

„There has never before been an analysis like this“

Almost everyone has an opinion on energy supplies in general and the use of conventional and renewable energy sources. But in discussions, people again and again debate using isolated figures – either for the conventional energy economy or on the side of renewables. What is often missing is an integration of such figures into the picture as a whole. The Energy Watch Group has been working on the first independent, worldwide, scientifically sound overview of all forms of energy supply for a long time now. In this issue, *SUN & WIND ENERGY* is starting the presentation of results from this evaluation. *S&WE* spoke with Thomas Seltmann, Project Manager of the Energy Watch Group, on the organisation's aims and results.



Thomas Seltmann

Photo: Tom Pischell

S&WE: Mr Seltmann, who and what is the Energy Watch Group?

Thomas Seltmann: The Energy Watch Group is a network of scientists and German MPs who are involved in energy matters. It is not yet complete, but is still a project in progress. As we are trying to be as impartial as possible, we are mainly financed through donations earmarked for the Energy Watch Group and made by private individuals or companies to the Ludwig Bölkow Foundation. We need the money in order to be able to carry out our work. Although a lot of voluntary work is done in the network, especially the scientific studies cannot be carried out for free and must be paid for.

S&WE: What aims has the Energy Watch Group set itself?

Seltmann: The aim and objective of the Energy Watch Group is to provide objective information that can be used for determining energy policies: making facts, data and links transparent which would otherwise be filtered by institutions and companies before being made public or passed on to politicians. As a typical example, the oil companies publish annual energy reports in which the published data is filtered according to company interests. As the Energy Watch Group we want to make information as transparent as possible, so that politicians, but also the public and the media, can form an objective opinion.

S&WE: What are you working on specifically?

Seltmann: The origin of the initiative was quite simple that some MPs had a problem accessing objective information. One of the questions was on what the real situation was concerning fossil fuel reserves. This was the reason for commissioning sci-

entists to create an overview report on the global energy supply situation, and this is the project which the Energy Watch Group is working on. The first steps have been taken: resource studies on coal, uranium, oil and one scenario for the expansion of renewable energies. The project as a whole includes additional questions. At the end we will bring out a comprehensive report on the worldwide energy supply situation – on both conventional fossil-fuel and atomic energy, as well as the expansion of renewables. Never before has such a comprehensive analysis as this one, especially concerning fossil fuels and their availability, been put together in this way.

S&WE: Is it primarily a description of the current situation or does it include forecasts on future developments?

Seltmann: For fossil fuels we describe the past, the present and a scenario for future supplies which is based on scientific data. For renewable energies there are expansion scenarios, which consider the current state of technology on the one hand, and experiences from recent expansion on the other. These are not studies on potential, in which the question is how much can be maximally obtained. These scenarios look at the question of what we can achieve in particular periods of time if we do certain things and invest certain amounts.

S&WE: Are you, as the Energy Watch Group, being sufficiently heard by politicians?

Seltmann: We would like to be heard more. But our work is being noticed – not just in Germany, but internationally. Naturally the situation right now is that the subject is still being neglected. It is a little bit overshadowed by climate protection, and now by the financial crisis. It is overlooked, however, that the high oil price was an important trigger of this crisis.

Maybe I should add something fundamental here. When we sum up the analyses of the Energy Watch Group, then one of the most important results is that we are going to pass the peak for all fossil fuels in the near future. The first energy source to already be confronting us with this is crude oil. We are now at a point where we can no longer that easily cover the increasing energy demand with fossil fuels. This is something which has not yet been sufficiently perceived and appreciated by politicians.

S&WE: How must the supply of energy change in the coming years?

Seltmann: The results of our work clearly show that we will be facing a massive supply problem if we don't expand into new energy sources much faster than we have been. We won't be able to cover additional economic development with the energy sources used up to now. We also won't be able to maintain past levels of economic activity using conventional sources. We will have to make up the shortfall from rising demand and a simultaneous drop in the supply from conventional energy sources.

S&WE: *What proposals do you therefore make in terms of political policy?*

Seltmann: The most important recommendation is quite simply to expand the use of renewable energies even faster than before. This is the main pillar, especially because one of our analyses shows that the transition will cost less in total the faster it occurs. The more we invest in expansion in the very near future, the cheaper, more cost-effective it will be all in all.

S&WE: *Which support mechanisms do you recommend?*

Seltmann: We have not so far made any firm recommendations. It is obviously clear, though, that the mechanisms which have a large effect should be implemented. You thus have to look at which support mechanisms in which countries have led to a large growth in renewable energies. The Renewable Energy Act is certainly one of the preferable choices here.

S&WE: *Do you use concrete figures when you talk to politicians? What sort of sums are we talking about here?*

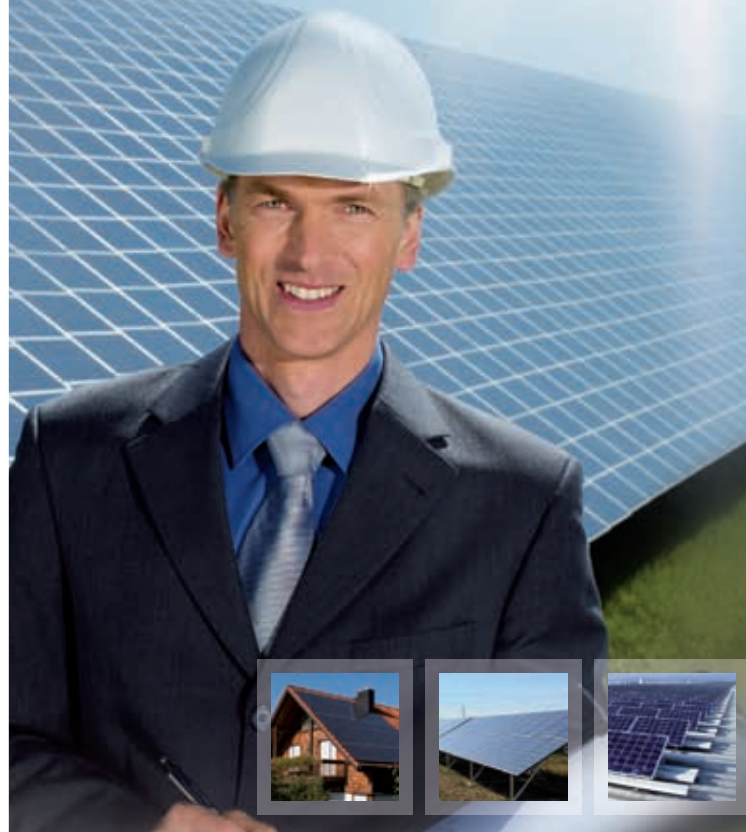
Seltmann: In our scenario in the field of renewable energies we set a firm figure for how much will have to be invested per capita in each particular area of the world for this development to be achievable. In the final expansion these are per capita values of one euro right up to 120 euros and above per year in the industrialised countries. Interestingly, the total to be invested in renewable energies in the year 2030 – the year with the highest annual investment – is exactly the same as the sum which is currently spent annually on subsidies for conventional energy sources, plus the amount invested in conventional energy sources. It is thus not an absurdly high value, but well within the normal framework.

S&WE: *Do you put the main focus on industrialised nations or does it span the whole world?*

Seltmann: The whole world. Energy supplies can only be looked at objectively on a global scale. I have also determined this for myself; I have been looking at the subject of energy for almost 20 years, but this global perspective has opened up a plethora of information and links for me too, of which I had previously been completely unaware.

The interview was conducted by Volker Buddensiek

"I was told time and time again that it wouldn't be possible – until, finally, I came across the right people."



Our goal: To put your ideas into practice.

Whether you need a photovoltaic or solar thermal system – we always have the right concept for you. We only design and supply products of the highest quality, ranging from domestic systems to large-scale installations.

- Your specialist wholesaler for solar technology
- Your partner for engineering and design

Put us to the test:

We'll be happy to provide you with more information!

Donauer Solartechnik Vertriebs GmbH

Head Office Gilching | Zeppelinstr. 10 | D-82205 Gilching
Phone +49 (0) 8105/77 25 - 0 | Fax +49 (0) 8105/77 25 - 100

info@donauer.eu | www.donauer.eu

Germany

Italy

Portugal

Spain

Oil at its peak



Production platform in the Heglig oilfield

Photo: UNEP

The question of the security of supplies is still being neglected when it comes to fossil fuel reserves and uranium. Crude oil has been our most important energy resource, and is at the same time the first to go past its peak.

We must save, save, save”, demanded Michel Mallet – a high-level manager at the French oil company Total – of oil consumers in mid-April in a magazine interview. The increasing demand in the threshold countries can only be met by doing this, as the companies are not finding enough new reserves. Despite increasing investments, the annual output is sinking. Total is no exception here, but is confirming the experiences of its competitors.

IEA starts warning of oil scarcity

Even the International Energy Agency (IEA), an organisation of governments representing the interests of 28 main consumer countries, and so far a professional optimist in energy security matters, is warning of dramatic shortages and is demanding a radical change in energy policies. In the current economic crisis the oil companies are throttling back on their investments. Nobuo Tanaka, head of the IEA, warns: “When demand grows again we could have supply shortages. We even forecast that this bottleneck could occur in 2013.” According to the IEA, the price of oil would then even surpass the peak from 2008 and reach up to US\$ 200 per barrel. “We could then steer towards a new crisis, the extent of which would be further than in the current one”, warns Tanaka.

The IEA already showed how dramatic the situation is in its latest “World Energy Outlook 2008” from November of last year. It talks of an annual reduction in output of 6.7 % from existing fields. In 580 of the 800 largest oilfields in the world the amounts are steadily sinking. Chief Economist Fatih Birol briefly states: “Time is against us!” The IEA does forecast a further increase in worldwide oil consumption by almost a quarter by 2030, but “which oil reserves are to cover the increased demand, how much the extraction of this oil will cost and how much consumers will end up having to pay for it, is extremely uncertain, maybe more uncertain than ever before”, states the IEA.

According to a study for the Energy Watch Group on the future of worldwide oil supplies, which has received a lot of attention internationally, we are currently at the peak of production and will have to reckon with a halving of output in the next twenty years. Also, the producing countries will themselves be using an ever-larger share for their own economic development. The supply for importing countries will thus be even more restricted. The German Federal Office for Geosciences and Resources (BGR) just recently confirmed the decline in worldwide oil extraction in 2007. BGR President Hans-Joachim Kumpel concludes from this: “Oil will be the first energy resource

for which a genuine scarcity of supply will become noticeable due to the finite nature of the resource.”

Sources bubbling less

Being finite does not however mean that the bubbling sources will dry up from one day to the next. The question is thus not “how long will the oil last?”, but “what amount will be available over which time period?”. Scientists have provided detailed answers to this in a study commissioned by the EWG. Their methodology can be made clear by using the example of the typical active lifetime of an oilfield: when first tapped, the oil output climbs rapidly initially, soon reaches its maximum and then slowly declines. With the second, third and further boreholes the output still initially rises, however, until further boring can no longer match the decline in output and the oil field as a whole passes its peak. Despite ever-more boreholes, the oil output then declines in total. The result is a so-called bell curve. This principle is true not just for individual oil fields, but also for entire extraction regions and the whole worldwide extraction, because it is commonly known that there is a limited total amount for geological reasons.

The three oil peaks

Conclusions for the worldwide peak of extraction can be drawn from the historical pattern. Commercial oil

extraction began on several continents simultaneously in around 1859 – exactly 150 years ago. Geologists date the peak of worldwide finds, i.e. the highest annual rate of finding oil, at around 100 years later, as early as the mid-sixties. The first oil peak thus already lies over forty years behind us. The largest oil fields found so far, which are still mainstays of worldwide oil production, were discovered as far back as the end of the 30s in Kuwait and the end of the 40s in Saudi-Arabia.

While new finds declined, consumption continued to rise. It was thus no surprise that just twenty years later, in around 1986, the annual extraction of oil surpassed the annually discovered amount. The unavoidable consequence: the remaining amount of extractable oil passed its peak (“peak two”). The reserves have been declining since then. Today we use four to five times as much as we discover. The discrepancy between these facts and the often-published data from the oil industry, for example, can be explained. The difference lies in the way you look at it. But the economically reserved figures of the oil companies are getting closer and closer to the realistic data of the geologists.

Hardly more than twenty years later and we are now seeing the third peak, the peak of worldwide oil extraction. This inevitably has to follow on from the peak in finds and the peak in remaining reserves, as one after the other all the oil sources go past their peaks. Opposing this are many voices which claim

elumatec®

Only Quality produces Quality !

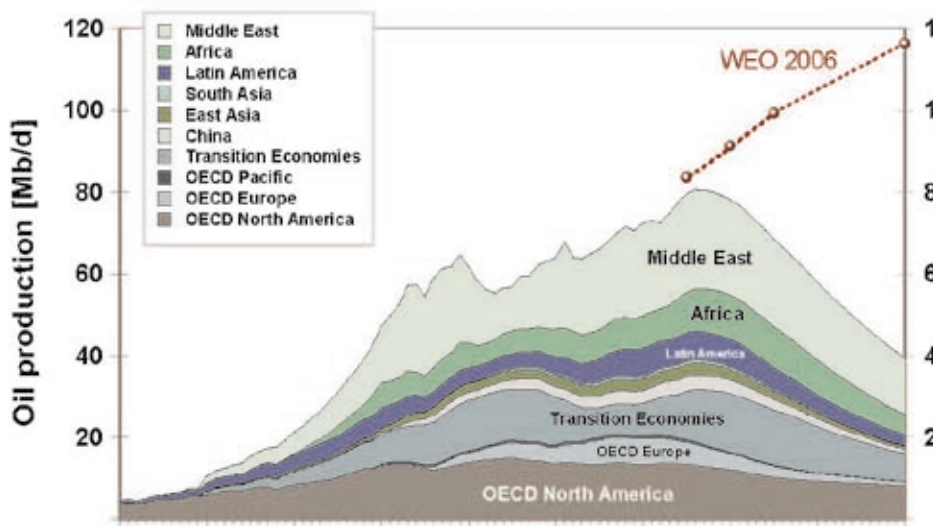
As a manufacturer of machines for the processing of aluminium profiles we supply matured solutions for various applications. From manual machines, semi-automatic machines up to CNC profile processing centres for sawing, routing, drilling, punching and complete profile processing.

From elumatec you will get a customized solution for your production.



Profile machining centre SBZ 130

You have the profile - leave us to do the work !



Overview of worldwide oil extraction up to 2030

Source: EWG Oil Report/
Ludwig-Bölkow-Systemtechnik

that oil extraction may still be considerably increased. Often it is denied that oil price rises are a sign of an increasing scarcity. They say that the problem is not the reserves, but a lack of investment. The business figures of the oil companies contradict this. At Shell, for example, oil extraction has dropped by a fifth in the last few years, even though investments in looking for oil and tapping reserves have increased fourfold. What are rising as a result are the costs and thus the oil price.

The situation has come by no means as a surprise. The fairy tale of never-ending oil was spread for far too long. And yet the geologists saw the peak in new finds as early as the 60s. The remaining reserves have been declining since the mid 80s. Although new technologies have made it possible to extract more from known fields faster, large new finds have not been expected for decades. Even the opening up of ecologically and technologically difficult fields, such as in the Arctic or the Canadian oil sands, will not be able to stop the downward trend.

Extraction as a driver of prices

The temporary drop in oil prices is also no sign of an easing of tension. The hopes of the bursting of a supposed bubble of speculation are in vain. Higher investments in looking for oil and its extraction will also not turn around the tendency towards higher prices. Quite the opposite: if the amount of oil extracted sinks despite increased efforts, the costs will rise, and analysts have stated that in some oil regions extraction even today will only be economical at oil prices of up to US\$ 100. The times of cheap, easy to extract oil, are thus over for good.

An example: the IEA assumes the installation of new extraction capacity between 2007 and 2030 to the tune of three quarters of what exists today. This is almost six times the current extraction capacity of Saudi Arabia. Apart from a huge capital requirement, finds of relevant amounts of new oil reserves are neither known nor expected. The IEA figures for this come from

resources figures that are much too high, ones which oil geologists have declared to be “unlikely amounts”. But even without such assumptions, the investments in oil and gas fields were nominally trebled between 2000 and 2007. By 2012 alone these are expected to rise by a further 50 %.

Politics and the economy have ignored these warnings for far too long. But now even the head of the oil company Total, Christophe de Margerie, reckons that we will never again be able to extract the current amount, firstly because the peak has been passed and secondly because oil is only available with an increasing amount of technical effort. The current situation thus marks a turning point and paradigm shift. If the continued increasing demand can no longer be met through increased supply, prices will reach unpredictable heights.

“The market”, complains the Swiss economist and top consultant Fredmund Malik, “doesn’t prevent mistakes – it merely punishes them”. And so the oil price explosion before the financial crisis was just a taste of things to come, and possibly the needle which burst the financial market bubble. In the future the shears will open up in two directions and throw up the question: how can we cover increasing demand and at the same time make up for the shortfall from the reduction in oil extraction?

Fossil-atomic energy peak

In this, the shortage and rise in prices of oil is just the beginning of the peak for conventional energy reserves. Natural gas and coal will follow some years behind. The question is thus how a growing world population can be supplied with enough energy in the future. The UNO reckons with a quarter more inhabitants of the planet by 2030, namely over 8 billion people. How, you have to further ask, can economic output be doubled again by then, as economists have forecast? At the same time the climate should be protected and carbon dioxide emissions be reduced by 85 % (IPCC recommendation). How is that going to be possible when today still over 80 % of our energy comes from fossil fuel sources and the IEA expects a further increase in consumption of 45 % over the next twenty years (WEO 2008)?

The world economy is in a unique situation in terms of its industrial development. Population growth and the financial economy demand economic growth – but more energy will be required for this in the future. At the same time we are experiencing a shortage in energy reserves, on which we have been almost totally dependent in the past. Nothing less than an energy revolution will be required to solve this problem. You can find out more on the supply situation for coal, gas and uranium, as well as the opportunities for expanding renewable energies, in the upcoming parts of this series.

Thomas Seltmann

Further information:
All the studies, additional material and press information are available for free download at www.energywatchgroup.org



It's not only a quality promise, it's a reliable partnership.



Our passion for solar energy has made us a world leader in the field. State-of-the-art designs and rigorous quality control result in products that meet the highest international standards. We deliver increased energy efficiency and environmental benefits, backed with dedicated service. Because with Suntech, you can rely on the product and on the people.

www.suntech-power.com

 **SUNTECH**
Solar powering a green future™