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Solar Energy: The Democratization of Energy Supply?

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Many thanks for inviting me to this lecture by the Human and Global Development Institute. It is especially important for me to contribute to this topic, since I feel very strongly about it. I have been working on this topic for decades, both professionally and privately, with a humanistic background.

The presumed shortage of energy – an error?

Why is this topic so important?

„Energy is everything", President Wilson is supposed to have said this in order to define the war objectives of the First World War. In 2005, my former highly esteemed colleague and Nobel Prize Winner Professor Rick Smalley from Texas wrote down a list of the most important problems of humanity before his death and made it available publicly for all politicians. On this list, the problem of energy ranked first. In a lecture, Rick stressed that if we have enough cheap energy, every other problem can be regarded as solved.

If we had cheap energy to a sufficient extent, we could distill/filter and clean seawater and water shortage would be solved. If we had enough energy, we could provide people in the Third World with local electricity, offer them good education and reach into every last corner of the earth by distance learning and electronic media.

Yes, if we had enough energy, we would not have to suffer from scarcity, which leads to wars and disputes for resources all over the world. If we had enough energy, we would not have to reduce the production of our society until the point that we are cutting off our own future. Overproduction could be met with cheaper distribution strategies and not clustered as a local problem.

If we had enough energy…

"The scarcity of goods defines their price", Karl Marx declared in his analyses. This does not only refer to the natural scarcity of goods but also the free availability of them. For example, silicon is available vastly on this planet as silicon dioxide, i.e. quartz sand. But in order to produce clean, crystalline silicon is a highly energy intensive reduction process and therefore, the availability of highly crystalline silicon is more or less defined by this energy intensive production costs. If we had a great, free and inexhaustible source of energy, this effort could be reduced to zero and the price of crystalline silicon would be like a ten a penny. But since right now, silicon is the most important substance for the production of photovoltaic solar cells; a great reduction in price of crystalline silicon would lead to even cheaper electricity. A negative price spiral would be possible.

The scarcity can also be "home-made", conscious or unconscious, deliberate or happen by mistake.

An unintentional mismanagement of energy happening by mistake, which lead to scarcity, can look as follows: We have great amounts of energy in Austria in order to supply our industry and our households. But if the heating systems stand still in summer, a great amount of surplus energy is available. This would be a waste and would lead to price decline. But if we planned our energy production for the summer months, scarcity in winter would be inevitable. This is an example for unconscious, unintentional scarcity caused by the system. In order to compensate this, a highly complicated international energy market was built. Despite every effort, the price of energy at the energy stock exchange EEX in Leipzig was negative in some days during the last years. This example shows how difficult it can be to build a balanced energy industry without scarcity or surplus. The renewable energy sources also have to be stored and buffered to compensate their instability.

A consciously and intentionally made scarcity of energy becomes more and more part of the agenda. The energy crises in 1974 was a prime example, when the embargo on crude oil by the Arabic oil producing countries made prices increase drastically. This intentional shortage of energy volume was a great shock for the Western world economy and is nowadays cited as a prime example of political blackmailing mechanisms. Those who control energy have great political power. The almost repetitive scarcity of the natural gas capacity in the middle of winter by the Russian Gazprom is an annual ritual which serves and will serve the submission of the "former Soviet Republic" states.

In my opinion, the intentional and conscious scarcity of energy by companies and countries, which control the flow of energy, is already reality. For example, let us take a look at the consistent agreement between natural gas and crude oil. Despite the fact that experts predict much greater natural gas reserves than crude oil reserves, the price of natural gas depends crude oil. Why? This intentional rise in price and scarcity is nothing more than an imperialistic measure like the salt tax of Britain on India before the revolution of Gandhi. It is a very profitable strategy of institutions producing and trading with natural gas without considering of those who cannot afford these prices of natural gas. The impoverishment of the Ukraine by this price war on natural gas is simply accepted. It seems that the European Union and the Ukraine will accept every Russian claim in order to provide own energy security. Political independence is therefore not more than an air bubble. The Ukraine is grinded between a European idealism and Putin’s imperialism.

It is therefore an unacceptable situation that a few countries and even fewer companies control the energy industry of the world in an imperialistic way. It is perfect for an oligarchy but it certainly does not serve humanity. Human rights are completely disregarded. The energy industry replaced the weapon and war industry as the number one imperialistic power instrument. In this context, the last ten years as the “age of oil wars” should be studied.

The "solar energy revolution" – democratic and decentralised

Therefore I predict that there will be and has to be a revolution in the energy sector. This energy revolution is called decentralised, delocalised and autonomous solar energy production. With this revolution, the energy industry will be transformed to a social administration of the power supply system. People will control their own energy production and build local energy communities. The possibility of blackmailing of individuals and states will therefore disappear. The autonomy of the social subject will be restored. The dependence on energy and the slavery resulting from it will be abolished and lead to a democratisation of society.

Is this scenario realistic? Can we imagine such a revolution happening?

Yes we can!

Let us take a look at the future of energy supply globally:

In 2030, the global community will need about 10-15 TW additional power generation capacity. Today's power generation of about 14-16 TW will grow to 30 TW. These numbers are of crude estimates and can vary by 20-25%. But serious scientists do not question the additional need of about 10 TW in the next 20 years. Gaining energy out of crude oil sources will get more and more difficult. The expectations show a lower production of crude oil in the future than today. Even by taking the dubious hypothesis into account that there will be constant support of crude oil worldwide, the price of crude oil cannot be stabilised due to the higher future demand around the globe. We are doomed to a growing price of crude oil, the only question is, how fast this price increase will appear and arrive in our society.

- The supply of natural gas depends on the price of crude oil and can therefore not be used as a cheap source. Those countries and few companies who control the natural gas supply of the world will not dissolve this oligarchy voluntarily. People will no longer accept the environmental catastrophies which are caused by the brutal technologies like sand oil or fracking.

- If we take nuclear energy as a solution, we first have to look at the numbers carefully. 10 TW power from nuclear energy means that we have to build 10.000 new 1 GW nuclear power plants of similar size as Fukushima. If we start tomorrow and build such a new nuclear power plant every day until the year of 2030, the time would still not be sufficient to build such a power capacity. If we could build such a capacity, the global availability of nuclear fuels would be used up within minutes. This simple arithmetic shows inevitably, how fatal the line of reasoning on nuclear industry as a solution of future global energy problems is. Nuclear energy is a luxury, which only some wealthy states can afford. For the global future of humanity, nuclear energy is to no extent a solution.

- Hydropower is already well developed globally and experts estimate the additional capacity of the hydro-electric energy industry to 1-2 TW.

- If we take a look at geothermal energy, there are bigger capacities. Geothermal energy could be developed in many places of the earth to an extent of a couple of TW. But in that case, the technological challenge of the geological stability of the plants in different regions becomes striking. The delocalised supply strategy is also of importance here. Our own houses could already be heated autonomously by heat pumps. The electricity needed for it can be gained by solar energy and thereby achieve complete autonomy.

- Wind energy is already produced and built to a couple of TW. A higher capacity is calculated for off-shore regions out in the sea. Wind energy causes worries due to its instability. Wind energy will need a higher storage capacity in order to stabilise it.

- The only thing left over is solar energy. The capacity of solar energy is as incredibly high as 100.000 TW! If we could only use a fraction of this energy, the future of global energy would be safe. This sounds like a fairy tale of simply infinite energy and could become reality. I do not want to play off the different technologies of solar energy production against each other. All roads lead to Rome and all technologies are promoted vigorously for this "solar revolution". Only time can tell which technologies will suit for this at the end of the day. The transformation of solar energy into heating, electricity or chemical energy all play a crucial role.

My own estimation is that solar technology will be more successful if it is built individually and decentralised. An authorisation of communities, individuals and poor regions to produce their own energy is philosophically opposite to the imperialistic control mechanisms of today's energy industry. From this kind of authorisation, poorer regions of the earth's south will benefit to a large extent due to their richness of sunshine.

The sun is truly "egalitarian", meaning that the sun shines for all of us and cannot be prohibited or stopped by certain people. Every citizen on this planet has the possibility to autonomously support him-/herself by solar energy. For Nordic states, it is a long-term purchase and the payback is more expensive, for Southern states it is faster and cheaper, since they have more sunshine. This is acceptable situation, since Nordic states have a far better financial power to start with.

Conclusion – the convergence of crises

In conclusion I would like to say a few words about a phenomenon which I call the "convergence of crises". In the 21st century, we experience a growing convergence of multiple crises: The energy crisis, the climate crisis of global warming, the demographic crisis of the world's population and the economic crisis.

1. The energy crisis appears as the scarcity and as the rise of energy prices. Fewer countries can afford the energy needed. This leads to the impoverishment of the population. Today, export revenues of many emerging countries do not come up for the costs of energy imports. The balance of foreign trade of several European countries will be in the deficit in the foreseeable future due to increasing energy imports.

2. The costs of the climate catastrophe are already perceivable. English studies show that humanity will not be able to afford these exorbitant costs of the damages in the future. Human suffering cannot be controlled then.

3. The 7th billion of people already live as a resident of this planet. To provide every citizen with enough food and water is a problem which cannot be solved using current systems. Further steps towards global prosperity are a Herculean task.

4. The consequences of these first three crises along with the greed to gain profits in the financial sectors will lead to the collapse of several "real" national economies.

A decentralised and delocalised energy supply based on solar and wind energy, supported by delocalised geothermal energy with heat pumps is the reasonable answer to these converging crises.

Each of the crises listed above can be corrected by investments into these new ways of energy supply. Energy autonomy will lead to a democratisation of energy supply and this democratisation will be an important step of human and global development. The discussed convergence of crises makes this "solar energy revolution" the logical way out.

Future societies, communities and individuals will be just as successful as how fast this strategy of a decentralised and democratic solar energy is being implemented.

Thank you for your attention.