

# Technology Assessment

## Technology in Sustainable Development



<http://www.retrofuture.com/flyingcar.html>

Karel Mulder

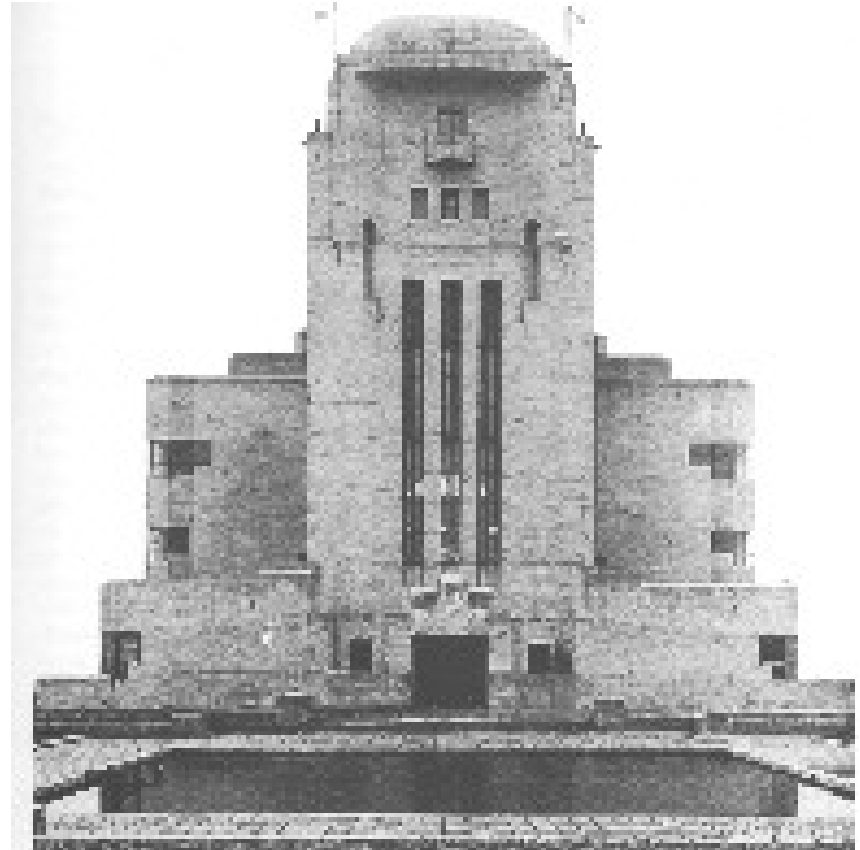
January 4, 2010

# What is Technology Assessment?

## Radio

Long wave radio  
(Radio Kootwijk)

Became unnecessary since  
short wave radio seemed  
to function better



# What is Technology Assessment?

## CFC's

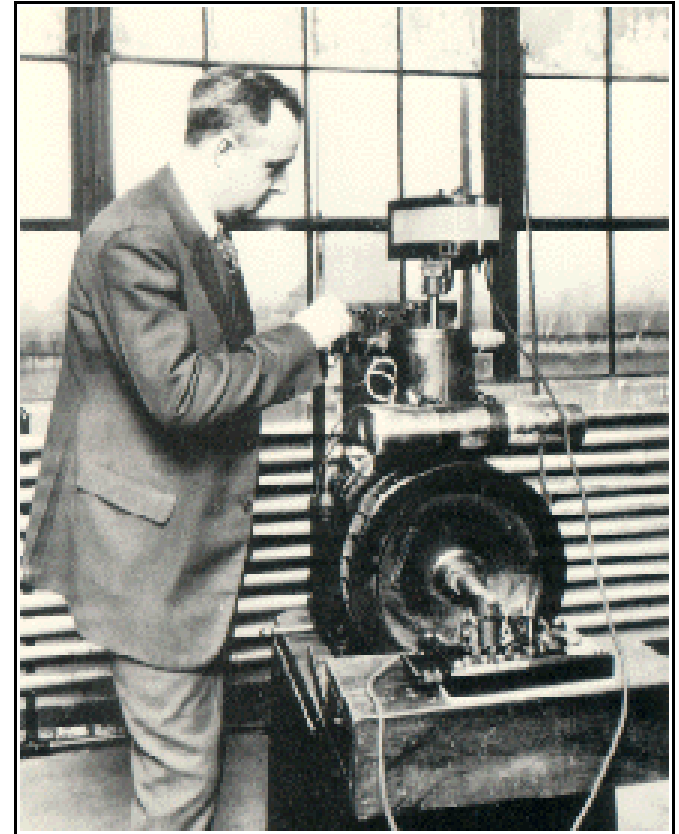
Thomas Midgley jr.

Developed tetra-ethyl lead (TEL) as an additive to gasoline and chlorofluorocarbons (CFCs)

Due to environmental effects:

In 1973 the first measures were taken in the US to phase out leaded gasoline

Since 1999 CFC's are no longer being produced



<http://www.dartmouth.edu/~toxmetal/images/Midgley.gif>

# What is Technology Assessment?

## DDT

Paul Hermann Muller

Invented DDT in 1939 (insecticide useful to control insect borne diseases)

Won the 1948 Nobel Prize in Medicine

Silent Spring, 1963, Rachel Carson

Dealt with the effects of chemicals such as DDT in the environment.

This led to the banning of DDT in the 70's and 80's in western countries



<http://sandwalk.blogspot.com/2007/03/nobel-laureate-paul-hermann-muller.html>

# What is Technology Assessment?

## Havilland Comet

First commercial jet airliner  
first flight in 1952

2 comets crashed in 1954  
due to fuselage fatigue

Aircraft was withdrawn and  
had to be redesigned



# What is Technology Assessment?

## Wadden area, Netherlands

Canal in Wadden-area

Was never constructed due to political and environmental reasons



# What is Technology Assessment?

## Bridges

Erasmusbridge,  
Rotterdam

Bridge 'swings'

Wind induced  
resonance in cables



# What is Technology Assessment?

## Bridges

Millenium Bridge,  
London

Horizontal resonance

Caused by  
pedestrians



[www.morgenthal.org](http://www.morgenthal.org)



# What is Technology Assessment?

Where do things go wrong?

Technology 'did not work' as was expected

Failed completely:

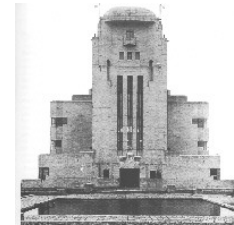
Long wave radio in Kootwijk

Didn't fully 'work':

Bridges, Havilland comet

Did other things as well:

CFC's and DDT



DDT... FOR CONTROL  
OF HOUSEHOLD PESTS

<http://www.mindfully.org/Pesticide>

# What is Technology Assessment?

Where do things go wrong?

Social demands for a product are not assessed correctly, or change

Usually all relevant requirements are discovered in practice:

Rachel Carson's Silent Spring



[http://en.wikipedia.org/wiki/Rachel\\_carson](http://en.wikipedia.org/wiki/Rachel_carson)

# What is Technology Assessment?

1950's

Technological optimism

Nuclear energy would be 'too cheap to meter'

Natural gas would be exhausted

Flying cars

Technology is a positive sum game



<http://www.retrofuture.com/flyingcar.html>

# What is Technology Assessment?

1960's

Charles Lindberg

loved both technology and nature

pioneered in looking for a balance between technological achievements and nature

→ technological assessment



<http://archives.delaware.gov/100/airlandandsea/A%20Meeting%20of%20Innovators.shtml>

# What is Technology Assessment?

Late 1960's

Technology and its consequences are decisive for the environment

Society (governments) should be able to make found judgments

Technology assessment as a neutral, factual analysis of technological effects as an input in the decision-making process.

# What is Technology Assessment?

Early 1970's

1972, USA, Office of Technology Assessment

Technology Assessment is intended to be a neutral, factual input into the decision-making process.

To provide members of congress with an objective and authoritative analysis of complex scientific and technical issues

Europe did not follow immediately due to other political traditions



[http://en.wikipedia.org/wiki/Image:OTA\\_seal.png](http://en.wikipedia.org/wiki/Image:OTA_seal.png)

# What is Technology Assessment?

## Technology Assessment Defined

Technology Assessment is:

the **systematic** identification, **analysis** and **evaluation** of the **potential secondary consequences** (whether beneficial or detrimental) of

technology in terms of its **impacts** on **social, cultural, political, economic** and **environmental** systems and processes.

# What is Technology Assessment?

## Technology Assessment Defined

Technology Assessment is an attempt to:

establish an **early warning system** to detect, control, and direct technological changes and developments so as to **maximize the public good** while **minimizing the public risk**





# What is Technology Assessment?

1980's

In the 80's Europe followed with several institutes for Technology Assessment:

Rathenau

TAB

STOA

POST

IPTS



<http://www.jrc.es/>  
[http://www.europarl.europa.eu/stoa/default\\_en.htm](http://www.europarl.europa.eu/stoa/default_en.htm)

# What is Technology Assessment?

## Criticism

Marcuse/Wynne:

little democracy

repressive tolerance

unpredictable

# What is Technology Assessment?

## Second order effects

Behavior changes due to new technology:

Traffic is attracted to new roads/connections

Cultural changes as a result of television

Third and higher order effects again lead to change

The Pill → changing sexual behavior → sexually transmitted diseases → ??



# What is Technology Assessment?

## Problems with classical Technology Assessment

Classical technology assessment:

Is deterministic

Objective claims can not be proven

'After the fact'- problems are identified when they are already there

It is not productive to correct on hindsight

Does not contribute to neutral, factual decision-making for technological or scientific issues.

# What is Technology Assessment?

## Strategic Technology Assessment

A process to analyze technological developments and discuss the consequences

The goal of technology analysis is to provide those involved with information to formulate strategic policy, and to define areas of further study.

But:

This is not neutral

Goal is to implement results



# What is Technology Assessment?

## Constructive Technology Assessment

Presuming that:

Technology can be directed

Improve interaction between  
technology developers and those  
implementing technology

Interactive technology assessment,  
public debate



# What is Technology Assessment?

## Classical vs. Modern Technology Assessment

Differences between classical and modern Technology Assessment are exaggerated

Public and political formulation of opinions is now most important but:

Political lobby and 'media coverage' were already relevant for the Office of Technology Assessment back in 1972

Public debate must be based on facts. This creates the need for classical technology assessment, that today is less pretentious