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To Accept the Future

Oil, climate, denial and the future capacity of development assistance—Part I

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"In good times and in bad, in sickness and in health..."- so says the Catholic ritual of marriage. The acceptance of "...and in bad" has become, unfortunately, rather limited in modern Western societies, so separation from „the bad“ by way of divorce has become common.

To divorce from the future, however, is not possible. At least not as long as one is alive. One can go and try a future elsewhere - in another place or country - but otherwise we have only two options: die or learn to live with it.

Perhaps this is one of the reasons we think less about the future than we should, or, if we do think about it, we tend to imagine our future as an extension of the line between our past and our present. As several generations of global „Northerners“ have now lived through an extended period of growth and prosperity, a linear extrapolation of our recent past leads to where - at least intuitively - we have always wanted to be: to safety, security and prosperity. Our expectations are almost as exuberant as those of newlyweds who selectively ignore and deny all warning signs suggesting the future may actually look very different than generally expected.

Historical events, as well as good old Heraclitus, tell us: Panta rhei – Everything flows. Civilizations, as with individuals, experience their birth, a period of growth, maturity, and then a fall. Regardless of history we are tempted to fool ourselves: this time it is different, this does not apply to us.

"The World of Yesterday“, an excellent book by the great European humanist Stefan Zweig, suggestively captures the atmosphere of expectation widespread among the residents of imperial Vienna during the first decade of the 20th century. After half a century of peace and steadily growing prosperity, the vast majority of Viennese - and other Europeans too, as they were no different - had not the slightest idea back around 1910 that within a few short years, millions would perish in the slaughterhouse of the Great War and once that war was over, the ancient Danube monarchy would be another closed chapter in the history books.

It was not as if the world suffered from a lack of clues that would make it impossible for an analyst at the threshold of the 20th century to predict where developments were heading. The main reasons were elsewhere: the intellectual elites of the time did not want to talk about the warning signs and the public did not want to hear about them.

As wittily stated by Niels Bohr "Prediction is very difficult, especially if it is about the future" (Bohr). The behaviour of human society is a complex process with many variables and unknowns, so solving equations about the future often produces results tinged with our subjective desires. Nevertheless human understanding of the world has made quite significant progress over the past few decades, so it can be argued – as we shall attempt in this essay – that the basic physical parameters of our future are already sufficiently and clearly predetermined so consequently the fundamental shapes of our future can be anticipated with reasonably high probability, on the basis of the input parameters and the laws of nature. We can do this at least with a time horizon of several decades in mind – which is the horizon directly relevant to most of our contemporaries.

Forever young?

All adults should be aware of the finality of our individual lives, yet we have become masters of its denial. For millennia our species has dreamt (and sung) about staying “forever young”, this powerful dream gave us both religions and modern science (rooted in an alchemist´s search for the legendary fountain of youth), as well as the cosmetic and plastic surgery industry. We are conditioned to refuse and deny finality and it is imprinted in us to strive for eternity.

The frame of the future for us, our daughters and sons, grandchildren and their descendants, is however, predetermined by the laws of physics and mathematics - and as we know, those laws do not negotiate, they just stubbornly apply.

It would appear the main challenge in our attitude towards the future is not in our inability to anticipate it. Plenty of data keeps proving the existence of finality. Our main challenge may well be rooted in our idea of the marriage with a „good future“. What key data suggest, unfortunately, is a future in which life may be much tougher, less comfortable and more dangerous than it is today.

The good times are over. How much worse the situation gets may depend on many adaptations and mal-adaptations to trends already manifest today, but those changes are still hanging in the limbo of general ignorance and denial. The general frame of the future is, in many aspects given, but in the details – in very important details! – our future will depend on the human capability to accept the future. Accept it „in good times and in bad, in sickness and in health“.

I recall the euphoric feelings of my generation during the revolutions of 1989. Many of my peers believed we were living through an epochal event only a few generations are blessed to see: we were the lucky ones to experience such a huge change. My view 25 years later is that we are heading towards many more fundamental changes than those we went through in 1989. However, the upcoming changes will be less glorious, less euphoric. The changes emerging from the fog of an unknown future may be depressing for many, perhaps even tragic.

„The possibility that our civilization could die doubles our own mortality“ says Ortega y Gasset in Joseph A. Tainter´s 1988 classic „The Collapse of Complex Societies“. It does not come as a great surprise that even the slightest hint that our affluent society filled with opportunities, comfort and safety could meet a similar fate to the Roman Empire provokes a chain of negative responses not unlike those described by Elisabeth Kuebler-Ross in another classic book of the 20th century „On Death and Dying“. Denial, anger, bargaining, depression and only sometimes (often after a lengthy process) acceptance of the possibility of a radically different future, are common responses from many of the people confronted with the perspectives presented in this essay. No doubt some readers will respond in a similar way. When I speak and write about the dangers of our near future, I am often confronted with anger or anger masked by irony. Others prefer to „bargain“ and suggest a variety of technological solutions to some of the limits we are about to experience: Sure – they say – oil (and coal and natural gas…) are limited, but we shall turn to shale oil, solar and wind energy, huge modern batteries, nuclear fusion and electric cars. There is plenty of energy all around us, and human ingenuity is an unlimited resource, isn´t it? Yes – food too is a challenge – but if we all become vegetarians and stop wasting food, the Earth can feed even more people than today. Did not Thomas Malthus warn people about overpopulation 200 years ago, when there were just one billion people on the Earth? How wrong he was! Did not Paul Ehrlich write his „The Population Bomb“ in 1968 when there were just 3 billion of us? Was not he dead wrong? We are 7.3 billion now – and growing!

My older, very non-consumeristic sons, used to tell me in their high school years: „Do not worry dad, all we need for life is the internet and pizza.

The challenge is the pizza

As citizens of OECD countries, we live in a world where more than half of the population live in cities. In Europe and North America more than three quarters of the people are urban. And of the remaining one quarter still living in rural areas, most work in rural towns or are pensioners. Only 5% of the populations of rich countries who work in agriculture. The fruits of their work enable the remaining 95% to live urban, comfortable lives detached from the soil and the land. Lives in which cheap pizza is taken for granted (The World Bank 2013).

However, this situation is not universal and, with the exception of part of the 20th century (and even that limited to Europe, North America and few other places) it never was. As late as 1800 more than 95% of the population of Central Europe still lived in villages and most of them made their living in the fields and the stables (Population Reference Bureau 2015). The current status, when 95% of Europeans and North Americans have sufficient cheap food without dirtying their hands and boots with mud and manure, is based on one fundamental precondition: industrial agriculture. And that is based on three basic inputs: oil, mineral fertilizers and massive irrigation.

In countries with no significant oil fields – and that currently includes almost all the countries of the European Union – oil is considered as an everyday commodity which comes from somewhere abroad. Most of us are quite ignorant about it, except we know it is the key material for gasoline, diesel, plastics and possibly some other „stuff". Despite this popular blissful ignorance, it is no exaggeration to say that our civilization stands on crude oil. It is a simple physical reality. Crude oil provides 34% of humanity´s primary energy consumption, followed by coal at around 30% and natural gas at approximately 23%. However, over 90% of transportation energy is provided by crude – and in the case of the crown jewel of globalization – air transport – oil's share is practically 100% (British Petroleum 2011). Concerning agriculture alone, one can find very few, if any, tractors, harvesters or heavy trucks without an internal combustion engine fuelled by crude-derived diesel.

"La dolce vita" of energy slaveholders

Indeed, the first phase of the industrialization and urbanization of Europe was enabled by a different fuel – coal burned in a steam engine. However, it was the internal combustion engine plus crude oil that pushed our global population and affluence to its current levels. To comprehend the power of oil, we need to be aware of crude´s energy content: one barrel of oil – roughly 160 litres – is the energy equivalent of 1 year's work by 12 people. A healthy, well fed worker is able to sustain an hourly energy output of around 75 watts over an 8-hour work shift, which is approximately 0.6 kWh per day, or around 144 kWh per work year (assuming a 5 day working week). The energy content of one barrel of crude oil is around 1.7 MWH, e.g. 11,8-times higher. A barrel of oil is never on sick leave, does not need breaks for a rest, does not need to eat or drink and has other advantages over human slaves. Currently, humankind extracts and burns around 73 to 75 million barrels of conventional crude oil daily. From an energy perspective it means 900 million new energy slaves entering 1 year's servitude to humankind every day. Or 328 billion energy slaves serving the needs of 7.3 billion people – 45 per each person in the world, if they were equally distributed among the population, which of course they are not.

„Energy slaves" released from their fossil bonds have become the key factor powering our rich world, in which 95% of people do not need to worry about food security, and in which 75% – or more – live in cities (The World Bank 2015). It is a world where we can fly to the other side of the planet on Monday and be back by Thursday, where we travel tens of kilometres on a daily basis (transporting along with our 75 kilos of living weight an extra 2 tons of shining metal and plastic). We can buy „for nothing" wine from Chile and Australia, bananas from Costa Rica, roses from Kenya and everything else from China. Prior to 1900 C.E., most central Europeans had never travelled further than 20-30 km from the place they were born and the most exotic fruit in their lives was a pear from the neighbouring village. The idea that somebody in the village could make a living cutting and combing hair or singing or chasing a ball around a meadow or ...add your own pro-

fession to the list... was inconceivable. Mortals had to plough, sow, harvest, feed and milk animals, mow, cook, wash, get wood ready for winter, carry water – these were the pre - oil choruses of life, even at the threshold of the 20th century.

Most of our contemporaries are enjoying our current lifestyle and believe it will last forever. Forever young! The plans, strategies and programs of all governments

and international institutions, including those involved in development assistance or, if you wish, cooperation, are based on the same belief. However, let me repeat what has already been said: it is mathematically and physically impossible to extract a limited resource indefinitely. Each oil well, coal seam and natural gas deposit will eventually, after a period of extraction, dry up. If the extraction is fast, it will hit rock bottom sooner. When the crude hits bottom in many oilfields, total extraction reaches a peak, breaks and starts to fall. It has already happened in thousands of oil wells, hundreds of oil fields and dozens of oil producing countries (British Petroleum 2011).

The question is only whether we have hit bottom in a sufficiently large number of oilfields globally. It appears that with conventional crude oil this actually happened back in 2005. Since 2005 global production of conventional crude oil has oscillated between 73 and 75 million barrels per day (CrudeOilPeak 2014). Stagnation is not a fall: but the cost of a barrel of oil prior to 2005 was around 25 dollars for a long time: then, between 2011 and mid-2014, it was at 100 dollars – four times higher. The quadruple price of oil was a decisive factor in maintaining global production of conventional oil at 2005 levels and it enabled the growth in production of much more expensive and unconventional oil from oil sands and shale formations. High prices pushed the beginning of the decline in global oil production to the future and bought our oil-dependent economy and civilization a few more precious years. However, our whole global economy is built on cheap oil: the 4-times more expensive oil contributed to a slowdown in global economic growth (in some countries such as European “trouble makers” – or if you wish, the forerunners of economic contraction PIGS – Portugal, Italy, Greece, Spain, it meant actual economic stagnation or downturn) and a sharp increase in global food prices.

The future volume of oil production is a subject of much debate. Official agencies such as the International Energy Agency continue to churn out optimistic predictions forecasting a fast and continued growth in oil production. The problem is, the IEA and similar agencies have a long track record of overly optimistic forecasts that do not come true (Kopits 2010). It would appear some of these predictions are more the fruits of wishful thinking, than products of serious analytical work.

Why would the world need to be misguided about oil? Why should we prefer rose-tinted reports to sober analysis urging us to prepare ourselves and our children for the upcoming inevitable changes?

No energy, no growth. No growth, no debts paid back

There are good reasons why our consumer civilization needs rosy predictions of plentiful oil supplies. Energy is, by definition, the ability to do work. No real economic growth is possible without the capacity to produce more real goods: we can pretend growth exists by producing virtual wealth – printing more and more fiat money has become a globally popular way of creating the illusion of growth out of thin air – but such Potemkin village-type growth always ends up in bursting bubbles.

Oil provides humankind with 1/3 of our primary energy consumption. Oil, coal and natural gas provide altogether 87% (British Petroleum 2014). To publically accept the fact that in the near future we shall have less and less available fossil fuels is tantamount to accepting the fact that the current debts of governments, banks, corporations and individuals will largely be not paid back. This is not information our system could deal with, without breaking apart and collapsing.

In a way, financial debt equals the promise of energy available in the future. There are very few ways in which debts and debt interest can be paid without economic growth. Or you start to take from the substance – becoming poorer in the process- or your wealth grows faster than the interest on your debt. Thus a precondition for paying back government debts is growth of GDP and government tax revenues. This is why GDP growth is such a mantra for politicians leading all indebted governments. And indebted they are!

There are only three ways to deal with debts without economic growth. The first and by far the most common is to take on more debt and pay the interest due on the old debts from the new ones. „Refinancing“ is the name of this miracle. It is done by selling government bonds to investors, who buy them, lured by interest on bonds and the perception of bonds as a very secure investment. Some governments live happily on this strategy for many decades – and during those happy decades they indebt future generations up to their ears. As part of the Maastricht criteria, Eurozone countries agreed that acceptable annual public budget deficits in Eurozone countries will be „only“ 3% of GDP. Most politicians today consider those annual 3% deficits – that are ever-growing debts – to be their sacrosanct right. How else could they deliver on their election promises of ever-growing prosperity (understand ever-growing consumption)? Most politicians, not their voters, do not seem to understand that 3% annual growth of anything – including debts – means the thing will double in just 23 years.

On top of this many politicians do not bother with the 3% deficit policy and higher public budget deficits are more the rule than the exception in too many Eurozone countries. When Slovakia entered the Eurozone in January 2009, her public debt was a modest 27%. It took 5 years for it to double to almost 54% by 2014. The public deficit in 2006 was 36.1% GDP and by 2014 it had almost tripled to 92.1%.

The second option for repaying debts is the famous “austerity measures“: politically extremely unpopular cuts in public expenditures. Closures of schools and hospitals, layoffs of government employees, the sale of government owned properties…The money saved can pay the interest on loans made by previous governments. Austerity measures may be good for future generations, but those generations do not elect the current politicians: for them to be elected, austerity measures need to be avoided at all costs. Refinancing is the name of the game they love, even more than golf. Finally there is the third option – bankruptcy. In principle it means an open admission that a borrowing entity is no longer able to pay back its debts, usually because nobody wants to refinance its old debts. That is to give a bankrupt company a new loan or to buy more government bonds. „Dear borrowers, you should not have lent us money in the first place, but since you did, let us do something with our debt, together and in a civilized, law - abiding manner”. Bankruptcy typically means a legal agreement between borrower and lender about diminishing the overall volume of the debt, decreasing its interest rate, extending the repayment period over a longer time and suchlike. In short, the aim is to get from the borrower at least part of what was lent. Bankruptcy can be called as such openly, especially when the bankrupt entity is a government, and it can be masked under various politically correct expressions.

My apologies if I explain trivialities: sometimes it is difficult to resist the feeling that a large part of the population, including a number of development specialists, just do not understand the dependence of the ability to pay debts on economic growth.

So here is the point: without cheap and abundant energy, above all crude oil (as oil provides one third of global energy consumption), real economic growth is an illusion. Energy is the ability to do work and work is a process in which real goods and real wealth are created. Economists and laymen can dream about a magic „decoupling“, a separation of growth in energy consumption from economic growth. Unfortunately, decoupling just does not happen. The fact that some rich OECD countries report economic growth without growth in energy consumption is an illusion enabled by their significant de-industrialization. They have simply exported many energy-intensive (and environmentally dirty) industries to China, India and other developing countries, from where they import energy-intensive goods. Their domestic statistics show handsome growth in low-energy sectors of the economy such as money printing, banking, IT business and services. Growing energy consumption and related growth in CO^2 and other emissions are statistically reported in China, India and elsewhere in poor countries, while OECD statistics report the illusion of decoupling.

The problem is that, unlike money, banking products and software; food, steel, aluminium, clothing, shoes, cars, machinery, diesel, gasoline, fertilizers and other real goods cannot be printed on a printer. To be produced, they require significant amounts of energy. Actual energy, not virtual. Even to produce solar panels and windmills we need to invest energy first.

Indeed, solar, wind and other renewable energy sources are the spring of hope that we may be able to escape the consequences of peak oil and a decrease in the availability of cheap fossil fuels and energy. But our civilization is in a race against time: after more than 60 years of nuclear energy, its contribution to global primary energy consumption is less than 5% (British Petroleum 2014).

After decades of solar and wind energy, their share in the global primary energy mix is even much lower – around 1% (British Petroleum 2014). Many technological developments in renewable energy and energy storage are reported almost on a daily basis, but the path from laboratories to large scale employment of new technology is very often long and winding.

If humankind fails in the race against time, the peak in the production of oil and later coal and natural gas would mean that a large part of the debts – public, private, mortgage, consumer – will never be paid back. That would mean nothing else but a massive wave of bankruptcies among banks and countries. It would be the end of our debt-fuelled „la dolce vita" and a return to a much more modest and materially poor life without an excessive amount of goods, jobs and car–based lives. There would be no vacations in Egypt, Mallorca or the Caribbean, nor the social security, services and luxuries which two to three generations of Europeans and North Americans have taken for granted, as my sons used do with pizza and the internet. The end of the sweet life of debt is being experienced by people in Greece and Spain, and soon Italians will discover it, with the French and citizens of many other rich OECD countries after them (or maybe sooner: the order is not too important). People in the countries which are already poor – or never became rich – will be in even worse conditions than those living in the „fat" economies of the Global North.

Someone once noted that the factors which stand at the beginning of civilizations, later become the source of their downfall and demise. No great civilization can blossom without the ability to produce a food surplus, as it is food surplus that allows people to leave the fields and begin to specialize in a variety of disciplines which leads to great architecture, art, science, technology, and urban development if that is another manifestation of civilization.

Our ancestors used to understand agriculture as a stumbling block to civilization. Our children may soon need to rediscover it. It would be much easier for them in a steady climate. Unfortunately, that is not where the Earth's climate system is heading.

End of Part I

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