

**Lecture 8**  
**Block II: Options for the future**

**Which path into sustainability?**

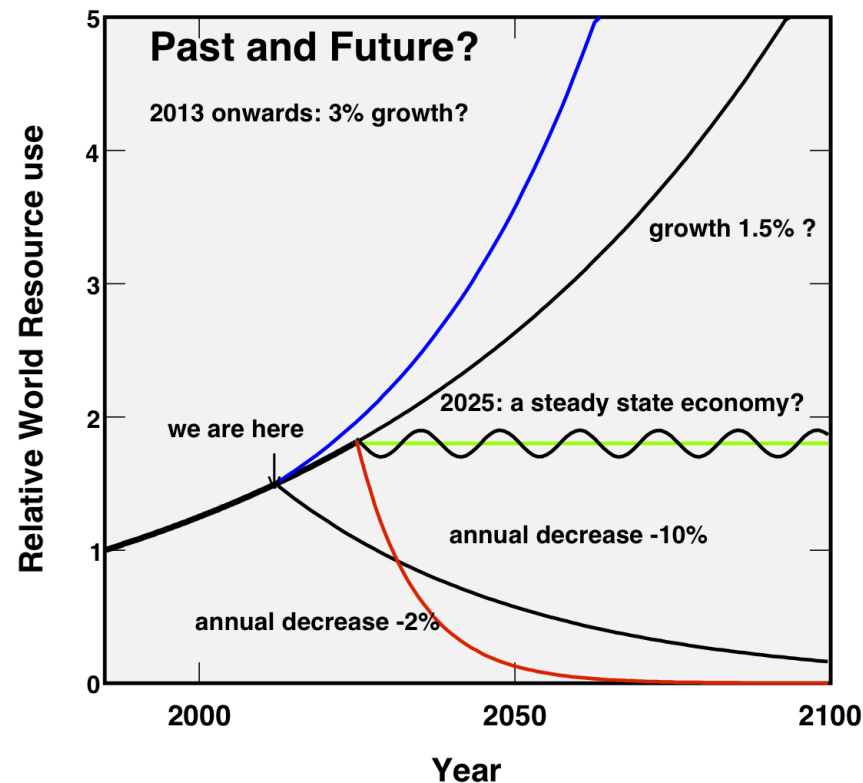
BAU = Business as usual (17.4) **Green Economy (11.4)**; Collapse (8.5);

**Green Economy:**

- If one accepts that “growth (BAU) as before is not a sustainable option.. can a “Green Economy” and “Green Growth” be the option for the future?
- Green Economy (GE) and Green Growth (GG).. what is it?
- the “ecological footprint...” a quantitative estimate for our human impact ( $I = P A T$ )?
- the “Ghost-Footprint” or why our real footprint is much much larger
- A “Green economie” for Switzerland or continue as before up to 2050(?) and then only “green growth”?

# realistic and unrealistic models for the future?

- BAU (= growth forever) is not an option anymore  
Even if today's way of life in rich countries became only possible thanks to past economic growth.
- Just a little more growth, especially in poor countries, followed by a global green (steady state) economy with only qualitative growth?
- Development towards sustainability through a rapid descent (collapse)?
- Our goal: a rational local and global "development towards sustainability" theoretical principles for the rational path into a sustainable system.



# Critical “politicians”, UN “scientists and diplomats” etc: the BAU scenario brings ruin for all and especially for the poor! (1)

UNEP United Nations Environment Programme: Environment for development  
<http://www.unep.org/> Quotes from the “Forword”

## Global Outlook on Sustainable Consumption and Production Policies

-Taking Action Together” <http://www.unep.fr/scp/publications/details.asp?id=DTI/1498/PA>

- “We are facing deeply interlinked economic, social and environmental crises that stem, in large part, from current **unsustainable patterns of consumption and production, and pose serious threats to human development.**”
- “Health, education, equity and empowerment are all adversely affected. **Humanity is now consuming more resources than ever, both per person and in absolute terms, exceeding by far our planets regenerative capacity.**”

# Critical “politicians”, UN “scientists and diplomats” etc: the BAU scenario brings ruin for all and especially for the poor! (2)

UNEP United Nations Environment Programme: Environment for development  
<http://www.unep.org/> Quotes from the “Executive Summary”

## Global Outlook on Sustainable Consumption and Production Policies

-Taking Action Together” <http://www.unep.fr/scp/publications/details.asp?id=DTI/1498/PA>

### “The Imperative of Sustainable Consumption and Production”

- “Although economic development over the past 30 years has managed to lift millions out of poverty and expand the number of countries reaching middle- income status, it has also been accompanied by a wide array of negative environmental and social impacts. These impacts threaten to undermine, or even reverse, the economic development that has been achieved to date.”
- “Globally, resource consumption continues to rise, waste and pollution grows, and the gap between rich and poor stretches wider.”
- “At the time of writing this report, the global economic system is still plagued by recent multiple crises with significant consequences for the worlds poor.”
- “Highly volatile and rising oil prices put further pressure on the gains that have been achieved through economic development.”

# Critical “politicians”, UN “scientists and diplomats” etc: the BAU scenario brings ruin for all and especially for the poor! (3)

UNEP United Nations Environment Programme: Environment for development  
<http://www.unep.org/> Quotes from the “Executive Summary”

## Global Outlook on Sustainable Consumption and Production Policies

-Taking Action Together” <http://www.unep.fr/scp/publications/details.asp?id=DTI/1498/PA>

### “The Imperative of Sustainable Consumption and Production”

- “Rapidly increasing food and commodity prices, in part driven by increased fuel prices, reflect further the inter-linkages of economic and environmental challenges.”
- “Considering a projected population of 9 billion in 2050, feeding the world will be a major challenge, given current consumption trends.”
- “Putting in place a more sustainable food supply systems is clearly an urgent need.”
- “Consumption of natural resources is increasing and will accelerate further if projected growth rates of the world economy are realised. **This is alarming for both non-renewable and renewable resources that depend on ecosystems, which can irreversibly collapse after overexploitation.**”

# Critical “politicians”, UN “scientists and diplomats” etc: the BAU scenario brings ruin for all and especially for the poor! (4)

UNEP United Nations Environment Programme: Environment for development  
<http://www.unep.org/> Quotes from “Section 1.1: Current challenges”

## Global Outlook on Sustainable Consumption and Production Policies

-Taking Action Together” <http://www.unep.fr/scp/publications/details.asp?id=DTI/1498/PA>

**“For many, the world economy has failed to deliver on its promises of sustainable improvements in well-being”**

- “The FAO has estimated that the 2007/2008 price spike increased the number of undernourished people from about 850 million in 2007 to about 1,023 million in 2009.”
- “Putting in place a more sustainable food supply systems is not the only urgent need. There is also no clear road ahead for the transition to sustainable energy systems. ”
- “According to the report on the implementation on Agenda 21, growth rates in the diffusion of renewable energy technologies are still insufficient to achieve the required decarbonized global energy system by 2050. At the same time, the lack of access to modern energy services is also a pressing development problem.”
- “..global consumption and production patterns are inexorably driving humanity toward future crises, as extractive industries and waste generation cause the destruction of natural capital on a wide scale.”

# Green Economy and Green Growth, what do our politicians and governments say?

Einige Zitate:

- “German Chancellor Makes Green Economy a Priority in Discussions in UNEP” (12. July 2011) <http://www.unep.org/newscentre/default.aspx?DocumentID=2647&ArticleID=8809>
- Francois Holland (Speaking at a green energy conference in Abu Dhabi, 15.1.2013), the French president said that people had an obligation to protect the planet for future generations.  
"If we don't act, if we don't do anything, if we don't invest anything, we can be sure that we will have a catastrophe very soon. We have to have confidence to invest in the new energy."  
<http://www.guardian.co.uk/environment/2013/jan/15/francois-hollande-renewable-energy>
- China to develop circular, green economy (7. Feb. 2013)  
<http://english.peopledaily.com.cn/90778/8126037.html>
- Obama (2009) “Green Jobs: Lessons we can learn from Spain”  
<http://www.youtube.com/watch?v=FPo47TIshLQ> und <http://www.youtube.com/watch?v=t3UebL-x-sw>

# **Green Economy (GE) and Green Growth (GG) .. ask the politicians for a proper definition? (1)**

**UNEP(2011): Towards a green Economy Report** [http://www.unep.org/greeneconomy/Portals/88/documents/ger/GER\\_synthesis\\_en.pdf](http://www.unep.org/greeneconomy/Portals/88/documents/ger/GER_synthesis_en.pdf)

**UNEP 2011 defines a green economy as one that:**

- **results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.**
- **In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive.**
- **In a green economy, growth in income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services.**

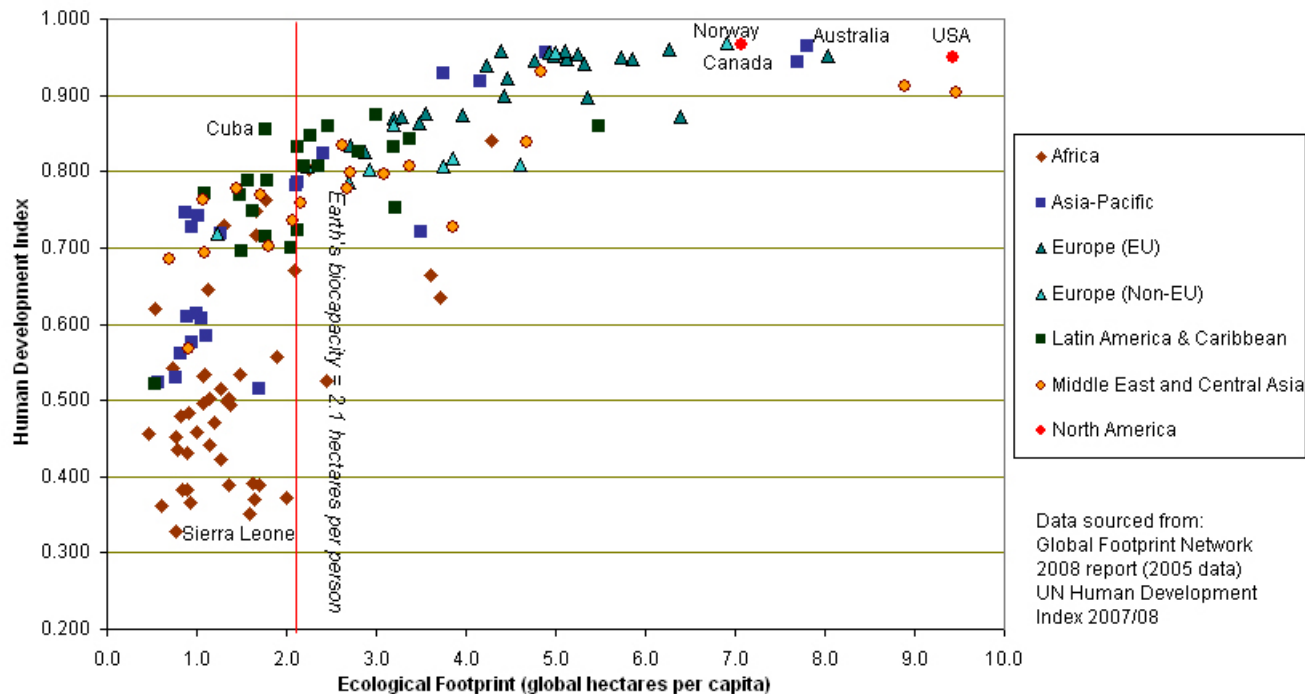


# Green Economy (GE) and Green Growth (GG) .. ask the politicians for a proper definition? (2)

UNEP defines a “Green Economy” as one that is:

(1) within the “Ecological Footprint” below 2 global hectares per capita  
and (2) a United Nations Human Development Index above 0.8

Human Welfare and Ecological Footprints compared



What one should never ever do:  
use a (two?) new undefined concept to define something!

# Green Economy (GE) and Green Growth (GG) .. ask the politicians for a proper definition? (3)

“Never(!)” define something with something undefined!

(1) within the Ecological footprint = less than 2 global hectares per capita?

Total land area of our planet = 150 million km<sup>2</sup>, minus 50 million km<sup>2</sup> ice, deserts and mountains etc..

Thus we only have a total of 10 billion global hectares land for soon 9 billion humans!

How much land do we allow for other species?

(2) a United Nations Human Development Index above 0.8

for a definition(?) see: [http://en.wikipedia.org/wiki/Human\\_Development\\_Index](http://en.wikipedia.org/wiki/Human_Development_Index)

(1) A long and healthy life: Life expectancy at birth

(2) Education index: Mean years of schooling and Expected years of schooling

(3) A decent standard of living: GNI per capita (PPP US dollar)

normalised HDI = “geometric mean” from these three quantities.

**If this definition results in something useful (please decide for yourself!)**

# Green Economy (GE) and Green Growth (GG) .. ask the politicians for a proper definition? (4)

A typical UN problem: tons of documents but (using the UN words): **A guide-book to the Green Economy**

<http://sustainabledevelopment.un.org/content/documents/GE%20Guidebook.pdf>

**“There is no internationally agreed definition of green economy and at least eight separate definitions were identified in recent publications (see Appendix 1)”**

The consequence: many new conferences and reports (quote from the introduction):

“Despite the growing international interest in green economy, negotiations among Member States on the concept in the lead up to Rio+20 were challenging. This was partly due to the lack of an internationally agreed definition or universal principles for green economy, the emergence of interrelated but different terminology and concepts over recent years (such as green growth, low carbon development, sustainable economy, steady state economy etc.), a lack of clarity around what green economy policy measures encompass and how they integrate with national priorities and objectives relating to economic growth and poverty eradication, as well as a perceived lack of experience in designing, implementing and reviewing the costs and benefits of green economy policies.

# The ecological footprint ... (1)

## a quantitative calculation for our impact

Quotes and more from [https://en.wikipedia.org/wiki/Ecological\\_footprint](https://en.wikipedia.org/wiki/Ecological_footprint)

“The first academic publication (William Rees in 1992)

The ecological footprint concept and calculation method was developed as the PhD dissertation of Mathis Wackernagel, under Rees supervision at the University of British Columbia in Vancouver, Canada, from 1990-1994.”

### **Definition (Wikipedia):**

“The ecological footprint is a measure of human demand on the Earth’s ecosystems. It is a standardised measure of demand for natural capital that may be contrasted with the planet’s ecological capacity to regenerate. It represents the amount of biologically productive land and sea area necessary to supply the resources a human population consumes, and to assimilate associated waste.”

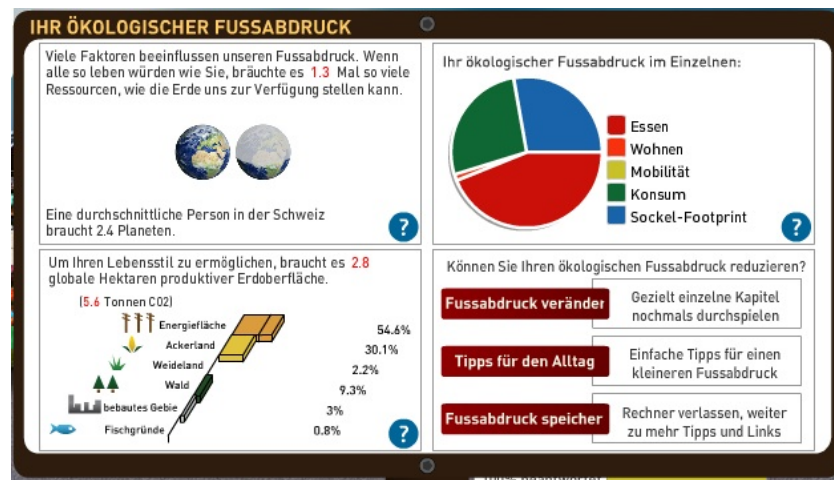
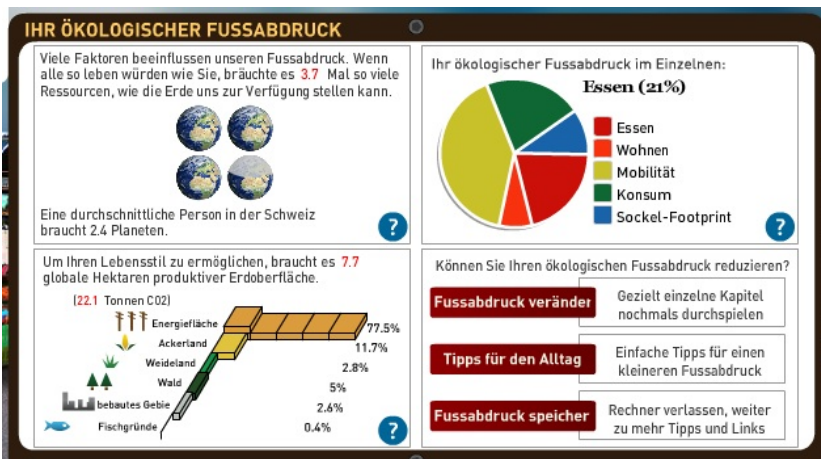
“In 2007, the average biologically productive area per person worldwide was approximately 1.8 global hectares (gha) per capita. The U.S. footprint per capita was 9.0 gha, and that of Switzerland was 5.6 gha, while China’s was 1.8 gha. The WWF claims that the human footprint has exceeded the biocapacity (the available supply of natural resources) of the planet by 20%.”

# The ecological footprint ... (2) a quantitative calculation for our impact

the “Footprint Calculator”

<http://www.footprintnetwork.org/pt/index.php/GFN/page/calculators/>

If one has time, try to be a small “eco pig” or an “eco saint”



## The ecological footprint ... (3) a quantitative calculation for our impact

some details/quotes from: <http://www.footprintnetwork.org/en/> and  
[http://www.footprintnetwork.org/en/index.php/GFN/page/footprint\\_science\\_introduction/](http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_science_introduction/)

### Footprint Science - Introduction

*How can we all live well and live within the means of one planet?*

“This is the research question of the 21st century. If we are serious about sustainable development, there is no way around this question. If we do not design ways to live within the means of one planet, sustainability will remain elusive, which creates risks for economies and humanity as a whole. Living within the means of nature is a necessary precondition for sustainability.”

Question from a physicist (M.D.) to M. Wackernagel:

*“Almost every year the “overshoot day” comes earlier. What happens when we reach January 1, 0:01?”*

Answer from M. Wackernagel (roughly) .. *“why do you ask the question?”*

# the “Ghost-Footprint” or Why our real footprint is much larger! (1)

[http://www.footprintnetwork.org/de/index.php/GFN/page/frequently\\_asked\\_technical\\_questions/#ic1](http://www.footprintnetwork.org/de/index.php/GFN/page/frequently_asked_technical_questions/#ic1)

**“An alternative method would be to calculate the consumption of fossil fuels according to the productive area required to regenerate them, which would result in a carbon Footprint many hundreds of times higher than the current calculation.”**

## **(My) criticism of the footprint concept (some points):**

- The original and remaining natural capital is ignored;
- the finite amount of non renewable resources is ignored;
- only the “CO<sub>2</sub>” impact from the use of fossile fuels is calculated (and it is not explained how it is done!);
- the impact from city and land living and from “poor and rich” people is not estimated;
- Rights from future generations and from other species are ignored.  
Would a global footprint of exactly “1 Earth” be sustainable?

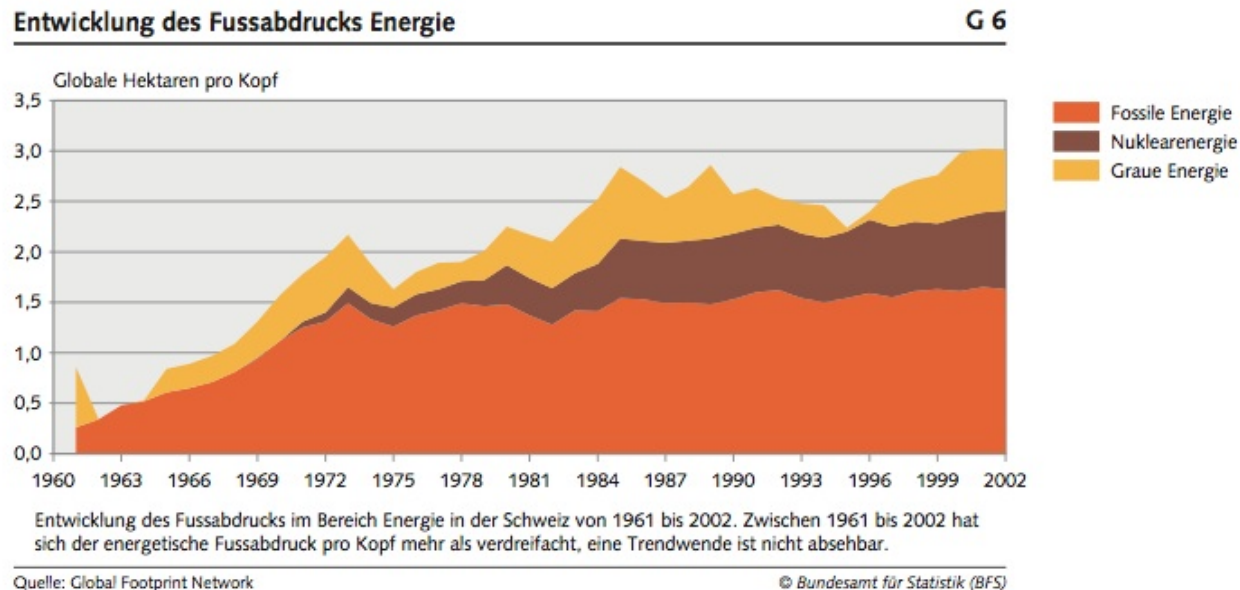
# the “Ghost-Footprint” or Why our real footprint is much larger! (2)

## The ecological footprint from Switzerland

Ein Beitrag zur Nachhaltigkeitsdiskussion (Bundesamt für Umwelt 2006)

<http://www.bafu.admin.ch/publikationen/publikation/00125/index.html?lang=de>

*“Der ökologische Fussabdruck in der Schweiz misst derzeit 4,7 globale Hektaren pro Person. Die Biokapazität unseres Landes beträgt indes bloss 1,6 globale Hektaren pro Kopf. Somit ist der Fussabdruck in der Schweiz fast dreimal so gross wie die Biokapazität. Der ökologische Fussabdruck ist bereits seit einigen Jahrzehnten grösser als die Biokapazität unseres Landes. Seit den 1960er Jahren hat sich der ökologische Fussabdruck der Schweiz mehr als verdoppelt.*



the official Suisse “CO<sub>2</sub> waste” and energy impact



## the “Ghost-Footprint” or Why our real footprint is much larger! (3)

**How large is the energy “Ghost-Footprint” of Switzerland?**

If Switzerland could not import oil, gas, uranium etc:

Renewable energy resources (hydropower and timber) cover roughly 15% of the Suisse Energy mix.

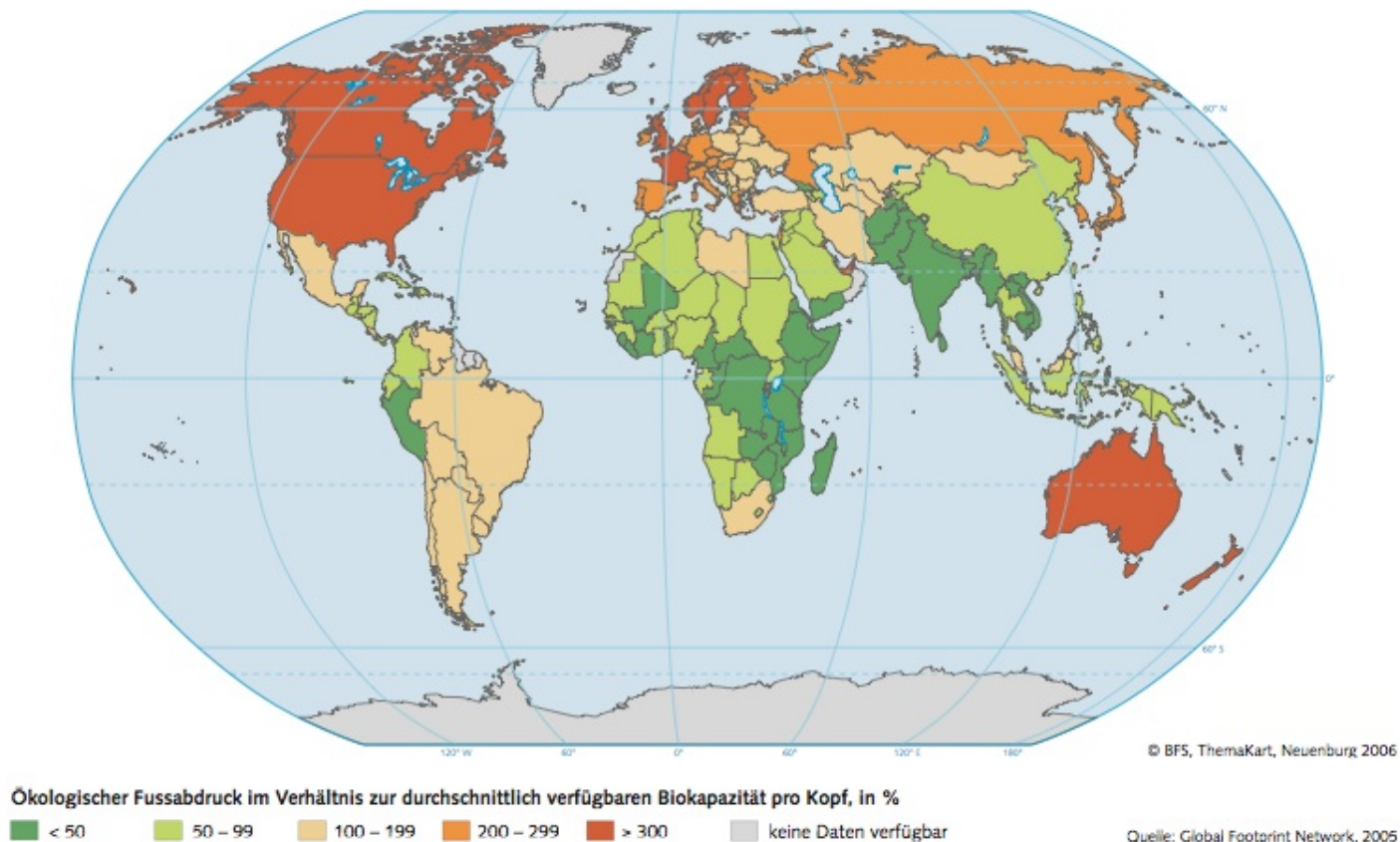
- For our way of life we are not only using 4 planets, but more like 30 planets!
- If all food, produced with today's methods, would be made from within Switzerland, we would need twice as much “productive land”!

# the “Ghost-Footprint” or Why our real footprint is much larger! (4)

Globally: our real energy footprint is roughly 10 times larger than what Wackernagel et al. calculate. Try to replace all fossile fuels (oil, coal and gas about 85% (plus uranium about 11% of the electric energy) with energy from “water, wind, solar and biomass”.

Globale Verteilung des ökologischen Fussabdrucks, 2002

K 1



# A GREEN ECONOMY for Switzerland

## Some voices from Switzerland (1)

### **Bundesrat setzt auf grüne Wirtschaft.. Ziele bis 2020:**

Doris Leuthard und Moritz Leuenberger machen sich für eine ökologischere Wirtschaft stark.

“So soll die Schweiz ihren Ressourcenverbrauch auf ein “naturverträgliches Mass” verringern. Der Bundesrat möchte, dass die Schweiz zur weltweiten Impulsgeberin für Ressourceneffizienz wird und als Wirtschafts- und Innovationsstandort eine führende Position einnimmt.”

19.10.2010 <http://www.tagesanzeiger.ch/schweiz/standard/Bundesrat-setzt-auf-gruene-Wirtschaft/story/14282284> and <http://www.srf.ch/player/tv/news-clip/video/leuthard-zur-bedeutung-von-gruener-wirtschaft?id=adac4372-8172-4e80-aae6-2fcea63c1645>

Quotes from Dr. Bruno Oberle, Direktor Bundesamt für Umwelt

<http://www.bafu.admin.ch/org/02314/02321/03681/index.html?lang=de>

- Logistiktagung Novotel Zürich, 18.05.2011  
“Um unsere Bedürfnisse zu stillen, benutzen wir heute weltweit 1.5 mal die Menge Ressourcen, welche die natürlichen Kreisläufe uns in derselben Zeitspanne zur Verfügung stellen. **Die Schweiz nutzt sogar 2.5 mal mehr als uns zustünde. Tendenz steigend.**”  
(Oberle, 21.1.2014: <https://www.youtube.com/watch?v=YpKnXCacNp4>)
- WRF in Beijing 2012: “Today, the world population is consuming one and a half times as many natural resources as the ecosystems can regenerate. This however differs from nation to nation and between individuals. If everyone would consume as much as the average Swiss, it would require 2.5 times the size of the earth. If consumers were like the average Chinese, it would be 1.2 planets... **Scientists, policymakers and business leaders must find ways and solutions to live within our planetary boundaries.**”
- “Finally, **a popular initiative for a greener economy ask to reach footprint 1 by 2050.** Despite all the measures in force, further action is also needed if we want to achieve this goal by mid-century.”

# A GREEN ECONOMY for Switzerland?

## Some voices from Switzerland (2)

Quotes from Dr. Bruno Oberle, Direktor Bundesamt für Umwelt  
<http://www.bafu.admin.ch/org/02314/02321/03681/index.html?lang=de>  
Rede 18.1.2013 Swiss Green Economy Symposium

- “Wenn natürliche Ressourcen wie Wasser, Boden, saubere Luft oder Rohstoffe nicht mehr in genügender Menge und Qualität zur Verfügung stehen, dann ist nicht nur die Lebensqualität der Menschen gefährdet; dann wird auch die Wirtschaft massiv behindert.”
- “Wir diskutieren heute über die Grüne Wirtschaft. Definitionen sind von meinen Vorrednerinnen und Vorrednern geleistet worden - vielen Dank. Dazu gibt es nicht mehr viel anzufügen.”
- “In der Schweiz verbrauchen wir heute knapp das Dreifache dessen, was uns unser Planet zur Verfügung stellt.” ..  
“(Wir gehen deshalb) von einer Steigerung der Effizienz um das Dreifache aus, welche die Schweiz leisten muss. Dieses Ziel zu erreichen ist eine Generationenaufgabe (25 Jahre?), meine Damen und Herren. Das ist kein Sprint, sondern ein Marathon.”  
“Wir wollen auf dem Weg zur Grünen Wirtschaft nicht blind voran stürmen, wir wollen solide Schritte machen, die richtigen Schritte machen.
- “Politischer Druck in Richtung Grüne Wirtschaft kommt auch von verschiedenen Volksinitiativen und Vorstössen. Im Vordergrund steht zurzeit die Initiative der Grünen Partei “für eine nachhaltige und ressourceneffiziente Wirtschaft”. Sie will in der Bundesverfassung das Ziel verankern, wonach bis im Jahr 2050 der ökologische Fussabdruck der Schweiz so reduziert wird, dass - Zitat - “er auf die Weltbevölkerung hochgerechnet eine Erde nicht überschreitet.”
- Der Bundesrat wird demnächst über die Stossrichtung im Umgang mit diesem politischen “Sprint” entscheiden - und ob er diesem allenfalls einen eigenen Vorschlag gegenüber stellen will...” Wenn wir Richtung und Tempo halten wollen, dürfen wir nicht den Sprint trainieren, sondern wir müssen den Marathon vor Augen haben - präziser gesagt: den Marathon in der Laufgruppe.

# A GREEN ECONOMY for Switzerland

## Some voices from Switzerland (3)

“Der Bundesrat will die natürlichen Ressourcen schonen und gleichzeitig die Schweizer Wirtschaft stärken. Der Bundesrat hat an seiner Sitzung vom 8. März 2013 von der Berichterstattung des UVEK zur Grünen Wirtschaft Kenntnis genommen und den Aktionsplan Grüne Wirtschaft des Bundes verabschiedet. Er ist die Grundlage für die geplante Änderung des Umweltschutzgesetzes, die als indirekter Gegenvorschlag zur Volksinitiative “Für eine nachhaltige und ressourceneffiziente Wirtschaft (Grüne Wirtschaft)” dient. <http://www.bafu.admin.ch/wirtschaft/11350/index.html?lang=de>

Zitate von Dr. Bruno Oberle, Direktor Bundesamt für Umwelt

<http://www.bafu.admin.ch/org/02314/02321/03681/index.html?lang=de>

Schritt für Schritt zum Fussabdruck 1 Erde (energissima, 14.3.2013, Forum Fribourg)

- “Der Bundesrat hat dem UVEK Ende Februar eine Botschaft zur Grünen Wirtschaft in Auftrag gegeben und am 8. März 2013 ein Paket mit 27 konkreten Massnahmen verabschiedet.”
- “Dem Bundesamt für Umwelt wird ganz offiziell eine gestaltende Rolle in der Wirtschaftspolitik zugewiesen. Hinter dieser Neueinschätzung der Umweltpolitik steht die Erkenntnis, dass **ohne natürliche Ressourcen nicht nur kein Lebewesen überlebt, sondern auch kein Wirtschaftszweig prosperieren kann.**”
- “Diese Einsicht ist überhaupt nicht neu. **Denken Sie an den Bericht “Die Grenzen des Wachstums”.** Neu ist, dass diese Einsicht jetzt offenbar mehrheitsfähig wird.”
- “Natürlich ist das Ziel “Fussabdruck 1 Erde” vernünftig. Alles andere wäre eine Übernutzung der Erde. Oder anders gesagt: rote Zahlen in der Bilanz. **Und wie wir wissen, führt jede rote Zahl in der Bilanz mittel- bis langfristig zum Kollaps.** Darum will auch der Bundesrat den Ressourcenverbrauch auf einen “Fussabdruck 1 Erde” reduzieren...”
- Der Bundesrat lehnt die Initiative (bis 2050) ab. Er geht davon aus, dass die Initiative bis zum Jahr 2050 **insbesondere wegen der Umweltbelastung, welche die Schweizer Bevölkerung im Ausland verursacht,** nicht umsetzbar ist.

# Eine Schweizer Green Economy

## Stimmen aus der Schweiz (4)

Was die "Initiative der Grünen fordert":

Informationen zur Initiative: [http://www.grueneinitiativen.ch/web/grn/volksinitiative/wichtigste\\_in\\_kurze.html](http://www.grueneinitiativen.ch/web/grn/volksinitiative/wichtigste_in_kurze.html) und der Text <http://www.grueneinitiativen.ch/web/grn/volksinitiative/initiativtext.html>

- "Die Schweizer Wirtschaft verschwendet Ressourcen als stünden ihr drei Planeten zur Verfügung. Doch haben wir nur einen. Das Ziel der Volksinitiative für eine Grüne Wirtschaft ist daher, den ökologischen Fussabdruck der Schweiz bis 2050 auf eine Erde zu reduzieren."
- "Die Wegwerfwirtschaft soll zu einer Kreislaufwirtschaft umgebaut werden. Die Kreislaufwirtschaft verwendet Abfälle als neue Ressourcen, recycelt Rohstoffe und setzt Energie effizient ein. So können Emissionen, Abfälle und Verschwendung vermieden werden."  
(Was machen die Grünen mit dem 2. Hauptsatz der Thermodynamik?)
- "Hierfür schlägt die Initiative dem Bund verschiedene Massnahmen vor: zum Beispiel die Förderung von Forschung, ökologische Kriterien für das öffentliche Beschaffungswesen und positive steuerliche Anreize für umweltfreundliche Unternehmen."

## Summary:

- (1) Perpetual economic growth (BAU) on a final planet is impossible.
- (2) If one accepts that today's human impact is too large, a plateau level steady state/green economy is unsustainable!**

Instead we can try to answer those more scientifically motivated questions:

- How much longer can we continue locally and globally before nature forces us to change?
- A BAU system without rules with “continue as before” brings the fastest ruin for all of us.
- The introduction of “traffic lights (Ampeln)” regulates the traffic and is annoying for most car drivers.  
The introduction of the “green economy” (like a “smart Grid” traffic system) is even more complex.
- Already many “street lights” are already only between yellow and red.
- What will happen if all “street lights” will turn permanently into red? (more on May 8).
- “Traffic” (in theory) can be imagined even without cars and without “street lights”! (more on May 15, 22 and 29)