



**Sustainable  
Development**

Ir. G.J. van Luijk, President TU Delft  
12 January 2007

1

**TU Delft**  
Delft University of Technology

Ladies and Gentlemen,

Welcome to TU Delft on the occasion of our 165<sup>th</sup> anniversary, the 33<sup>rd</sup> Lustrum

A special word of welcome to our 3 main speakers of today:

The ambassador of the republic of south africa, Her Excellency Mrs Mhkize

Prof. Sir Leszek Borysiewicz, Deputy Rector of Imperial College in London,

And Prof Tim van der Hagen one of our leading professors in the field of sustainable energy

I also welcome :

Our honorary doctors,

The mayor of delft

Other representatives of the public and private sector

Last but not least: professors, students & staff of TU Delft,

Ladies and Gentlemen,

The theme we have chosen for this year of celebrations is: sustainability

Hardly a surprising choice, since sustainability is by now one of the most used words in the English language:

It is a fact that recently we can observe an increase in public interest in the subject of sustainability; (Gore, Clinton)

This is partly caused by the fact that the public is beginning to feel some discomfort, mainly driven by high gasoline prices (us and absence of snow in the alps (w-eu)

It is not anymore a "far away show" it is now coming home.

So why choose this theme?

Plans, intentions, policies are announced every day at national and international level

Is sustainability not already getting the right amount of attention?

Well, the simple answer is: no!

If we look at, what is actually happening and how the issue of sustainability is being tackled, i observe that the focus of attention of many key players is still very much on business as usual,

Guided by short term interests, like:

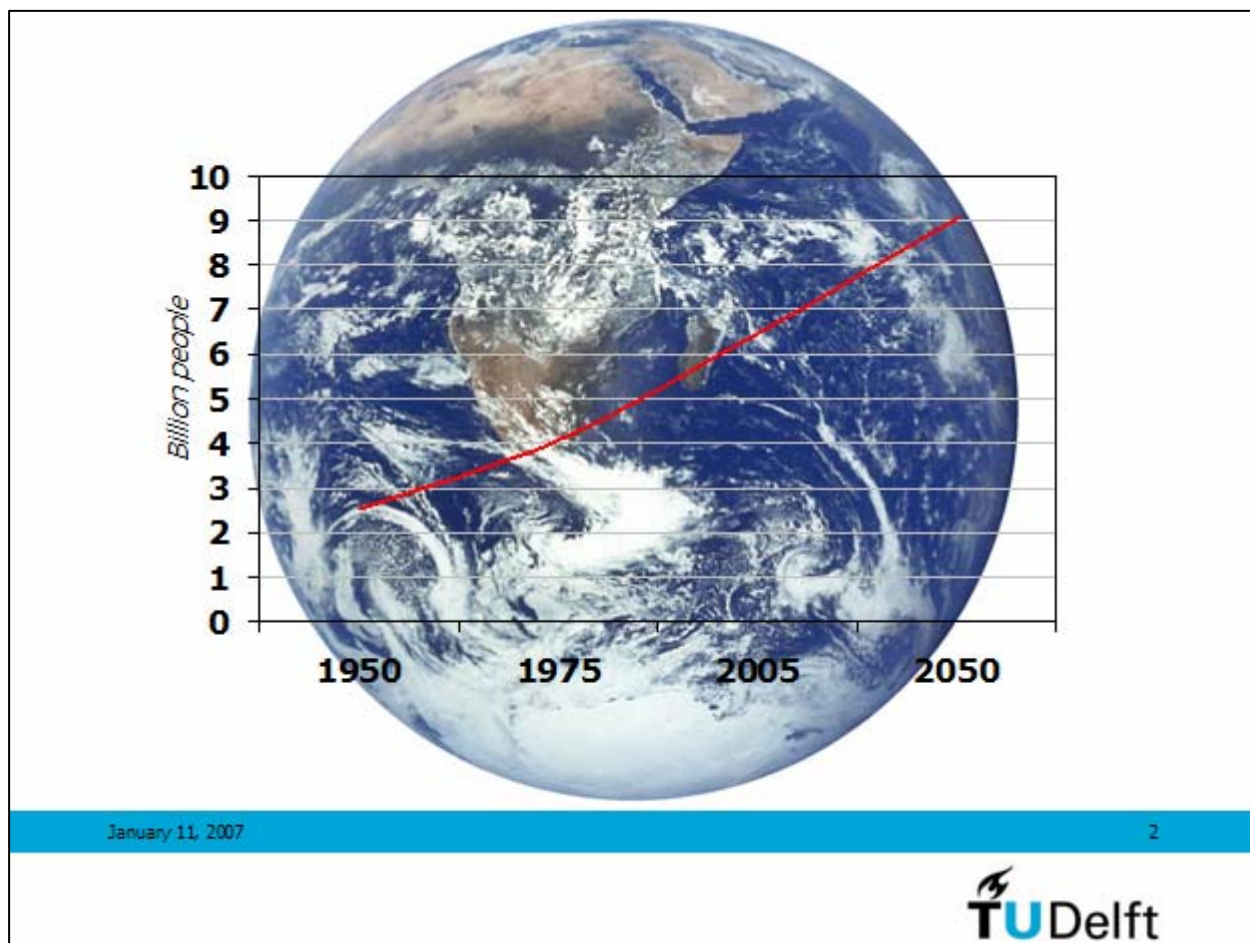
Economic policy for governments, profitability for industries, low prices for consumers.

All these different actors have there own rationale to avoid the drastic steps which are necessary to deal with the serious problem of keeping the earth livable

As a result we see a struggle to agree on, let alone implement the Kyoto agreement, which may in itself not be stringent enough!

Therefore i am pessimistic whether the world is really capable to timely meet the challenges of creating a sustainable world, which is defined by:

- The presence of 9 bln people 40 years from now
- Most of whom need to improve their standard of living



Why am i so gloomy?

Has history not shown that the world always had the capacity to adapt to major changes when required?

Have solutions not always come in time?

Well, indeed, if we take a quick look at the past 165 years this assumption seems right. In this relatively short period in the history of mankind, unimaginable changes have taken place, accompanied by, or maybe even triggered by mindboggeling technological breakthroughs.

Just a few examples:

- In 1842 -the founding year of our university -there were a little more than 1 billion people on earth  
Now there are 6.5 bln people
- Let us look at some of the technological breakthroughs:  
In 1842 there was no mass *transportation* of any kind: transport took place mainly over water or by horsecart;
  - Now there is 1 million km railway worldwide (25x earth)
  - 600 mln automobiles
  - 20 mln plane departures per year

Look at the field of *communication*:

Transition from handwritten letters to:

- Telephones( in nl in 1881)
- Radio in 1900; ; television in end 1950's
- Personal computer - introduced early 1980's
- Internet is only some 15 years old

I could choose other domains like energy, health, agriculture all of which were subject to major changes, driven by new technology.

The observation here is that a great number of truly breakthrough technologies were developed in a very short period, which have allowed the society to grow successfully to it's current form.

Ladies and Gentlemen,

The crucial question today is: can this continue ?

Is success in the past a guarantee for the future?

Of course it isn't as any investment banker will tell you!

Now, what *is* happening with the world in the next, say 40 yrs?

Where to start? Which parameter to select?

- The exponential increase in population and a continuous increase in standard of living for many, will mean that the demand for essential goods & services (transportation, cars, planes, but also housing, materials, water, food) will increase by at least a factor 2 in the next few decades.
- The world will also need to cope with waste products on an unprecedented scale
- Take energy for example where demand is expected to double by 2040. professor Van der Hagen will talk about this subject, but it is clear that the world has to live in the near future with a significant increase in the use of fossile fuels
- The consequences of current fossile fuel based energy supply are already alarming; some examples;

# Global warming is here...

**Global concentration of CO2 in the atmosphere**  
Parts per million (ppm)

**Variations in global near-surface land temperature**  
Temperature variation in degrees C

**Predicted change in average surface air temperature**  
Period: 1960-1990 to 2070-2100

January 11, 2007 3

# ...bringing global disruptions

1979      2001      2045      2075

**Recent Sea Level Rise**  
23 Annual Tide Gauge Records  
— Three Year Average  
— Satellite Altimetry

Sea Level Change (cm)

1880 1900 1920 1940 1960 1980 2000

January 11, 2007 4





We are already now in many fields reaching the limits of what our earth can sustain. If the need to support an additional 3 bln people *and* the effect of increased per capita consumption is added, it is clear that there are only a few options:

- 1) we need more earths ! We haven't)
- 2) we must globally agree to change the demand (unlikely, think of Kyoto)
- 3) find better and sustainable solutions :

This last point translates into an ever increasing and accelerating need for breakthrough technologies in the coming decades

200 years after the industrial revolution the world needs a new technological revolution



**If 9 billion people have a Western lifestyle...**

*We would need*

**6 earths**

January 11, 2007

6

TU Delft

So the real question is therefore:

Can the required science be developed in time?

Time is the critical factor, considering the fact that:

- The need for reversing the trend of a deteriorating ecosystem exists already today
- However, it will take some 20 years to develop breakthrough technologies from initial thoughts to effective large scale application; only thereafter these will take effect
- The knowledge workers and leaders of this technological revolution are the *current* generation of students, who will make their contribution to the society in the coming 40 years.

So we must already now provide them with the right skills and knowledge for a new world, which we can hardly imagine

This implies that knowledge institutes like universities (which in Europe generate 80% of the new fundamental knowledge!) Should develop and disseminate these new technologies, *right now!*

Are they in a position to do so?

Are sufficient resources allocated on a structural basis?

Is there sufficient sense of urgency

Is there focussed political support in the long term?

These are questions which will need to be resolved, since results will only come:

- In the long term, even if we start today
- If there is global consensus, which is still far away.

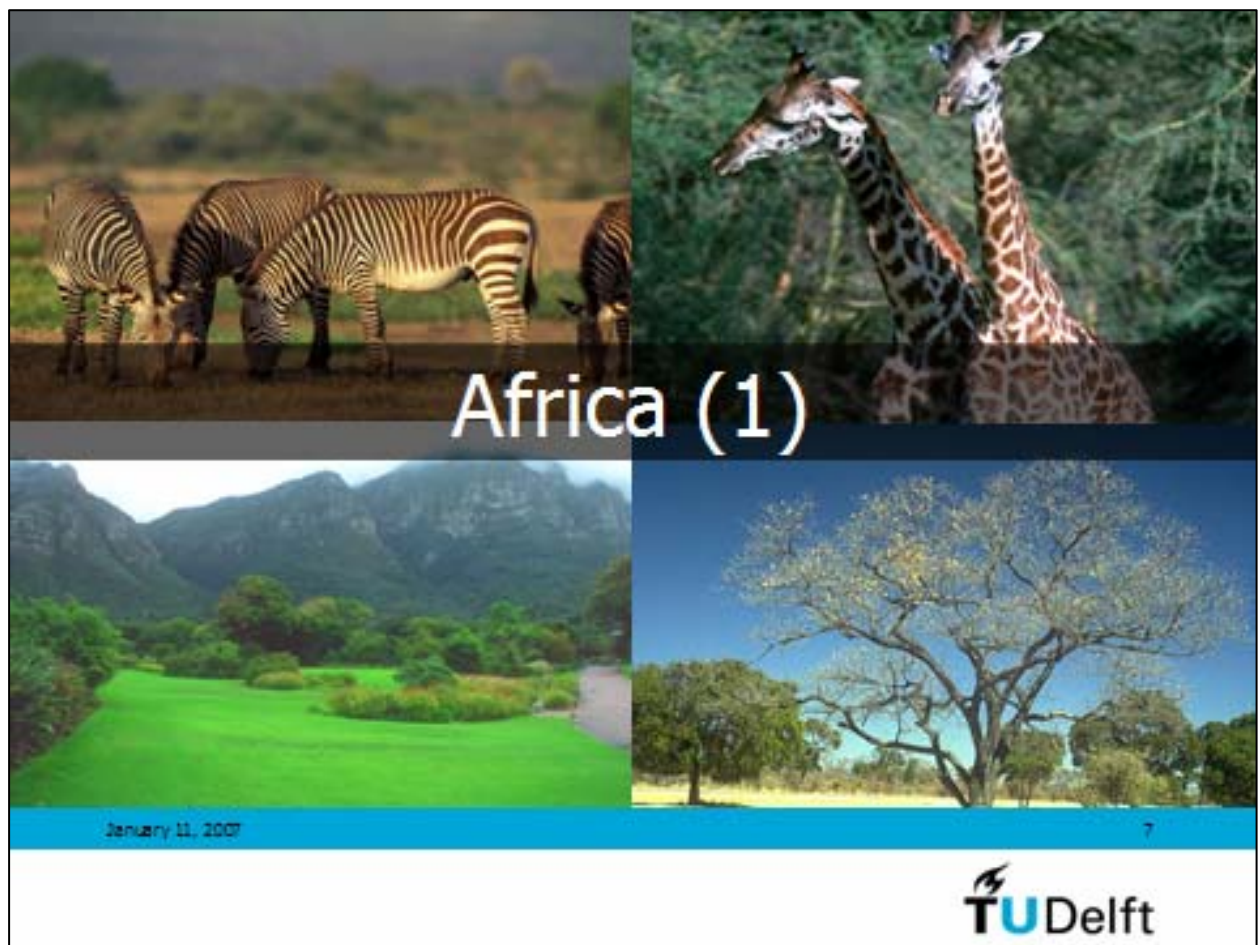
Continued collective denial of the problem could well result in a situation where it will be too late to be sorry!

Here i could stop, pleading for more action, more focus, less politics, and even, less priority for short term economical arguments

But there is more to sustainability than our rather biased western perspective

- What about countries with a very different economic mix : more agriculture, less industry
- What about regions in very different stages of economic development?
- What about regions which contribute themselves very little to these global problems but which are hard hit by the effects caused by others

This brings me to Africa



This is the Africa which we – people outside Africa- like to see: lush tropical rainforests, snow capped mountains on the equator, rich in resources, rich in biodiversity, an important component of the global ecosystem

But there is another face of Africa , which we rather avoid on our trips to that continent:





## Africa (2)

Africa produces 3% of the world's industrial CO<sub>2</sub> emissions. Africa is the most vulnerable of all continents to the negative effects of climate change and the one that faces the greatest challenges to adapt.

January 11, 2007

8



If we think about climate change, think about Africa and not just about the alps.

Africa produces only 3% of worlds co2 emissions,

But it is the continent most vulnerable to the negative effects of climate change. Some examples:

- 220 mln people in Africa, are annually exposed to drought (equal to approx. half of Europe's population)
- Desertification is causing major disruption in African society
  - o Livestock is dying, the backbone of the rural communities.
  - o Arable land is disappearing at a high rate
  - o Migration of large communities
- Water is the problem number one, both for agriculture as well as freshwater for drinking & hygiene

What should be done? Should we not develop a technology agenda which also includes more specific needs from Africa?





Ladies and gentlemen

What I wanted to do in this short introduction of our lustrum theme, is to give a wakeup call:

- About the urgency of taking real action on the sustainability issue
- To also think about regions of the world which have their specific needs

Let me close on a positive note

At TU Delft, we have a serious ambition as one of the leading institutes of technology in Europe, to be in the forefront in contributing to long term sustainable solutions

On the research side TU Delft is already developing technology to satisfy needs which exist in Africa at the level of regional communities, like:

- Development of next generation solar cells for distributed energy systems
- Small scale water purification systems,
- Tools to improve physical health etc.

We intend to cooperate closely with selected African universities on these and other subjects

The best way to make a structural and lasting contribution to Africa is to strengthen the knowledge base of the younger generation by educating talented and motivated students. It is therefore a pleasure for me to announce that in cooperation with the ministry of foreign affairs, jointly we will make available 25 scholarships, specifically for the talented students from *Africa* to follow a master of science education at our university.

This is how TU Delft serves its mission and responds to the demands of society

I like to end with a proverb from Africa (Kenya)



*Treat the Earth well. It is not inherited from your parents, it is borrowed from your children.*

Kenyan proverb  
In: 'Harnessing Technology for Sustainable Development', UN Economic Commission for Africa

January 11, 2007 10

**TU**Delft

Thank you

G.J. van Luijk  
President  
Delft University of Technology