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ROUGH DRAFT

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Factor X:
Policy, Strategies and Instruments Towards a Sustainable Resource Use

TOWARD A
6 TON SOCIETY

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The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so we must think anew, and act anew. We must disenthrall ourselves, and then we shall save our country.

Lincoln's Second Annual Message to Congress, December 1, 1862

A. Where we stand

Ecological disruption is still increasing at a fast pace, as are global natural resource use[3], and population. Current environmental and economic policies have not been able to stop this trend. Traditional environmental protection and economic policies were *not* designed to lead to ecologically sustainable conditions. They tend to focus on correcting specific dangerous developments in the environment after these were discovered and politically acknowledged as a thread. Obviously, these policies cannot be precautious.

Planet earth is a closed system. Materials, fresh water and space are limited. Only solar radiation and geothermal energy are available without limits. Within one hour, the sun radiates to earth as much energy as the entire yearly energy need of the world economy. To date, neither solar energy nor the inexhaustible storage of geothermal energy have as yet been utilized to the possible extent. This is not because technology could not have been developed for transforming this ecologically “neutral” energy into technically useful forms. This failure is a consequence of “saving money” at the expense of ecological stability. Massive material flows in form of fossil energy carriers are set in motion in order to drive the industrial metabolism.

As a consequence, we are losing natural capital and in particular eco-systemic services[4] at increasing speed, services that are pre-requisite to human life on earth. Increasingly, the

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[3] Resources encompass here all naturally available non-renewable (abiotic) and biotic raw materials (minerals, gravel, fossil and nuclear energy carriers, plants, wild animals), air, water, and space (land use for human settlements, infrastructures, industry, mineral extraction, agriculture and forestry).

[4] Services of nature (eco-systemic services) are the essential and cost-free support for all life on earth. They include the availability of liquid water and clean air, edible plants and animals, the propagative power of seeds and sperms, and the availability of a multitude of different elements and materials. They include the formation and maintenance of productive soil, a rich biodiversity, fitting climatic conditions with appropriate seasonal changes and temperature ranges, all linked to the water cycles, and they also include the protection from dangerous radiation from outer space.

world experiences such costly consequences as water shortages, desertification, climatic change, extinction of species, spread of old and new diseases, floods and hurricanes [5].

In order to approach sustainable conditions, a systemic ***risk reduction policy*** has to be applied that focuses on the basic reasons for the present disharmony between the human economy and nature.

Several aspects are important here:

From a *physical point of view*,
the root cause for this disharmony is the enormous resource intensity of goods and services. Climate science and the Millennium Ecosystem Assessment make clear that without a radical reform of the human-nature relation in favor of nature human civilization is at grave risk. Specifically, nine billion humans cannot live current Western lifestyles and maintain a habitable planet.

On average, more than 90% of natural the material moved and extracted for manufacturing goods turn into waste and are denatured before a car or any other industrial product reaches the point of sale. Their *ecological rucksacks*[6] are obviously enormous[7]. To operate a mid-sized car, the life-cycle-wide input of material (including energy) per km [MIPS], amounts to about 400 grams of nature per km – without counting water - *including* the 35 grams of carbon contained in 120 grams of emitted CO_2 per km.

Worldwide, close to 100 Billion (90 European Milliards) tons of non-renewable materials are currently being disturbed and extracted per year (*ex*cluding plowing fields), or roughly 14 tons per person [8]. Schmidt-Bleek estimated in 1993, that half of this quantity is the uppermost limit for maintaining stable ecological conditions[9], leading to the proposed “6 Ton Society”.

From an ***economic*** point of view:
Any aspiration for a sustainable economy must be based on the recognition that indefinite physical expansion of human wealth is obviously impossible on a finite planet. The assumption of economists that economic growth is a basic need for a healthy economy has been a pipe dream from its inception and is largely responsible for the currently sad state of ecological affairs. Dozens of Nobel Prizes have been bestowed on economists for researching the “scientific basis” of an economy that is *a priori* instable from a systems point of view. Today, indications are many that there is precious little time left for changing the economic framework conditions for avoiding an otherwise insurmountable ecological crisis.

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[5] See, for instance, the Wiegandt Series „Courage for Sustainability“ Haus Printers, London, 2008/2009; and the IPCC (Intergovernmental Panel on Climate Change) Climate Report 2007; the UNDP (United Nations Development Programme) Report 2007 on Climate Change and Poverty; the UNEP (United Nations Environment Programme) Report 2007 „Global Environmental Outlook GEO-4“, and the EEA (European Environment Agency) Report 2007 „Europe's Environment“

[6] The Ecological Rucksack of a Product is the total amount of natural material moved and extracted for manufacturing (MI in kg) a product, minus the weight of the product itself. Ecological rucksacks are counted separately for abiotic (non-renewable) and biotic materials, water and air.

[7] F. Schmidt-Bleek,:”The Earth, Natural Resources and Human Intervention“, Haus Publishers, London, 2008

[8] z. B. F. Hinterberger in his chapter on ecological rucksacks, Oekologisches Jahrbuch 2010.

[9] F. Schmidt-Bleek, “Wieviel Umwelt braucht der Mensch?, MIPS, das Mass für ökologisches Wirtschaften” Birkhäuser, 1993. Japanese, Chinese and Finish translations are on the market. An English version (“The Fossil Makers”) can be downloaded from www.factor10-institute.org.

As a minimum, prices of things on the market must reflect their true price, the price for maintaining human life on earth[10].

From a ***technical*** point of view:
The most fundamental *technical* requirement for moving towards a sustainable human economy is to dematerialize[11] human economic activities and curb the use of sweet water and land use dramatically. A wide range of technical options to achieve these goals already exists, but such solutions remain largely unimplemented because of a lack of economic incentives to do so. It has been demonstrated that dematerialized technology does *not* lessen end use satisfaction for consumers.

From a ***policy*** point of view:
At present, framework conditions for the market still allow *inter alia*: insufficient controls and accounting methods for (unexpected) ecological (economic, financial, social etc) change, incomplete early warning systems, missing competence in systems analysis and risk management, unwillingness to implement precautionary policies, short-term profit maximization subsidized by nature, optimizing labor and economic advantages at the expense of the ecopshere, the marketing of toxic products, and wrong prices of products in general.

Preserving the ecosphere and enhancing sustainable economic activities must be made mutually supportive *at the front end* of the cycle when the goals and policies of society are being set, not at the tail end after society has already incurred the damage costs of unsustainable development [12]. One of the key issues here is to get the prices on the market for goods and services right, reflecting the inherent scarcity of natural resources.

A great deal of literature already exists[13], explaining details and giving examples of practical improvement options.

Where we need to go

We propose therefore as one worldwide goal **THE 6 TON SOCIETY** be achieved as early as possible, but not later than in 2050. This goal encompasses the maximum emission of 2 yearly tons of climate-effecting gases proposed previously[14].

The 6 ton goal for abiotic material use per year corresponds well with the average Factor 10 increase in resource productivity proposed since 1993 for industrialized nations [15]. Germany, for example would have to dematerialize[16] its economy by a factor of about 10, Finland by a factor of ca 18, the USA slightly less than that, and the UK and Japan by factor of about 7. On

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[10] See Paul Ekins: Reducing Resource Consumption, Berlin Meeting, 18. June 2009

[12] 1994 Declaration of the International Factor 10 Club (www.factor10-institute.org)

[13] See for instance books by: Raimund Bleischwitz, Stephan Bringezu, Claude Fussler, Paul Hawken, Fritz Hinterberger, Harry Lehmann, Christa Liedtke, Bernd Meyer, F. Schmidt-Bleek, Ursula Tischner, Ernst U. von Weizsaecker, Jola Welfens, Ryoichi Yamamoto

[14] F. Schmidt-Bleek, 2008, Editorial: „Factor 10:The Future Of Stuff", Sustainability, Science, Practice, & Policy http://ejournal.nbii.org

[15] F. Schmidt-Bleek, H. Lehmann, et. al., Wuppertal Institute: Special Issue of "Fresenius Environmental Bulletin", Birkhäuser, August 1993, In English

[16] Dematerialization in this context is taken to mean the radical reduction in the use of all natural materials by humans.

the other hand, many developing nations would then have “environmental space to grow into”.

Conclusions

Available evidence indicates that every national and international possible effort must be made to come near the maximum limit of 6 tons/person-year of non-renewable resource movements and extraction for all countries by the middle of this century in order to avoid serious economic and ecological breakdowns.

Next to the ecological reasons for limiting the motion, extraction, and use of natural resources, natural capital in terms of material, water and land is continuously getting scarcer. This calls for increasing productivity (efficiency) in their use. The specific use of material, water and land for creating a unit of service or value in the technosphere will be the economic yardstick of tomorrows’ excellence and leadership.

We suggest that intensive political attention be turned without delay to changing the economic framework conditions, such that ecologically sensible production and consumption become profitable. Massive R&D will have to be devoted to eco-innovation[17]. The limits and goals suggested above must unquestionably be continuously monitored and fine-tuned on the basis of improved information, data, and practical experience: a platform for systemic risk reduction observation must be created without delay.

[17] *Eco-innovation* means the creation of novel and competitively priced goods, processes, systems, services, and procedures that can satisfy human needs and bring quality of life to all people with a life-cycle-wide minimal use of natural resources (material including energy carriers, and surface area) per unit output, and a minimal release of toxic substances. (Reid, Alasdair, Miedzinski, Michal (2008), EUROPE INNOVA, Final Report for the EU Sectoral Innovation Watch Panel on Eco-Innovation, www.europe-innova.org).