



Sustainability and the actuary

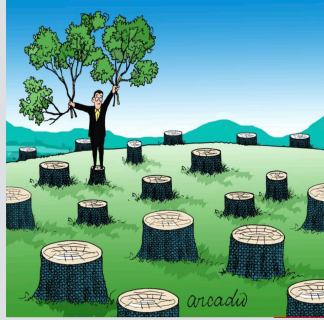
Climate change sessional

13 Feb 2024

Presented by Taryn Reddy

Research done by Taryn Reddy and Prof Rob
Thomson

Agenda



What is the problem?

Is human activity 'sustainable'?
What do we mean by 'sustainability'?
How do we measure it?



The actuary

How will our roles and requirements to
fulfill those roles change?
Why should the actuary get involved in
measuring sustainability?

What is the problem?

- Is human activity sustainable? Yes or No
- Dictionary definition of 'sustainability'-can we maintain current economic activity?



sustainability

/səˌsteɪnəˈbɪlɪti/

noun

the ability to be maintained at a certain rate or level.

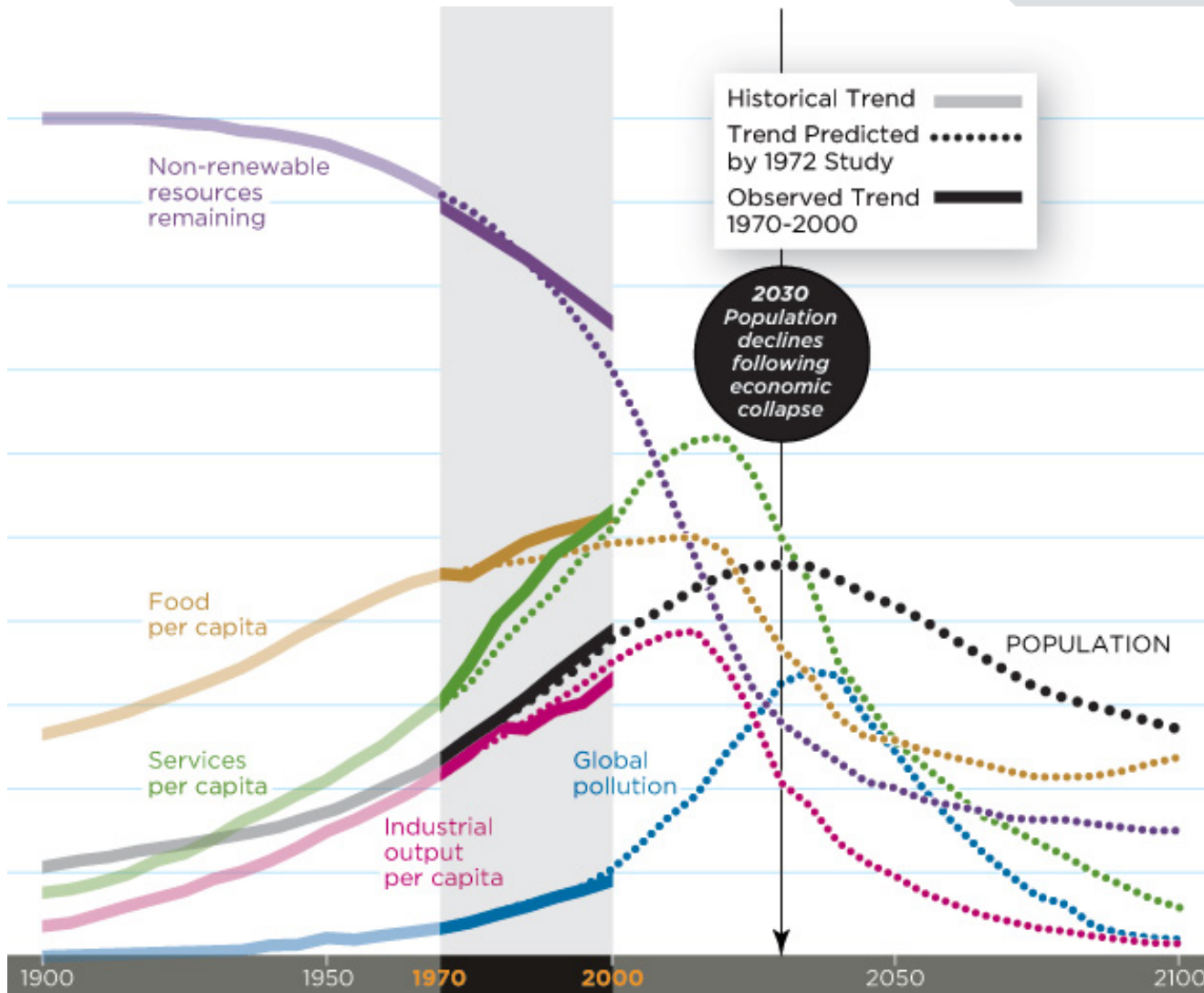
"the sustainability of economic growth"

- avoidance of the depletion of natural resources in order to maintain an ecological balance.
"the pursuit of global environmental sustainability"



Is human activity sustainable?

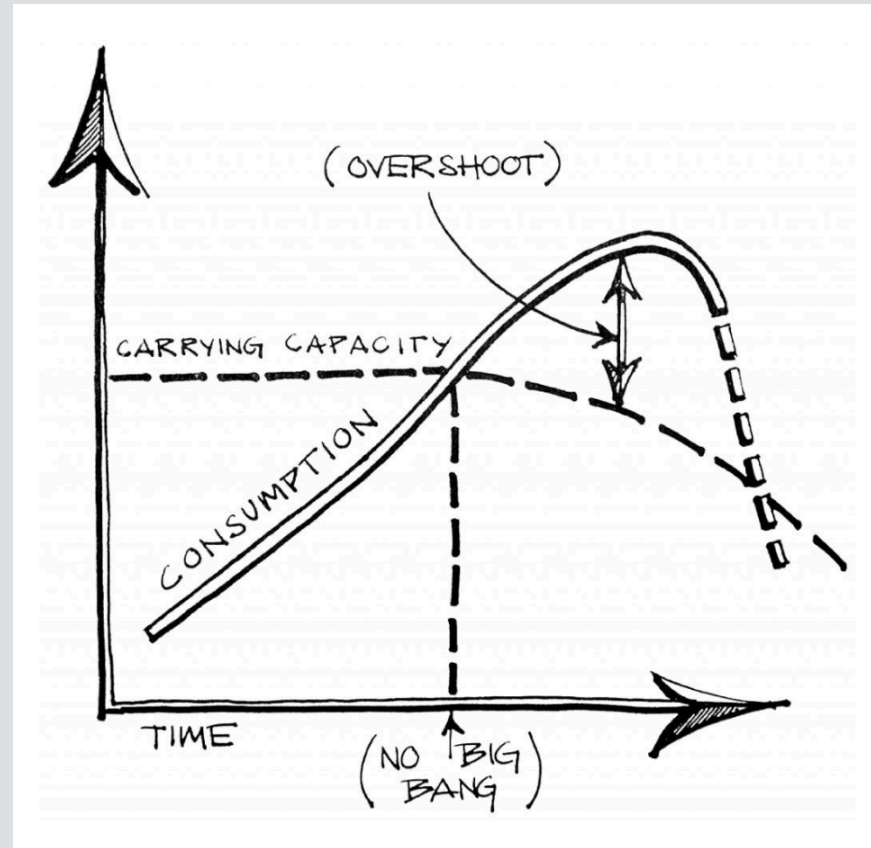
- In the 1972 book, "Limits to Growth", the authors concluded that **population growth** coupled with increased **resource consumption** beyond what the Earth can sustain, will lead to the decline in or the collapse of the environment, society and economy by **2030**.



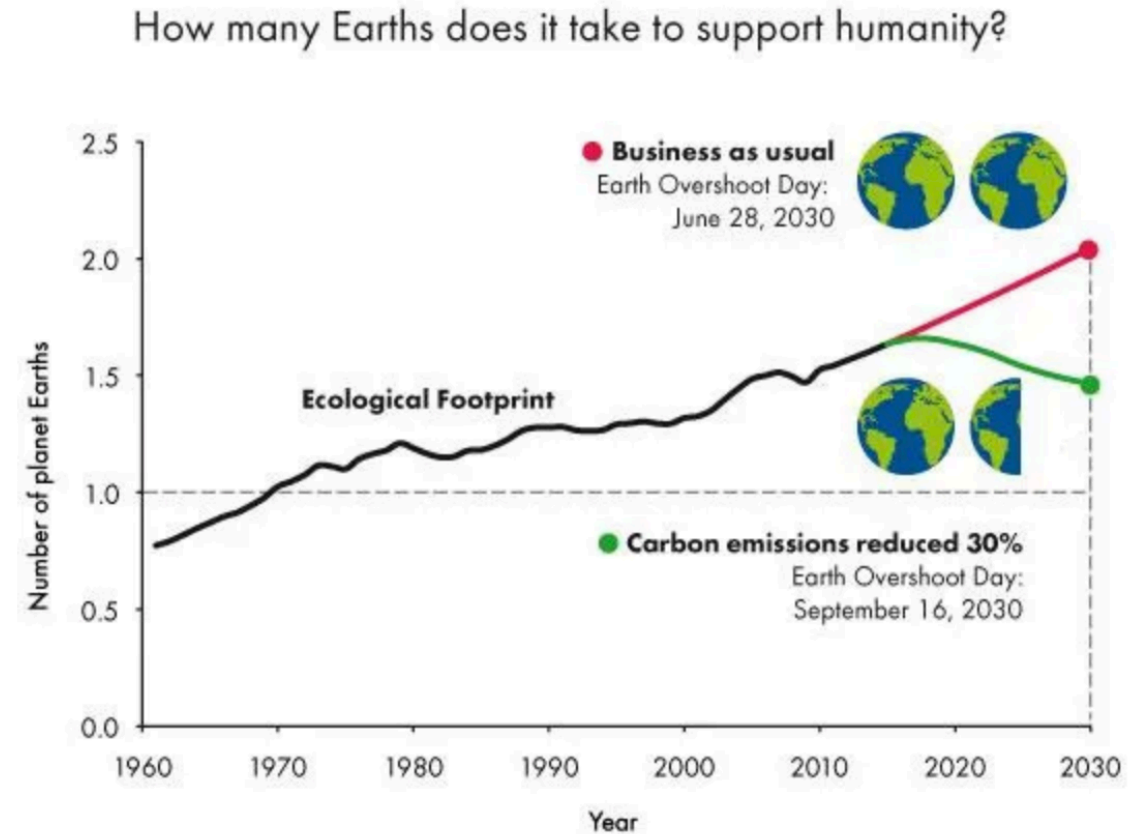
"...there was nothing that I could find in the book which has so far been even vaguely invalidated. To the contrary, the chilling warnings of how powerful exponential growth rate can be are right on track."

- Matthew Simmons, 2010

Is human activity sustainable?



Is human activity sustainable?



What is the problem?

- 100s of other measures telling us there is a problem of unsustainability
- Is human activity sustainable? Yes or No

What do we actually mean by ‘sustainability’?

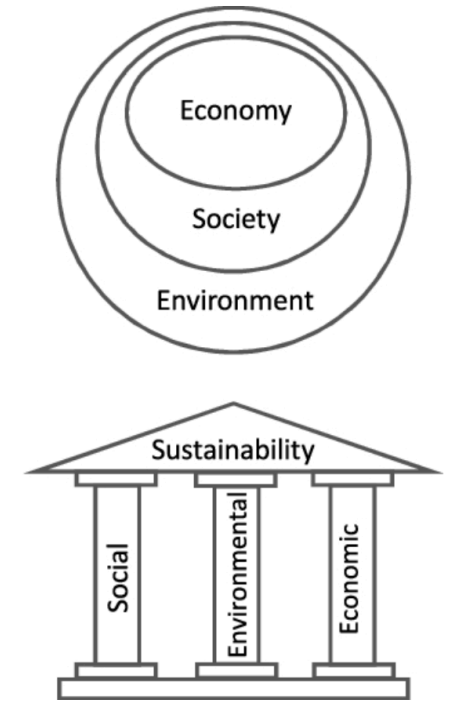
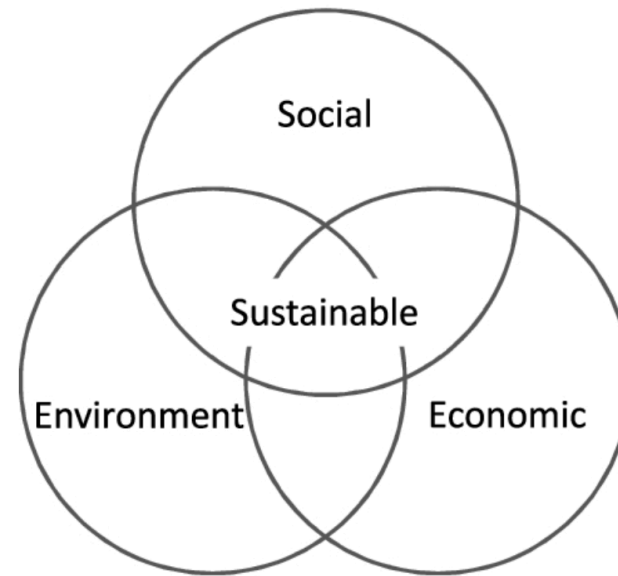
From 200 references found 37
definitions in literature

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

definition by the Brundtland Commission
of the overall goal of sustainable development
1987

Common themes

- Domains of sustainability
- Accountability
- Long-term view
- Global view



Current measures

100s in each domain (not an exaggeration)



Main issues:

Comparability

Ultimate outcomes

Accountability for the
past, responsibility
for the future

Reductionist

Long-term view

Global view



Our definition of 'sustainability'

The global economic system—that is, the sum total of human economic activity—is taken to be 'sustainable' if, assuming its **indefinite continuance**, the **effects of that activity** will enable the **environment, human society** and the **economic system** itself to **attain** and **maintain** a specified state of well-being in **every region of the world**.

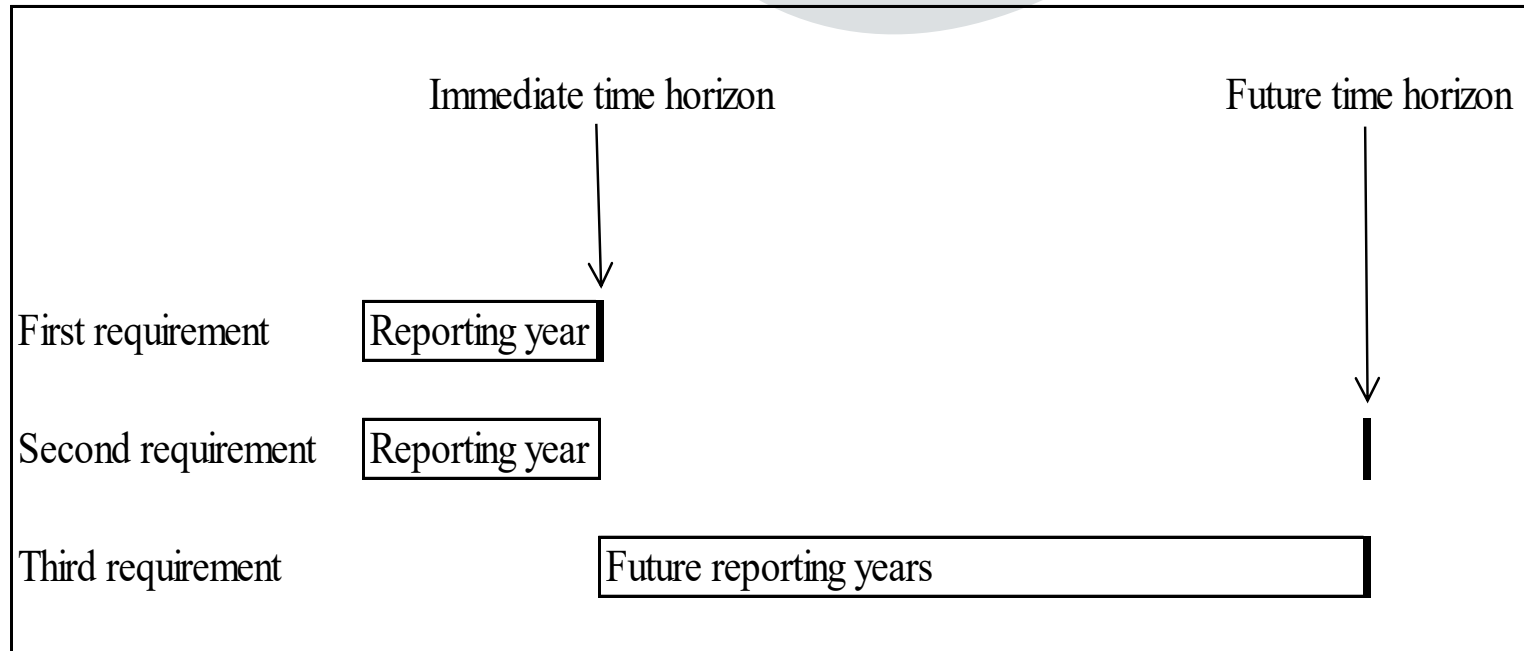
From a 'big-picture' perspective we want to determine whether an entity is sustainable or not.

Proposed framework for measurement

Ecological bottom line

Social bottom line

Economic bottom line



Sustainability and the actuary (specific to the profession and not exhaustive)





Example of resource constraints on actuarial assumptions

- Resource Constraints: Sharing a Finite World by Jones et al. (unpublished)
- Economic assumptions:
 - Future economic growth will be lower
 - Returns on investments will be lower and more volatile
 - Discount rates will be lower as governments respond to a lower-growth environment
 - Real wage growth will be lower
- Demographic assumptions:
 - Life expectancies will decline

Effects of climate change

- Higher temperatures would cause increased incidence of deaths and serious illness and reduced cold-related morbidity and mortality:
 - Affect life- and health-insurance business directly
- Higher temperatures would increase the risk of death in livestock and damage to crops and reduce the risk of damage to crops due to cold weather.
 - Affect general insurance business directly
- Net liability exposures are expected to increase.
 - Product design

Institutional investors “own” the global economy

Sustainability **is affected** by the investment choices
institutional investors make

and

Sustainability **affects** the choices they make:
Unsustainability of the entities they invest in

which requires:

Measuring the sustainability of our client's activities

and

**Measuring the sustainability of the entities our clients invest in
respectively**

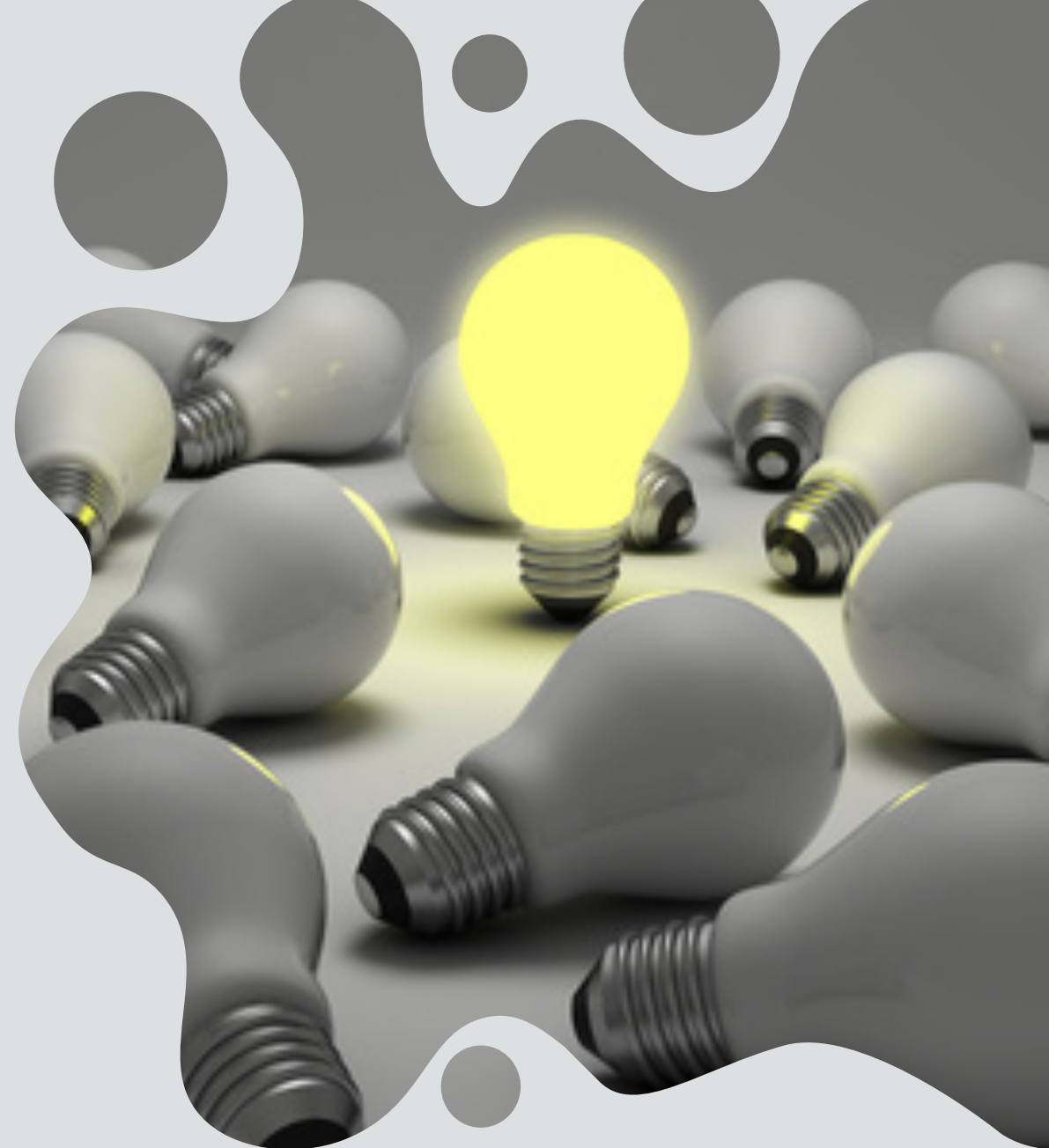


Why should the actuary be involved in measuring sustainability?

- Should we rely on the accounting profession?
- Actuaries are more orientated to modelling.
- As Ms C. Jones, a pensions actuary and sustainability and economics manager at the Institute of Chartered Accountants in England and Wales puts it:

"Sustainability issues are too often seen as concerns for other people. Part of the problem is caused by gaps in background knowledge. For example, business and finance specialists may know little about ecology, so they often do not appreciate just how much businesses and society generally depend on the natural environment."

- Cannot wait to know everything before starting.



Our
quantitative
approach will
be challenged



Questions?

Contact details:

Taryn Leigh Reddy

School of Statistics and Actuarial Science
University of the Witwatersrand
Johannesburg
South Africa

Email: taryn.reddy@wits.ac.za

"THE SECRET OF
CHANGE IS TO FOCUS
ALL OF YOUR ENERGY,
NOT ON FIGHTING THE
OLD, BUT ON BUILDING
THE NEW."

— SOCRATES

How do we determine if an entity is sustainable?

Considered in the light of the sustainability of the entire system.

An entity is considered sustainable if:

- the entire global system is sustainable, or

- the most efficient way of restoring the system to sustainability would not necessitate any change in the activities of that entity.

Since we are considering future sustainability we must consider requirement 3.

Measurement of efficiency

If economic bottom line is negative then, unless the entity can be nationalised or subsidised, it should be liquidated.

Environmental efficiency to a specified time horizon:

Environmental bottom line

Economic bottom line

Social efficiency to a specified time horizon:

Social bottom line

Economic bottom line

Restoring the global system

Environmentally
sustainable

Cumulative environmental bottom line=0

Environmentally
unsustainable