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Changes and Continuities in U.S. Energy Policy

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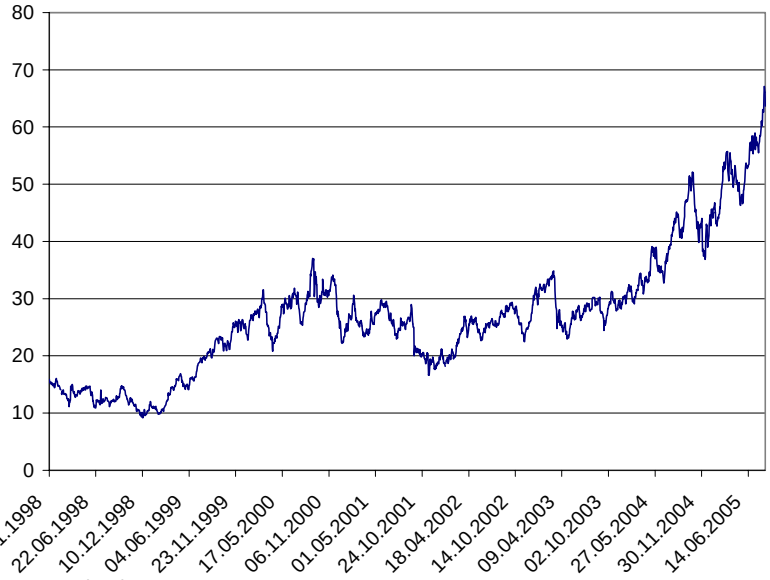
Content

1. Introduction

Energy policy is increasingly moving to the forefront of public attention in the United States. The recent oil supply shortages and prices hikes in the wake of hurricane Katrina have only added to widespread concern about the US energy situation. One month before Katrina flooded large parts of New Orleans, Congress passed the Energy Policy Act of 2005 at the end of July.[1] The Energy Policy Act of 2005 was the result of years of intensive debate, which had started after the energy price hike of 1999/2000.

Since the end of World War II, the United States has been confronted with five major energy price hikes, each of which has resulted in a national debate on the appropriate national energy policy consequences. The Arab oil embargo of 1973-74 and the ensuing oil price rise caused the first severe worries about energy costs in the U.S. Concerns reappeared with the second oil price shock of 1979/80. The third price spike came after the Iraqi invasion of Kuwait in 1990 and the fourth in 1999/2000. The most recent price hike has brought a doubling of oil prices within twenty months from January 2004 until August 2005.

Figure 1:
Crude Oil Prices (Brent), US. Dollars Per Barrel, 1998-2005



Source: International Energy Agency,
http://www.eia.doe.gov/emeu/international/crude1.html

The Energy Policy Act of 2005 aims to establish a comprehensive, long-term energy policy, something which the United States – according to energy experts – is still lacking.[2] However, it is questionable whether this ambitious task can actually be accomplished. Gregg Easterbrook from the Brookings Institution calls it an "Energy Status Quo Act" and not an urgently needed "Energy Future Act".[3] The final 1,700-page bill addresses a wide range of issues, such as increased production of fossil fuels through massive tax breaks to oil and gas companies, the construction of new nuclear power plants and terminals for liquid natural gas as well as the promotion of wind and solar power. Nevertheless, it fails to consider other significant measures in the energy sector. The bill excludes the issue of greenhouse gases and the handling of nuclear waste and will be insufficient in addressing the

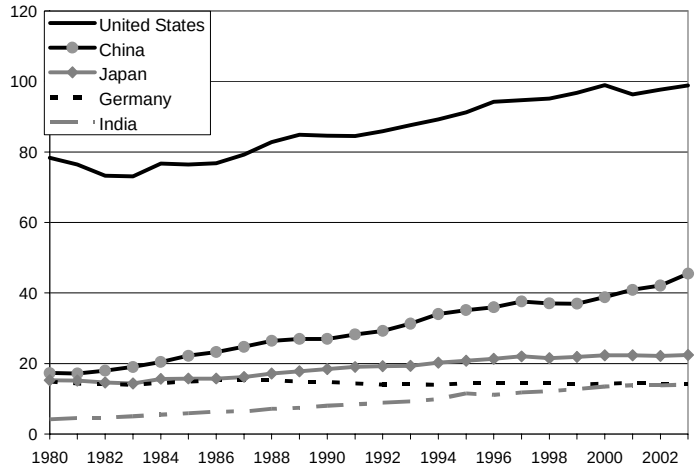
[1] Energy Policy Act of 2005, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:h6pp.txt.pdf
[2] Timothy E. Wirth/C. Boyden Gray/John D. Podesta (2003), "The Future of Energy Policy", in: *Foreign Affairs* 82 (4), pp. 132-155; Council on Foreign Relations (2001), *Strategic Energy Policy. Challenges for the 21st Century*. New York, http://www.cfr.org/pdf/Energy_TaskForce.pdf.
[3] Gregg Easterbrook (2005), "Vote Yes for the Energy Bill, then start working on the real issues", The Brookings Institution, July 28, 2005, http://www.brookings.edu/views/op-ed/Easterbrook/20050728.htm

most pressing problems in the energy sector such as reducing energy consumption and the increasing energy import dependency.

U.S. energy consumption is the highest worldwide both in absolute as well as in per capita numbers (figures 2+3) and its energy consumption is expected to further increase by almost 40% until 2025.[4] The United States still consumes twice as much energy as China, the second biggest energy consumer (see figure 2). In petroleum consumption, China has only recently surpassed Japan and since 2004 has become the world's second largest consumer of petroleum products for the first time. On a per capita basis the U.S. economy uses about ten times the energy of the Chinese economy and almost as much energy as the German and the Japanese economy together (see figure 3).

Two major problems will be most prominent on the energy agenda of the next decade. For its energy consumption, the U.S. will be more and more dependent on foreign energy sources. Since more than 70% of world proven oil and natural gas reserves are concentrated in the Middle East, the reliance on this very unstable region will increase.[5] In addition, environmental problems connected to the use of energy and its production have remained unsolved.

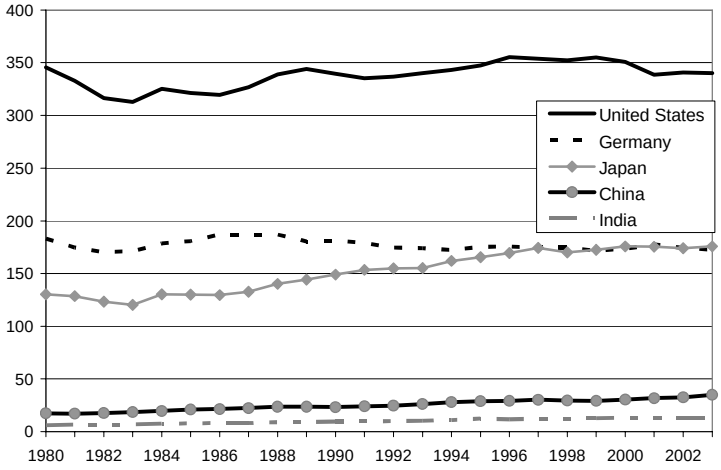
Figure 2:
Total Primary Energy Consumption*, Quadrillion Btu, 1980-2002



Source: Energy Information Administration, www.eia.doe.gov/

* energy sources aggregated (petroleum, natural gas, coal, nuclear, renewables)

Figure 3:
Per Capita Total Primary Energy Consumption*, Mio. Btu, 1980-2003



Source: Energy Information Administration, www.eia.doe.gov/

Against this background, this paper illustrates continuities and changes in U.S. energy policy from the 1970s until today. First, the different energy sources will be briefly discussed.

Secondly, the political environment and the most important political activities in the energy field will be discussed. It will become evident that the United States has so far not succeeded in developing an energy policy, which addresses the most important challenges in this sector. Especially the 1990s can be regarded as a "lost decade" in energy policy with no comprehensive reforms achieved despite a very favorable energy supply situation. Since the 1970s the United States government has favored a very technology-centered approach in energy policy. Instead of promoting increases in energy efficiency and energy conservation, the U.S. government has continuously relied on the development of - mostly very expensive - new technologies to encounter the challenges in the energy sector.

Finally, the questions will be discussed whether there is a distinctly different situation in energy policy today and why the U.S. economy so far has been only mildly affected by high energy prices.

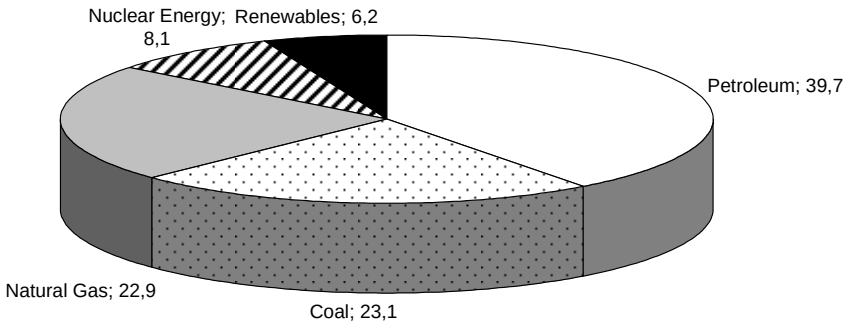
[4] Energy Information Administration (2005), *Annual Energy Outlook 2005*. http://www.eia.doe.gov/oiaf//aeo/pdf/0383(2005).pdf.
[5] BP (2005), *Statistical Review on World Energy*. http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/publications/energy_reviews_2005/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_report_2005.pdf.

2. Energy Sources

On the supply side, the ultimate aim of any energy policy has to be to find efficient, environmentally safe and economical energy sources to meet a country's energy needs. The most important energy sources are oil, natural gas, coal, nuclear and renewable energy. Figure 4 illustrates the share of those energy sources of total U.S. energy consumption which will be discussed in more detail below. Energy use is mostly analyzed along four economic sectors: residential, commercial, industrial and transportation (figure 5). In the United States, the industrial and the transportation sector are the two main energy users (36% and 46% respectively). U.S. households and the commercial sector[6] use only 12% and 7% respectively.

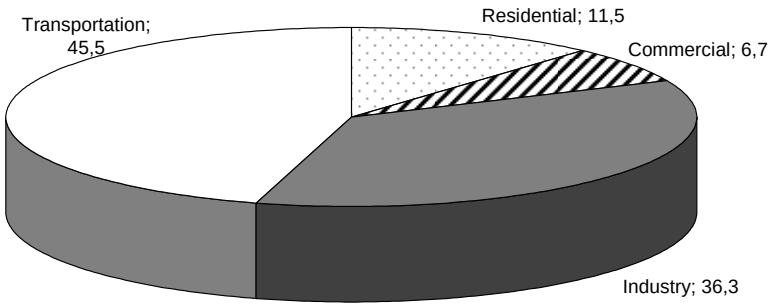
A brief analysis of the most important fuel types follows.

Figure 4:
U.S. energy consumption by source, 2003, in %



Source: Energy Information Administration, http://www.eia.doe.gov

Figure 5:
U.S. primary energy consumption by sector, 2004, in %



Source: Energy Information Administration, http://www.eia.doe.gov

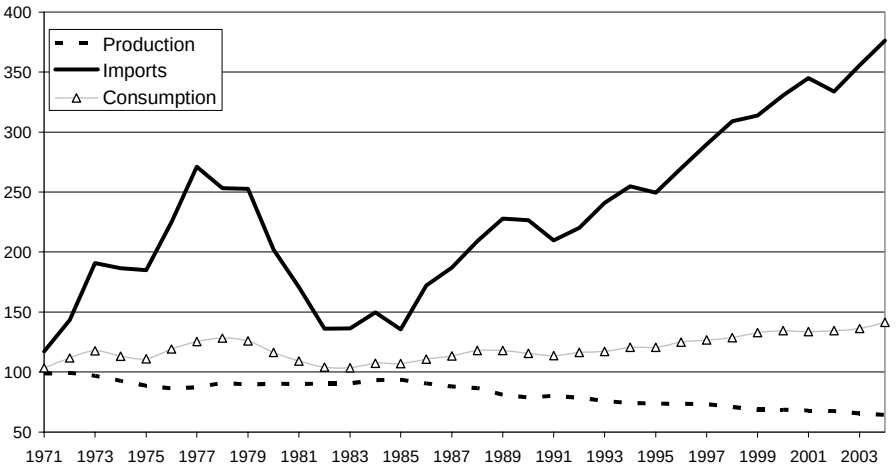
2.1 Petroleum

Petroleum is the most important energy source in the United States. It provides as much as 40% of total U.S. energy needs. The transportation sector depends almost entirely (96%) on petroleum. Since the 1950s these proportions have remained relatively constant.[7]

[6] Energy consumption in the commercial sector refers to energy use in (mostly) buildings of businesses that are not engaged in industrial or transportation activities.

[7] Carol Glover/Carl H. Behrens (2004), *Energy. Useful Facts and Figures.* Congressional Research Service, Washington, D. C., p. 7.

Figure 6:
U.S. petroleum production, consumption and imports, 1970-2004
(1970=100)

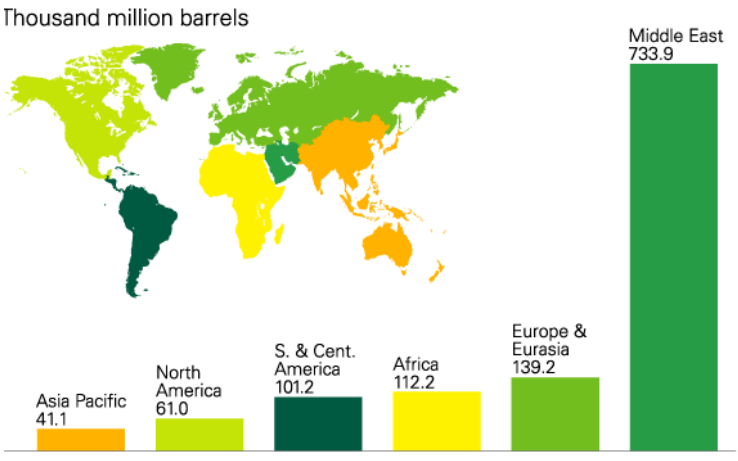


Source: Energy Information Administration

Figure 6 illustrates the development of U.S. petroleum production, consumption, and imports since 1970. U.S. petroleum production decreased by about 35% since 1970, whereas U.S. petroleum consumption has increased by about 40% since then. Petroleum imports almost quadrupled between 1970 and 2004. Figure 6 shows how oil imports have slowed after the two OPEC oil embargoes in 1973/74 and 1979. Since the mid 80s petroleum imports continuously grew at high rates. From 1998 on, the United States imported more than 50% of its petroleum consumption and petroleum import dependency is expected to increase further.[8] This fact gives rise to many voices that regard the increased oil import dependency as a threat to U.S. national security.[9]

The reason is not that the world is on the verge of running out of oil. Petroleum as well as other fossil fuels will remain the most important sources of energy for at least the next thirty to forty years. In fact, proven oil reserves today are greater than in the 1970s. However, for every two barrels petroleum used today, only one new barrel is found. Besides, the concentration of the remaining petroleum reserves in the Middle East puts increased pressure on oil markets (see figure 7). It is important to keep in mind that oil dependency and supply security is essentially a problem for the transport sector which relies to almost 100 percent on - increasingly imported - petroleum.

Figure 7:
Proved oil reserves at end 2004



Source: BP Statistical Review of World Energy 2005

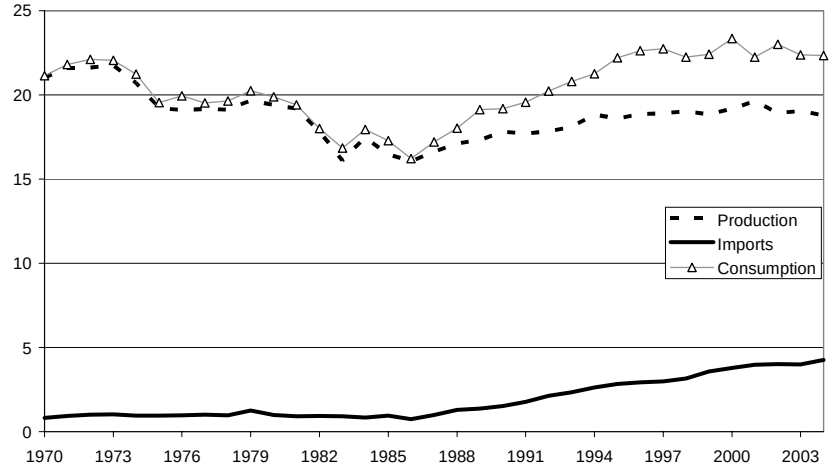
[8] Energy Information Administration (2005).
[9] Michael Klare (2004).

2.2 Natural Gas

About 23% of the energy used in the United States today is natural gas. The consumption of natural gas is expected to increase by over 40% until 2025.[10] The growth rate of natural gas use might even further increase if the costs for imported natural gas can be significantly lowered through the intensified use of liquefied natural gas (LNG).[11] Today, over 30 new liquefied natural gas terminals are proposed in the United States. Until now, the United States still receives 85% of its natural gas imports through pipelines from Canada. But the share of LNG in total imports of natural gas already grew from 1% in 1988 to over 15% in 2004.[12]

In the natural gas sector the United States was self-sufficient until the late 1980s, only then did consumption outpace production and U.S. imports grew (see figure 8). Compared to petroleum imports, natural gas imports are still fairly low. Today the share of net imports in natural gas consumption is about 20%, up from about 4% in 1970.

Figure 8:
U.S. natural gas production, consumption and imports, 1970-2004, trillion cubic feet



Source: Energy Information Administration, http://www.eia.doe.gov/oil_gas/natural_gas/info_glance/natural_gas.html

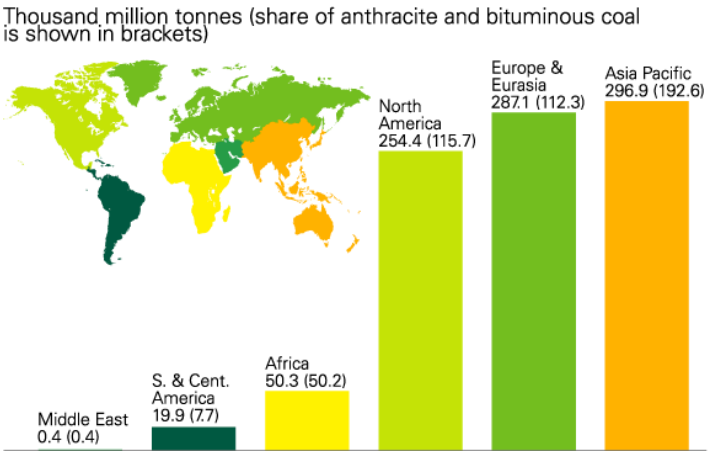
2.3 Coal

Coal was the most important energy source in the United States from 1885 to 1951.[13] Until today, coal has remained the second most important one. The United States has the biggest coal reserves of any single country in the world; one quarter of the world's known reserves.[14]

Increasing coal production, though, is limited both on economic as well as on environmental grounds. Despite higher international coal prices, coal production in the U.S. has been falling due to comparably high costs and environmental concerns. Currently, with natural gas und oil prices steeply rising, domestic coal is becoming more attractive again. However, the burning of coal contributes substantially to poor air quality through the emission of carbon dioxide and other pollutants.

[10] Energy Information Administration (2005).
[11] Institute for Energy and Law Enterprise (2003), *Introduction to LNG*. University of Houston Law Center, p. 16, www.beg.utexas.edu/energyecon/lng/documents/IELE_introduction_to_LNG.pdf.
[12] Energy Information Administration, Natural Gas, http://www.eia.doe.gov/oil_gas/natural_gas/info_glance/natural_gas.html.
[13] Energy Information Administration, Coal, http://www.eia.doe.gov/fuelcoal.html.
[14] BP (2005).

Figure 9:
Proved coal reserves at end 2004



Source: BP Statistical Review of World Energy 2005

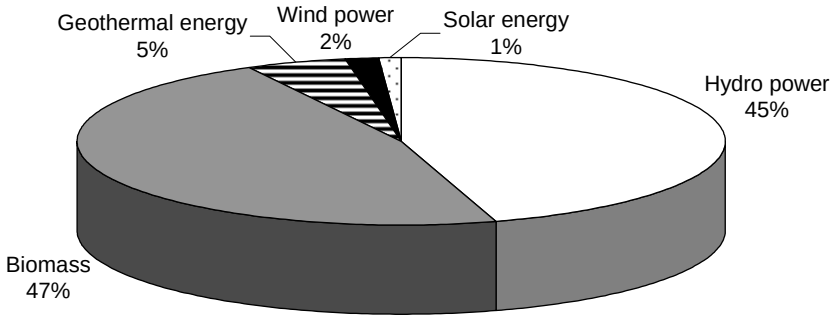
2.4 Nuclear Power

Nuclear power is used as an energy source since the 1950s in the United States.[15] Today nuclear energy makes up about 8% of total U.S. energy consumption. With the growth of the environmental movement in the 1970s and the nuclear accident at Three Mile Island in 1979 the nuclear industry came under strong pressure. In fact, no new nuclear facilities have been built since 1974.[16] Nevertheless, the United States is still the most important producer of nuclear energy followed by France and Japan.[17] Currently, the approval process for several new nuclear facilities in the United States is underway and the Energy Policy Act of 2005 also includes provisions that intend to promote the construction of new nuclear power plants.

2.5 Renewables

A possible long-term solution to challenges in the energy sector can be provided by renewable sources of energy. Today renewable energy sources contribute almost as much as nuclear energy to total energy consumption, about 6% (see figure 4 above).

Figure 10:
Share of total U.S. renewable energy consumption, 2003, in %



Source: Energy Information Administration

Renewable energy is obtained from sources that are essentially inexhaustible unlike fossil fuels of which there is a finite supply. Renewable sources of energy include wood, waste, hydropower, geothermal, wind, photovoltaic, and solar thermal energy. Through the increased use of renewable energy both the petroleum import dependency as well as environmental problems caused through the burning of fossil fuels could be approached.

[15] Jacqueline V. Switzer (1998), Environmental Politics: Domestic and Global Dimensions. New York, p. 126.
[16] Switzer (1998), p. 127
[17] Energy Information Administration, Nuclear Energy, http://www.eia.doe.gov/fuelnuclear_njava.html.

So far, though, the production costs for renewable energy are mostly higher than for fossil fuels, except for hydro power.

The latter is one of the cheapest overall energy sources.[18] Energy supplied by hydroelectric power makes up 45% of all energy supplied by renewables in the United States. But there is only limited growth potential for hydroelectric power, since most water bodies that can profitably be dammed are already in use. Moreover, energy from hydroelectric power also causes environmental problems through the damming of water bodies, e.g. for fish populations.

The most important source of renewable energy is biomass which accounts for 47% of U.S. renewable energy consumption. Energy from biomass is mostly obtained through the burning of wood and waste. Other important renewable energy sources in the U.S. include geothermal energy (5% of renewable energy consumption), solar energy (1%) and wind energy (1.8 %). In Germany, for example, the proportion of power generated from wind is with 17.5% of total renewable energy consumption much higher than in the U.S.[19]

3. U.S. Energy Policy

Since the 1970s, the U.S. government has struggled to develop a comprehensive energy policy. Before the 1970s U.S. energy policy focused primarily on providing incentives for the oil and gas industries.[20] At that time, only a very small group of energy elites - mostly the producers of fossil fuels - were involved in developing energy polices. Most policies focused on how to increase energy production in order to provide abundant, stable and low-priced energy. Concepts of energy conservation and increased energy efficiency did not exist. Such an approach was feasible, because energy was available in abundance to very low prices. All of this changed after the first "energy crisis" in 1973 with the OPEC oil embargo. The sudden shortage of petroleum supplies put energy issues high on the political agenda and forced U.S. energy consumers for the first time to consider their energy consumption.

3.1 The first OPEC oil embargo in 1973

One of the first responses to the oil embargo of 1973 was the removal of mandatory petroleum import quotas. The mandatory quotas had been enacted after World War II to protect domestic oil producers through restricting petroleum imports. This has resulted in petroleum prices considerably above world market prices. The removal of the mandatory quotas intended to increase the petroleum supply and so ease some of the pressure caused by the OPEC oil embargo. Nevertheless, prices for gasoline in the United States had doubled by 1974 compared to pre-embargo prices and all other energy prices had also increased dramatically.

This led to a completely different focus of national energy policy: It increased the awareness of the connection between energy supply and economic growth on the one hand and national security on the other hand. Energy was increasingly seen as linked to foreign policy and the growing reliance of the United States on politically volatile regions for its energy imports was perceived as a threat to national security. To counter this threat President Nixon launched ***Project Independence*** stating the unrealistic goal of achieving energy self-sufficiency by 1980. James E. Katz calls ***Project Independence*** “a disastrous approach” and states:

> "Nixon was practically alone in his administration in believing that the nation could realistically become independent of foreign sources by 1980. The cost of this achievement would be astronomical, and, in economic terms, suicidal. The administration chose to deal with the embargo and energy shortage initially with symbolic gestures rather that with a meaningful plan of action".[21]

[18] Switzer (1998), p. 120.
[19] Umweltbundesministerium, www.bmu.de
[20] Mary M. Timney (2004), Power for the People. Protecting States' Energy Policy Interests in an Era of Deregulation. Armonk, N.Y., p. 17.
[21] James E. Katz (1984), *Congress and National Energy Policy*. New Brunswick, p. 30.

A more constructive approach was taken by launching a national energy policy for efficiency and conservation during the Nixon and Ford administrations.[22] The recognition that saving energy is a very cheap way to reduce energy consumption and also has a positive effect on the environment started to proliferate.

The election of Jimmy Carter in 1976 brought an even stronger emphasis on energy efficiency and conservation, for example via the National Energy Conservation Act and the National Energy Act of 1978. Carter also called for a stronger role of the federal government in energy policy. The creation of a cabinet-level Department of Energy (DOE) in 1977, which was supposed to bring together energy-related activities, was one step in that direction. Carter also started one of the most expensive energy programs in the history of the United States: the Synthetic Fuels Program to produce synthetic fuel derived from coal. In 1980, Congress approved $20 billion for this program, which was only part of a total of $88 billion to be expended on synthetic fuels within the next decade. Reagan stopped the program during his presidency, which proved to be highly inefficient.

3.2 Energy policy under Reagan

Under President Ronald Reagan U.S. energy policy took yet another turn. To limit government intervention as much as possible - in the energy sector as well as in virtually all other sectors, most prominently perhaps in the environmental sector - Reagan pursued a drastic deregulation policy. In the energy field, Reagan restructured the DOE and cut its budget significantly. Energy prices were decontrolled.

During the 1980s, the assumption prevailed that price controls would reduce investments in the energy sector. Prices set by market forces would increase domestic supplies of oil as well the development of alternative energy supply.[23] Energy policy became more market-oriented and the role of government was reduced.

In one sector, though, Reagan even increased government intervention, namely in nuclear energy. This change can clearly be seen in the structure of the budget of the DOE: Between 1978 and 1983, spending on energy conservation was cut from $538 to $22 million and spending on solar and renewable energy was reduced from $532 million in 1978 to $82 million in 1983. Spending on nuclear fission was merely reduced from $1535 million in 1978 to $1274 million in 1983. In that year, about 86% of total spending was devoted to the nuclear industry, whereas in 1978 this share was only 45%.[24]

Reagan's energy policy has been widely criticized for its concentration on the nuclear industry. It can be summarized as follows: Reagan's energy policy was successful in "untrammeling the oil-producing companies; reducing governmental energy organization and its attendant regulatory accoutrements; strongly supporting nuclear energy while cutting all other energy technology development; and eliminating past administration's commitments to environmental quality and energy planning, conservation, consumer protection, emergency preparation."[25]

3.3 U.S. energy policy in the 1990s

President George Bush basically continued the policies initiated by Reagan. Under his presidency the National Energy Policy Act of 1992 was enacted, the only important energy act in the 1990s. It contained measures in the areas of electricity, coal, energy efficiency and renewable energy, strategic petroleum reserve, global climate change and nuclear energy.

Even though the act lacked many important issues such as the tightening of the corporate average fuel economy (CAFE) standards, which will be discussed in more detail below, it was the first time in more than a decade that Congress became intensively active in the energy field.

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[22] Timney (2004), p. 20.
[23] Robert L. Bamberger (2002), *Energy Policy: Setting the Stage for the Current Debate* . Congressional Research Service, Washington, D.C., p. 2.
[24] Katz (1984), p. 163.
[25] Katz (1984), p. 153.

When Clinton came to power in 1993, he attempted to establish a national energy tax on gasoline, but was defeated by a wide margin in Congress. Clinton succeeded, though, in deregulating electric power industries and in restricting oil and gas drilling activity on federal lands.[26]

In the 1990s, the states became important actors in the energy field. For example, electricity restructuring and deregulating was initiated by several states. Moreover, the National Energy Act of 1992 gave the states greater leverage in energy policy by funding state energy offices to pursue efficiency and energy conservation programs.[27]

In general, the 1990s have not seen much action of the federal government in the energy field. Due to the relatively low and stable energy prices, energy issues became less important. An opportunity was missed to promote a more comprehensive future-oriented energy policy when it would have been less costly to do so. A paper of the Congressional Research Service comes to the conclusion: "An energy policy that would most effectively shield the nation and the economy from the worst effects of supply shortages would be a policy that might well deny the nation the full benefits of cheap and plentiful energy when markets are stable".[28]

3.4 The Bush administration and the Energy Policy Act of 2005

When George W. Bush took office in 2001 the energy situation was remarkably different. The price of a barrel of oil on the world market had risen to $35, the highest price since 1982. A task force headed by Vice President Dick Cheney, former CEO of Halliburton, was established, which was supposed to present an approach to meet the challenge of "the most serious energy shortage since the oil embargoes of the 1970s".[29]

The approach that emerged focused primarily on increase the supply of fossil fuels and nuclear energy. On the promotion of energy conservation, energy efficiency or renewable energy only very vague language was offered. Cheney's report emphasizes the importance of market forces and concludes that "reliance on market forces have led to major energy security gains over the past two decades."[30] Political measures are seen as secondary options only when private companies fail to provide a sufficient energy supply.

It is not surprising that the new Energy Policy Act of 2005 follows the same assumptions. President Bush calls the act, which has been debated in Congress for four years, "essential to U.S. national and economic security" and "a critical first step toward making U.S. energy more affordable and reliable".[31]

The Energy Act provides tax cuts and incentives for almost all forms of energy including renewable energy and energy efficiency, but the biggest winners are oil, gas, coal, and nuclear energy suppliers.[32] The act gives major incentives to the oil industry to drill in the Gulf of Mexico and to the gas industry to expand the pipeline systems. The nuclear industry receives subsidies for a variety of operations. The construction of new nuclear power plants, for example, is encouraged through a federal risk insurance for construction and licensing delays.

Provisions to tackle the vexing problem of global climate change and nuclear waste storage are not included in the act. In fact, the act has some major environmental flaws by exempting energy companies from some environmental laws, such as the Safe Drinking Water Act.

Moreover, there is no tightening of the corporate average fuel economy (CAFE) standards, which impose energy efficiency standards on cars and light trucks. These standards were first adopted in 1975 and have been very successful in increasing the average fuel economy of new cars (doubling from 1975-1985) and light trucks (50% increase in the same period) as can be seen in figure 11.[33] Since the late 1980s fuel economy has not been further increased. In addition to the CAFE standards, a tax on inefficient "gas guzzlers" was enacted in 1975. Today, though, most of the SUVs (sport utility vehicles) and minivans are exempt from the tax and it applies to relatively few new cars.

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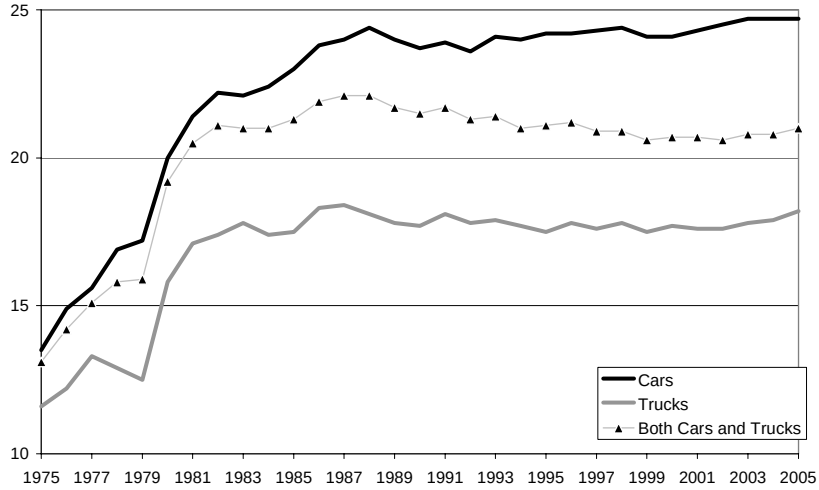
[26] Paul L. Joskow (2001), *U.S. Energy Policy during the 1990s.* Cambridge, MA, p. 2.
[27] Timney (1998), p. 29.
[28] Bamberger (2002), p. 5
[29] National Energy Policy Development Group (2001), p. viii
[30] National Energy Policy Development Group (2001), p. 8-1.
[31] The White House (2005), "President signs Energy Policy Act", http://www.whitehouse.gov/news/releases/2005/08/20050808-6.html
[32] Michael Grunwald/Juliet Eilperin (2005), "Energy Bill Raises Fears about Pollution", in: Washington Post, July 30, p. A01.
[33] Howard S. Geller (2003), Energy Revolution. Policies for a Sustainable Future. Washington, D.C., p. 100.

Figure 11:
Fuel Economy, 1975-2005, Miles per Gallon



Source: Environmental Protection Agency (2005), Light-Duty Automotive Technology and Fuel Economy Trends 1975 through 2005, Washington, D.C.

If U.S. imports of petroleum were to be reduced, the transportation sector would have to be the starting point, because almost 70% of all petroleum is used in transportation. So far the pressure of vehicle manufacturers has been too strong and so such action has been prevented.[34] In the Energy Policy Act of 2005 only a study of the possible effects of increased CAFE standards is required. Possibly in response to the criticism for not including tightened CAFE standards, Bush proposed new fuel economy standards about two weeks after signing the Energy Policy Act of 2005.[35] These new standards would apply to SUVs and minivans and differentiate six sizes of vehicles, in contrast to the now existing single standard for all light trucks. The proposed standards aim to save 10 billion gallons of gasoline over a period of 15 years. The effect on fuel consumption has been called "almost embarrassing" by Environmental Defense, a New York-based nonprofit organization, and "far-reaching" by the U.S. administration.[36]

In conclusion, it can be argued that the Energy Policy Act of 2005 does not present a comprehensive, sustainable approach to energy production and use. It is not more than a patchwork of various different measures with a strong reliance on technical solutions to energy challenges. This can also be seen in President Bush's energy budget for 2006. Bush proposed to spend $286 million for the Clean Coal Program, $260 million for the Hydrogen Fuel Initiative and about $100 million for nuclear fusion, which are all highly controversial programs.

4. Conclusion

What can be concluded? Is there a distinctly different situation in energy policy today? Why has the U.S. economy remained relatively unaffected – at least compared to the early 1970s - by the latest energy price hike?

It can be argued that the context for the latest debate on energy policy is distinctly different from previous ones. Several reasons can be stated to justify this argument.

First, even though energy policy has been primarily market-based since the 1980s, policy makers today increasingly consider market failures and national security concerns in the energy sector as adequate justification for governmental intervention.[37] In the 1970s, government intervention mostly aimed at protecting consumers and

[34] David Friedmann et al. (2001), *Drilling in Detroit.* Cambridge.
[35] Margaret Webb Pressler (2005), "New Fuel Economy Standards Proposed", in: *Washington Post,* August 24, p. A01.
[36] Pressler (2005).
[37] Bamberger, Robert et al (2001),. 'Domestic Oil and Gas Producers. Public Policy when Oil Prices are Volatile,' in Roland V. Barnes, eds., Energy Crisis in America?. Huntington, NY, 2001, pp. 93-116 (104).

the economy from high energy prices. Market failures in the energy sector include lack of competition and most importantly negative externalities such as environmental costs. National security concerns may justify government intervention in order to protect domestic producers of key commodities.

Secondly, the relatively low energy prices in the 1980s and 90s hampered investment in the energy industry which led to serious insufficiencies in the nation's energy infrastructure, such as refining capacity, gas and oil pipelines, transmission lines, and electric generating facilities. The Californian electricity crisis of 2000 and 2001 was a very drastic result of those insufficiencies.

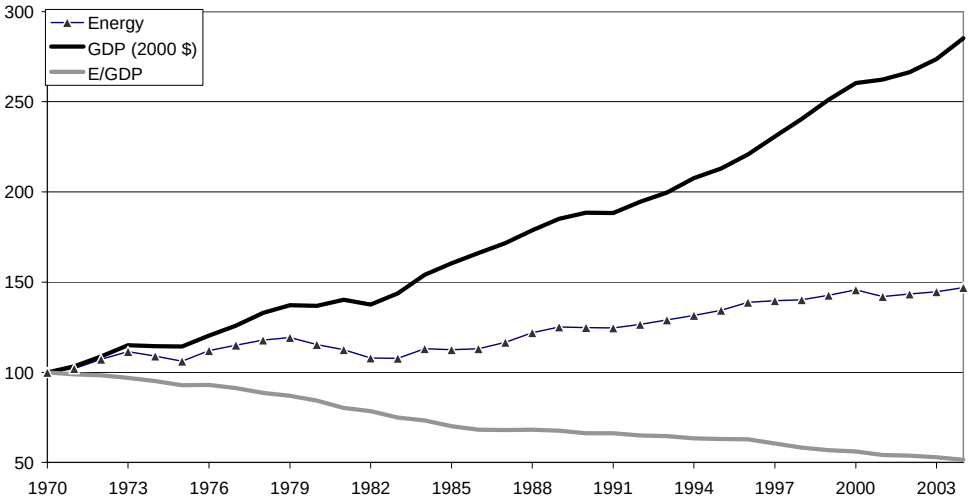
Moreover, energy prices today are much more volatile than they have been earlier. This leads to reluctance to invest in capital intensive energy infrastructure because returns on these investments are unsure.[38] Lastly, in the early 1970s, the global climate debate had not yet fully started. Global climate change, which certainly presents one of the most pressing problems of our time, adds further complexity to energy policy making. Energy policy makers today will have to take these concerns into account. If they decide to act on it, is something different.

All these aspects illustrate how the energy situation today is different from the one in the 1970s. One more factor is remarkably different, namely the effect of higher energy prices on economic growth.

Why have the rising oil prices since 1999 not affected the economy as heavily as the three previous shocks even though prices for crude oil jumped from around $15 per barrel in 1999 to well over $60 per barrel in 2005? In 1974/75 after the first OPEC oil embargo and in 1980 after the second oil price shock, the U.S. economy had negative growth rates of −0.5 and −0.2%. Since the latest oil price rise the U.S. economy is still growing at robust rates.

The two most important reasons for this situation are changes in energy intensity and energy efficiency (see figure 12).[39] Energy intensity is measured by the amount of energy required per unit of GDP. Figure 12 shows that since the 1970s the ratio of energy per unit of GDP (E/GDP) is declining, so today considerably less energy is needed for one unit of GDP. Between 1970 and 2005 alone the amount of energy needed to produce a dollar's worth of goods and services in the U.S. economy fell almost by half. Between 1949 and 1970 energy intensity declined only by eight percent. Between 1973 and 1985 the decline in energy intensity was highest with rates of about 2.7% per year. This is clearly a result of the political efforts in the 1970s and early 1980s to increase energy efficiency.

Figure 12:
U.S. energy consumption, GDP and energy intensity, 1970-2004 (1970=100)



Source: Energy Information Administration

However, it is important to keep in mind that energy intensity is not the same as energy efficiency even though both measures are sometimes used interchangeably. The E/GDP ratio in itself does not allow for clear assumptions on the development of energy efficiency. This is because the energy intensity ratio is not only de-

[38] Enno Harks (2004), "Der hohe Ölpreis. Anzeichen einer neuen Ölkrise?", SWP-Aktuell 2004/49. Please quote the English version, too.
[39] Labonte/Makinen (2001), p. 118.

termined by energy efficiency, but also by structural, behavioural, and other external changes. True efficiency changes were depicted in figure 11 for fuel economy. Structural changes in the U.S. economy, most notably the shift from the industrial to the service sector, explain the reduction in energy intensity to a significant degree. Nevertheless, improvements in energy intensity and energy efficiency – be they deliberately encouraged or only a "by-product"- remain the best option to reduce negative effects of price hikes.

This does not mean, however, that the U.S. and the world economy will continue to be relatively mildly affected by high energy prices, especially if, and this is highly likely, oil prices will not return to pre-1999 levels. The industrial world most probably will have to get used too much higher energy prices in the future. But high oil prices might be able to achieve what U.S. energy policy could not or did not want to achieve in decades: a reduction of energy consumption and increased energy efficiency. This would actually foster both the protection of the environment as well as the reduction of oil import dependency.

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