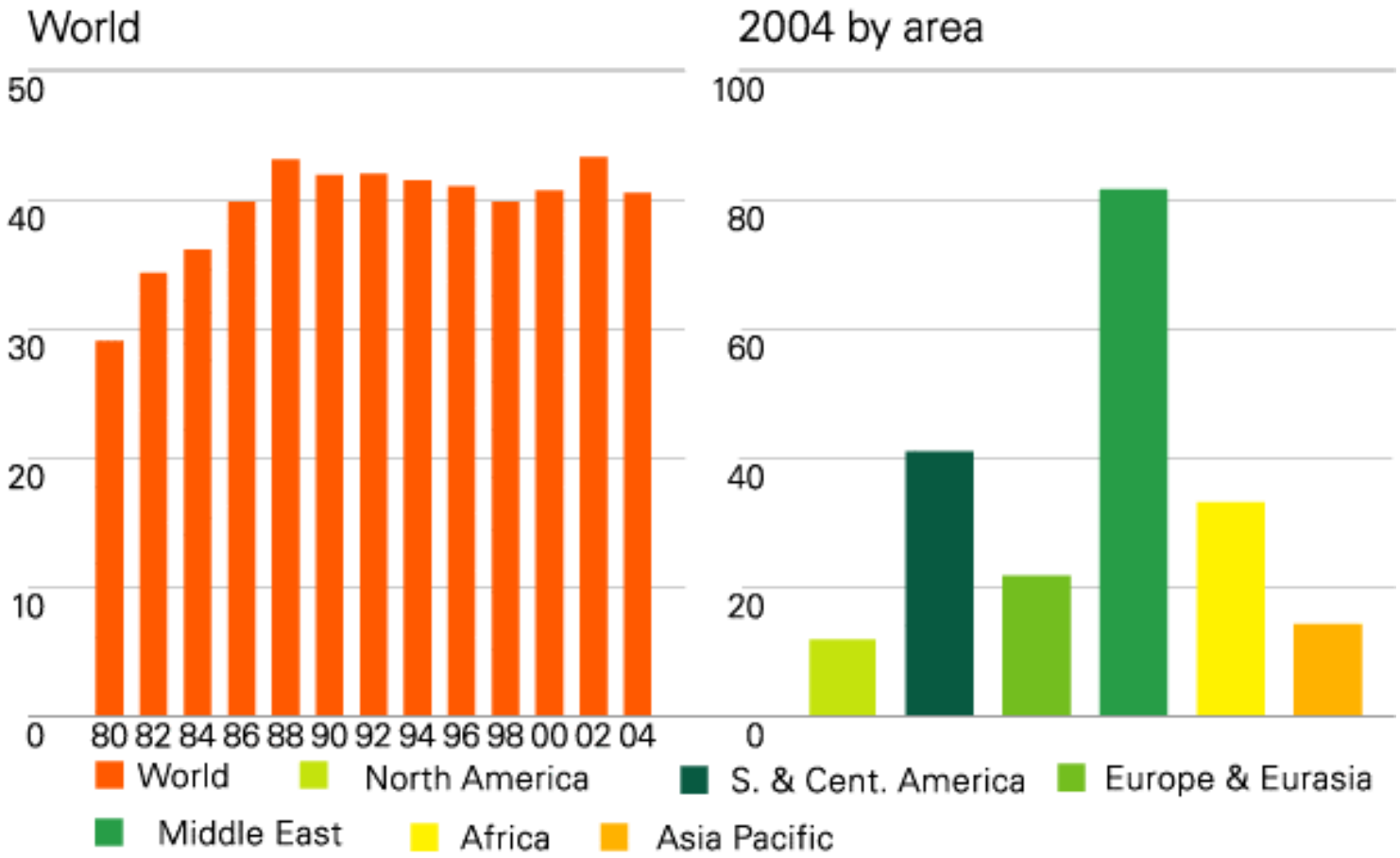
- In Classical Political Economy not Growth but Distribution (Wages, Profits, Rent, to a minor extent also Interest) was the Central Concern
  - Increase of Welfare by Increasing Productivity and Distribution of Wealth
  - The „neoclassical“ Revolution (von Menger, Jevons, Walras et al) of individualistic maximisation of the satisfaction of needs
  - John St. Mill and the value of contemplation
  - Marx and the accumulation and crises of capital
- The emergence of the growth discourse in the early Soviet Union: The role of economic planning
- The Importance of Keynesian Economics for the growth discourse since the 1930s, particularly after World War II
  - The central importance of the block-competition: catch up and overhaul
- Today growth is **a fetish**, a cure for every problem in the world
  - The World Bank: „Growth is good for the Poor“
  - Governments: Growths creates jobs
  - Business: Growth improves Competitiveness
  - Political Parties: Growth facilitates the Fiscal Crisis of the State…etc.

The Limits of Supply of Fossil Energies

- The static Reach: Estimated Reserves, divided through current concumption
  - Oil reserves ca. 165 bn t, Annual Consumption ca. 4 bn t, Reach ca. **43 years**
  - Gas Reserves ca. 155.673 bn cbm, Reach ca 45 years
  - Coal: Reach is substantially larger
- The Dynamic Reach: Estimated Reservesn divided through estimated increasing Consumption
- Annual Increase of Consumption between 1992 and 2001
  - Oil: 15,2%
  - Mineral Gas 20,3%
  - Coal 5,4%
  - The Dynamic Reach is shorter than the static reach

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

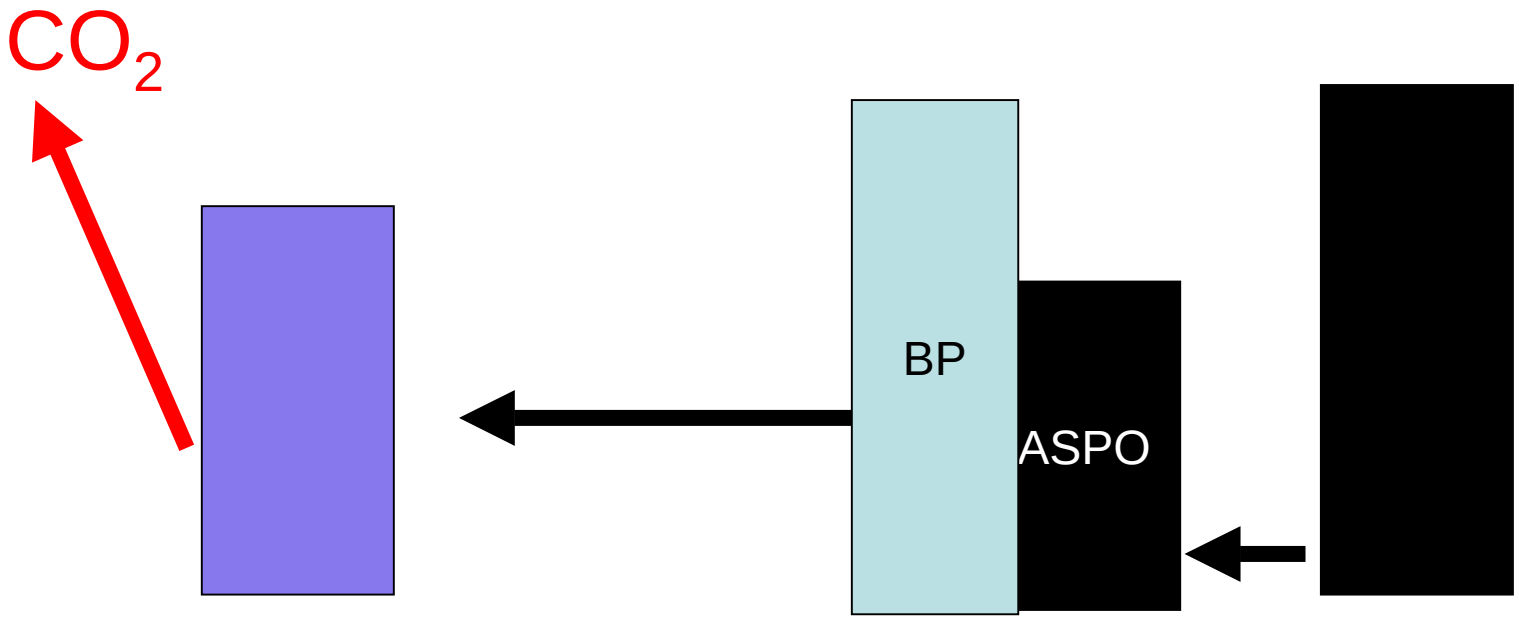
Daten von BP



The world's oil reserves-to-production ratio fell to 40.5 years in 2004, down from 43.3 in 2002. Reserves have continued to increase and now stand 17% above the 1994 level; production is 20% higher.

Already (in the past) consumed and (for the future) secure Reserves

Figures from BP und ASPO



Until 2005 already consumed:
944 bn Barrel

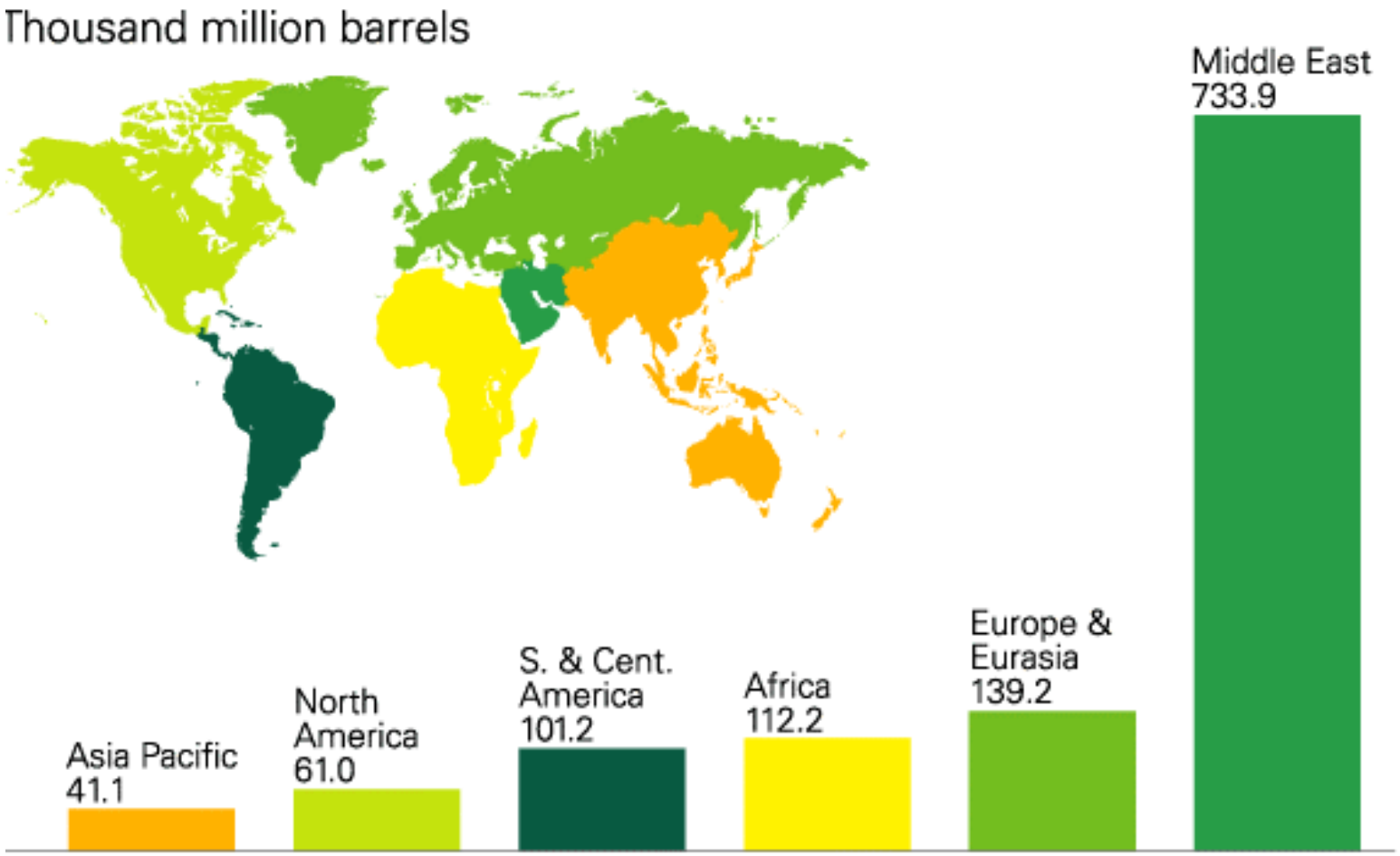
Secure Reserves
748 bn Barrel (ASPO)
1148 bn Barrel (BP)

Unsecured Reserves:

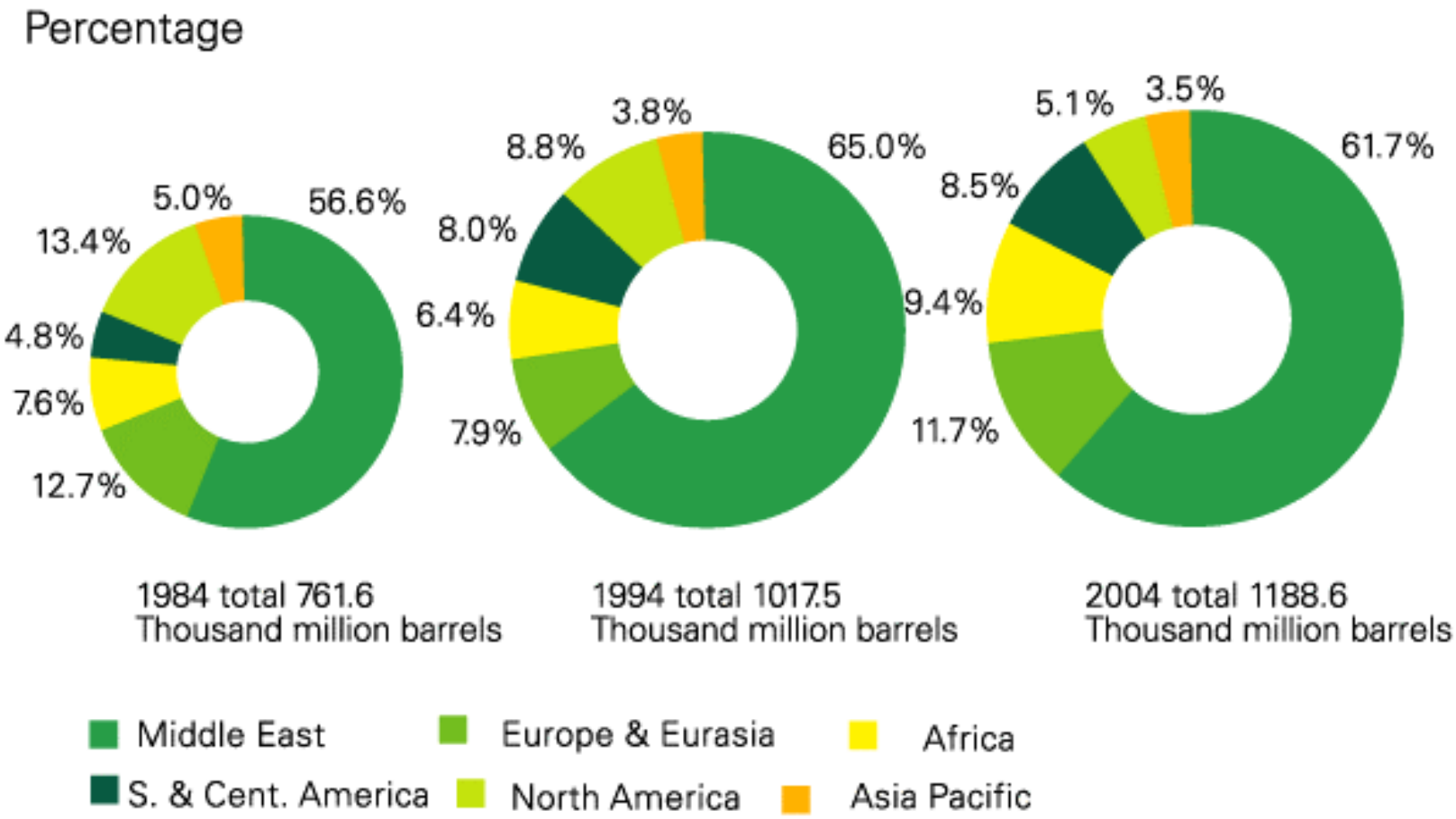
?

Data from BP

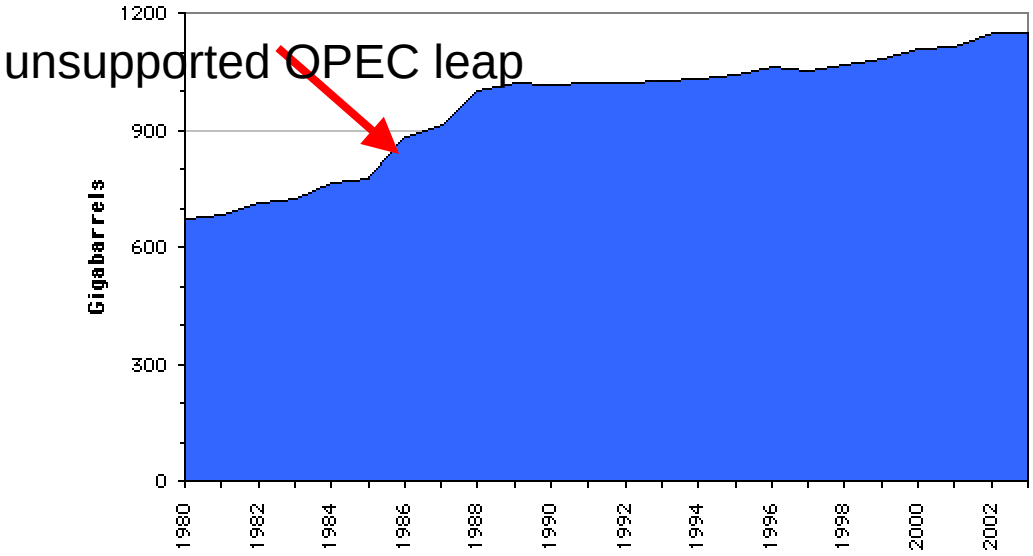
Proved oil reserves at end 2004



Distribution of proved (oil) reserves 1984,1994, 2004



R2. Proved Reserves of Oil (world) BP Statistics

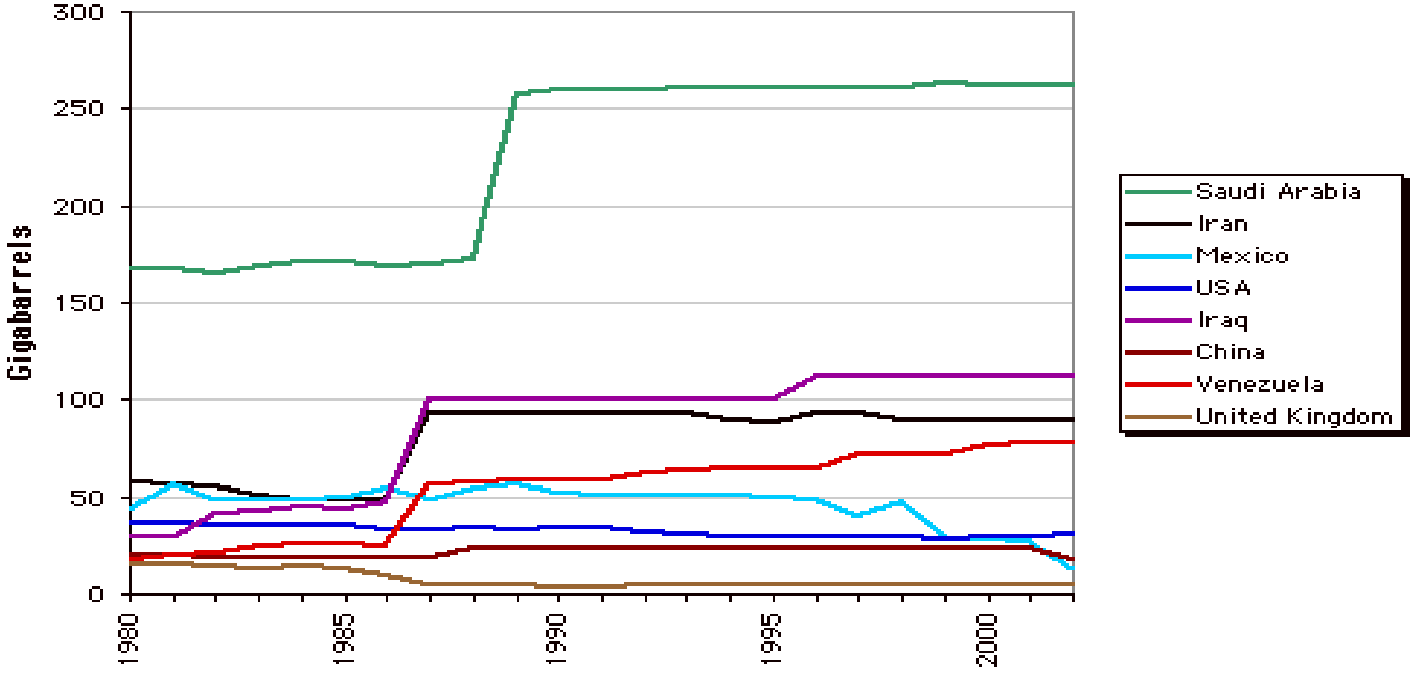


The BP statistics for the world's proved reserves of oil are unrealistic, showing the unsupported OPEC leap in the 1980s and a steady increase despite years when consumption was greater than discovery.

Source: BP

Close Window

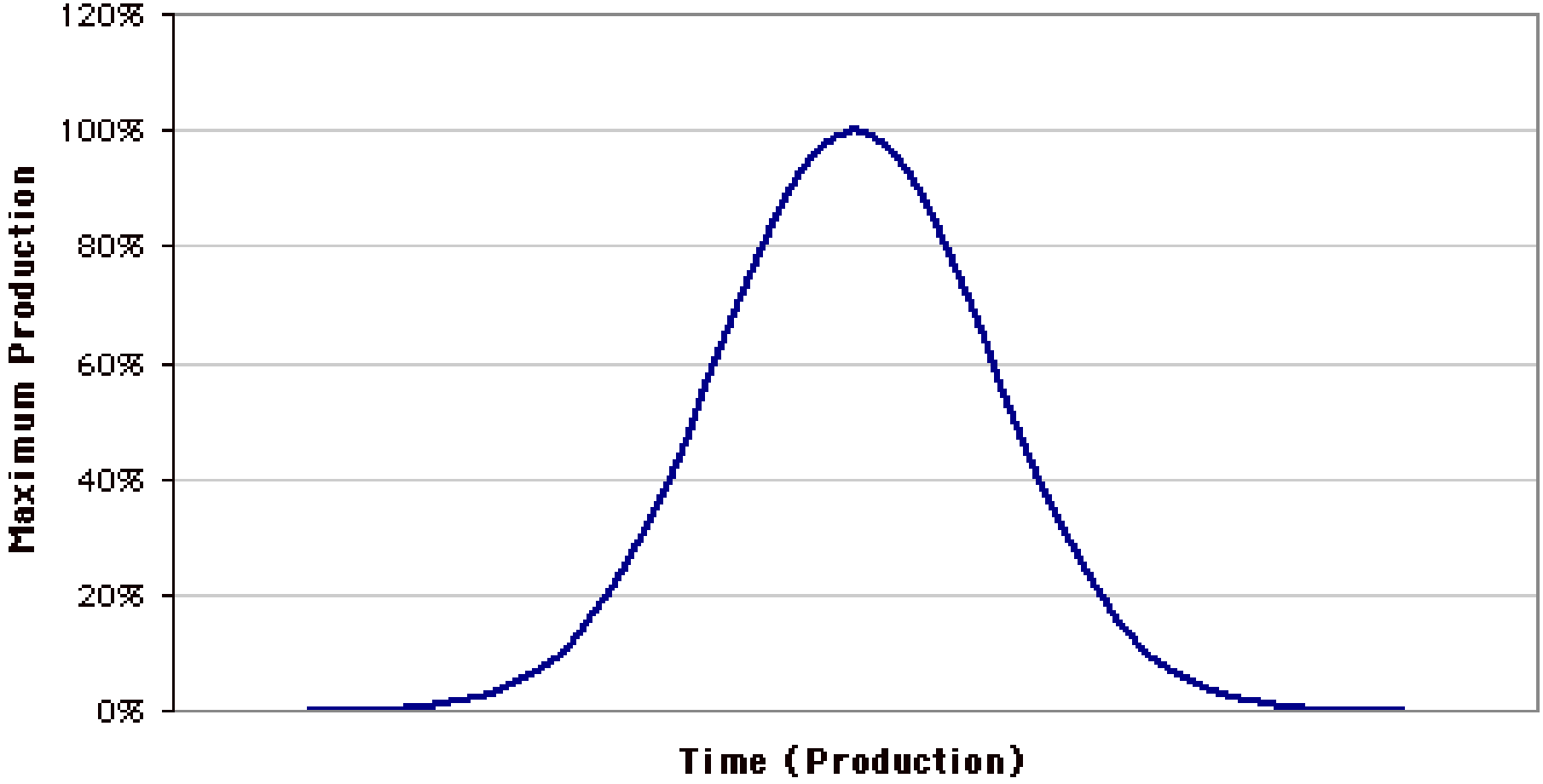
Creative Bookkeeping on Oilreserves: The Case of OPEC-Countries

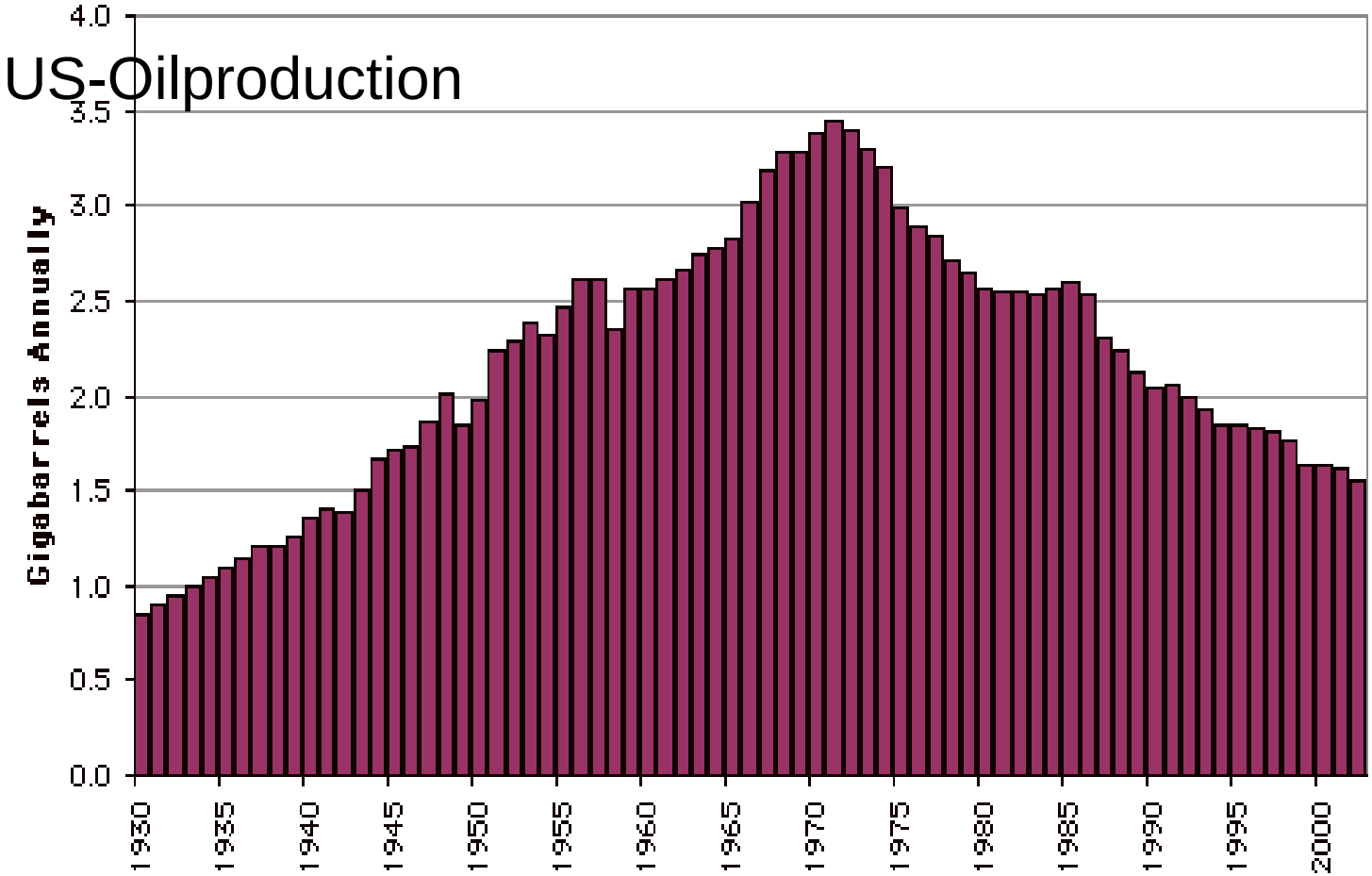


In the 1980s, OPEC's declared reserves jumped without any new discoveries due to attempts to increase the countries' quotas. This chart compares the reported reserves of some OPEC countries against some non-OPEC countries, showing this 'cooking of the books'.

Source: BP

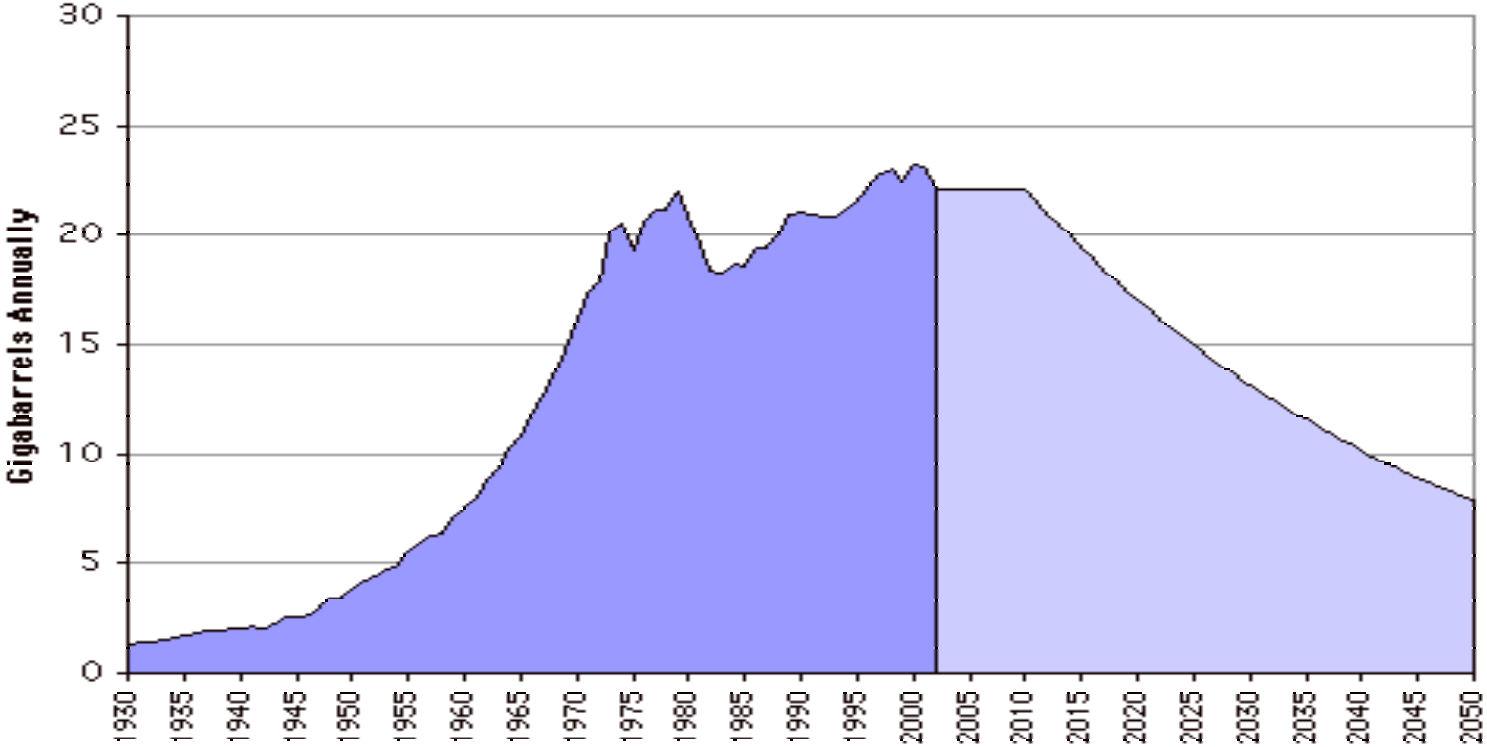
The „Hubbert-Curve“ or „Peakoil“: The Decrease of the Relation between Extraction and Newly Explored Reserves





Because the USA (excluding Hawaii and Alaska) has been producing longer than anyone else, largely unaffected by external matters, it shows the Hubbert Curve better than anywhere else. You can see that production has been declining since the 1970s and, despite the efforts of the richest, most technologically advanced society in the world, has not been stopped.
Source: ASPO

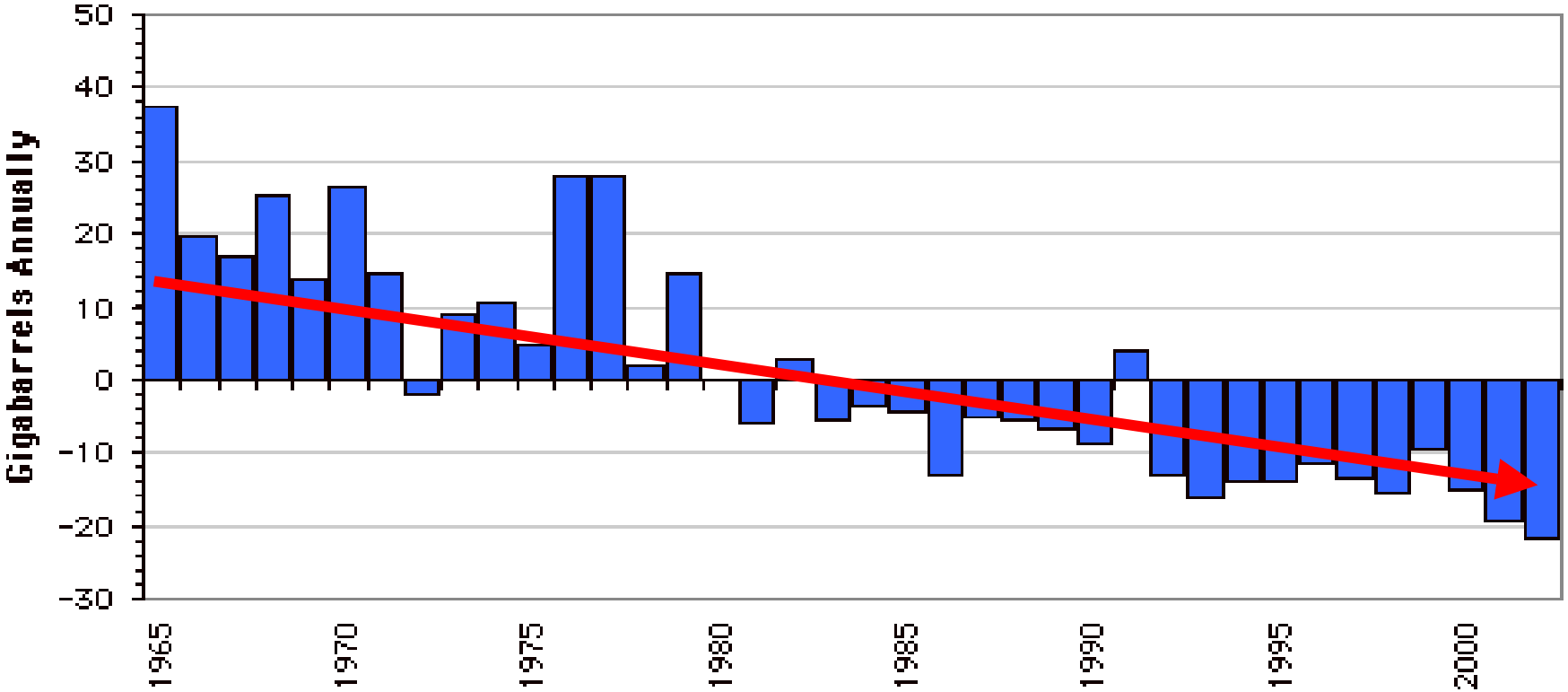
P5. Oil Production (world) 1930-2050



This chart shows world oil production up until 2002 with ASPO's predictions of what might occur afterwards. After a plateau, it is expected to drop away (although it won't be as smooth as shown, of course). The comparisons with the Hubbert Curve are clear until the 1970s when the OPEC-induced oil crisis messed up the slope.

Source: ASPO

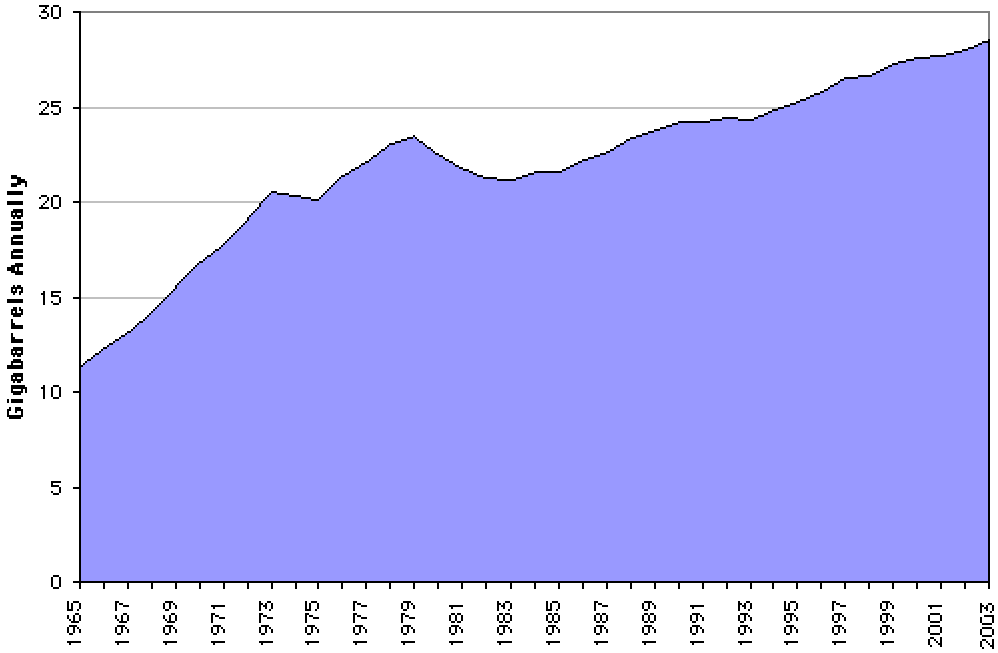
Oil Discovery minus Consumption (world)



The really important statistic about discovery is shown here as the difference between what the world discovers and what it consumes. Until 1980 (with the exception of 1972), we had been discovering more than we used. Since then, the trend has gone into negative and we are eating away at our stores of oil. As discovery is expected to continue to fall and consumption rise, it can only get worse.

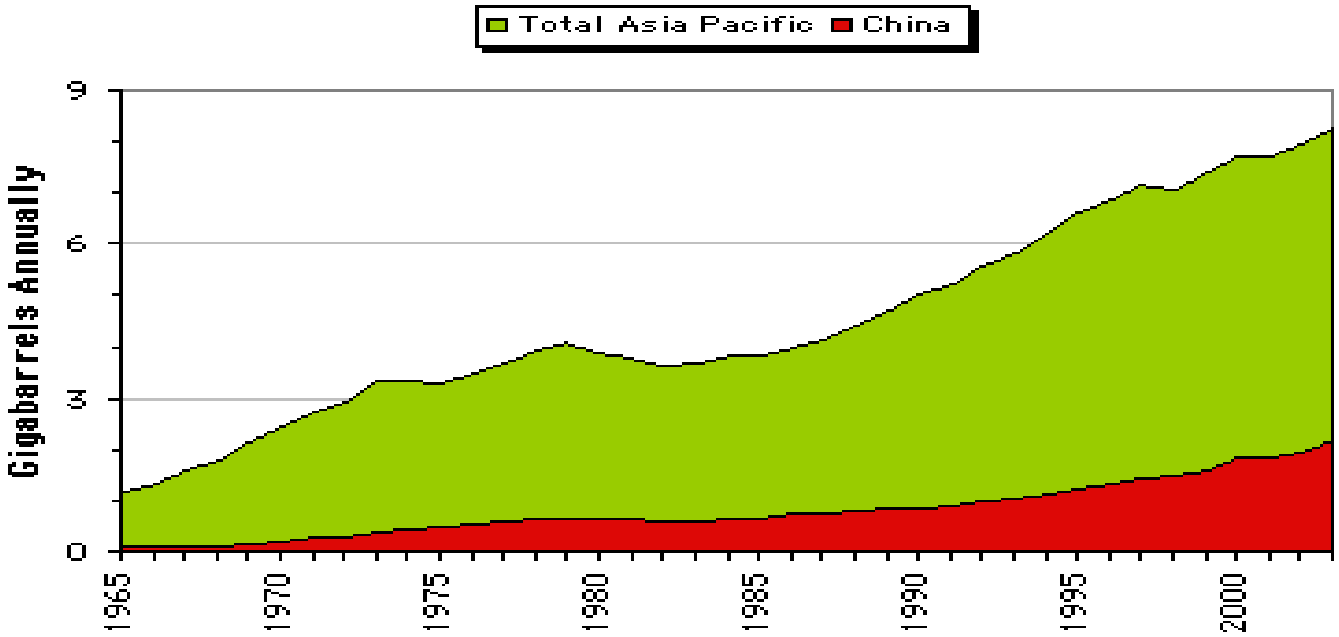
Source: ASPO

C1. Oil Consumption (World) 1965–2003



The massive growth in the world's consumption of oil is shown here, doubling in about thirty years. Falls and plateaus tend to be caused by recessions as in the 1970s and 1980s. The change in the previous year was a 2.1% rise.

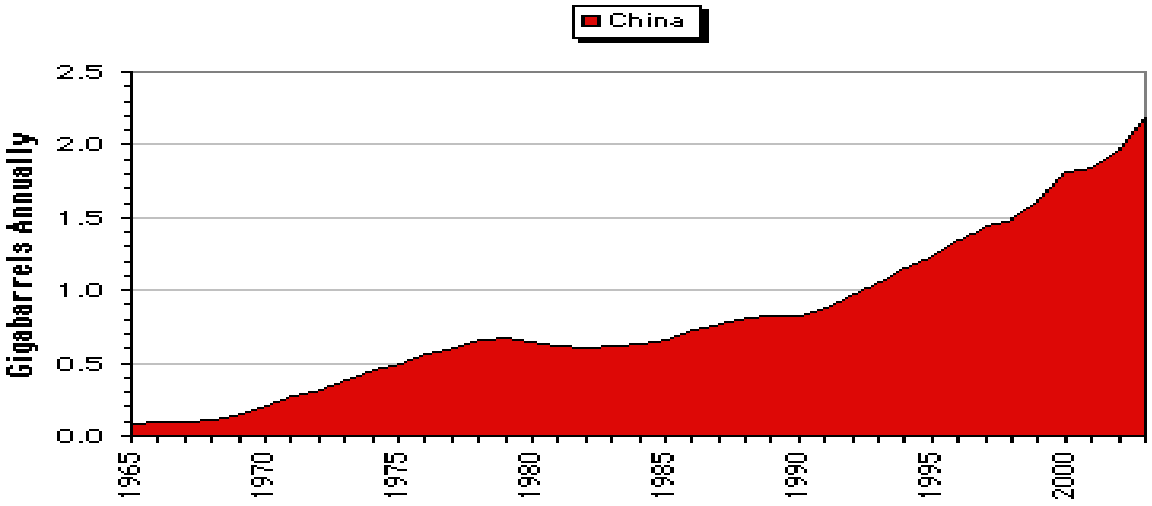
Source: BP



This is the worrying chart for oil consumption, a dramatic rise of nearly seven times (695%) in Asia over the four decades as populations grew and the countries demanded a standard of living closer to the West's. From a 1965 total of 1.19 Gb to 8.25 Gb, from 10.4% of the world's consumption to 28.9%. China's rise seemed gentler but it actually shows an increase of 1125%, from 1.7% of the world to 7.6%. The rise is clearer in chart C9.

Source: BP

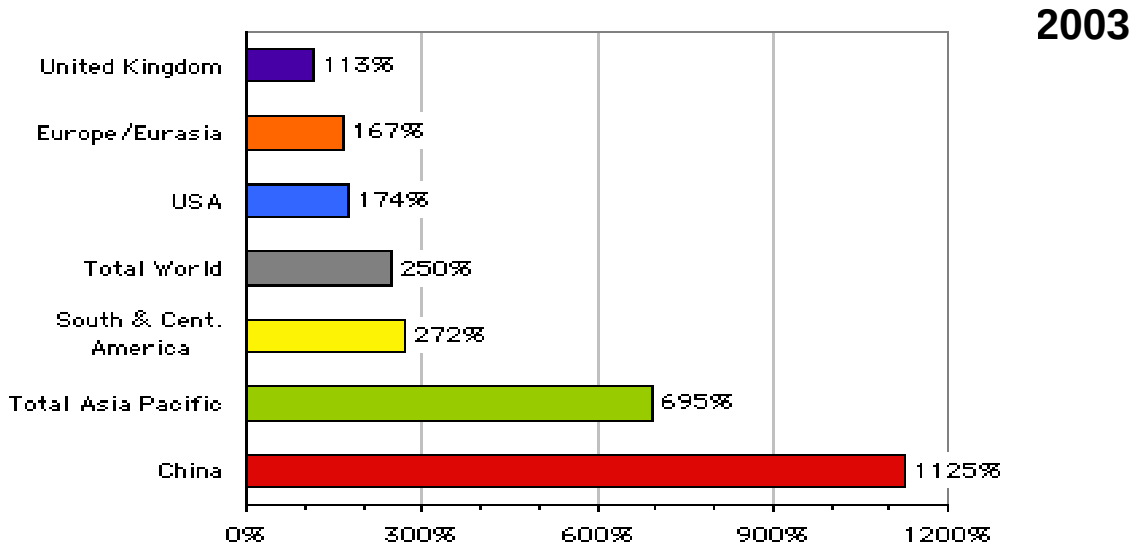
C9. Oil Consumption (China) 1965–2003



China's frightening consumption rise from chart C8 is made clearer when it has its own scale. An increase of 1125%, from 0.19 Gb in 1965 to 2.18 Gb in 2003.

Source: BP

Change of oil consumption 1965-2003



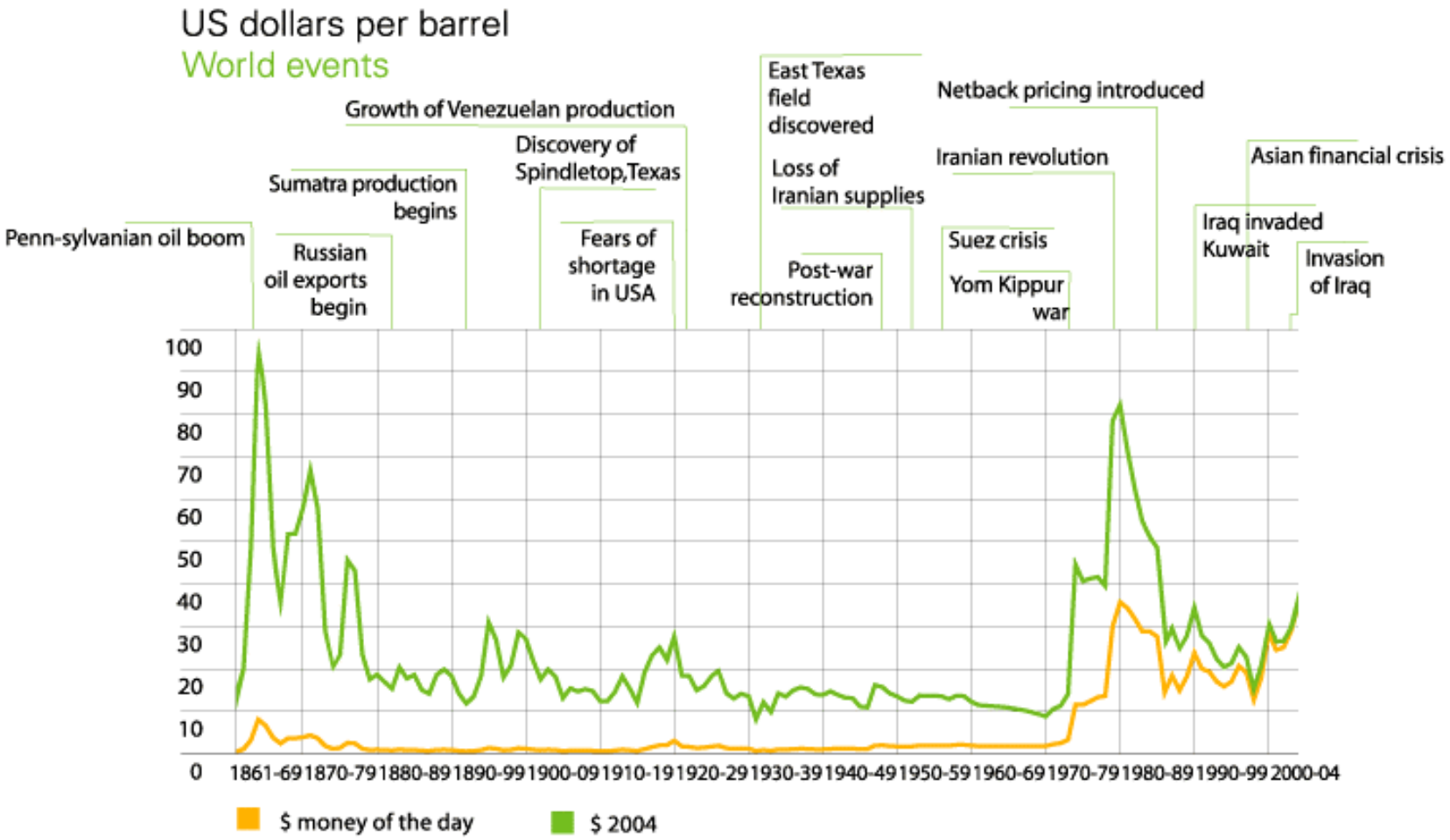
This chart summarises changes shown in charts C6 to C9. The huge increases in Asia and China are very clear.

Source: BP

The increase of Oil-Prices is inevitable (in the long run)

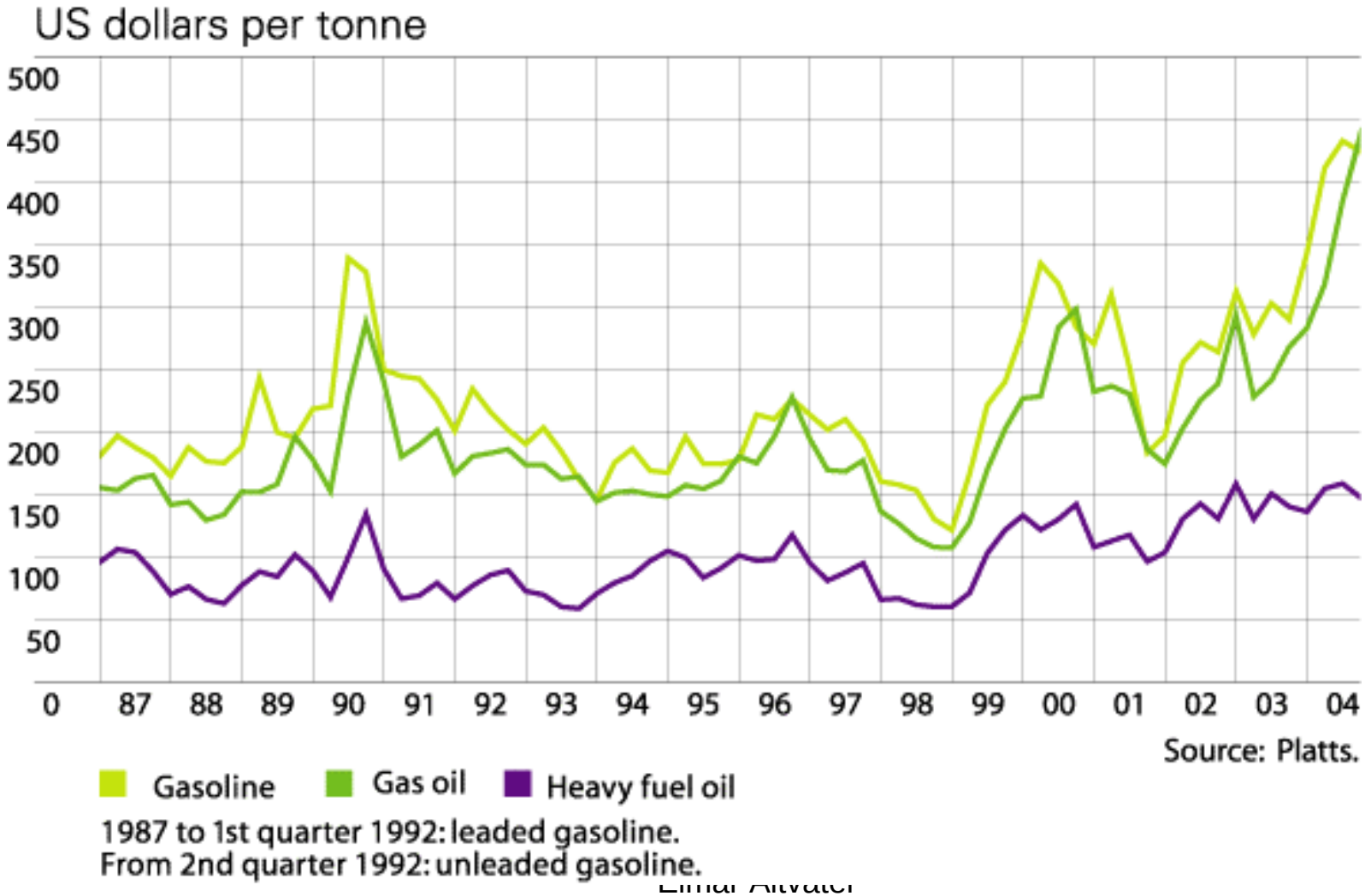
- When the production of oil (and other sources of energy) reaches the peak, so that the supply cannot simply be increased
- When the demand grows under the pressure of
  - Competitiveness on global product markets,
  - The „hard budget constraint“ of financial markets and
  - The attrativeness of the western life style
- The oilprice inevitably goes up
- Thus the interrelationship of energy-markets and commodity- and financial markts has to be taken into account

Crude oil prices since 1861



1861-1944 US average.
1945-1983 Arabian Light posted at Ras Tanura.
1984-2004 Brent dated.

Rotterdam oil product prices



The Dependence on Oil-Imports: Share of Export-Revennues to be spent for Oil-Imports, 2002 (in Mio US$)

Country	Imports of fuels	Total export-revenues	Share of fuel imports in total imports (%)	Share of fuel imports in export revenues
Argentina[a]	798	26610	3,9	2,9
Brasil	7549	60362	15,2	12,5
Peru	1034	7688	13,7	13,4
Mexico	4455	160682	2,3	2,7
Pakistan	3004	9913	26,7	30,3
South Afrika	3269	29723	13,0	11,0
China	19285	325565	6,5	5,9
India[a]	15935	49251	31,7	32,4
USA	121927	693860	10,1	17,6
Europ. Union[b]	129868	939804	13,9	13,8

[a] 2001; [b] Imports and Exports from or to third countries
Source: WTO, Trade Statistics 2003

The growing Importance of the MiddleEast and of OPEC for Global Oil Supply

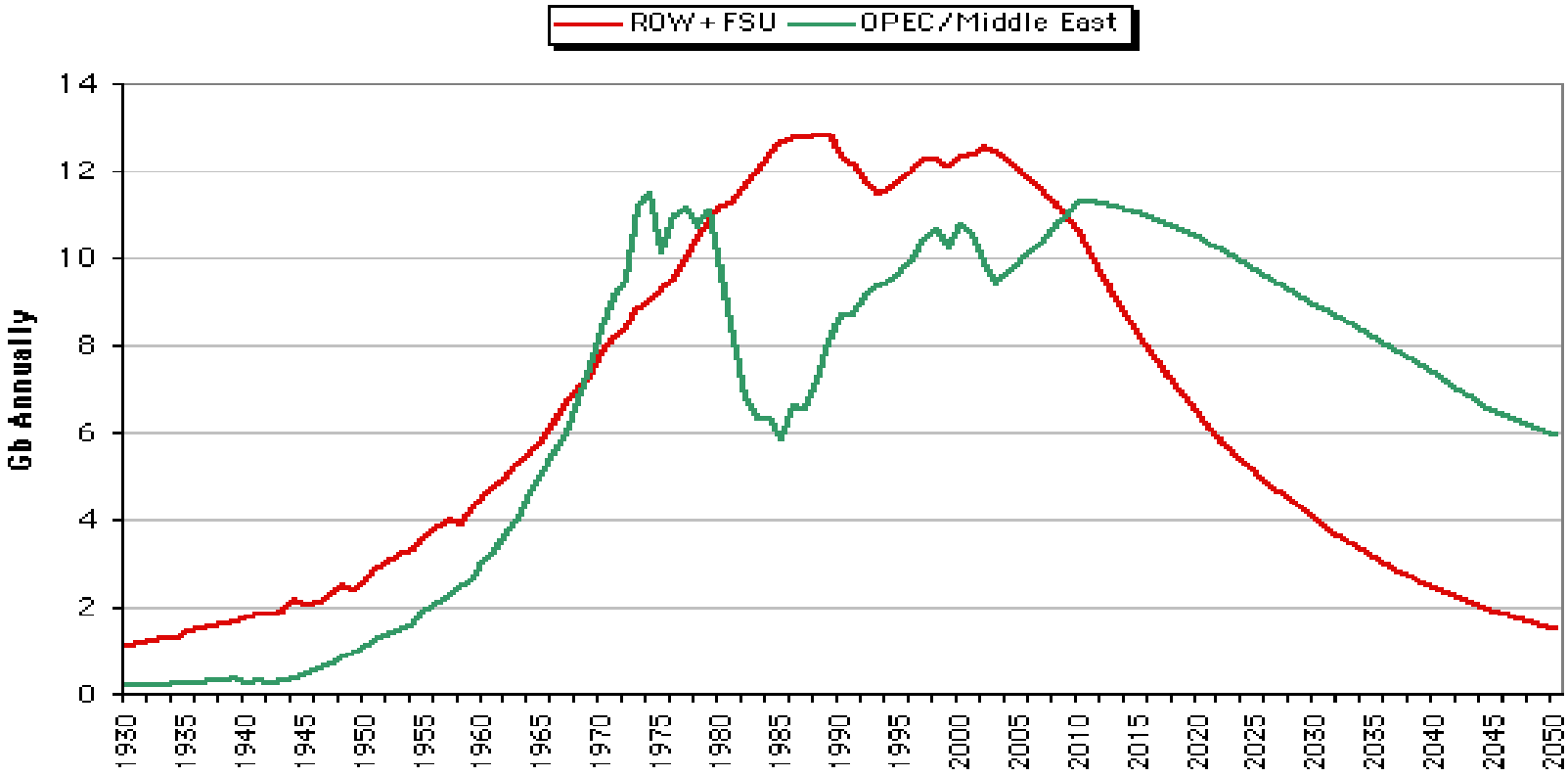


Chart shows oil production comparing the OPEC/Middle East countries with the Former Soviet Union/Rest of the World. It shows that OPEC/Middle East is expected to produce more than 50% of the world's oil around 2010.
Source: ASPO

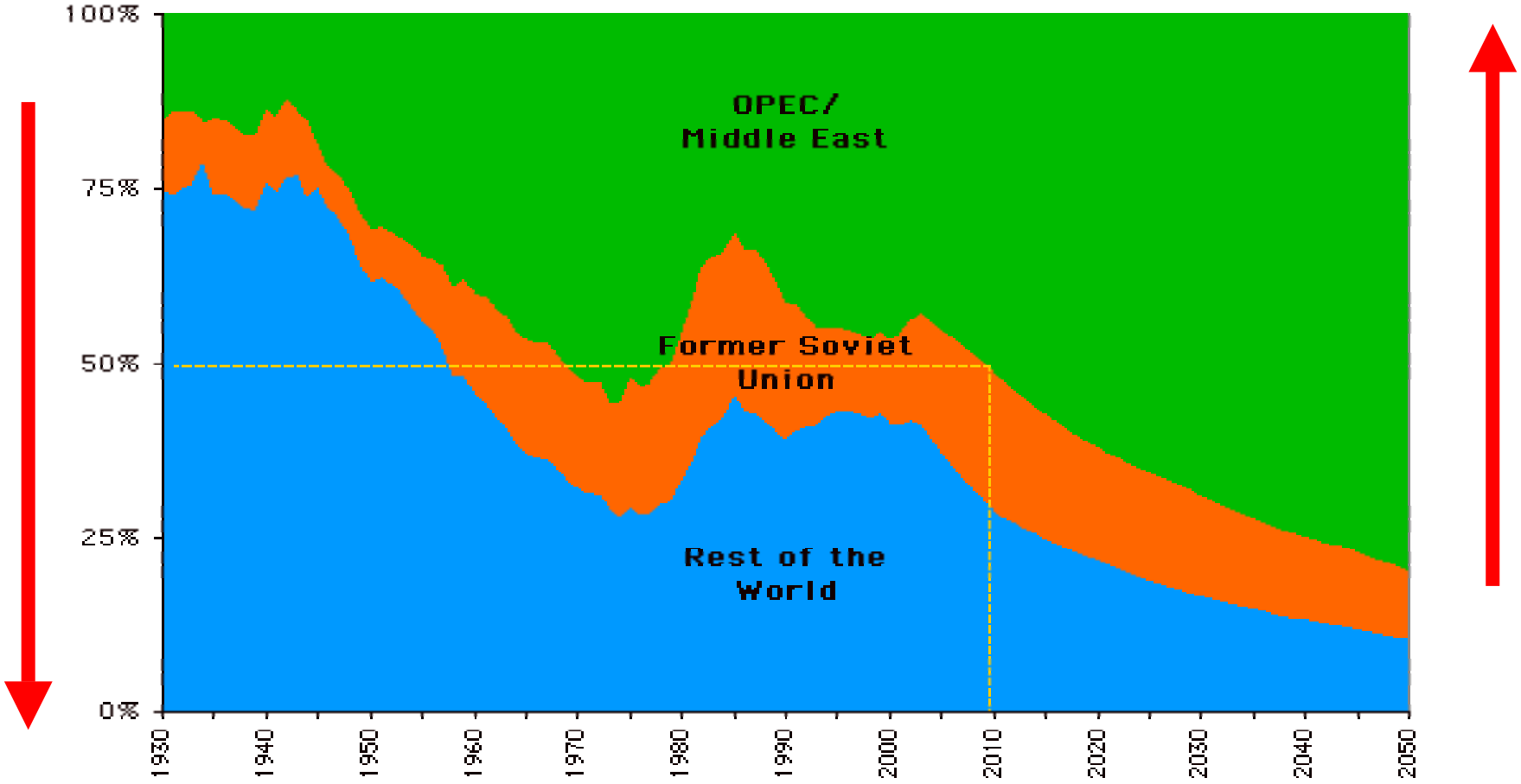
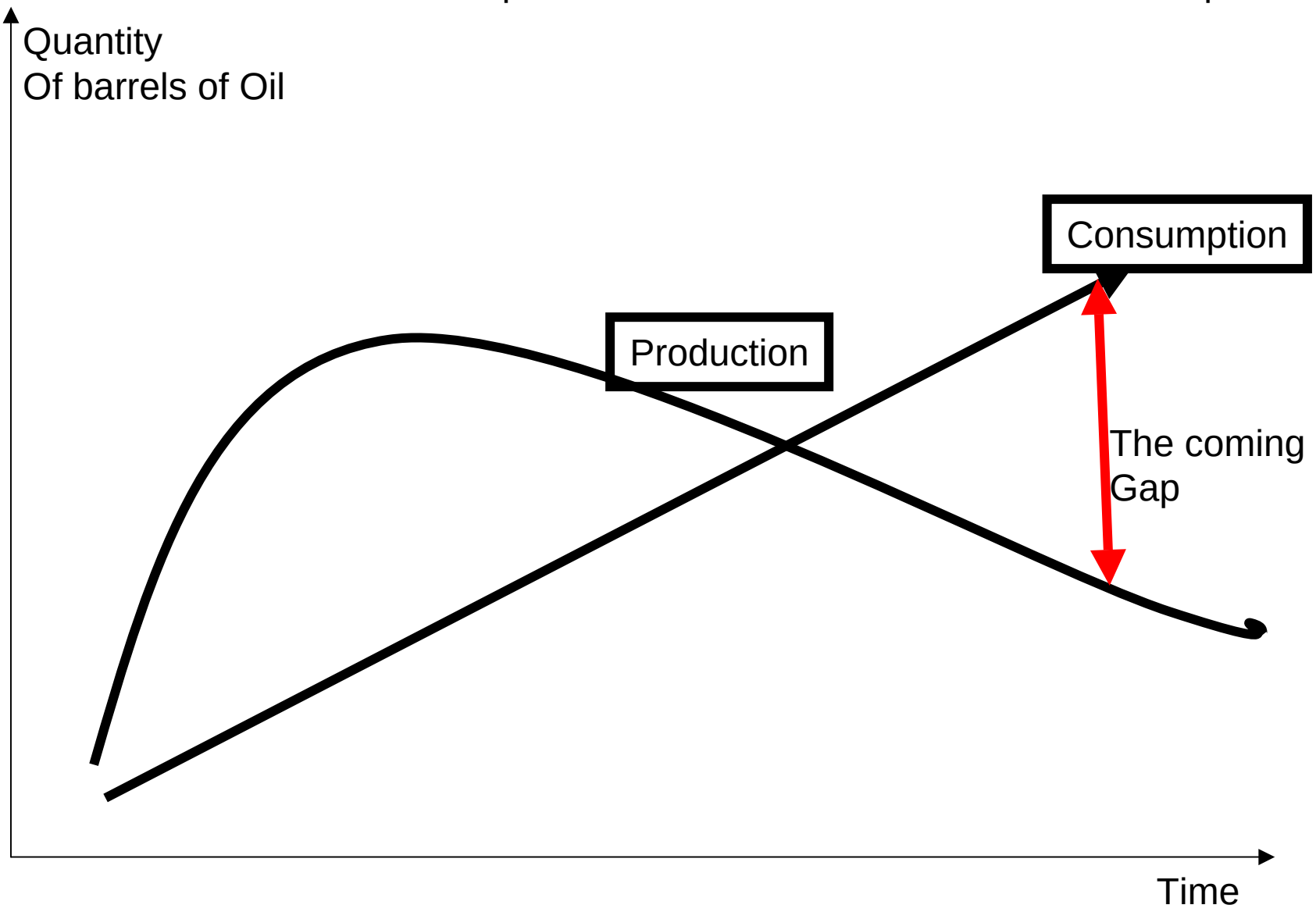


Chart shows percentage of the world's oil production from the two main oil producing groupings compared with the rest of the world. As well as showing the point, around 2010, when half of the world's output is expected to come from OPEC/Middle East. It shows how the FSU will also become more important as its output equals the rest of the world's.
Source: ASPO

The Gap between Oil-Production and Oil-Consumption



The Gap and Energy Security

Geo-economic Strategies

- Influencing the Formation of the Oil Price
- Pressure on Oil Producers, to adapt their Production to Demand (The Decisive Role of the „Swing Producer“
- Development of Oil Subsitutes
- Influencing the Recycling of Petro-Dollars
- Influence on the Choice of the Currency in which the Oilprice is Invoiced

Geo-political Strategies

- Diplomatic Pressure on Oil-Producers
- Use of Political and Military Pressure on Oil Producers
- Occupation of Oil Territories
- Control of Oil-Logistics (Pipelines, Tankship- and other Transport Routes etc.
- Developing a new form of „Oil Governance“

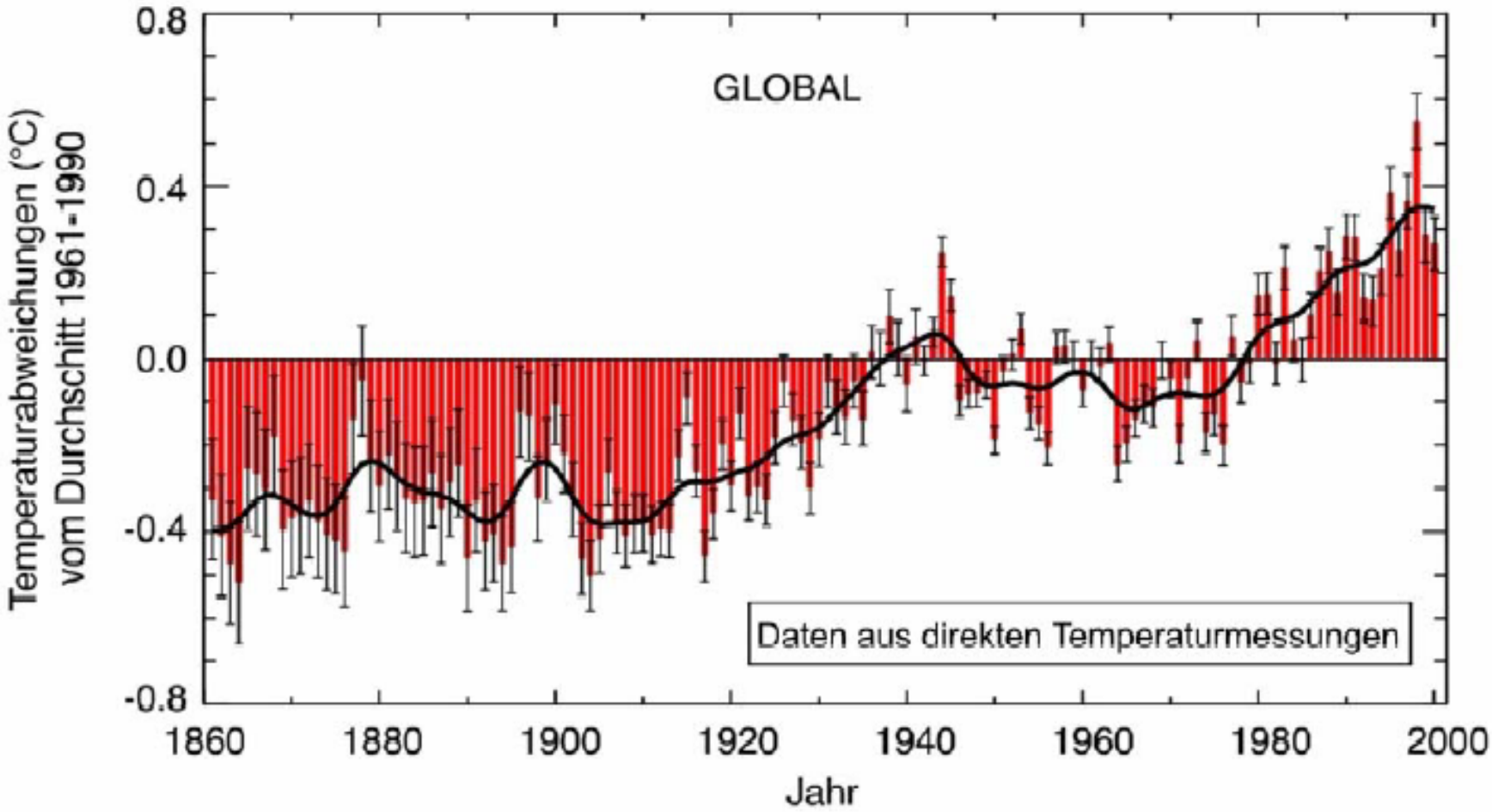
Consequence: a new „great game“ in Oil-Regions Middle East,Caucasus, Central Asia,
But also in Africa and Latin America
„Oil-Imperialism“

The new Great Game

- Oil-Imperialism by using the Rule of free trade
  - The Neo-liberal Argument for Free Markets which serve best the Powerful Nations
- Oil-Imperialism by using political and military power up to the occupation of strategic territories (Afghanistan, Iraq)
  - The neo-conservative plea for a New American Century and the use of poltical power and not only of market mechanisms
- The Amalgamation of Neo-Liberalism and Neo-Conservatism in the Recent Political Discourses and the
- Growing Global Resistence against it
  - In the Islamic World
  - In Latin America
  - By Social Movements in the Industrialized World
  - Etc.

Another Consequence of the Combustion of Fossil Fuel: Emissions of Greenhouse Gases and the Warming-up of the Atmosphere

Abbildung 1: Erdoberflächentemperatur in den vergangenen 140 Jahren



Source: Umweltbundesamt, 21Thesen 2006

The Consequences of Oil Combustion for the Climate and Climate-Conflicts

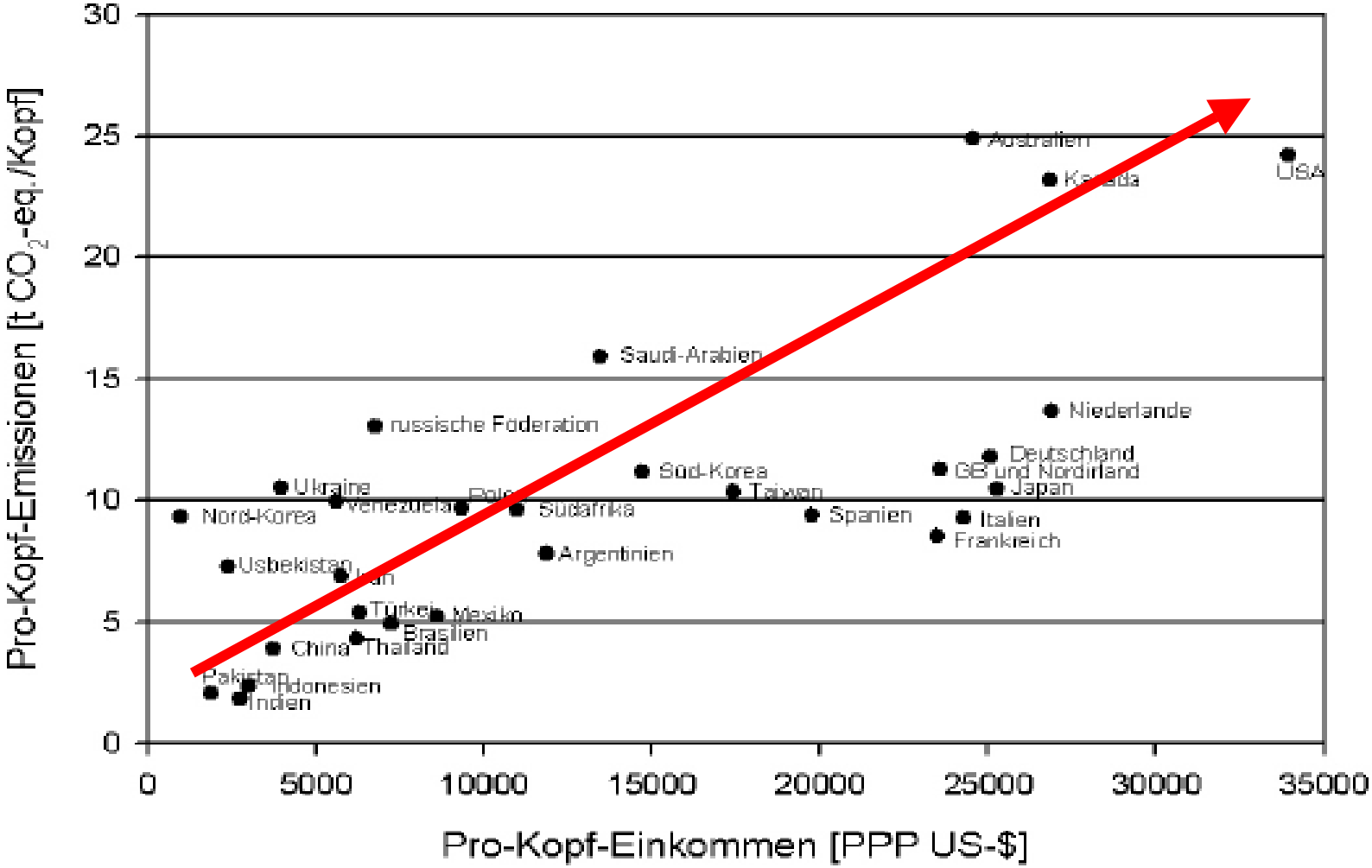
- The IPCC expects an Increase of average surface temperature on Earth until 2100 of 1,4°C to 5,8°C.
- The Sea-level is supposed to increase by 9-88cm with dramatic consequences for life on Earth
- In case of a smelting down of the Greenland Ice-sheet the rise of the sea level can reach up to 7m
- The changes of the salination of the ocean waters can change the direction of ocean currents, e.g. of the Gulf stream

What are the Causes of High Greenhouse Gas-emissions?

- It is necessary to distinguish between
  - Survival emissions
  - Inefficiency-Emissions due to technical deficiencies
  - Lifestyle-emissions
- A Reduction of the Greenhouse Gas-emissions requires different measures with regard to the causes
  - From increasing eficiency
  - To changes of consumption and production patterns

Abbildung A 3: Pro-Kopf-Einkommen und Pro-Kopf Emissionen

Lifestyle: Per Capita Income and Per Capita Emissions

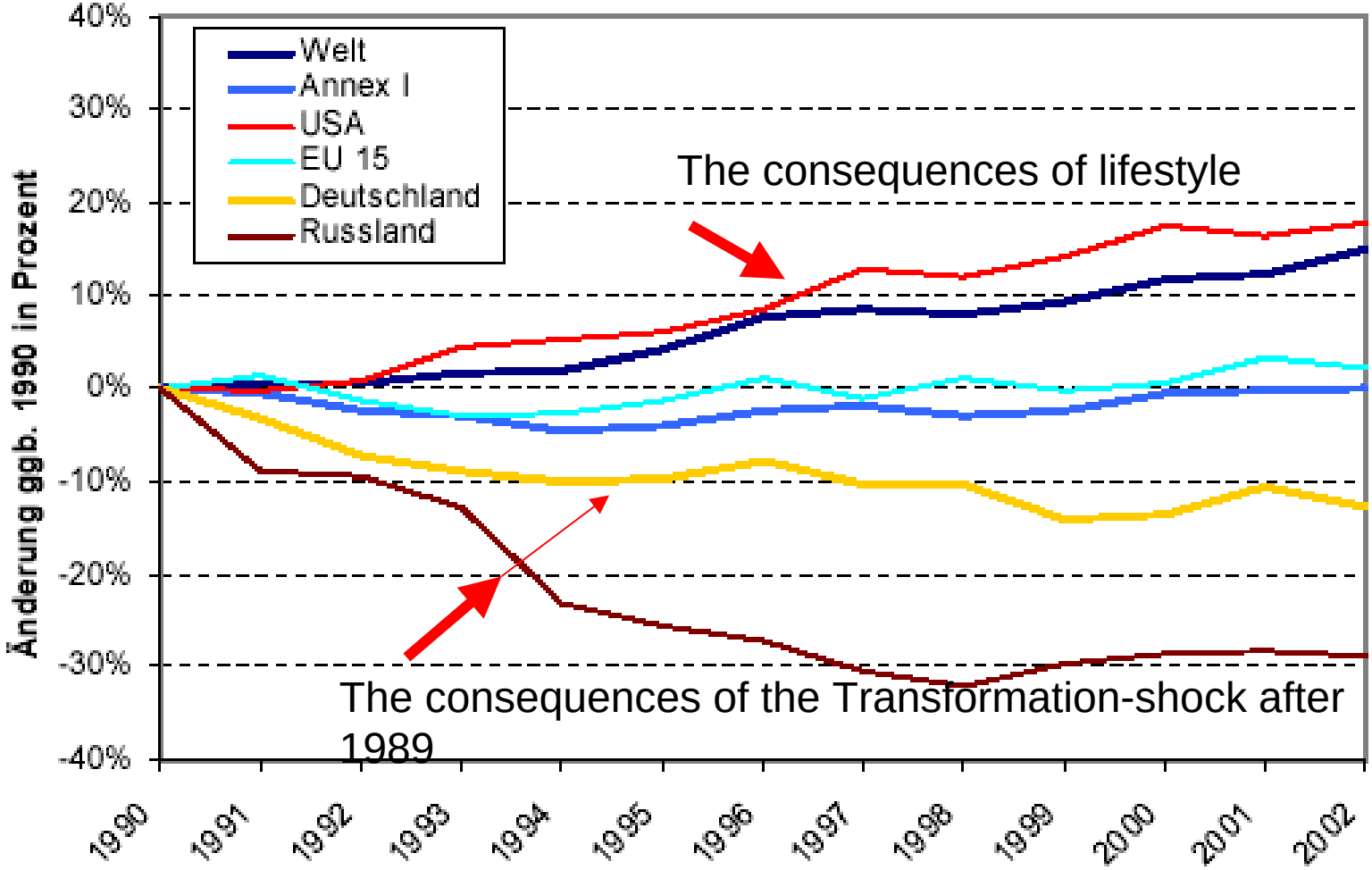


Quelle: Eigene Darstellung aus Daten für das Jahr 2000, Quelle: CAIT 1.5, http://cait.wri.org

Source: Umweltbundesamt, 2005

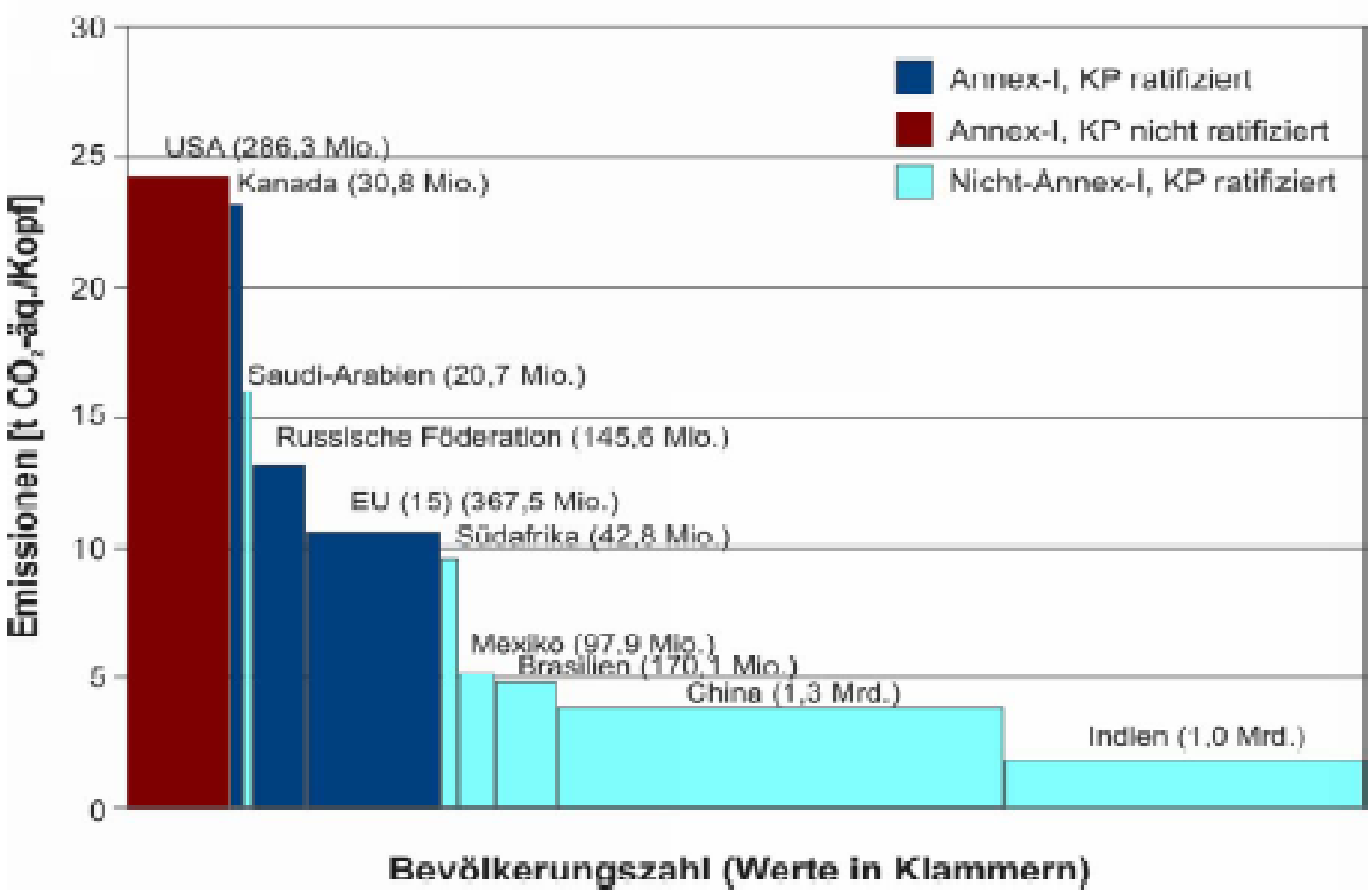
Energy-conditioned CO2-Emissions 199ß-2002

Abbildung 7: Energiebedingte CO_2-Emissionen 1990 bis 2002



Greenhouse-gas-emissions per capita and total population, 2000

Abbildung 10: Treibhausgasemissionen pro Kopf und Bevölkerungszahl (2000)



Quelle: Daten nach CAIT, World Resources Institute, http://cait.wri.org, die Breite der Balken repräsentiert die relative Größe der Bevölkerung.

The Kyoto-Protocol for the reduction of greenhouse-gas-emissions

- In February 2005 the Kyoto Protocol took force after the ratification by Russia
- Obligations of Reductions until 2012 under the level of 1990:
  - EU 15 plus CS, Est, LT, Let, SL, SLO, BG, RU, CH 8%
  - Kanada, Hu, Japan, PL 6%
  - Croatia 5%
  - Newzealand, Ru, Ukraine 0%
  - N +1% Isl +10%
  - Annex-I-countries: mostly OECD; Non-Annex-I-countries mostly Developing Countries
  - Not ratified: USA, Australia
  - Germany: 21%
  - Non-Annex I-countries: no reduction until 2012

Flexible Mechanisms

- Emissions Trading; Distribution of Emissions Rights to Private Actors by Public Institutions
  - Privatisation of the atmosphere, creation of a commodity to be traded on special stock exchanges
  - Financial Investors can make use of emissions rights as a capital investment
- Joint Implementation: Common measures of two or more industrialised countries in order to take them into their emissions account
- Clean Development Mechanism: The reduction of greenhouse gases in developing countries is taken on the account of industrial countries
  - Therefore emissions-rights can be sold
- The possibility of taking CO_2-sinks (forestation) into the emissions account

Critical Points of the Kyoto-Protocol

- The targets of a reduction of CO2-Emissions (5% until 2012, compared with 1990) are insufficient for an effective limitation of the warming of planet earth
- The political will to realize the already too low-conceived reduction targets does not exist
  - the Preference for technical improvements in order to reduce inefficiency emisions
  - The position of the Bush-Adinistration and the Blair-Initiative of autumn 2005
  - The conflict between climate-stabilistation and competitiveness: the counterproductive role of financial institutions and of the free trade rules
  - The case of ecological and social clauses in the WTO-framework
  - The unwillingness of the rich to change the lifestyle
- The Kyoto-Protocol has been watered down in the Negotiations in order to seduce the USA to Ratification – what the Bush-Adinistration refused
- The flexible mechanisms offer a new field of investment for business, for the stabilization of the climate they are counterproductive

Technical Solutions are insufficient for a reduction of greenhouse-gas-emissions

- The contribution of different components to Greenhouse gas reduction: The example of the European Union, 2004 (2003) compared with 1990
  - Demographic component +4,5% (increase)
  - Income Component +22,8% (increase)
  - Energyintensty component -12,7% (decrease)
  - Energymix component -15,6% (decrease)
  - Total Reduction -1,1% (decrease)
  - (without Germany and Great Britain + 12,7% (increase)

- The technical reductions already are of a substantial size; however survival- and lifestyle-emissions increase and outpace the technical reductions

Source: DIW Nr. 39/ 2005

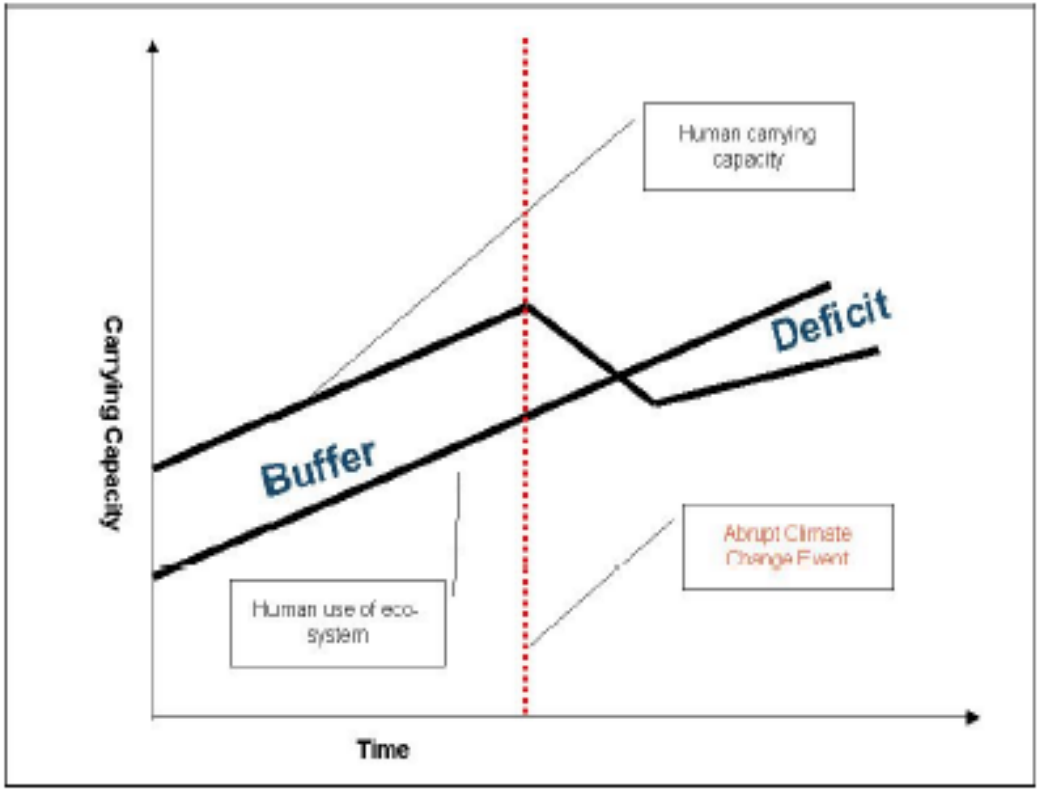
As a Consequence of the Failure to stabilize the Climate – Future Conflicts in the Greenhouse Earth are becoming more likely

- The Destructions caused by anormal Weather-events and the Effects in a Class-Society – The Hurrikanes of 2005
- The Droughts in Africa, in the Amazon and elsewhere and the consequences for the Living Conditions of peoples
- What happens in the Case that the Gulf Stream fades away in North- and Central Europe?
  - The Increase of Migration Flows
  - The Defense of Boderlines – „at the Hindukusch“, in Ceuta and Mellilla, in Tijuana and elsewhere
  - The Pentagon-Scenario of future military Conflicts: Climate Policy and „Homeland Protection“

The Regions: 2010 to 2020

From: Peter Schwartz and Goug Randall, An Abrupt Climate Change Scenario and Its Implications for United States National Security, October 2003 (commissioned by the Pentagon)

Decreasing Carrying Capacity



The graphic shows how abrupt climate change may cause human carrying capacity to fall below usage of the eco-system, suggesting insufficient resources leading to a contraction of the population through war, disease, and famine.

From Schwartz and Randall

Conflict Scenario Due to Climate Change

	Europe	Asia	United States
2010-2020	2012: Severe drought and cold push Scandinavian populations southward, push back from EU 2015: Conflict within the EU over food and water supply leads to skirmishes and strained diplomatic relations 2018: Russia joins EU, providing energy resources 2020: Migration from northern countries such as Holland and Germany toward Spain and Italy	2010: Border skirmishes and conflict in Bangladesh, India, and China, as mass migration occurs toward Burma 2012: Regional instability leads Japan to develop force projection capability 2015: Strategic agreement between Japan and Russia for Siberia and Sakhalin energy resources 2018: China intervenes in Kazakhstan to protect pipelines regularly disrupted by rebels and criminals.	2010: Disagreements with Canada and Mexico over water increase tension 2012: Flood of refugees to southeast U.S. and Mexico from Caribbean islands 2015: European migration to United States (mostly wealthy) 2016: Conflict with European countries over fishing rights 2018: Securing North America, U.S. forms integrated security alliance with Canada and Mexico 2020: Department of Defense manages borders and refugees from Caribbean and Europe.

From Schwartz and Randall

2020-2030	2020: Increasing: skirmishes over water and immigration 2022: Skirmish between France and Germany over commercial access to Rhine 2025: EU nears collapse 2027: Increasing migration to Mediterranean countries such as Algeria, Morocco, Egypt, and Israel 2030: Nearly 10% of European population moves to a different country	2020: Persistent conflict in South East Asia; Burma, Laos, Vietnam, India, China 2025: Internal conditions in China deteriorate dramatically leading to civil war and border wars. 2030: Tension growing between China and Japan over Russian energy *	2020: Oil prices increase as security of supply is threatened by conflicts in Persian Gulf and Caspian 2025: Internal struggle in Saudi Arabia brings Chinese and U.S. naval forces to Gulf ,in direct confrontation

The chart above outlines some potential military implications of climate change

From Schwartz and Randall

Recommendations of Schwartz and Randall for the Pentagon: Signing the Kyoto Protocol is not mentioned

1) Improve predictive climate models. Further research should be conducted so more confidence can be placed in predictions about climate change. There needs to be a deeper understanding of the relationship between ocean patterns and climate change. This research should focus on historical, current, and predictive forces, and aim to further our understanding of abrupt climate change, how it may happen, and how we'll know it's occurring.

2) Assemble comprehensive predictive models of climate change impacts. Substantial research should be done on the potential ecological, economic, social, and political impact of abrupt climate change. Sophisticated models and scenarios should be developed to anticipate possible local conditions. A system should be created to identify how climate change may impact the global distribution of social, economic, and political power. These analyses can be used to mitigate potential sources of conflict before they happen.

3) Create vulnerability metrics. Metrics should be created to understand a country's vulnerability to the impacts of climate change. Metrics may include climatic impact on existing agricultural, water, and mineral resources; technical capability; social cohesion and adaptability.

4) Identify no-regrets strategies. No-regrets strategies should be identified and implemented to ensure reliable access to food supply and water, and to ensure national security.

5) Rehearse adaptive responses. Adaptive response teams should be established to address and prepare for inevitable climate driven events such as massive migration, disease and epidemics, and food and water supply shortages.

6) Explore local implications. The first-order effects of climate change are local. While we can anticipate changes in pest prevalence and severity and changes in agricultural productivity, one has to look at very specific locations and conditions to know which pests are of concern, which crops and regions are vulnerable, and how severe impacts will be. Such studies should be undertaken, particularly in strategically important food producing regions.

7) Explore geo-engineering options that control the climate. Today, it is easier to warm than to cool the climate, so it might be possible to add various gases, such as hydrofluorocarbons, to the atmosphere to offset the affects of cooling. Such actions, of course, would be studied carefully, as they have the potentialto exacerbate conflicts among nations.

A CO_2-Reduction is Possible

- Until 2050 in the Industrialized Countries a Reduction of 80% is Necessary and Possible
- Ethical Foundations: The burden in the industrialized countries is higher than in developing countries: due to considerations of global justice
- Energy-mix: By using more renewable energy and
- technical efficiency: Less oil consumption due to better isolation of houses, more efficient motors etc.

Renewable Energy Sources

- In the order of their technical-economic Realization
  - Biomass
  - Eolic Energy
  - Waterpower
  - Photovoltaic
  - Solarthermal devices
  - Geothermal devices
- The Importance of an adequate and supportive Legal Framework
  - In Germany: The Renewable Energy Law
    - Regulation of Minimum-Prices and Guarantee of Acceptance of delivered Energy
    - Cooperation on the European Level

A Regime of Renewable Ressources at the End of the fossil Energy Sources?

The Capitalist System found in historical Development the adequate fossil Energysystem

Capitalism → (Fossil) Energysystem

Today it is the other Way round:
Which is the social Formation matching a solar Energysystem?

(Renewable) Energysystem → Which Social Formation?

Creating a Renewable Energy-System in order to avoid Conflicts on Access to Oil and Greenhouse Conflicts

The Role of Social Movements and of the mobilization and participation of Citizen

The Relation to Solidary Forms of Production and Consumption

Can this happen within Capitalism or beyond?