

## ”Reflections on Limits” –



comments by **Anders Wijkman**, co-president of the Club of Rome, at the launch of the

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1. For the Club of Rome the discussion on economic growth goes back to the Limits to Growth Report in 1972. Its chief message was that a depletion of vital resources and increasing pressures from pollution would create high risks for the global economy during the first half of the 21st century. Many people have referred to the report as if the world economy would come to a standstill after a few decades. But that was never the message. The report had a fifty to hundred years time perspective. Another thing that should be made very clear is that the main focus of the report was the increasing physical impact of economic growth – *the ecological footprint* - not growth itself.

In 1972, when the report was presented, the world’s population and economy were still most probably within the planet’s carrying capacity. The report warned, however, that the human footprint was likely to overshoot the physical limitations of the planet in the near future, mainly because of delays in decision-making at the political level. It stressed that forward-looking policy ought to be able to solve the problems.

Few reports have become so controversial and, not least among economists, so criticized. The main critique was that the report had not factored in the ingenuity of man. Whenever there would be a problem of scarcity or pollution – the reasoning went - we would solve the problems through innovation. Most economists still today view the LtG report negatively. They simply do not accept that the combination of growing economies, rapid population growth, resource constraints and an increase in pollution and waste can lead to large and growing problems, or even a collapse of the world economy. Their models deal primarily with the relationship between producers and consumers. Nature is looked upon more or less as a constant. No wonder they do not perceive any limits.

One of the sad things of the more than forty years that went by, is that the acceptance among conventional economists about the problems posed by the report still seem to be very limited. Moreover, the debate among economists – i e within the economic discipline – is almost non-existing. Over the years ecological economics – as well as biophysical economics – have emerged as new sub-disciplines. But their impact on conventional economics is still marginal.

2. This beings said, the general debate in society is sobering up. A series of international reports have emerged in recent years that essentially confirm many of the conclusions of the Limits to Growth. Among these, one report - ”Imperative to Act” - launched in 2012 by all the eighteen recipients of the Blue Planet Prize, among them Gro Harlem Brundtland, James Hansen, Amory Lovins, James Lovelock, Susan Solomon and Bob Watson, conveys a particularly stark message:

”The human ability to do has vastly outstripped the ability to understand. As a result civilization is faced with a perfect storm of problems, driven by overpopulation, overconsumption by the rich, the use of environmentally malign technologies and gross inequalities.” The statement continues: ”The rapidly deteriorating biophysical situation is more than bad enough, but it is barely recognized by a global society infected by the irrational belief that physical economies can grow forever.”

3. Ever since the LtG report the Club of Rome the issue of serious decoupling has been high on the agenda. Many reports to the Club of Rome have been forthcoming during the years, most of them with a clear focus on the tension between growing economies and populations and planet Earth – and the need to decouple growth from energy and material throughput. The most recent ones have been “2052” by Jorgen Randers, “Bankrupting Nature” by Johan Rockström and myself, “Extracted” by Hugo Bardi, “On the Edge” by Claude Martin and, most recently, a study by Kristian Skånberg and myself on the benefits for society by moving to a more circular economy.

4. There are obvious reasons behind the way the industrial economy – with its linear production system – evolved. Companies in most sectors were benefitting from cheap fossil fuels and falling commodity prices for most of the 20<sup>th</sup> Century. Consequently, the focus on productivity was on labor and capital, not on resources. Even though modest efforts have been made in the recent past to enhance resource efficiency, the demand for both energy and resources have continued to increase over time in most countries. We may see a leveling off in some countries – like Sweden – with regard to energy demand, particularly electricity. But that leveling off is on a very high level of per capita-demand.

4. Based on BAU demand for energy and materials are estimated to increase significantly in the decades to come. According to studies by the International Resource Panel, 50 % of the urban infrastructure that will be needed in 2050 has yet to be built. Consequently, resource constraints as well as rising volumes of waste and pollution are likely to pose increasing threats to both societies and businesses in the future – unless our systems of production and consumption undergo a major transformation. The main reasons can be summarized as

*First of all, increased competition for resources in general – leading to possible shortages and disruptions –*

*Secondly, political instability or resource protectionism among key producing regions,*

*Thirdly, increasing costs for commodities of different kinds over time,*

*Fourthly, increasing levels of pollution – not least greenhouse gases.*

More than twenty years after the signing of the Climate Convention GHG continue to increase. The pace has been leveling out during the last two years, but the GHG concentration in the atmosphere continues to rise. We are on track for at least 3° degrees of warming. And this means we are likely to experience tipping points on our way, the consequences of which we can only imagine.

In recent years temperatures on land remained more or less flat. Climate deniers used it as an example that the climate is not warming, rather the opposite. What the deniers forget is that most of the excess heat, due to the energy imbalance,

is being absorbed by the oceans. “Most of that heat has been absorbed in the upper 2,300 feet of the oceans, but an ever greater amount is reaching into deeper ocean levels — a mile and more down”, according to [Peter J. Gleckler](#), a Livermore physicist and climate scientist. One should add, that the temperatures on land are affected, as well, by the El Nino/La Nina phenonema.

But in 2014 and 2015 the temperatures on land were record high and the first three months of this year have been almost 2° C higher than average. Some scientists even question whether we already are about to surpass the 2°-degree target?

Allow me yet another comment about climate change. The outcome in Paris has been rightly praised. But we should not forget that the agreement reached has many shortcomings. I agree with George Monbiot, who the day after the agreement was agreed upon said “compared to what it could have been the agreement is a miracle, but compared to what it should have been it is a disaster!” Apart from saying nothing about *how* to implement the agreement – nothing about carbon taxes, for instance – the agreement rests on a risky assumption.

Almost all of the IPCC 2°C pathways – not to speak of those for 1,5°C – do require a significant volume of negative emissions, starting well ahead of 2050 and continuing for the rest of this century. To stay below the temperature target it will be necessary to remove CO<sub>2</sub> from the atmosphere and sequester it indefinitely. A range of options have been identified, such as biochar, artificial trees, geoengineering and Biogenic CCS (BECCS). The one most often referred to is BECCS, i.e. the burning of biomass with carbon capture and storage (CCS). While there are proven technologies both to capture and store CO<sub>2</sub>, the main challenge with BECCS is the scale needed. The following comment by Professor Kevin Andersson, deputy director of the Tyndall Centre, puts BECCS into perspective:

”The sheer scale of the BECCS assumption underpinning the Paris Agreement is breathtaking – decades of ongoing planting and harvesting of energy crops over an area the size of one to three times that of India. At the same time the aviation industry anticipates fuelling its planes with bio-fuels, the shipping industry is seriously considering biomass to power its ships and the chemical sector sees biomass as a potential feedstock. And then there are 9 billion or so human mouths to feed. Surely this critical assumption deserved serious attention within the Agreement?”

*A fifth reason is increasing pressure on ecosystems and biodiversity. Tropical forests, soils, freshwater and marine resources are the most obvious examples of overshoot. Add to that biodiversity loss – which by an increasing number of experts are being viewed as just as serious as climate change. In his most recent book – “Half Earth” – E O Wilson argues in favor of a very radical idea. He says that the only way we can stave off a mass extinction crisis – as serious as the one killing off the dinosaurs some 65 million years ago – would be to set aside half the planet as permanently protected areas for the ten million of the other species on Earth.*

5. Against this background, governments and businesses must work closely together to develop resource strategies to avoid both resource constraints and address the increasingly serious problems of environment degradation and pollution. The productivity concept must be broadened and include the use of natural resources.

Leveraging technology for enhancing productivity is nothing new. Labor productivity, which did increase by at least a factor 20 since the birth of the industrial revolution, is a case in point. But to quote my close colleague Ernst von Weizsaecker, “it is not labor that is in short supply in the future but rather nature and basic resources, like energy, soil and water. The same level of innovation and effort must now go into using technology for resource productivity as was the case with labor.”

6. Parallel to the problems of conventional growth and the health of the Planet, a host of other problems are emerging that are closely related to the way the economy is organized:

*First of all - rising inequalities* – both within countries and between countries; Piketty’s work has demonstrated that there seems to be an almost irresistible force to widen the gaps between those in the top of the pyramid and the rest. The crucial question is: “What will become of the general level of trust in society if this development continues?” The election campaign in the US – but, as well, developments among the electorate in Europe – bears witness not only of a loss of social capital and trust but, as well, of a tendency of populism to gain ground. People look for easy solutions and politicians of the extreme right are happy to offer them.

*Secondly, rising unemployment.* In a forthcoming report to the Club of Rome Jorgen Randers and Graeme Maxton argue that economic growth has done little to provide jobs in the recent past. In a few countries – like my own, Sweden – the number of people being part of the work force has gone up. But in most OECD countries the unemployment rates are higher today than thirty years ago. According to Randers and Maxton growth policies were successful up till the late 1970’s – both in terms of raising living standards and providing jobs. But after that growth policies have run into increasing problems because of the finiteness of the planet. “Ever higher outputs required the use of ever more resources per year and generated an ever stronger stream of pollution, in addition to a growing destruction of biodiversity and wild nature. The emerging cost of climate change appears to be the most serious of the negative side effects of continued economic growth.”

A new challenge is the *digitization of the economy* and the possibility of *automation and robotization* of an increasing number of jobs. We already see the effects. According to the authors of “*The second machine age*” – Brynjolfsson and Mc Afee - the almost perfect correlation that used to exist in the US between productivity gains in the private sector and the creation of new jobs has been broken. To them economic growth could be seen as a direct threat to employment. “The faster growth is the more companies tend to invest in automation and robotization.” There will be new jobs created in this process, as well, but probably far fewer than those being lost.

The debate on robotization and jobs is still in its early stages. Some people contend that robots arrive timely. Most OECD countries experience aging populations and hence a shrinking work force, the argument goes. Robots could be the substitutes.

Two things are clear to me. *First of all:* We have to understand much better what technology disruption will mean. *Secondly,* the notion that growth in the economy will automatically provide new jobs is no longer a given. Rather, I think,

we may expect "jobless growth" to be an increasing phenomenon.

Another problem related to the digitization of the economy is income distribution. "In the long run, automation makes us more prosperous overall, but it creates income distribution challenges, with the people towards the bottom being crowded out," according to David Autor, professor at MIT. "If we manage to create resources without a huge labour demand, the problem will not only be, 'Oh no, there's no jobs!' but 'Oh no, we have lots of wealth – now how do we distribute it?'"

Here we are confronted with challenges that will require a rethinking of institutions, of education, of taxation – to name just a few. Keynes wrote about "technological unemployment" more than seventy years ago. He saw it as both a curse and a blessing. On the positive side would be that people would need to work less and could spend more time on culture, on being together with family etc. But it would also be a challenge in a society where almost everything is organised around being employed.

7. From the discourse so far one can draw a few conclusions:

- economic growth policies have served OECD countries well for most of the 20th Century

- increasingly, however, we are experiencing problems. There seems to be an urgent need to rethink the logic behind the industrial society. We face serious problems of pollution, ecosystem decline, resource constraints and an increasingly unstable climate. Moreover, what worked seemingly well in the industrial society is not working as well in the emerging digital society. The main challenges are rising inequalities and unemployment.

8. Yet another dimension of this debate is the emerging discussion on *secular stagnation*. The concept was first introduced by Larry Summers. The implication is that our societies in the Western world have reached a point where it is going to be increasingly difficult to uphold economic growth. The economies suffer from an imbalance in the form of too much savings and too little investments. Even with low interest rates the willingness to invest is low. If and when growth is achieved it comes from dangerously high levels of borrowing that translate excess savings into unsustainable investments (like the housing bubble).

The secular stagnation debate has an increasing number of voices. In the most recent edition of *Foreign Affairs* several articles are devoted to the notion of "slow growth" or "no growth". One of the writers is Zachary Karabell, head of Global Strategy at Envestment. He is suggesting that conventional growth may not be necessary for prosperity – a reasoning echoing Tim Jackson's landmark report some years ago. Moreover, some of Karabell's arguments are similar to the most recent book by Jeremy Rifkin: "*The Zero Marginal Cost Society*". By focusing on growth alone we tend to miss the great advances made thanks to technology disruption; many services provided on the Internet at low or no cost. This is positive for prosperity but is not reflected in GDP statistics. Furthermore, information technology has also led to numerous cost savings in the production of consumer products, a benefit for consumers in general. The rapid cost reductions in solar and wind technologies is yet another example. The shift to solar technology, for instance, means a rise in GDP when investments are made. But thereafter – when access to solar power, at almost zero marginal cost, replaces purchase of coal power – GDP is negatively affected.

9. So from whatever angle we look at it there is good reason to question whether economic growth can continue to be the main objective for policy-making in the future.

10 *So what should we do?* Before bringing to the fore a number of things that should put us on a more healthy path – and at least would buy some time – let me provide a few comments on why it has been so difficult in the past to mobilize support of more sustainable policies:

- one main barrier of course is all the vested interests, people who have invested in present-day technologies and don't want their revenues to disappear.

- another one is the wide-spread notion in society that environment policies constitute a threat to both competitiveness and jobs.

- a third reason is that most people are short-term in their thinking. This notion is well underpinned by the most recent research on how our brains work. We tend to suppress uncertainty and we do not want to make sacrifices in the short term - even if that would mean benefits in the long term.

- there is as well a lot of ideology involved. Most climate denial in the US is found among right-wing people who basically are very negative to government interventions, be they taxes or regulation.

So whenever suggesting strategies for the future barriers to change like the ones referred to here must be taken into account – and, if possible, circumvented.

### **11. Let me finally list a few types of action to be considered in the interest of sustainability and, more specifically, to reduce our ecological footprint:**

*First of all, rethink the way we measure progress.*

For too long has growth in GDP been used as the main indicator of progress. GDP growth is a deeply flawed measure of well-being. High growth does not guarantee shared wellbeing. Furthermore, growth rates tell us very little about levels of waste and emissions and the health of our most important ecosystems. As long as governments insist on maintaining GDP growth – a quantitative indicator – as the main indicator of societal progress, there is little hope we can steer development towards sustainability. There are alternatives to GDP in the form of indicators that highlight qualitative improvements. It is high time we adopt them.

*Secondly, take nature into account*

One major shortcoming of economics is the failure to assign a value to ecosystem services and biodiversity. I don't mean to say that everything in nature should be monetized. But as long as there is no value assigned, ecosystem services and biodiversity will be invisible and, consequently, not taken into account. Most likely they will be progressively eroded.

*Thirdly, take the Paris Agreement seriously.* This means proactive policies to curb emissions from industry, transport, power production, housing and construction and, indeed from land use.

*Fourthly, be serious about decoupling*

One aspect of climate mitigation that so far has been more or less neglected is related to material metabolism in society. Much focus has been given energy use. But material use – the other side of the coin has been given scant attention. Let me expand a bit on this.

A first important step towards a more efficient use of materials would be to significantly increase recycling rates in society. But enhanced rates of recycling is just one of several necessary steps. Decades ago the concept “Cradle to Cradle” was introduced. The main message was not to focus only on enhancing efficiency, but to increase effectiveness. *“If your system is wrong, to increase efficiency is not the solution.”* What the founders of the concept - Stahel, Braungart and McDonough - were advocating was to *“do things right”*.

The main principles behind “cradle to cradle” – to extend wealth, to minimize waste and to go for maximum reuse and recycling of materials – is gradually gaining ground. At the core of the concept is to turn products into services. This in turn implies new business models, earning revenue by not primarily selling more “stuff” but by offering high-quality services.

Stahel, Braungart and McDonough have been joined lately in their pleas for more intelligent resource use. The most prominent example is Dame Ellen MacArthur. The foundation she launched – Ellen MacArthur Foundation - has produced several reports on the benefits for both companies and society by moving towards a circular economy.

Parallel to the work of Ellen MacArthur Foundation, the EU Commission has taken several initiatives – primarily under its former Environment Commissioner, Janez Potochnik - to enhance resource efficiency and move the European economy towards a more circular economy. A Circular Economy Package, launched in December 2015, is currently being debated both in the Council of Ministers and the European Parliament.

A new report from the Club of Rome has studied the likely macro-economic effects by moving towards a more circular economy. Five countries - Finland, France, the Netherlands, Spain and Sweden – were analysed using a traditional input / output model. The question posed was: *How would the economies perform today if they were 25% more energy efficient, had reduced the use of fossil fuels by 50% in favor of renewable energy and achieved a far more efficient use of materials?*

The result is very promising. If the countries studied were to introduce all the three actions in parallel, the effects would be substantial: CO2 emissions would be between 65 and 70% lower. The impact on jobs would be highly positive as well: an estimated 75 000 additional jobs in Finland, 100,000 in Sweden, 200,000 in Holland, 400,000 in Spain and half a million in France.

The result should not come as a surprise. An economy giving priority to caring for what has already been produced – through repair, maintenance, upgrading and remanufacturing – is more labor-intensive than both mining and manufacturing (often in highly automated and robotized facilities).

A circular economy will not happen by itself. Policy measures - as well as targeted investments – will be needed. The scope here is too limited to dwell into this. But let me make a few suggestions as concluding remarks:

*\*\* binding targets for resource efficiency; by setting such targets well above the expected growth rate in the economy, the right signals would be sent to industry to focus on the maximum reuse and recycling of materials;*

*\*\* sustainable innovation; by giving priority to sustainable design and closed material loops, the research community would give maximum attention to the principles of a circular economy.*

*\*\* a tax reform; by lowering taxes on labor and raising them on the use of virgin materials, similar incentives would be at play as in the case of binding resource efficiency targets. Furthermore, by exempting recycled materials from VAT the market for secondary materials would get a much needed boost.*

### *Fifthly, use the benefits of digitization and technology disruption*

I referred earlier to the Information technology revolution. It poses threats to employment, at least initially. But in general digitization offers a lot of opportunities. We have only seen the beginning. New on-line services – for free or at low cost – virtual meetings, smart grids, smart buildings, driverless vehicles, the Internet of Things etc. One common denominator is that all kinds of activities can be carried out in much more efficient – and effective ways. But in order for society – and sustainability – to benefit there is a need for smart policy frameworks. Otherwise the benefits may stay with a few and not with society at large.

These were just a few suggestions on what would be required to move society in a direction of sustainability. A number of crucial measures have not come to the fore, primarily because of time limitations. The topic discussed is broad. Some of the most important areas of intervention not mentioned by me today are

- *financial system reform,*

- *rethinking company law* – complementing shareholder value,

- *education reform* – helping people to understand that everything is interconnected,

- *specifically reforming the education of economists* – helping them to stop seeing nature as a constant.

Finally. I would suggest that we redefine the concept of sustainability. For too long the definition from the Brundtland Report has prevailed. Instead of viewing sustainability as a balancing act between economics, social sustainability and the environment, I would suggest the following approach:

*Social sustainability should be the core objective. This ought to happen with respect of the Planetary Boundaries. The economy would then be seen as the toolbox to make these objectives happen.*

Today it is most often the other way around. Economic growth is the main objective and social and environment objectives are compromised in the interest of growth. By turning this principle on its head I believe we would have a much more constructive discussion and by far much better chance to move decisively towards a more just and sustainable society.