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The Oil Shortage – A Time for Change

The era of cheap oil has been and gone

Authored paper by the Members of the German Bundestag

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Summary

For years and decades, the International Energy Agency (IEA) and the mineral-oil companies have sent out the message that there will be sufficient oil over the long term and prices will remain low, a message that is just as incorrect as it is disastrous. With the political interests of the IEA and the economic interests of the mineral-oil companies being taken as givens, it has been suggested to the world that there will be no cause to worry until well into the 21st century and there is no need to have a strategy in place for action to reduce our dependence on oil. This has proved to be false. As a result, valuable time has been lost that our economies would have needed to prepare for the oil shortage. All our institutional early-warning systems have failed – with drastic consequences.

Anyone who starts from false premises will not be able to find the best possible solutions. What, then, is the problem that we have to solve? The Energy Watch Group has shown that we are racing straight into an oil shortage, as global oil production cannot grow any more, indeed will actually fall at a rapid pace. What is the solution? We have to move as rapidly as possible to end our dependence on oil and the other limited resources that are now being overtaken by the storm of shortages. We need to stop using oil – and the faster the better.

This can only be done with a holistic strategy that uses socially acceptable measures to prioritise energy saving and the efficient use of resources in all areas of activity, just as much as a rapid transition to renewable energies.

Anyone in politics who proposes reductions in energy taxes or more subsidies, such as an increase in the mileage-based tax allowance for commuters, is trying to put out the fire by pouring cheap petrol on it. Anyone who thinks this way is investing in things that will only encourage the flames. Instead of making the shortage problem even worse, we need to invest large amounts of money in energy saving and unlimited alternative sources of energy all over the world.

No one knows how high the oil price will rise in the next few months and years. However, it is certain that no more crude oil can be consumed than can be extracted. In consequence, the price will have to rise continually until it reaches a level at which demand adjusts to the falling supply.

Anyone who can no longer pay this price will find themselves left by the wayside. Crude oil and, consequently, petrol, diesel and kerosene will become luxury goods. It is the poorer sections of the population around the world that will be affected by this. Those developing countries in Africa, Asia and Latin America that do not possess their own crude oil reserves will suffer to a particularly great extent from the price rises. Private households and state budgets are coming under considerable pressure in these places. But the upsurge in prices is not necessarily an opportunity for developing countries rich in crude oil either. Corruption and conflicts over access to resources are already associated with mineral riches in many of these states today. The run on the remaining oil fields being driven by the major consumer countries will spread and intensify the conflicts over resources.

However, rising oil prices mean not just rising heating costs and petrol prices, but also higher production costs, in particular for foodstuffs and many chemical products. Inflation is going up. The 1970s gave us a foretaste of this – except that the oil crises of that time were attributable to a shortage caused for political reasons by the OPEC states, and important new oil fields like those in the North Sea were discovered. Today, however, even with the best will in the world, no more crude oil can be extracted. The high point of oil production has been passed, as the stagnating production figures since 2005 prove. The fact that the pressure of global demand has increased strongly during the same period only makes the problem even worse.

Natural gas, coal and uranium do not offer ways out of the oil crisis. They too are finite and their prices have also increased a great deal in the recent past as soon as the first signs of scarcity become evident. Anyone who looks on these energies as alternatives to our rapidly dwindling stocks of crude oil is out of touch with reality and will only waste further time and funds.

Renewable energies have made tremendous progress over recent years as far as technology and the reduction of costs are concerned. It is here and in a comprehensive energy-saving strategy that our great opportunity lies. There is no other, we have to exploit it now and do so more consistently and rapidly than hitherto. At the same time, this is a big chance for climate protection and Germany as a high-tech location.

From the oil crisis to current consumption

The oil shock of 1973 is still fresh in many people's memories. At that time, OPEC cut off the world's supply of oil for political reasons. Sunday driving bans, driving restrictions based on number plates and other drastic measures were the consequence. At a single stroke, the international community became aware how dependent its prosperity, its economy and, indeed, its everyday life were on a sufficient flow of energy supplies.

But the low oil prices of the 1980s and 1990s led to a waning of this awareness, and the world's dependence on oil increased. Over the last few years, according to the IEA, the average annual rise in demand has been more than 2 million barrels a day despite big surges in oil prices. By way of comparison: Germany consumes a total of roughly 2.5 million barrels a day. A large proportion of the forecast increase is attributable to the high levels of economic growth and the major increase in the numbers of cars in Asian countries. This strong expansion of consumption in some regions contrasts with oil production that has been stagnating recently and will soon start to fall. Since the supply of crude oil has been stagnating, the increase in consumption in some regions has been associated with falls in consumption in other regions.

The new dimension of the critical oil shortage

The oil shock of the 1970s is now threatening to repeat itself in a changed form as a long-term crisis caused by a shortage of resources. In contrast to the 1970s, however, today's crisis cannot be dealt with by opening up new oil fields over the short term or shifting to other fossil energies, such as natural gas. This is imposing immense pressure on the markets and threatening the world economy with unforeseeable consequences, particularly for the developing countries.

The distinctive features of the oil crisis that is now beginning are the dynamic speed with which it has taken hold and the economic turbulence it has been able to cause within just a year. We are not experiencing a gradual process in which it is possible to slowly change course, but are now moving into the dynamic phase of the shortage, in which the gulf between demand and supply opens up very fast. This means we are facing a global challenge that is extremely complex and difficult to cope with.

Alliance 90/The Greens was not just the first party to demand – many years ago – that the use of crude oil be phased out and a fundamental change of direction made, but actually began steps to bring this about when we were in government with the Renewable Energy Sources Act and other measures – and also stands for a different lifestyle, as well as a political programme with an overall focus on sustainability.

This paper is intended as the first contribution to a discussion about the causes, effects and ways out of the current critical oil shortage.

Development of oil production

Until the early 1960s, significantly more crude oil was being found than was being consumed. This situation has long since been reversed. For several decades, the amount of new reserves found each year has only represented a fraction of annual crude oil consumption. It is true that there are reports again and again of new fields being discovered. A closer look shows, however, that the forecast levels of output from these fields are markedly less than new discoveries in the past.

Institutions like the Energy Watch Group (EWG) and the Association for the Study of Peak Oil and Gas (ASPO) also assume more new fields will be found. However, they warn that these fresh reserves can only replace a small proportion of the exhausted oil fields.

The fact is that oil production has been falling for years or even decades in many countries and producing regions. It has been going down ever since the 1970s in North America, and the same has been happening since the beginning of this decade in the North Sea as well. There are only a few regions where production could still be increased somewhat, which include parts of Africa and Brazil. However, the growth rates in these regions will not even be enough to compensate for the falls in output from the old producing regions over the next few years, let alone to satisfy the additional demand. Ultimately, oil production will reach its peak and then fall in these regions as well.

For a long time, the International Energy Agency (IEA) based in Paris has been placing its hopes for the future in a number of Middle Eastern states tangibly increasing their oil production. In this respect, it is completely unclear what capacities Saudi Arabia and Kuwait really have left. The often announced increases in production volumes to 13 million barrels have not materialised to date. Saudi Arabia still produces 9 million barrels of oil a day. And even an increase by 4 million barrels would be cancelled out in two years by rises in global demand. In the mean time, the IEA has clearly played down its earlier demand-guided scenario in its public statements. It has long been overdue for the IEA to get in touch with reality. Nevertheless, some mineral-oil companies, such as BP, are continuing to divert attention from the shortage problem with largely irrelevant long-term estimates of reserves.

It is extremely questionable whether a technological fix can be found for the way the world's oil reserves are running dry. Again and again, there are reports that new technologies will make it

possible to increase yields from oil fields. Nothing has been seen to confirm the truth of this. Some of the technologies being mentioned have already been in use for many years, yet have not been able to hold up the fall in production in a large number of locations. Sometimes, they may help to slow the decline of production over the short term, but this effect fades away after a few years. In addition to this, certain approaches, such as horizontal drilling and the water injection method, involve the danger that short-term increases in production may be purchased with lower overall yields from the oil fields where they are deployed.

The hopes placed in oil sands and oil shales are not justified either. What appear to be large resources on paper are subject to enormous technical, ecological and, above all, financial constraints, which mean their development cannot compensate for the falls in production from conventional sources.

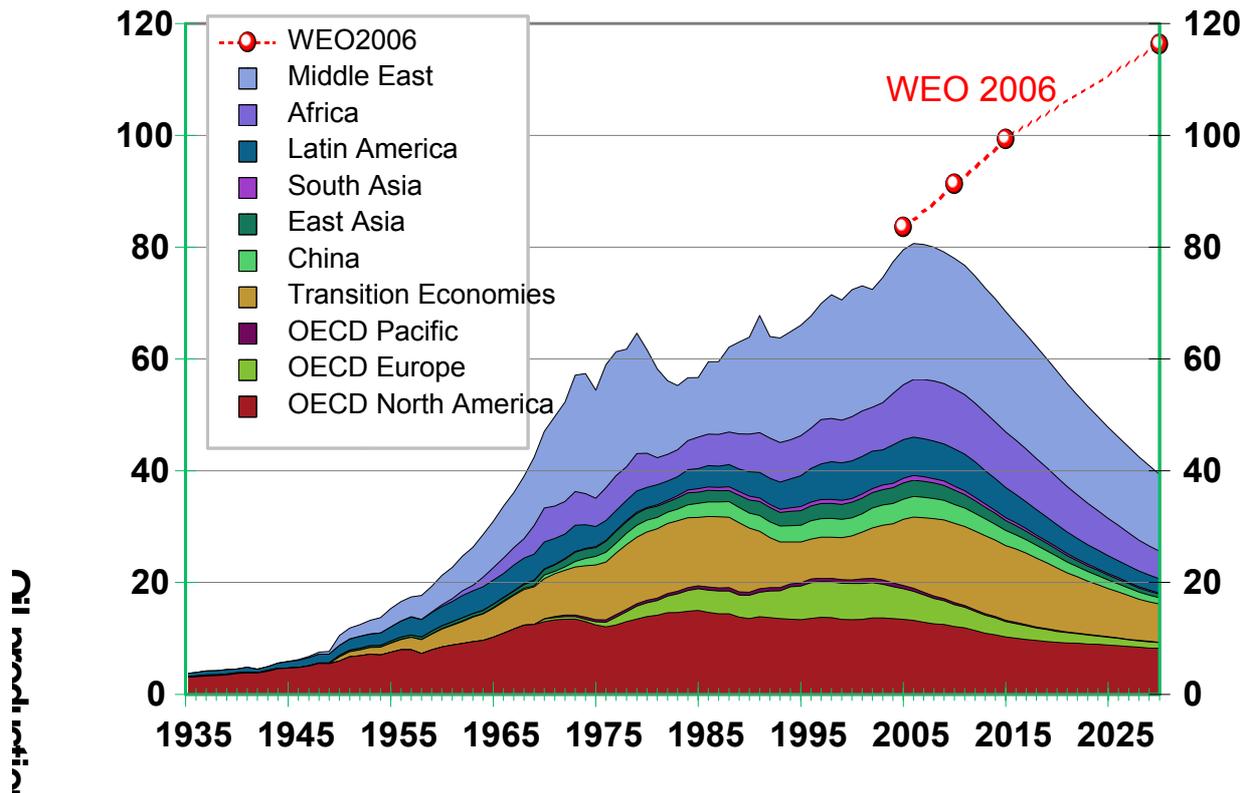
Forecasting the extent of the problem

Forecasts about the limits of oil reserves were already being made long before the oil wells started drying up all over the world. Almost at the same time as the oil crisis of 1973, the Club of Rome presented the first research-based conclusions concerning the finite nature of these resources to the world public.

Current forecasts concerning the availability of crude oil diverge widely. While BP sees no likelihood of bottlenecks for decades yet, the IEA is already displaying greater caution. It warns, for instance, that the high point in output of crude oil will be reached in 2030 with production at 120 million barrels a day. To be more accurate, this is the level of demand forecast by the IEA, which assumed for a long time that it would be possible to meet this demand, but has itself now started questioning the feasibility of this assumption.

Not all forecasts put Peak Oil in the future. In its most recent study of oil resources, the Energy Watch Group (EWG) comes to the conclusion that the maximum level of oil production was passed back in 2006. Approximately 81 million barrels were being produced every day in 2006. Since then, daily production has fallen continuously. Neither rising demand, high oil prices, the feverish search for new oil fields nor further investment in production capacities have been sufficient to counter this decline.

By way of comparison: From 2001 to 2005, oil production rose rapidly from approximately 72 to 81 million barrels a day on account of economic growth in the Far East. The EWG quantifies the future annual decline in production at three percent, which would mean that production would not be 120 million barrels a day in 2030, but 40 million.

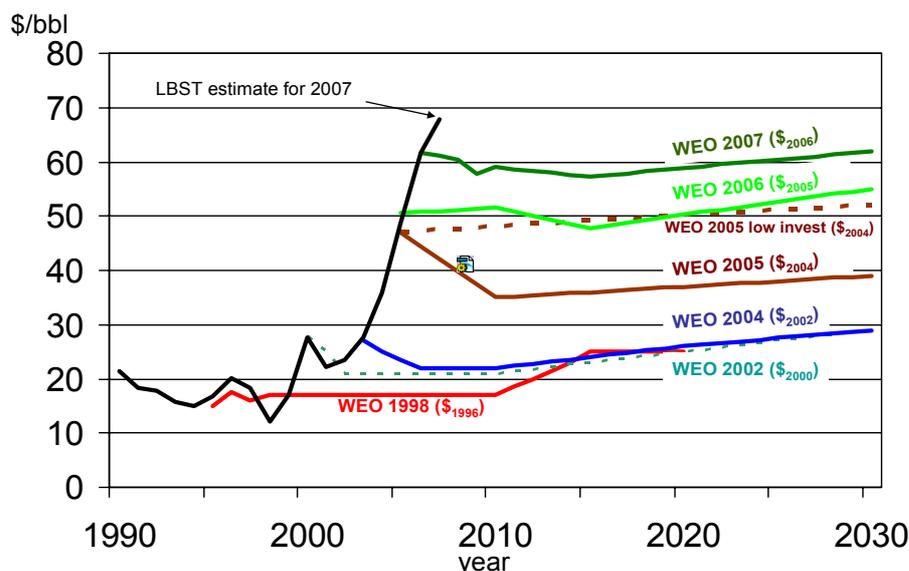


GRAPHIC: EWG: Oil consumption figures from the EWG and the IEA

The estimates issued by the IEA and the EWG differ fundamentally. The overwhelming majority of governments, economists, politicians, journalists and energy researchers have followed the IEA's statements until now. Over the last few years, though, the IEA has got decisive parts of its forecasts completely wrong. It did not notice the maximum levels of output being passed in important producing regions, such as the North Sea or Mexico, and rejected forecasts of falling production rates. In retrospect, however, these forecasts, drawn up by the petroleum geologists of the critical ASPO network, have proven to be absolutely correct.

Since the turn of the millennium, crude oil prices have increased more than ten-fold: from about 10 dollars a barrel to more than 130 dollars in May 2008. The IEA never forecast that prices would develop in this fashion. In 2004, the IEA forecast an oil price of 22 dollars a barrel for 2008. In November 2007, when the oil price stood at approximately 100 dollars, the IEA was, as ever, forecasting a rapid fall from the high oil prices at that point, with a minimal increase to about 62 dollars a barrel in 2030 – forecasts that seem absurd in view of the current price of oil! Even so, it is precisely these absurd forecasts that are accepted as realistic.

IEA Ölpreisprognosen



GRAPHIC: Oil price forecasts from the IEA's World Energy Outlook (WEO) compared with the real development of prices

Even in its most recent World Energy Outlook (WEO), the IEA sticks to its old message that rising oil prices are not due to reserves becoming scarcer and there is still plenty of crude oil. This opinion, which is also widespread among scientists, economists, journalists and politicians, will be highly dangerous should it not be correct – and there is a growing weight of analyses that suggest the world economy has already entered a stage in which there will be physical shortages of crude oil, though not of all commodities.

Peak Oil

The high point of oil production is known as Peak Oil (also peak of oil production). After this point has been passed, global production will fall permanently. Peak Oil marks the moment when an epochal global change takes place – the beginning of the end of the age of oil. A sufficient period of preparation would be required in order to manage the transition to the next, post-fossil age. Until now, however, we have failed to prepare globally and nationally for the shortage phase and ensure we are able to make the transition to renewable raw materials without problems and social friction. Only the Greens have always pointed out that our resources are finite. Valuable time has been lost all over the world and now has to be made up for. Those who continue to play for time and want to carry on with business as usual are putting our further economic development at danger from major social upheavals.

Natural gas, coal and uranium cannot make up for the decline in oil production.

Natural gas is already in short supply in some parts of the world. The fall in natural gas production in the UK and the Netherlands is a first warning sign that Europe too is likely to be threatened by a shortage of natural gas as early as the next decade. Nor will new pipelines help in this respect if they do not result in the development of any fresh sources of natural gas on a relevant scale.

Uranium plays only a marginal role in world energy supplies today, meeting less than 2.5 percent of global energy demand. Even with this small market share, there have already been shortages

on the uranium markets that, at times, have driven the volatile prices for uranium on the spot market up by a factor of as much as 18. It is inconceivable that uranium could become a replacement for crude oil on a relevant scale in future. It is foreseeable that the operators of nuclear power stations will have enough problems just finding sufficient uranium to run their current nuclear power stations at full capacity over the medium and long term.

Presently, only approximately 60 percent of the world's uranium demand is met by current uranium mining and about 40 percent from stocks. These will last until approximately 2015, 2020 at best. At the moment, the nuclear industry is therefore seeking desperately to drive ahead worldwide uranium extraction through new mining projects so that at least the ongoing demand of the nuclear power stations currently in operation can be met. Any noteworthy expansion of the world's nuclear power station capacities is therefore inconceivable. The nuclear industry also faces a fuel shortage due to the worldwide failure of rapid breeder projects.

There are already shortages in coal supplies on account of the strong growth in demand for coal from China. China, until recently a coal exporter, has become a coal-importing country, and even a classic coal-exporting country like South Africa has had to announce a national emergency and cut electricity production due to a lack of power-station-grade coal. Currently, it is almost inconceivable that coal will be able to replace the oil being lost to a relevant extent. Furthermore, the fact that the coal price has already doubled between the beginning of 2006 and the present day has not led to an increase in production. This has come as a complete surprise to the many people who adhered to the assumption that there would be sufficient coal for centuries ahead. However, even if large quantities of coal were available around the world, their use would be ruled out by climate protection.

The particularly dramatic nature of the fossil and nuclear resource situation is a result of the overlapping effects of the peaks in the production of oil, gas, uranium and, somewhat later, coal that are following each other in rapid succession: none of the other sources can take crude oil's place in quantitative terms. The likely levels of production will not even be sufficient to meet current demand for fossil and nuclear raw materials, let alone what is expected in future – certainly not if it rises further as forecast. The gap between the demand for, and consumption of, raw materials will become ever greater. Only inexhaustible renewable energies would be available in sufficient quantities if their commercial and technical development progressed fast enough.

Consequences of the oil shortage

The oil shortage has the following implications: The demand for oil will continue to increase noticeably. However, oil production can no longer meet the rising demand for crude oil. Since no more crude oil can be consumed than is produced, demand must adjust to supply. This will occur by means of price rises that take place until supply and demand from those able to purchase are in equilibrium. It is hardly possible to estimate the oil price – 150, 200 or 250 dollars a barrel – at which this will happen, particularly as it will also depend on other parameters, such as the stability of worldwide economic activity and the financial markets. However, it is obvious that the price must be so high that demand is clearly curbed. The consequence will be considerable effects on the development of the world economy. Once a certain price has been reached, the developing and threshold countries will no longer be in a position to pay the high market prices for energy. This will rein in demand, but also have serious effects on individuals and the world economy. We already find ourselves in a situation where weaker economies cannot compensate for rising prices any

more. As the supply of crude oil can no longer be increased, the rising demand in certain sectors and countries will inevitably lead to a reduction of demand in other countries and sectors. The greater the demand from China, the less Africa can consume.

The high oil price will initially have less of an impact in the industrialised countries than in the developing countries.

Since it is a shortage we are having to cope with, the most damaging measure that governments could take in response to the oil crisis would be to cut energy taxes. The only consequence would be a rise in demand. However, this would not be accompanied by a greater availability of supplies. Prices would then have to rise once again. The income generated would subsequently flow to state-owned and private mineral-oil companies instead of the state. High prices would then be accompanied by even higher levels of public debt, forcing the state to put up other taxes or cut benefits.

Apart from economic disruption, there would be societal frictions marked by increasing social tensions and inequities in the distribution of resources as they become more expensive, just as much as a destabilisation of the geopolitical situation. It will not take decades, but just a few years for the process triggered by the oil shortage to become more dynamic. The governments of the world are accelerating it by continuing to follow the questionable forecasts issued by the IEA.

Oil-exporting countries

Economic distortions will continue to grow stronger in oil-producing countries where crude oil is one of the main sources of revenue. In what are known as "rent economies", other branches of the economy have hardly any opportunities to develop. These economies are dependent on crude oil as well, even if it is the export of crude oil.

The producing countries convert a proportion of their oil revenues into consumption, from which our export businesses benefit too. However, this benefit is marginal in comparison to the dangers our economy is exposed to as a result of its dependence on oil. Apart from high energy prices, it is necessary, above all, to highlight the danger that companies in Germany will be bought up. Today, oil-producing countries already hold increasingly large stakes in DAX-quoted businesses. As they build up their liquidity, it is foreseeable that these holdings will increase markedly. In the worst case scenario, our domestic economy is in danger of being sold off.

Potential conflicts

It is uncertain what role the markets and what role the power factor will play in the distribution of the remaining resources. Back in the 1970s, oil was deployed as a political weapon in order to exert pressure on the West over to its policies towards Israel. Why should this not be repeated if the potential threat is incomparably greater in a situation marked by shortages? It is already impossible to ignore the fact that certain nations are seeking to gain influence in oil-producing countries – sometimes even using force to do so. Rising energy prices provoke dissatisfaction and trigger internal conflicts within states. If unrest breaks out, authoritarian governments, in particular, will not shy away from using force to suppress it.

At the moment, the industrialised and threshold countries are seeking to secure access to the resources that are still available. In this respect, they are relying above all on bilateral agreements

and influence. Only an energy policy abroad that concentrates on multilateralism, fair access to resources, renewable energies and energy saving can prevent the worst consequences of these activities. Military measures to secure conventional energy supplies of the kind being proposed by the Christian Democratic Union (CDU) and Christian Social Union (CSU) are only likely to provoke conflicts.

Impact of the oil shortage on road use

Driving a car will become more expensive. Above all, petrol prices will rise drastically. However, cars too will themselves become more expensive on account of innovative, more efficient drive technologies. If our current “gas-guzzling” structures are kept in place, ever fewer people will be able to afford the high fuel prices, which will lead to a clear reduction in private traffic. In Germany, partly due to the ecological tax reform, we have already had comparatively high petrol prices over the last few years, which has created incentives to develop and sell more economical vehicles.

Private road use will have to change. Car manufacturers who cling to old concepts will not be able to hold their own in competition. Furthermore, traffic will be transferred more and more to modes of transport that are considerably more economical than the car. Bicycles and, increasingly, electric bicycles will play an important role in cities and on short journeys. Electric scooters will not only replace smelly, noisy motor scooters, but also represent an alternative to the car over certain distances and at certain times of the year.

However, the car too has a chance – if it evolves fast enough. The first step has been taken with the hybrid car. Next it will have to be a hybrid car that can be connected to the mains. Such “plug-in hybrids” will be able to drive 30, 50 or 80 km purely on electricity from ecopower, enough for the majority of everyday car journeys. For longer distances, an engine will kick in as well. If biofuels supply the additional energy, oil will even have been cut completely out of the equation. In this respect, biofuels could be used extremely economically in plug-in hybrids of this kind. A pure electric vehicle does not even require biofuels.

The future of the lorry is uncertain. Delivery vehicles that travel mainly in urban areas are perfect for electric drives. However, batteries soon run up against their limits when it comes to long-distance traffic.

Transportation by rail or through pipelines is more efficient. Our railway system will need to be expanded significantly. The line closures of the past will have to be reversed – in so far as this is still possible.

It would be even more fundamental to manage our production and consumption with less traffic. This would significantly reduce the length of supply lines and make a large proportion of transport movements superfluous. Local producers who supply retailers and customers in their own regions will become more significant.

Impact of the oil shortage on railways and public transport

The use of electricity to run rail services could easily create links between the railway industry and the rapidly growing renewable generation sector. Technologies that supply current through rails or cables make it possible to deliver power directly and so operate locomotives without batteries, the

mass production of which may represent a barrier in the way of a rapid transition to electric vehicles for private use.

The railway industry will therefore gain markedly in competitiveness over the next few years.

Impact of the oil shortage on aviation

Aviation is as good as totally dependent on oil. Alternative fuels are almost completely impracticable and battery drives out of the question in this field. Hydrogen takes up far too much space and is far too heavy. What remain are regenerative raw materials, which are available in limited quantities, and coal liquification. However, liquified coal would not only be considerably more expensive than the kerosene in use today; it would finally make the aeroplane a climate killer. Nevertheless, there are signs that the aviation industry wants to take this route. For instance, an Airbus is already flying on a synthetically produced fuel derived from natural gas.

However, the most probable outcome is a decline in the levels of air traffic because the price of kerosene will push down air passenger numbers as it becomes ever more expensive.

In consequence, it does not appear very advisable to still be investing in the expansion of capacities at airports today. Pumping public and private money into projects of this kind threatens to create white elephants as business plans based on constantly rising figures for the volume of flights threaten to collapse. At the least, a critical review of these developments would be necessary. Expansion plans for airports, e.g. in Frankfurt and Berlin, also need to be scrutinised once again against the background of the new oil crisis.

Impact of the oil shortage on shipping

The shipping industry is accustomed to low energy costs. Until now, it has overwhelmingly used dirty, cheap, low-quality heavy oil as a fuel. But even this is becoming more expensive.

Energy costs will be a factor in waterborne transport for the first time. Alternative drives will get a chance in the shipping industry – first and foremost wind energy. For thousands of years, wind was the main energy used to propel ships. The future will bring the hybrid ship on which, apart from engines and possibly fuel cells, wind power will play an important role on routes where there is plenty of wind. Innovative approaches such as traction kites or on-board Flettner rotors could make a contribution.

Electric power will again have good chances – as it did 100 years ago – when ships and boats are travelling through coastal waters or along inland waterways. Solar boats will ensure boat excursions can be run on the River Spree in Berlin and lakes elsewhere while both preserving clean air and water and reducing noise pollution.

Impact of the oil shortage on infrastructure

Large parts of our infrastructure – primarily our transport infrastructure – are designed for car traffic. Our roads have been built for cars and lorries. In some cases, the whole structure of settlements in the USA and elsewhere has been planned to be totally reliant on the car, while the "drive in" has become part of the culture. Bicycle paths and pedestrian precincts are unknown there. Anyone who does not have a car has problems going shopping.

A look at these places makes it clear that our towns and settlements will have to be structured differently in future.

Whereas our vehicle fleet and heating systems can, in theory, be replaced within one or two decades if necessary, infrastructure has totally different cycles. It could take 100 years until the process of adjustment has been successfully completed in this field. With the best will in the world, our stock of buildings cannot be converted to comply with the passive house standard within a couple of dozen years, while the transition from motorways to railways will require many decades. This also illustrates how our societies are affected to differing degrees by the oil shortage. The more an individual society is geared towards the car and the greater its demand for energy in the buildings sector, the more intractable will be the difficulties that society will have to face.

Impact of the oil shortage on the chemicals industry

Process manufacturing will be affected by the oil shortage to a great extent. The shortfall will be particularly relevant to petrochemicals. The industry has been used to low oil prices for decades and obstructed any taxation of crude oil in this sector by means of clever lobbying. The price increases are therefore hitting home all the more in this field. Petrochemicals face a very serious problem: The basis of raw materials on which it is dependent is crumbling away.

What are the alternatives? Renewable raw materials, above all. However, there is also demand for these substances on the energy markets and, in addition to this, renewable raw materials sometimes find themselves in competition with foodstuffs, for which there is also significantly greater demand. This is why it will be necessary to apply new solutions for the use of biomass in future in order to exploit it more efficiently than in the past. Biorefineries are one such approach. They bring together technology paths that have been pursued independently from each other up until now and exploit renewable raw materials to the full in ways analogous to the conventional processing of crude oil. Consequently, biomass is used to produce a wide range of valuable (and highly priced) commodities. These commodities can then be further processed in industrial applications, above all as replacements for oil in the chemicals industry and plastics manufacturing. One important product from biorefineries is bioethanol, which can either be used as a fuel or play a part in the production of plastics.

One other alternative being considered by some chemicals companies is coal liquification, a technology that is highly problematic. Coal has not only doubled in price recently; more than anything else, coal liquification is extremely damaging to the climate. At a time when climate change is accelerating, the chemicals industry will have difficulties converting to coal as its basic raw material. It is possible that the large-scale production of chemicals from coal will increasingly be relocated to countries that do not want to set any climate protection goals. However, the shortage on the coal market today is already making it plain that these alternatives are not practical, at least not for all market participants, and their use would help to speed up the rate at which coal reserves are exhausted. Against this background, German lignite finds itself under particular pressure of extraction and use as a regionally available fuel. However, it is particularly damaging to the environment and climate and its exploitation clashes massively with our environmental targets – strategies need to be developed for the management of this resource.

Impact of the oil shortage on agriculture

Decades of cheap oil prices have made agriculture heavily dependent on oil products. This starts with the tractor and ends with artificial fertilisers. Artificial fertilisers and pesticides are produced using large amounts of mineral oil. As a consequence, the prices for mineral fertilisers also rise when the oil price goes up. This is one of the most important reasons for the strong increase in food prices over the last few years. Continuing to rely on conventional mineral fertilisers would result in rising food prices.

Many farmers – especially in the poorer countries – will no longer be able to afford the prices for mineral-oil-based fertilisers as they continue to soar. Either they will be forced out of the markets or they will succeed in keeping pace with conventional agriculture using alternative, more ecological farming methods. The gap in costs between conventional farming and organic farming will narrow more and more over the next few years. The level of oil prices from which conventional farming will become more expensive than ecoagriculture needs to be investigated.

The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) has called for hunger to be tackled not by making agriculture more intensive, but by consolidating small-scale farming structures and regional economic cycles.

In the agricultural sector, we find more competitive organic farming on the opportunity side. Various studies have shown that ecological farming can be much more effective in helping small farmers, especially in the threshold countries, to achieve food security than intensive agriculture with high levels of purchased factor inputs – let alone when genetic engineering is deployed.

Should it not prove possible to further strengthen ecological farming methods and regionally anchored small farming around the world in the next few years, there will even be reason to fear that excessive prices for oil-based fertilisers will also drive down agricultural yields and considerably exacerbate the shortage situation on the agricultural markets. Food prices would rise noticeably, which would have a particularly negative effect on poorer people. The most recent rises in food prices have also been caused by the increases in the price of oil.

Anyone who clings to oil-based agriculture at a time of oil shortages is putting the global supply of foodstuffs in danger.

Another impact of the oil shortage on agriculture is the rising demand for fuels that can be substituted for oil, including biofuels. On the one hand, this improves farmers' incomes. On the other hand, unsustainably cultivated biofuels also increase the prices for foodstuffs. Other factors that drive up food prices include failed harvests – above all due to the warming of the climate, the rising demand for biomass, foodstuffs and animal feeds and the inflation in the prices for fuels and mineral fertilisers discussed above. Without doubt, however, the competition for farm land will additionally aggravate the shortages on the agricultural markets. Answers must be found for this problem. They will include the simultaneous mixed cultivation of food crops and energy crops, as well as the development of degraded areas of land. Such an approach will make it possible to preclude competition between different land uses. However, this is not something that will happen by itself, but will require a comprehensive strategy.

Impact of the oil shortage on public budgets

Public budgets will be affected by various effects of the oil shortage. These will include greater expenditure. Higher energy prices can be felt immediately where the public sector itself purchases energy. This is true above all for the estates managed by the public sector, which owns approximately ten percent of the total stock of buildings in Germany, as well as its vehicle fleet. One major energy consumer is the Bundeswehr, Germany's federal armed forces, which heat barracks and whose vehicles, aircraft and ships have to stay mobile, even when oil prices are high.

Furthermore, the public sector will incur high additional expenditure in the social field. Direct and indirect subsidies to rental costs will have to be adjusted to take account of rising heating expenses. This is an area where billions of euros can be spent very quickly. Further billions of euros will have to be invested in order to insulate our residential accommodation, convert our transport infrastructure and help renewable energies to make the breakthrough as alternatives to crude oil.

How serious the effects already are today is shown by the warnings of the German Hospitals Federation. The Federation is forecasting closures in 2008, above all of smaller hospitals in rural regions, because the total deficit of 2.2 billion euros across the whole hospital sector in Germany is no longer manageable. One of the most important reasons mentioned is a 950-million-euro rise in personnel and material costs, something that is attributable above all to increases in energy and food prices, both of which have been caused mainly by the higher oil prices.

It is to be presumed that the reduction in revenues will be even more serious than the higher expenditure that is incurred. Tax revenues depend to a great extent on the development of the economy. If the economy grows, tax revenues rise. If the economy stagnates, revenues turn out lower. If tax revenues are flowing freely, the debts of the past can be paid off too. If revenues falter, annual budgetary deficits grow larger, and the debt mountain gets bigger at the same time. If the world economy is going to get stuck in a long recession over the next few years and possibly even decades due to an oil shortage, there is a risk that the mountains of debt will grow so huge that whole economies find themselves in danger.

Public budgets will become completely unbalanced if populist political measures gain acceptance. Demands for the reduction of mineral-oil tax or increases in subsidies for heating costs are already to be heard today. However, these instruments are unsuitable because they lead the consumer to believe that ever more expensive crude oil prices can be compensated for with tax reliefs or increased subsidies. The pressure to convert to renewable energies and save energy is taken off consumers and, at the same time, public budgets become overstretched.

Impact of the oil shortage on developing countries

The decline in oil reserves and the inflation in prices for raw materials are already having bitter consequences today for the poor states of this world. Developing countries reliant on imports of oil, gas or coal have consequently seen rising energy prices eat up the low growth rates of their economies.

Energy prices have a serious effect on agriculture and the worldwide supply of foodstuffs. The rising oil price makes fertilisers, transport and production more expensive, added to which there is the growing demand for meat and dairy products in the threshold countries, such as China and India, as well as speculation on the financial markets. Developing countries can no longer make up

for all this and the neglect of small-scale farming and decentralised structures in the energy industry. Meanwhile, more than 33 states are at risk from unrest and instability because their citizens can no longer afford their daily rice, maize or wheat. This process is threatening to accelerate because these states have no reserves of any kind with which to respond adequately to this development.

In developing countries that are rich in crude oil reserves, however, the worldwide shortage will trigger a dynamic process with negative effects or strengthen existing structures that obstruct development. It is true that revenues from the oil business will rise, e.g. in countries such as Nigeria or Angola. Yet the poor populations of these countries, in particular, have never profited from the massive amounts of money that have been earned because the funds in public budgets have been frittered away through corruption and bad governance.

There is now a danger of these problems being made even worse, for financially strong state companies from the major threshold countries, China, India and Russia, as well as the industrialised states are making ever more aggressive approaches to nations that possess oil. It is to be expected that this "run" on the remaining oil sources will dramatically increase the pressures to which people and the environment are exposed. It is true that, apart from action to combat corruption, more work is currently being done within an international framework on the introduction of social and ecological standards for the extraction of raw materials. The progress in this field achieved by initiatives such as the Extractive Industries Transparency Initiative (EITI) and *Publish What You Pay* is now in danger of being swept away by the dynamic nature of the rivalries over resources.

Against this background, the funds for development cooperation must be topped up rapidly and permanently to the promised 0.7 percent of GDP. For the energy crisis and inflation are affecting the world's poorest countries to a particular degree. Today, for example, some countries in Africa are already spending more than 50-70 percent of their state expenditure on subsidising oil imports. The initiation of a comprehensive renewable energies policy in partnership with the developing countries, measures to adjust to climate change, and aid when natural disasters and famines induced by climate change occur are important development-policy tasks for the future. It becomes even more difficult to gather budgetary resources for this purpose at a time of energy inflation, and it can only be done successfully by deploying innovative funding instruments.

Impact of the oil shortage on private households

The further increases in oil prices will also push up the inflation rate in the next few years. Money will be worth less, purchasing power will decline. Higher oil prices have already driven up inflation rates in Germany and abroad over recent years. Some consumers will be able to pay higher prices, others will have to reduce their consumption. At any rate, less money will be available for other consumer spending, which will hold back economic growth. It is the poorer sections of the population, above all, that tend to be hit by rises in heating bills and food prices.

The effects will be particularly serious for what are known as borderline households. These are households with levels of disposable income barely higher than households on benefits (covered by Books II und XII of the German Social Code). If energy spending rises, they may even slip below this threshold without becoming entitled to welfare benefits. A new energy poverty is emerging.

Impact of the oil shortage on businesses

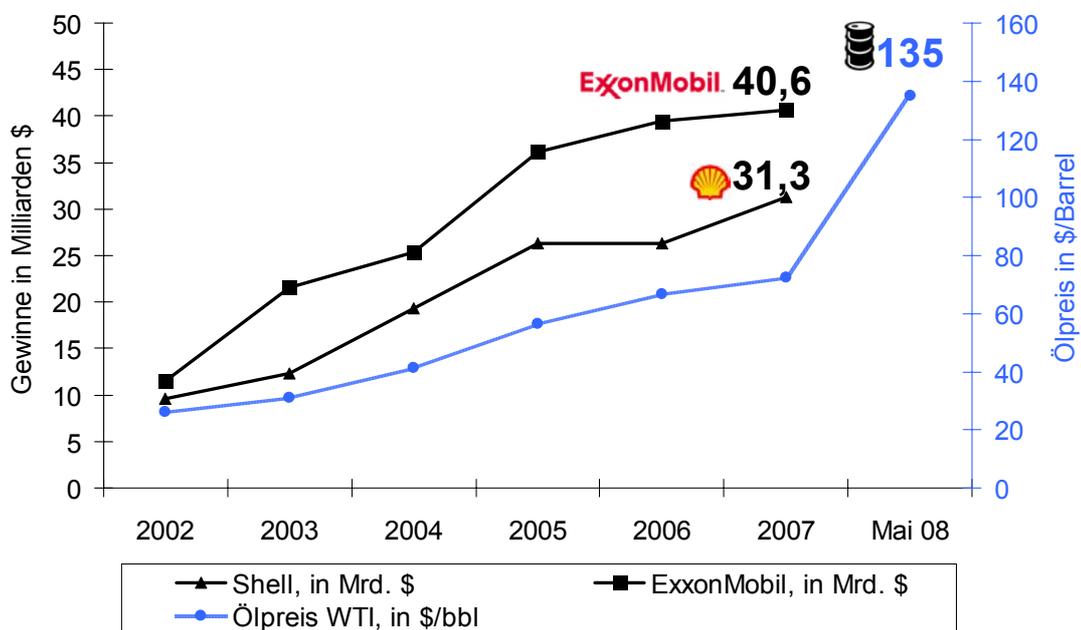
Manufacturing companies will be exposed to higher purchasing costs. At the same time, they will have to hold their own on markets that have less purchasing power. This means it will become difficult for them to pass on higher costs to their customers. The consequences will be lower profits and even bankruptcies.

To begin with, for example, companies dependent on air tourism, such as holiday providers, air lines and hotels in holiday regions, will be affected. The car industry will have to struggle with massive collapses in turnover.

On the other side of the coin, businesses that are able to develop new markets will be the winners of the oil shortage. These include, most of all, the suppliers of renewable energies and energy saving technologies (manufacturers and service providers), as well as chemicals companies that refine renewable raw materials and businesses that produce with far greater energy efficiency than their competitors.

Oil companies will always earn bigger profits in a shortage phase when oil prices are higher. As a result, Exxon's net profit of about 12 billion dollars in 2002 has risen with the oil price to more than 40 billion dollars in 2007. Energy prices are revealing themselves ever more to be a mechanism for the redistribution of resources from the poor to the rich.

Konzerngewinne steigen mit Ölpreis



Quelle Ölpreis: MWV (Rohölsorte WTI); Quelle Gewinne: Jahresabschlüsse, dpa

www.hans-josef-fell.de

Graphic: Rises in profits reported by Shell and Exxon

Risk: Misinvestments and the financial crises to come

One fundamental problem is that it is practically impossible to foresee increases in the oil price over the years ahead when investment decisions are being taken. Hardly any investor will be

prepared to incorporate drastic price rises into their calculations. The consequences are miscalculations if price increases occur. It is to be feared that misinvestments will be made by private investors, state investors and across the whole economy.

Anyone who purchases an oil heating system today should factor what could potentially be a five-fold rise in the oil price during the years from 2008 to 2030 into their decision. This is not possible because no one can know exactly what prices will be in future. Most investors will therefore base themselves on current prices. Anyone who listens to the IEA will even allow for lower prices. If the investment is made and prices rise, it will turn out to be a misinvestment. This damages investors, whether they want to heat a detached house or production facilities. If many thousands or millions of people make the same misinvestment, economic damage is suffered – partly in the form of considerable capital outflows to the oil-exporting countries, but also in the form of higher inflation rates and lower economic growth on account of weaker purchasing power and extra bankruptcies.

Today, at an oil price of about 130 dollars a barrel, the additional economic costs already amount to approximately 20 billion euros a year, which corresponds to roughly one percent of gross domestic product.

Large-volume investments in new energy plants that depend on conventional energies, e.g. coal power stations, will also be economically unprofitable if more and more customers prefer to install their own systems and use renewable energies instead of paying power, oil, and natural gas prices that keep on rising and rising. The sales of conventional energy will decline, with which the returns on investments in this field may fail to be realised. The plants that have been built will rapidly lose value, which may precipitate a new financial crisis.

Solutions

Green policymakers must develop measures that will take effect rapidly and discuss them with the population and institutional players. We must show strength and the ability to lead public opinion.

Our policy proposals, e.g. the Energy Concept 2.0, our ideas on ecological agriculture and our alternative transport policy, are therefore gaining a special new dimension in addition to the arguments about climate protection and environmental conservation. Climate protection and the struggle against the new oil crisis demand the same solutions.

Strategic solutions: renewable energies and energy saving

The decisive strategy for addressing an economic crisis caused by the shortage of resources will combine a rapid conversion to renewable energies with effective energy saving. In this connection, the Green parliamentary group in the German Bundestag presented its comprehensive Energy Concept 2.0 and its Green Car Concept back in 2007. The Energy Concept 2.0 alone contains about 80 proposed solutions, which will not be explained again in detail here.

It is true that the growth rates for renewable energies in the power sector are rapid and encouraging in Germany, but they have to be speeded up even further instead of being held back. In view of the oil shortage, the decision taken by the Grand Coalition to tax sustainable biofuels as well was a grave mistake. Dynamic processes still need to take off on the heating market and in the transport sector. Only then will innovative technologies and companies be able to develop and establish themselves in these fields as well. A range of innovations are just waiting for industrial

implementation, such as solar storage units that allow solar energy to be used in winter and electric cars.

Germany is not an island. If we do not succeed in developing and implementing strategies around the world, the oil shortage will catch up with us again through the back door. Germany must therefore be proactive at both the European and international levels and help to ensure that the consequences of the oil shortage are minimised.

We need

- different power stations that generate electricity from renewable energies, primarily in decentralised systems;
- different cities: cities that shift their motorised traffic to electric modes and rail services running on ecopower; cities of short distances, cities that return shopping areas to city centres and in which bicycles, electric scooters and public transport are given clear priority over cars. Furthermore, cities will increasingly obtain their supplies from their immediate environs. Long transport chains will become unattractive;
- different buildings: as far as both existing and new buildings are concerned, the future must belong to the plus-energy house. The house of the future will have to produce its own energy and make as much energy as possible available for mobility. It is urgently necessary for the installation of new oil heating systems to be banned during the next decade;
- different approaches in the transport sector: the state must cut tax breaks and other subsidies that are exacerbating the energy crisis even more, such as the tax-free status of aviation fuel, agricultural diesel in farming, shipping diesel and natural gas in the transport sector. Instead of this, it should promote transport systems that do not require fossil energies. Such a redistribution of resources would be simultaneously oriented towards the challenges we will face in future and cost neutral. It could create new incentives for research and technological innovations as well as helping alternatives that are already available to become more competitive. Electric vehicles therefore need to be both privileged in regulatory terms and financially supported – e.g. by means of exceptions from congestion charging, which should in turn be introduced very rapidly in as many cities as possible;
- different chemical feedstocks: the chemicals industry must be converted to renewable raw materials. Biorefineries must be supported consistently. This makes it necessary for sufficient renewable raw materials from sustainable production to be available for the manufacture of products that will pass through a cascade of uses before finally being used to produce energy;
- different, fairer distribution mechanisms organised on a decentralised, renewable basis that reach people in rural areas and poor regions of the world and enable them to gain access to markets and development;
- different methods in the agricultural industry: a farming industry that rapidly liberates itself from its dependence on mineral fertilisers and energy-intensive farming techniques and looks to intelligent farming methods. States must act as rapidly as possible to establish major research programmes to look at ecofarming. This is far more important than nuclear fusion or manned space flight;

- different public buildings and procurement processes: The state must set a good example. By doing so, it can, firstly, do justice to its exemplary function and, secondly, prevent rising expenditure on energy due to the oil shortage from also causing budgetary crises.