



International Institute for
Applied Systems Analysis
www.iiasa.ac.at

science for global insight

An introduction to the “twilight zone” between science and policy: Principles, structures and pitfalls of science advice

Dr. Jan Marco Müller

Acting Chief Operations Officer

International Institute for Applied Systems Analysis



IIASA, International Institute for Applied Systems Analysis

International Institute for Applied Systems Analysis (IIASA)

- Established in 1972 by initiative of USA and Soviet Union
- Located in Vienna, Austria
- 350 scientists doing systems research (e.g. climate change, Sustainable Development Goals, systemic risks etc.)
- 22 member countries, among which Egypt and South Africa
- www.iiasa.ac.at



Systems Analysis and Africa

Transformative uses of systems analysis
to address regional challenges



Registration and Call for Posters Now Open

3 December 2019

National Research Foundation (NRF)

Pretoria, South Africa



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1. Introduction
2. Principles
3. Structures
4. Pitfalls
5. Tips and tricks
6. Conclusion

I just got this from the cash machine



Ethiopia is the cradle of humanity



Is Ethiopia also a cradle of science advice?

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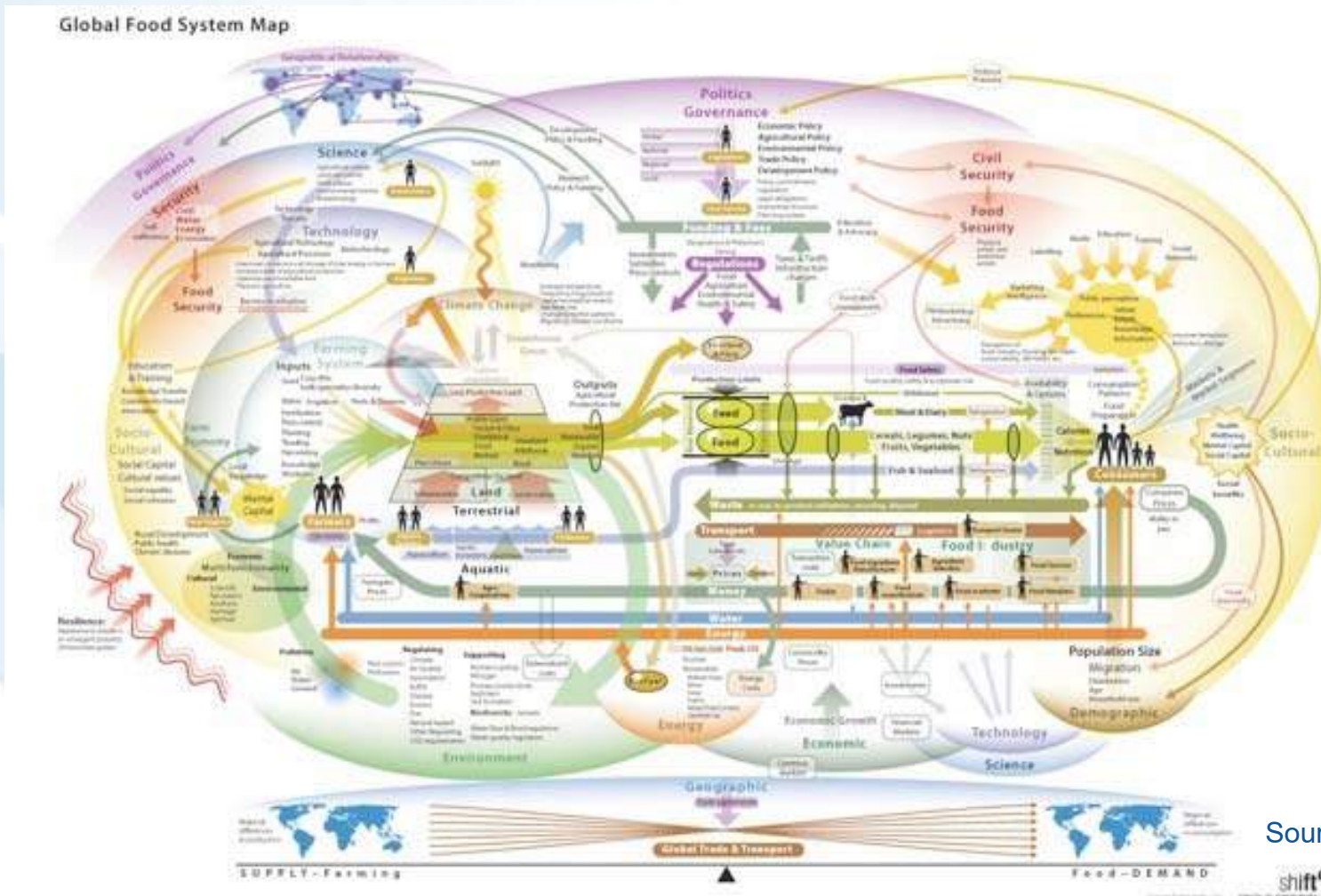
Kebra Nagast – The Glory of the Kings

24. How the Queen Made Ready
to Set Out on her Journey

“And the Queen said unto them: [...] For I desire wisdom and my heart seeks to find understanding. [...] And as for a kingdom, it cannot stand without wisdom, and riches cannot be preserved without wisdom; [...] Wisdom is the best of all treasures.”



The world has changed a lot since then – it is getting more and more complex and interdependent and so do political challenges

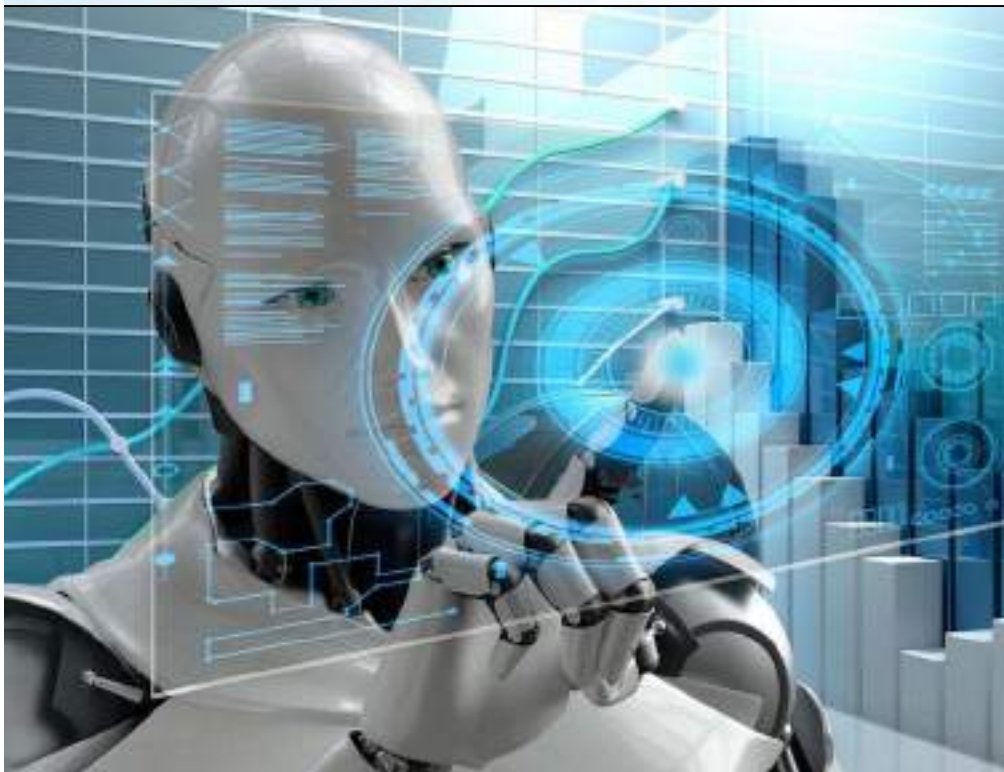


Source: shiftN

More and more political decisions depend on science and technology

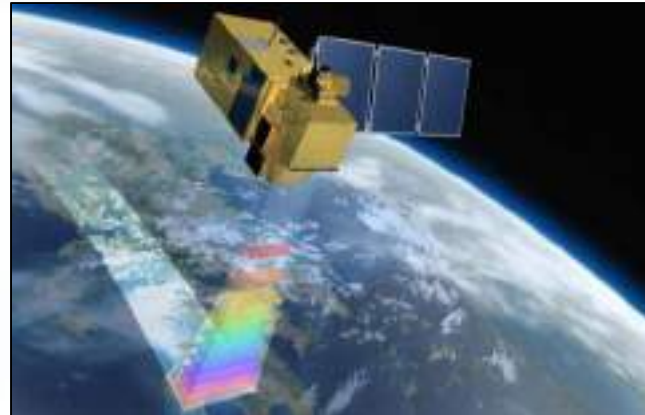
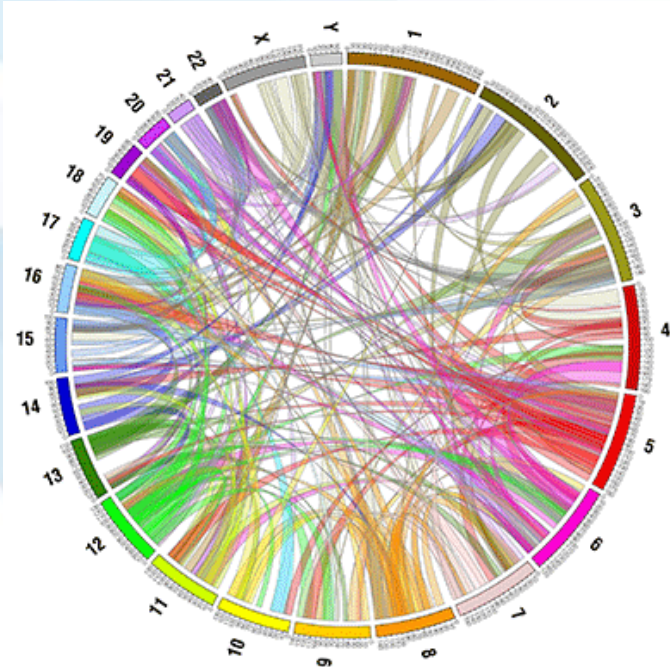


Knowledge and technological progress are advancing at an unprecedented speed and trigger political and ethical questions



CRISPR/Cas9

There is a diluge of data coming from multiple sources – how to make sense of it?

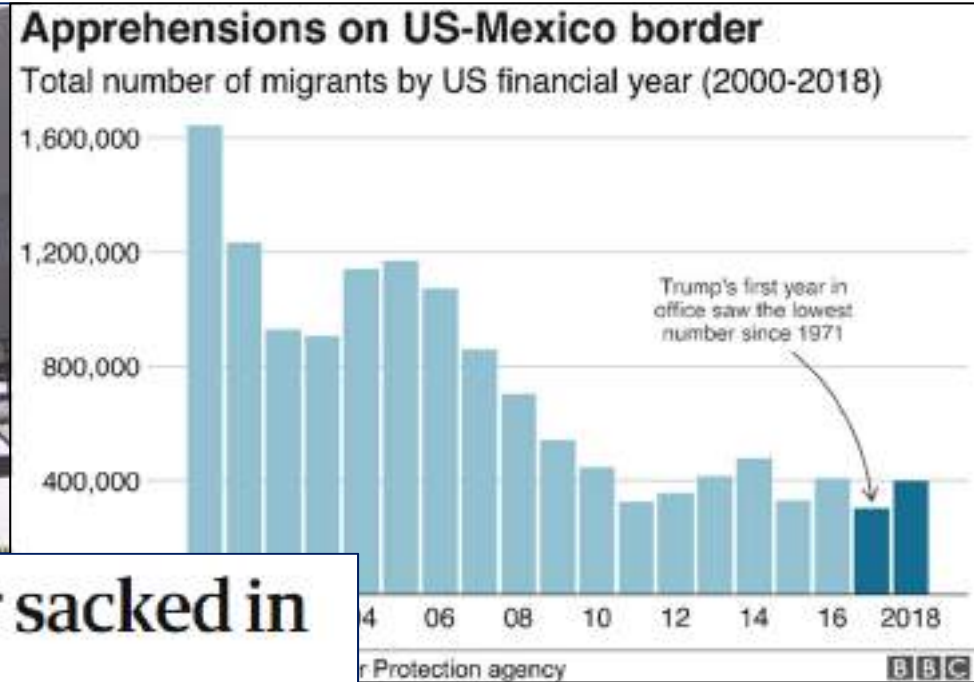


The way we do politics is changing as well

The collage consists of several key elements:

- Facebook Profile:** A screenshot of the Facebook profile for President Uhuru Kenyatta. The profile picture shows him with the Kenyan flag. The cover photo features the text "Transforming Kenya" over an image of the Kenyan Parliament building. The name "President Uhuru Kenyatta" and the handle "@PresidentUhuruKenya" are visible.
- Twitter Post:** A tweet from the "Office of the Prime Minister - Ethiopia" (@PMEthiopia). The text reads: "We thank the world for celebrating with #Ethiopia." and includes the hashtag "#PMOEthiopia".
- Nobel Prize Announcement:** A graphic announcing that Prime Minister **ABIY AHMED** is the "WINNER OF THE NOBEL 100TH PEACE PRIZE" in 2019. It features a circular portrait of him and a Nobel laureate medal.
- Video Player:** A video player showing President **YOWERI MUSEVENI** of Uganda speaking at a podium. The video title is "No one can disturb Uganda - Museveni".

Fake news and “alternative facts” are a major challenge for democracy – and for science



Brazil space institute director sacked in Amazon deforestation row

Far-right leader Jair Bolsonaro calls satellite data showing rise in deforestation 'lies'



Science is only *one* factor in decision-making



Politicians have the right to ignore the facts
(BUT: They are not entitled to their own facts)!

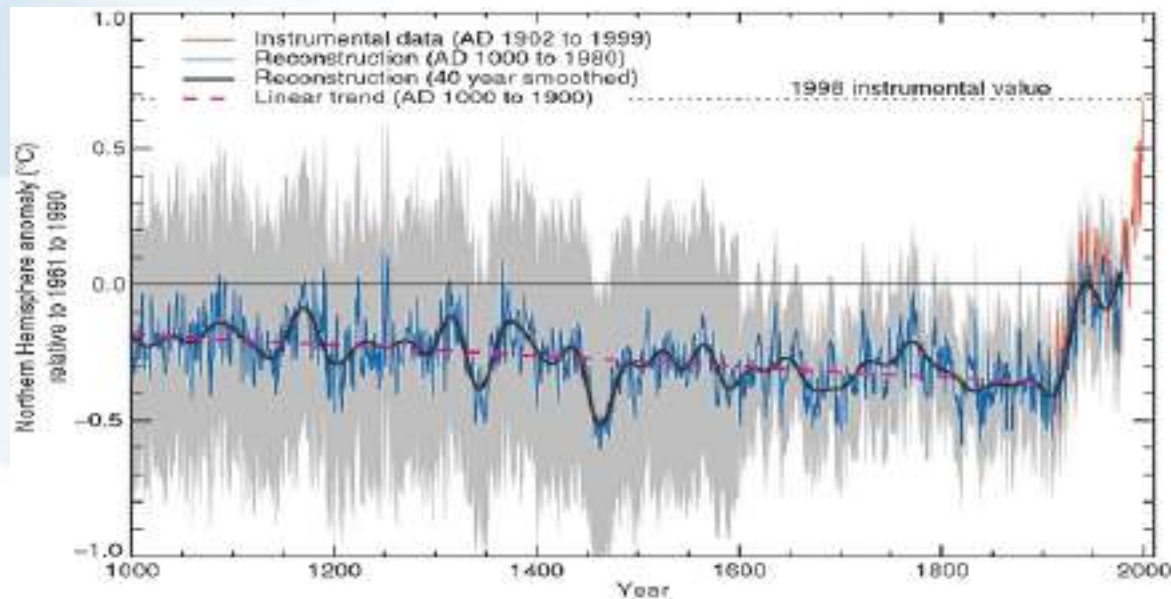
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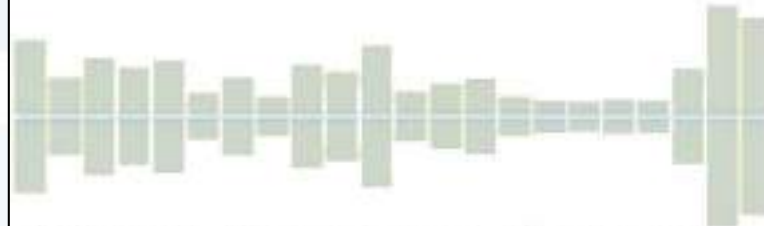


10 PhD SCHOLARSHIP OPPORTUNITIES IN; HEALTH INFORMATICS,
HEALTH SYSTEMS, PUBLIC HEALTH, EPIDEMIOLOGY, BIOSTATISTICS—
WITH A RESEARCH CONCENTRATION IN HEALTH INFORMATION
SYSTEMS

Policy for Science vs. Science for Policy



ዓመታዊ የስታቲስቲክስ መጻሕፍት : ማሰኔ



ANNUAL STATISTICAL ABSTRACT

CSA - ETHIOPIA

Scientific support to policy vs.
science advice to politics





Science advice to government vs. science advice to parliament

 HOUSES OF PARLIAMENT
PARLIAMETARY OFFICE OF SCIENCE & TECHNOLOGY

The Role of Research in the UK Parliament

The screenshot shows the European Commission website for a call for evidence. The main heading is "BANKING AND FINANCE". The breadcrumb trail is "European Commission > Banking and finance > Consultations > 2015 > Financial regulatory framework review". The main content area is titled "Call for evidence: EU regulatory framework for financial services" and features a graphic with the hashtag #CMU, the dates 30.09.2015 to 31.01.2016, and the text "Financial Services" and "Respond to the consultation". A sidebar on the left lists various policy areas, and a sidebar on the right provides quick links to documents.

Solicited science advice vs. unsolicited science advice

The poster is for a PhD dissertation defense. It features the logos of Addis Ababa University and Addis Ababa Institute of Technology. The text on the poster includes the candidate's name, the title of the dissertation, the supervisor's name, and the date and venue of the defense.

Addis Ababa University, Addis Ababa Institute of Technology
 School of Chemical and Bio Engineering
 Environmental Engineering, Chair

PhD Dissertation Defense

"Water Quality Assessment Using Optimal Multi-Objective Waste-Load Allocation Approach; the Case of Little Akaki River"

PhD Candidate: **Mulugeta Yilma**

Supervisor: **Dr. Ing. Zebene Hiflie**
Dr. Andreas Windsperger
Dr. Nebiyoleal Gesseso

Date: **February 27, 2019** Venue: **AAiT Conference Hall**



Formal science advice vs. informal science advice

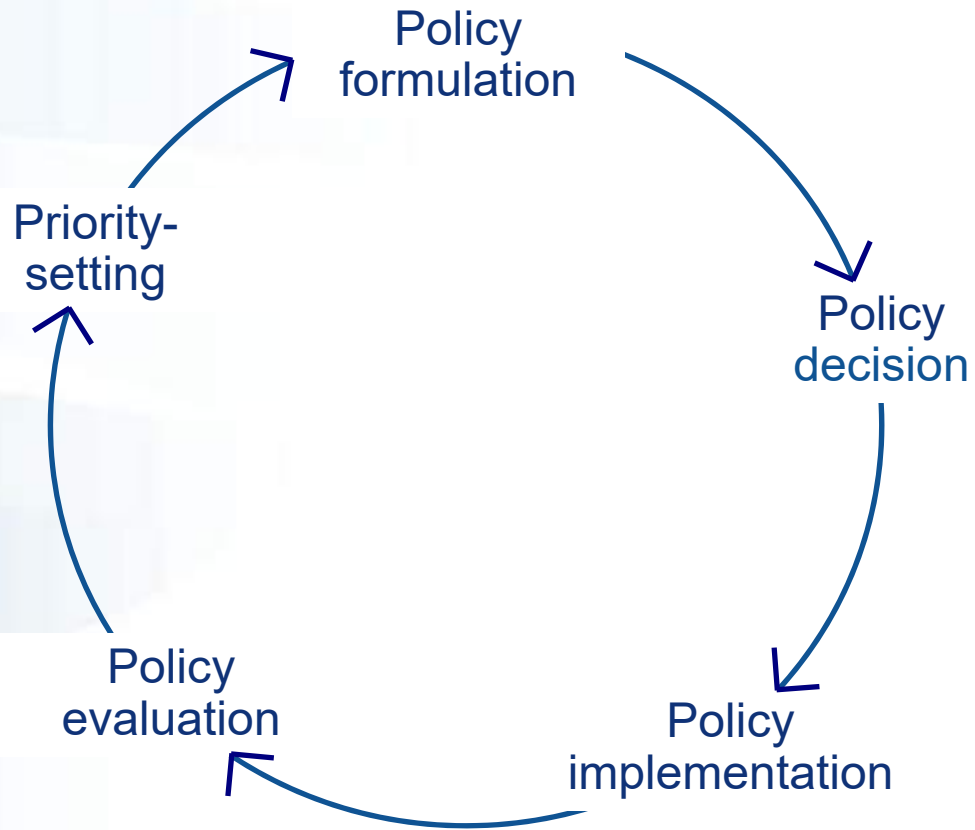




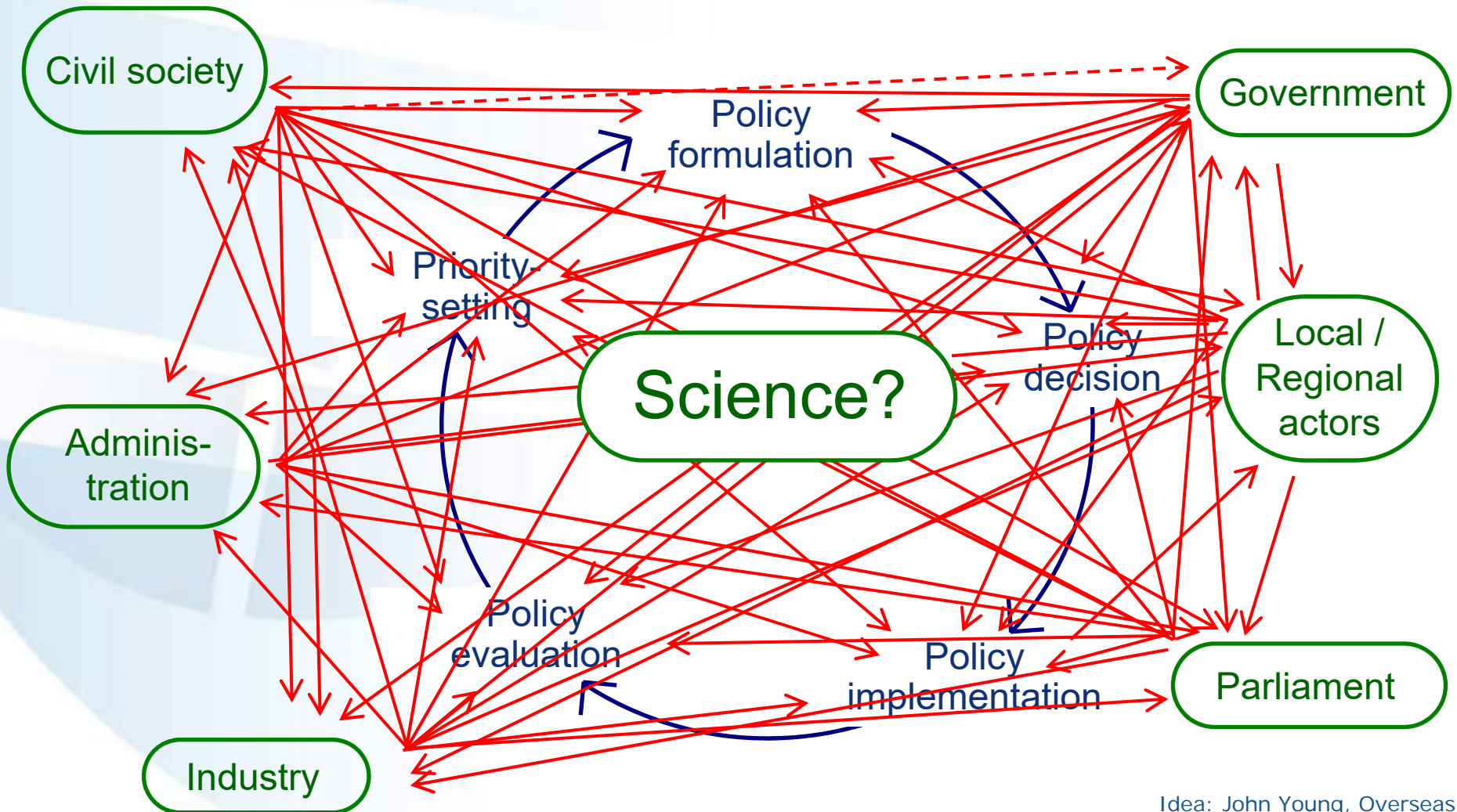
Direct science advice vs. indirect science advice

ENCYCLICAL LETTER
LAUDATO SI'
OF THE HOLY FATHER
FRANCIS
ON CARE FOR OUR COMMON HOME

Policy cycle: The theory



Policy cycle: The reality



Idea: John Young, Overseas Development Institute

Linking policy and science



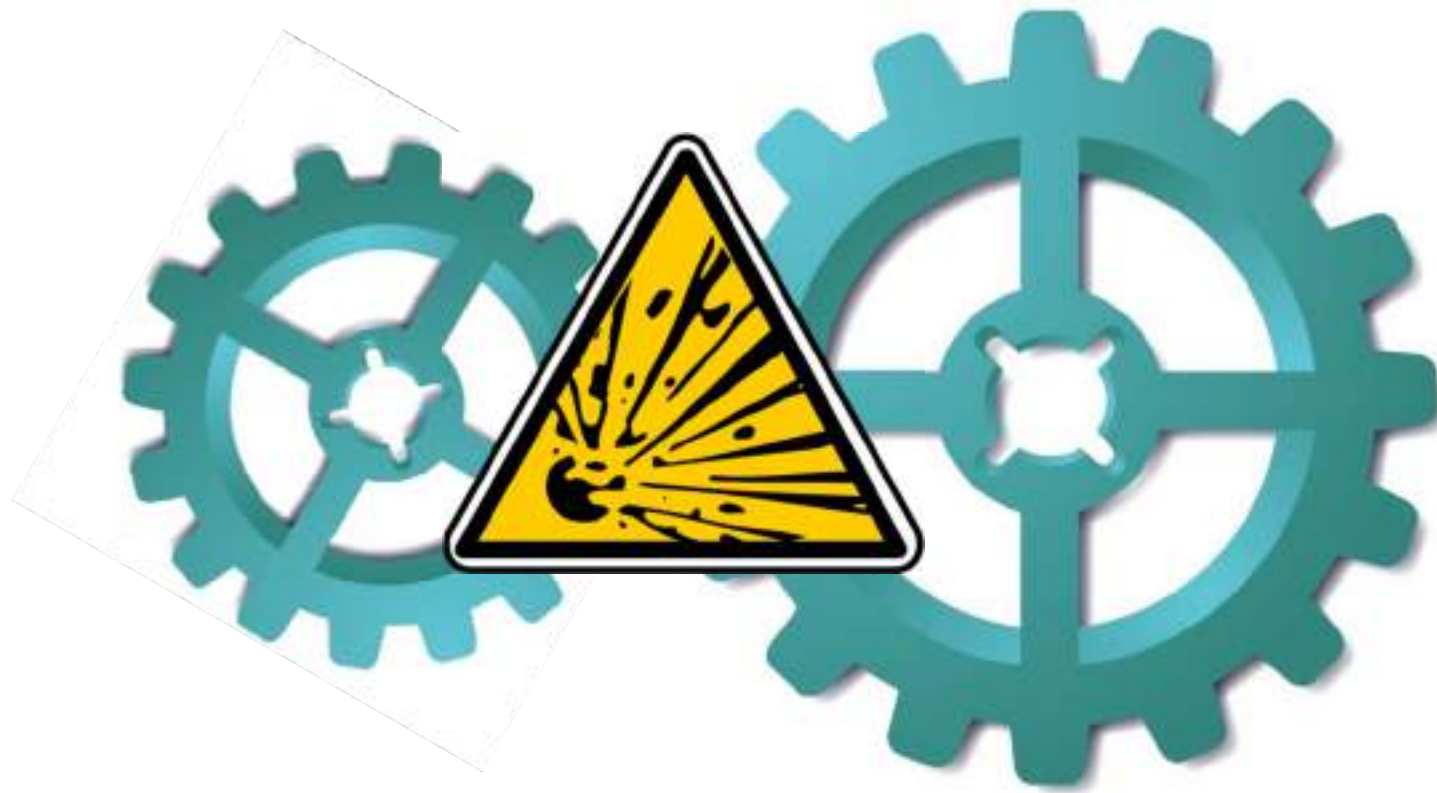
Policy



Science

Design: Jan Marco Müller

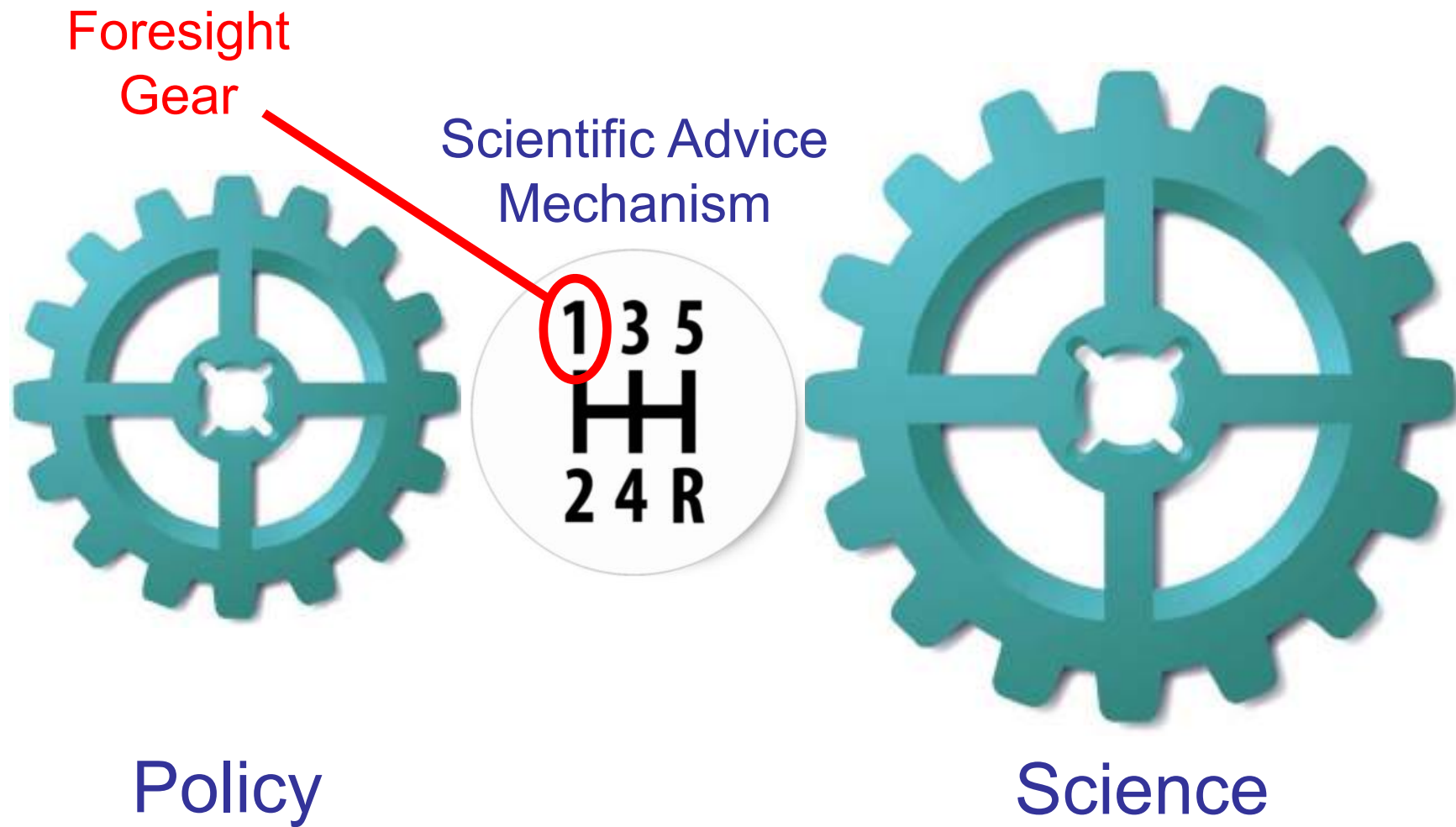
Linking policy and science



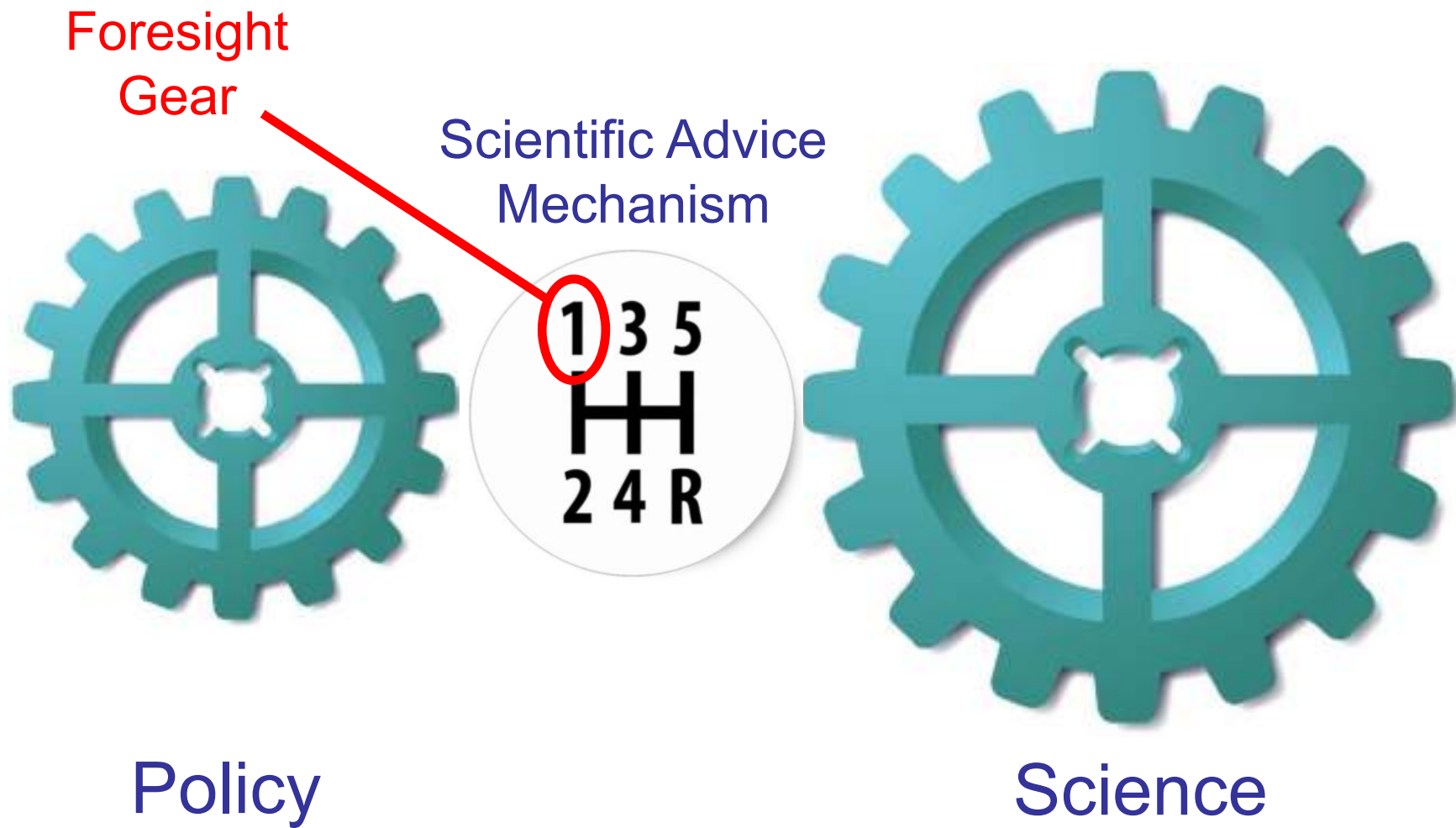
Policy

Science

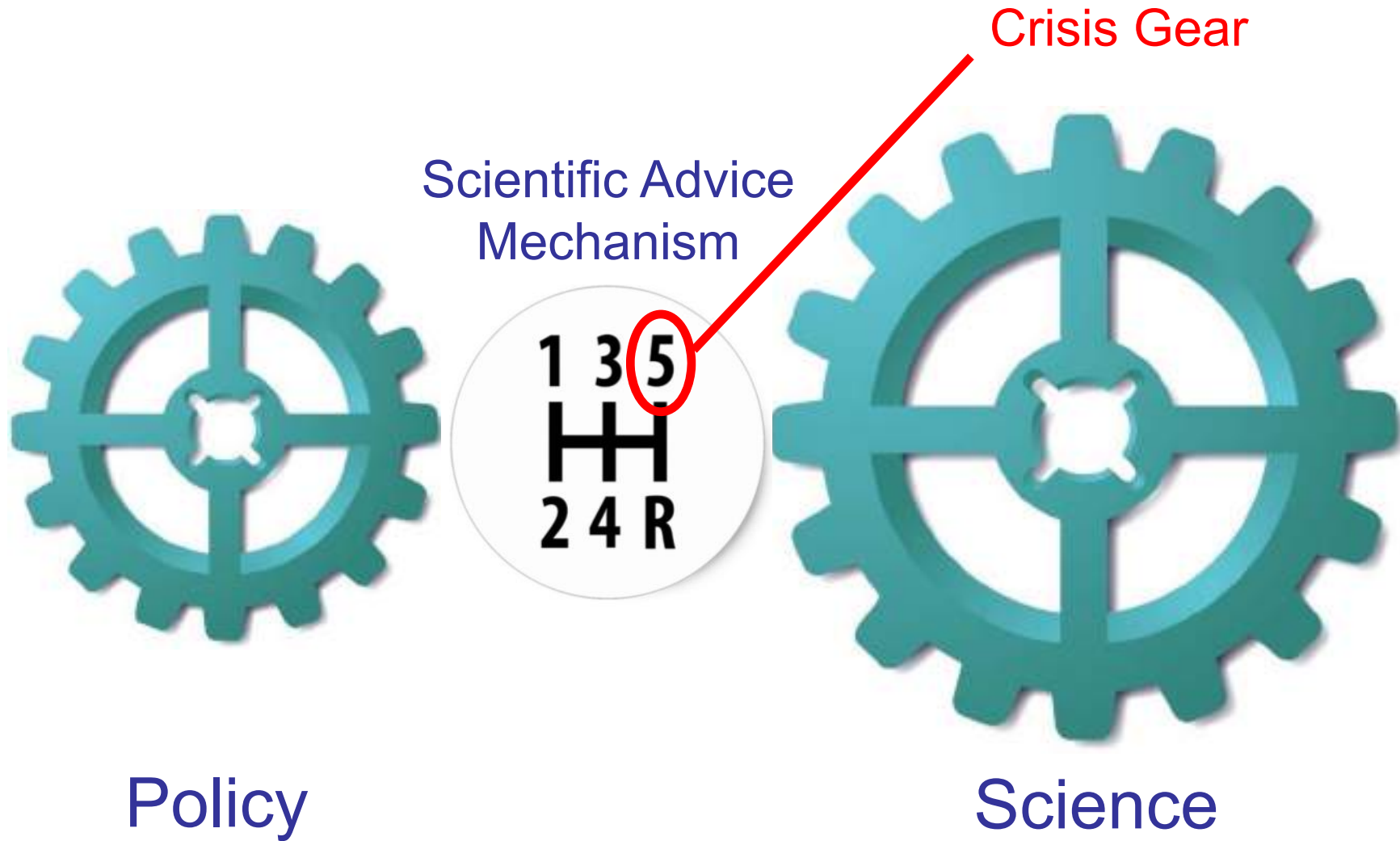
Linking policy and science



Linking policy and science

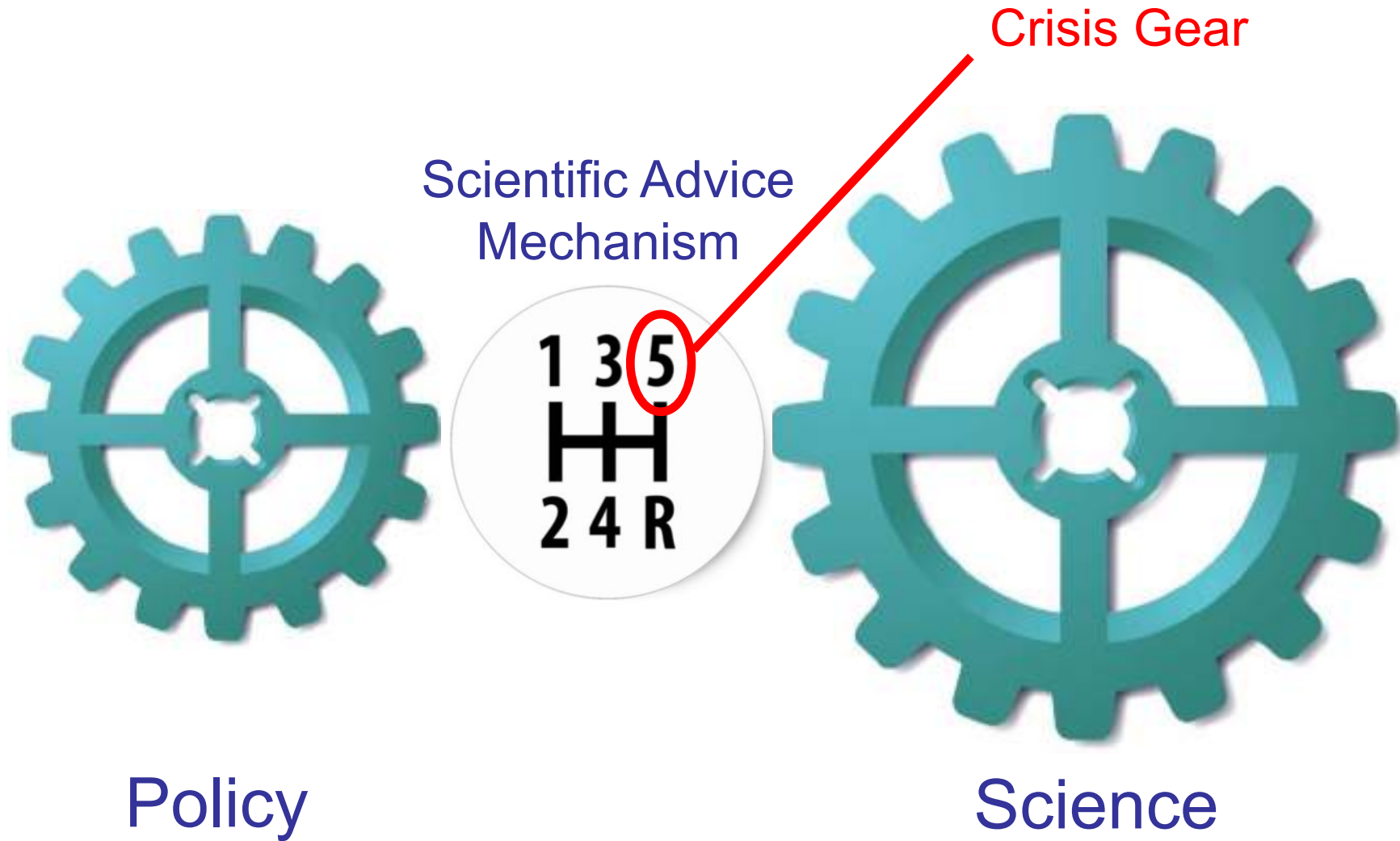


Linking policy and science



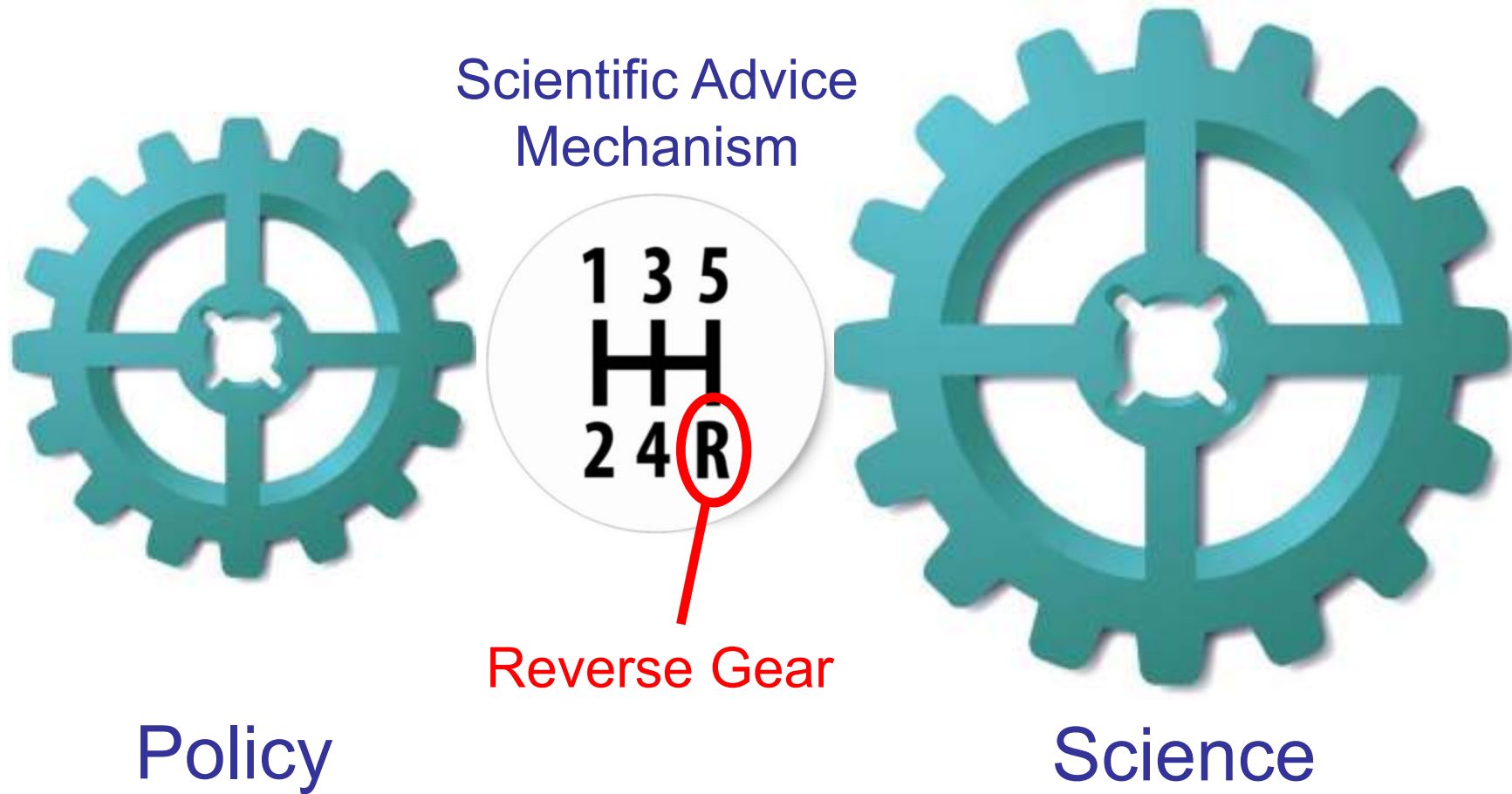
Design: Jan Marco Müller

Linking policy and science



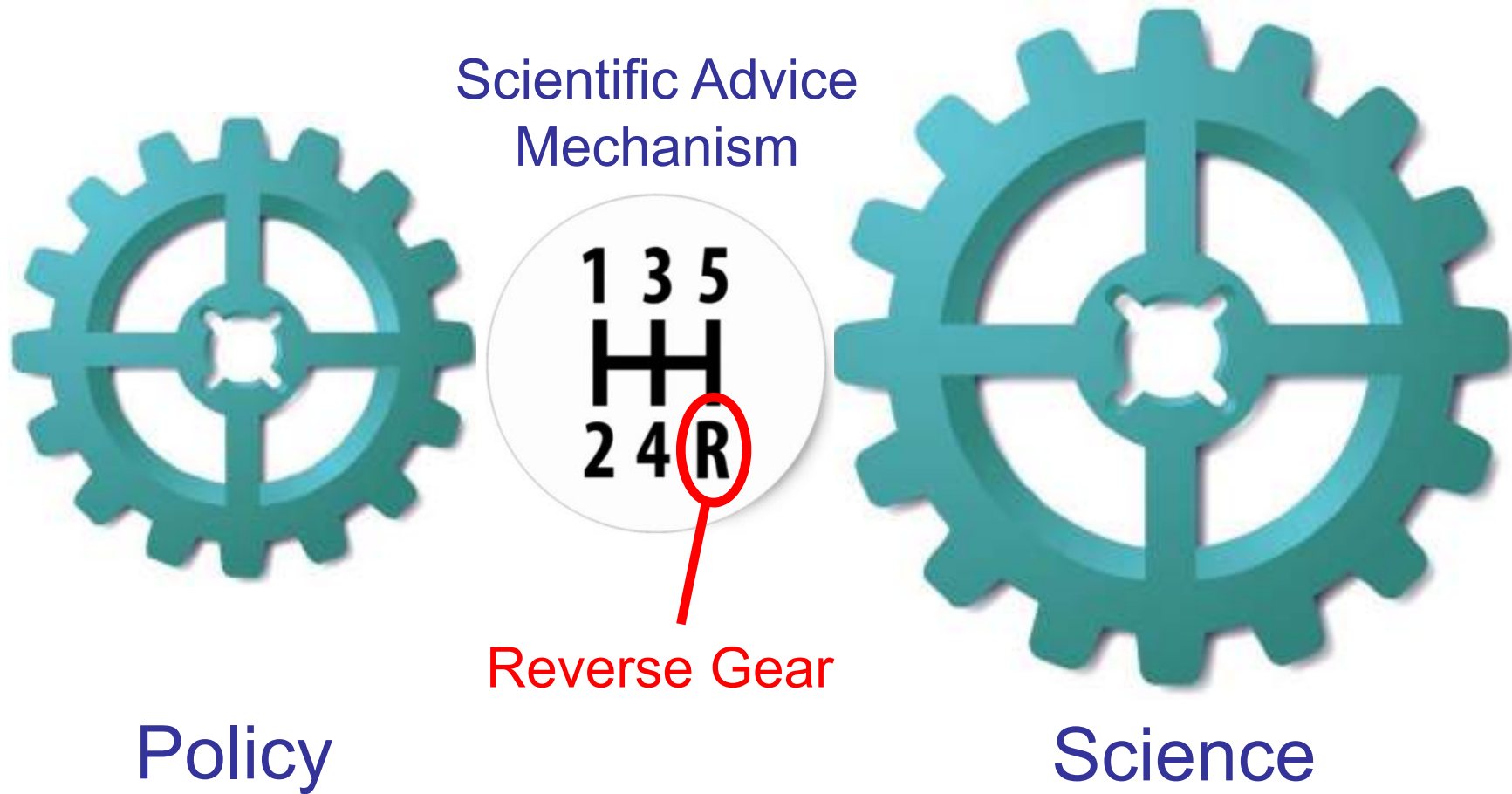
Design: Jan Marco Müller

Linking policy and science

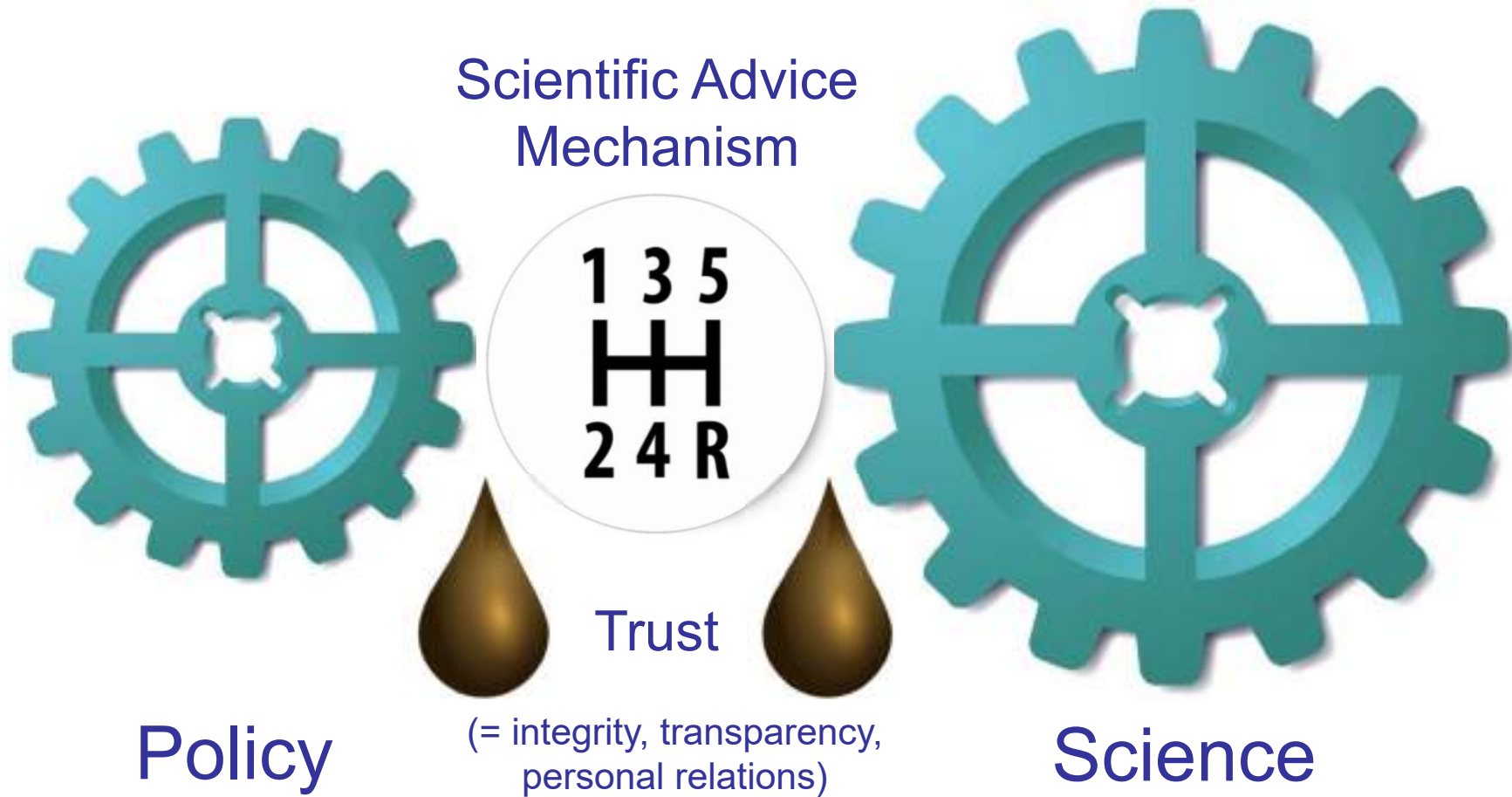


Design: Jan Marco Müller

Linking policy and science



Linking policy and science



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Types of science advisory structures

EXTERNAL

- a) Academies and learned societies
- b) Not-for-profit research institutes, universities, and related scientific associations
- c) Think tanks and scientific consultancies

MANDATED

- d) Scientific advisory committees (permanent or ad-hoc)
- e) State agencies

INTERNAL

- f) In-house science services
- g) Individual science advisors (e.g. chief scientific advisors)

Types of science advisory structures

Important:

- All approaches are equally valid!
- No approach provides the "golden bullet", therefore in any given science advisory system one can find a mix of approaches
- The choice of the advisory body depends on the problem at hand (e.g. technical vs. philosophical, time frame, confidentiality), and is often influenced by personal relationships
- Science advisory systems depend significantly on the institutional and cultural traditions and structures in both science and policy of the country / organization

a) Academies and learned societies

Description:

Institutions made up of individual academics, members are selected based on merit



Advantages:

- Access to top scientists and the scientific mainstream
- Highly reputed/respected (also by the public)
- Stringent procedures and quality control

Disadvantages:

- Somewhat disconnected from policy
- Reports are often more difficult to read (scientific jargon)
- Assessments usually take some time (> 1 year)

b) Not-for-profit research institutes, universities, and related scientific associations

Description:

Public or private research-performing organizations and higher education institutions (or groupings thereof)

Advantages:

- Access to a wide variety of experts
- local / regional vision

Disadvantages:

- Call for proposals needed (by ministry or research agency)
- The results may not reflect the opinion of the wider scientific community (issue of advocacy)
- Reports end with the words: more research is needed



c) Think tanks and scientific consultancies

Description:

Usually private-funded, semi-scientific policy advisory bodies.

Advantages:

- Deep understanding of policy processes and customer demands, deliver quick and on time
- Present in the capital

Disadvantages:

- Often do not stand up to scientific scrutiny
- Biases and hidden agendas (e.g. party-funded think tanks)
- Tend to confirm what you would like to hear



d) Scientific advisory committees (permanent or ad-hoc)

Description:

Committees of independent scientists mandated to advise government on specific issues, either on a permanent or temporary basis.

Advantages:

- A relatively quick and cheap way to get an opinion from a range of experts
- Can serve as sounding board for ideas

Disadvantages:

- They meet only now and then
- Limited resources



e) State agencies

Description:

Legally mandated bodies set up to implement policies (e.g. Collection of data, monitoring, risk assessments, certification, accreditation)

Advantages:

- They need to act upon request of government
- Highly-skilled staff with expert knowledge
- Holders of “official” data and statistics
- Largely trusted by the public

Disadvantages:

- Very technical
- Need to follow (lengthy) procedures

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CENTRAL STATISTICAL AGENCY

f) In-house science services

Description:

A research-performing body within government (e.g. a research branch within a ministry)

Advantages:

- Ability to share confidential files
- They understand well your needs
- They cover the whole policy cycle
- Will always deliver on time

Disadvantages:

- May not ask whether your question is the right one
- May down-tone inconvenient messages



The European Commission's
science and knowledge service

Joint Research Centre

g) Individual science advisors (e.g. chief scientific advisors)

Description:

An individual science advisor employed by government to advise the Prime Minister or a Minister directly

Advantages:

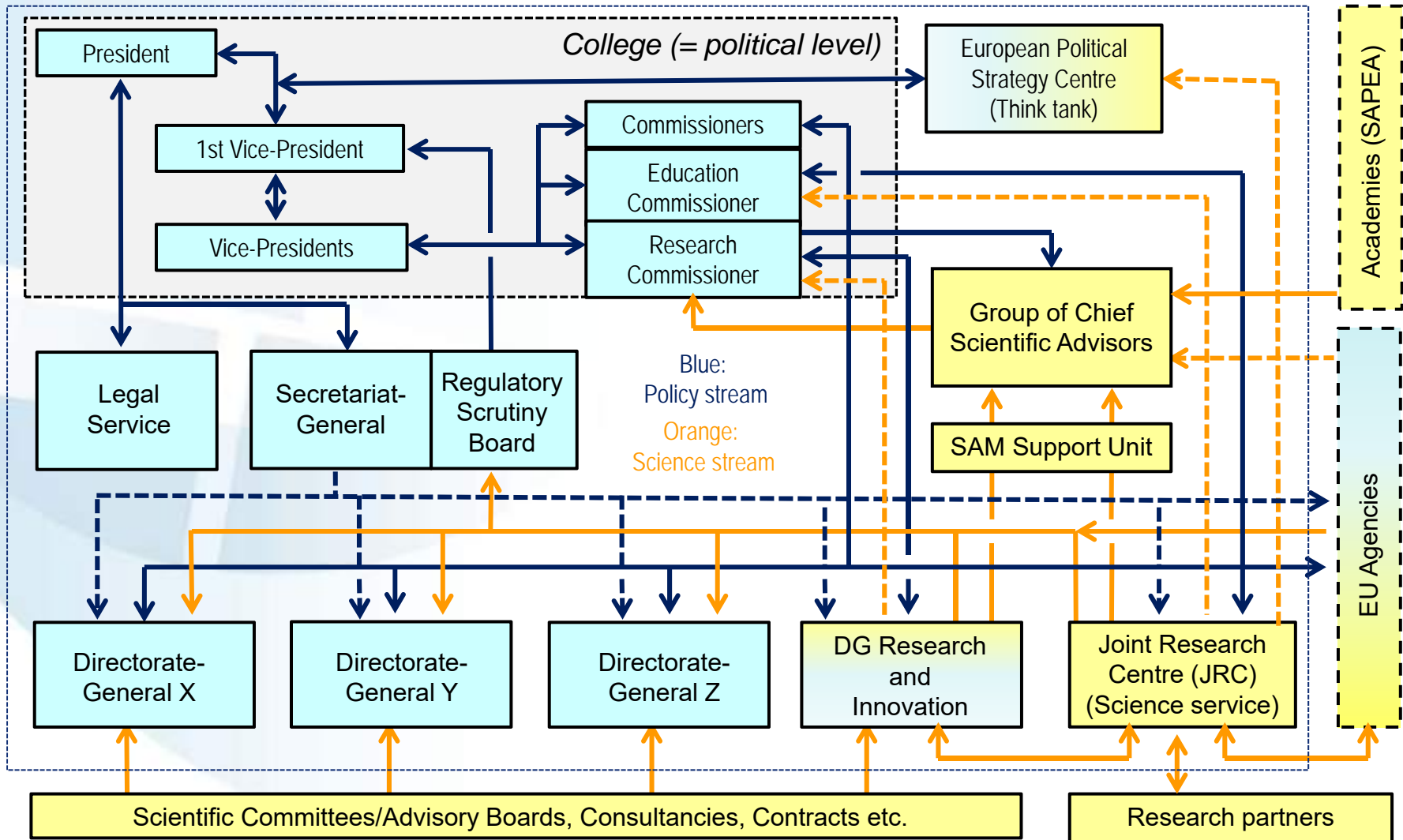
- Single number to call
- Available 24/7, can react quickly (e.g. in a crisis)
- Sits in the same building or a few blocks away
- Can give you informal, confidential advice

Disadvantages:

- Is not an expert on all matters (but knows whom to ask)



That's how the science advisory ecosystem in the European Commission looks like



Design: Jan Marco Müller



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Pitfalls of science advice: The example of the EU Ecodesign Directive

In December 2008 EU Member States adopted the 20-20-20 targets to be reached by 2020:

- 20% reduction in CO₂ emissions
- 20% of the energy consumption coming from renewables
- 20% increase in energy efficiency compared to 1990 levels



**DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 21 October 2009**

establishing a framework for the setting of ecodesign requirements for energy-related products

Article 16 (2)

The Commission shall, as appropriate, introduce by anticipation:

(a)

implementing measures starting with those products which have been identified as offering a high potential for cost-effective reduction of greenhouse gas emissions, such as **heating and water heating equipment, electric motor systems, lighting in both the domestic and tertiary sectors, domestic appliances, office equipment in both the domestic and tertiary sectors, consumer electronics and HVAC (heating ventilating air conditioning) systems.**



Work on Preparatory Studies for Eco-Design Requirements of EuPs (II) Lot 17 Vacuum Cleaners TREN/D3/390-2006 Final Report

Report to European Commission

Restricted Commercial
ED 04002
Issue 1
February 2008

Intertek ETL SEMKO

ConsumerResearchAssociates

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COMMISSION REGULATION (EU) No 666/2013
of 8 July 2013

implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to
ecodesign requirements for vacuum cleaners

After light bulbs and TVs... now
EU officials BAN our vacuum
cleaners

THEY have forced us to change our light bulbs and banned our power-hungry plasma TVs.

Opinion: This vacuum cleaner ban is a reason to
leave EU

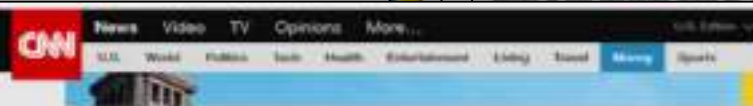
By Derby Telegraph | Posted August 25, 2014

Meddling eurocrats to ban
supercharged hoovers as Brussels lays
down new rules



Nick Webb
EMAIL

PUB
24/0



Brits say 'EU sucks' over vacuum
cleaner ban

By Jim Brubaker, CNN
Updated 12:51 PM ET, Mon September 1, 2014

NOW KETTLES FACE EU BAN

Brussels meddlers in another assault on our way of life

By Nathan Rian

THE British way of life is under fresh threat from the EU as it targets the nation's kettles, toasters and even lawnmowers.
Congressmen last night vented their fury as Brussels bureaucrats unveiled their latest plan to invade the "lifestyles and choices of ordinary people".
Our beloved EU meddlers in London who have only revealed their economic policies to other European nations...



After vacuum cleaner ban, the EU targets
hairdryers, kettles and even smartphones

The great vacuum cleaner stampede: Panic buying hits shops as deadline looms for Brussels ban on high-powered machines

- Shoppers are panic-buying powerful vacuum cleaners to beat European Union ban that comes into force next week
- Last night, retailers reported that sales had soared by nearly 50 per cent, with many running out of powerful models
- Brussels diktat will prohibit companies from manufacturing or importing vacuum cleaners that are above 1,600 watts
- EU is now considering measures to ban most powerful hairdryers, lawn mowers and electric kettles, it was revealed



Environment

Shoppers rush to buy extra-strength vacuum cleaners before EU ban comes into force

'Which?' accused of encouraging the stampede by panicking its readers

Buy a powerful vacuum cleaner before they are BANNED: New EU rules 'will outlaw best models in 10 days because they're not eco-friendly'

All Of Europe Is Panic-Buying High-Powered Vacuum Cleaners Before They Become Illegal

Dina Spector | 5 | 15,400 | 3D
Sep 4, 2014, 11:06 AM

FACEBOOK | LINKEDIN | TWITTER | EMAIL | PRINT

Home | Analysis | Policy

Vacuum cleaner manufacturers urge Cameron to back EU ban

EXCLUSIVE: Chief executive of Miele tells Prime Minister that the Ecodesign Directive provides a welcome boost to innovation

By Jessica Shankleman | 06 Oct 2014 | 0 Comments

Send | Print | Comment

Sir James Dyson backs EU directive on vacuum power rated above 1,600 watts

By Western Daily Press | Posted: September 01, 2014

By Josie Clarke

NEWS FRONTPAGE
See the awards on ITV1 from 8pm >

Mirror

WEBSITE OF THE YEAR

Most read | Top Videos | News | Politics | Football | Sport | Celebs | TV & Film | Web

TRENDING: LABOUR PARTY CONFERENCE 2014 | JESSIE J | VOLKSWAGEN | REPSOLE CHOC | DAVID CAMERON | Technology | Money | Travel

News | UK News | European Union

Vacuum cleaner ban: Britons clean out stores as EU power limit on dust-busting machines

17:42, 28 AUG 2014 | UPDATED: 19:02, 28 AUG 2014 | BY AUSTIN JAMES

Panic buying has swept through Britain after consumer watchdog Which? warned Brits to "act quickly" if they wanted an appliance that is 1,600-2,200 watts.



EU regulations with regard to ecodesign requirements for....

107/2009	Set-Top Boxes	813/2013	Space heaters and combination heaters
244/2009	Non-directional household lamps	814/2013	Water heaters and hot water storage tanks
245/2009	Fluorescent lamps and high intensity discharge lamps	66/2014	Domestic ovens, hobs and range hoods
278/2009	No-load condition electric power consumption and external power supplies	548/2014	Small, medium and large power transformers
640/2009	Electric motors	1253/2014	Ventilation units
641/2009	Glandless circulators	1095/2015	Professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers
642/2009	Televisions	1185/2015	Solid fuel local space heaters
643/2009	Household refrigerating appliances	1188/2015	Local space heaters
1015/2010	Household washing machines	1189/2015	Solid fuel boilers
1016/2010	Household dish washers	2281/2016	Air heating products, cooling products, high temperature process chillers and fan coil units
327/2011	Fans		
206/2012	Air conditioners		
932/2012	Household tumble driers		
1194/2012	Directional lamps and LED lamps		
617/2013	Computers and Servers		
666/2013	Vacuum cleaners		

Such stories feed the agendas of populists...



...and science becomes a casualty
in the political debate

“The people in this
country have had
enough of experts”

Michael Gove, 3 June 2016

In other words:
One of the reasons for Brexit was the ecological design of vaccuum cleaners

Britain Votes to Leave

U.K. votes to quit European Union after more than four decades

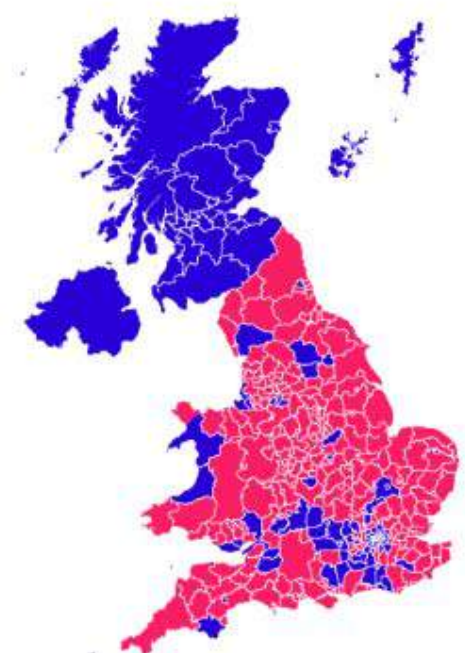
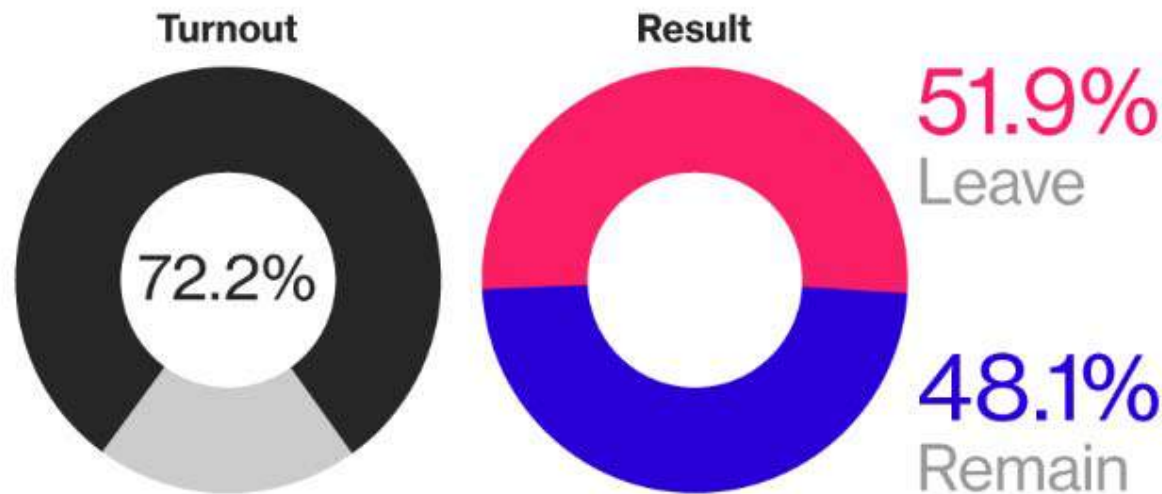


Image: Bloomberg

Lessons learnt from the ecodesign case

- The science-policy interface is messy
- Even the best science advisory system will not save you from political trouble
- Scientists need to understand the dynamics of politics
- Political decisions need to be informed by science, but cannot be “outsourced” to scientists
- Behavioral science and engagement with the public are needed

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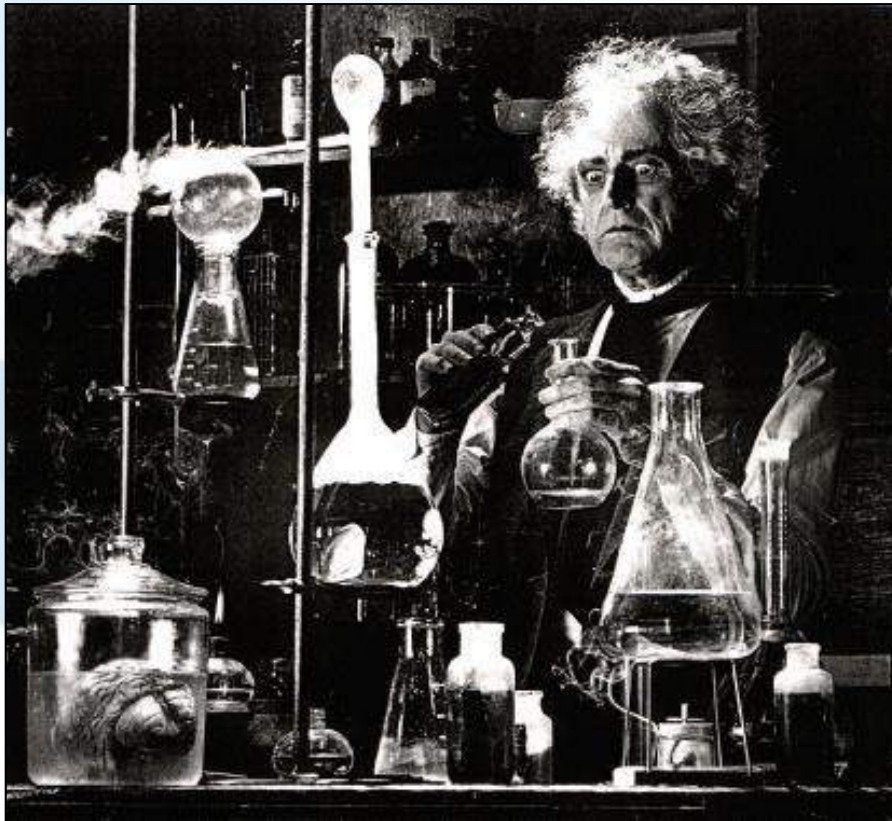
Some practical tips and tricks on how to improve the impact of science on policy



We need to enthuse people
for science and technology



Which scientist would you trust?



We need to communicate,
otherwise the void will be filled by the uninformed



Greta Thunberg may not be an expert,
but she makes the voices of experts heard



*"I don't want you to listen to me,
I want you to listen to science"*

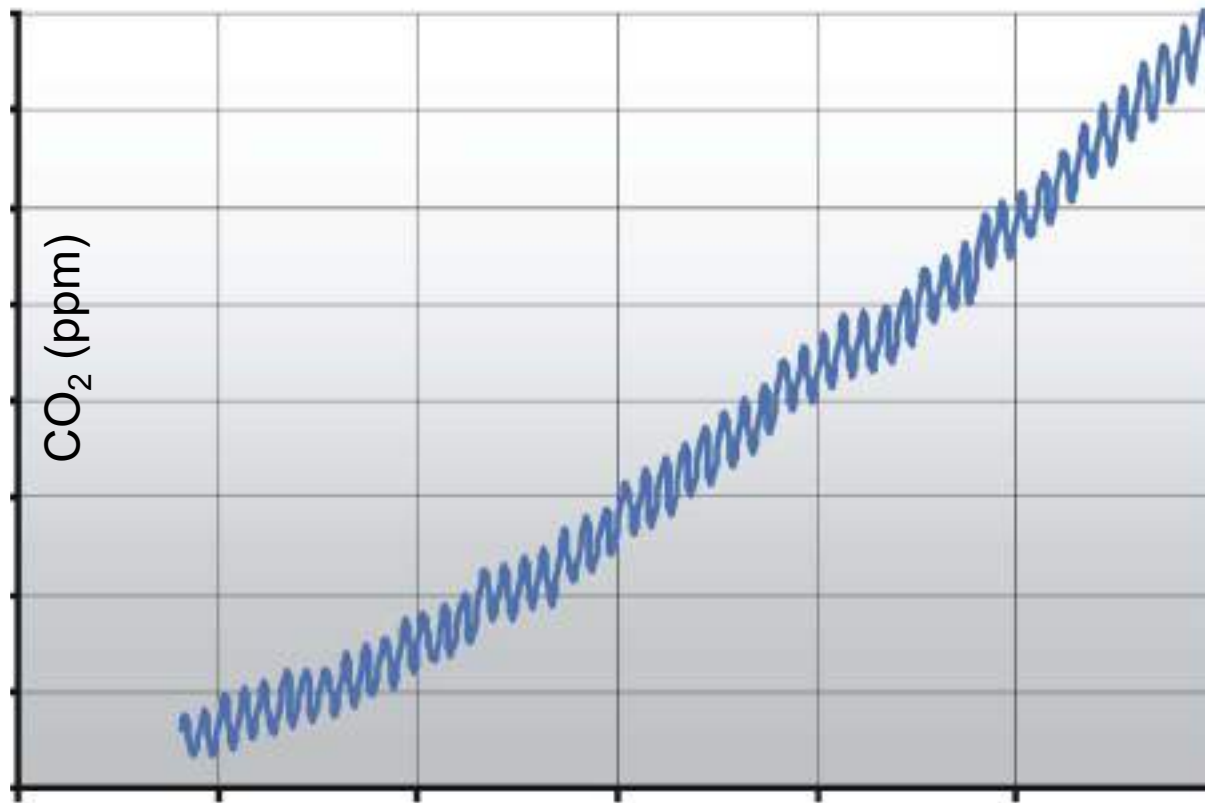
We need to use a language everybody understands!



Photo credits: Background Stadium Thomas Faivre-Duboz,
forest taken from H.-D. Viktor Boehm (globalcarbonproject),
Photo montage by Alan Belward, Joint Research Centre

Narratives are very powerful

Mauna Loa Monthly Mean Carbon Dioxide
(NOAA ESRL GMD Carbon Cycle)



Emotions matter



If the other side comes with anecdotes,
then we should have the better anecdotes



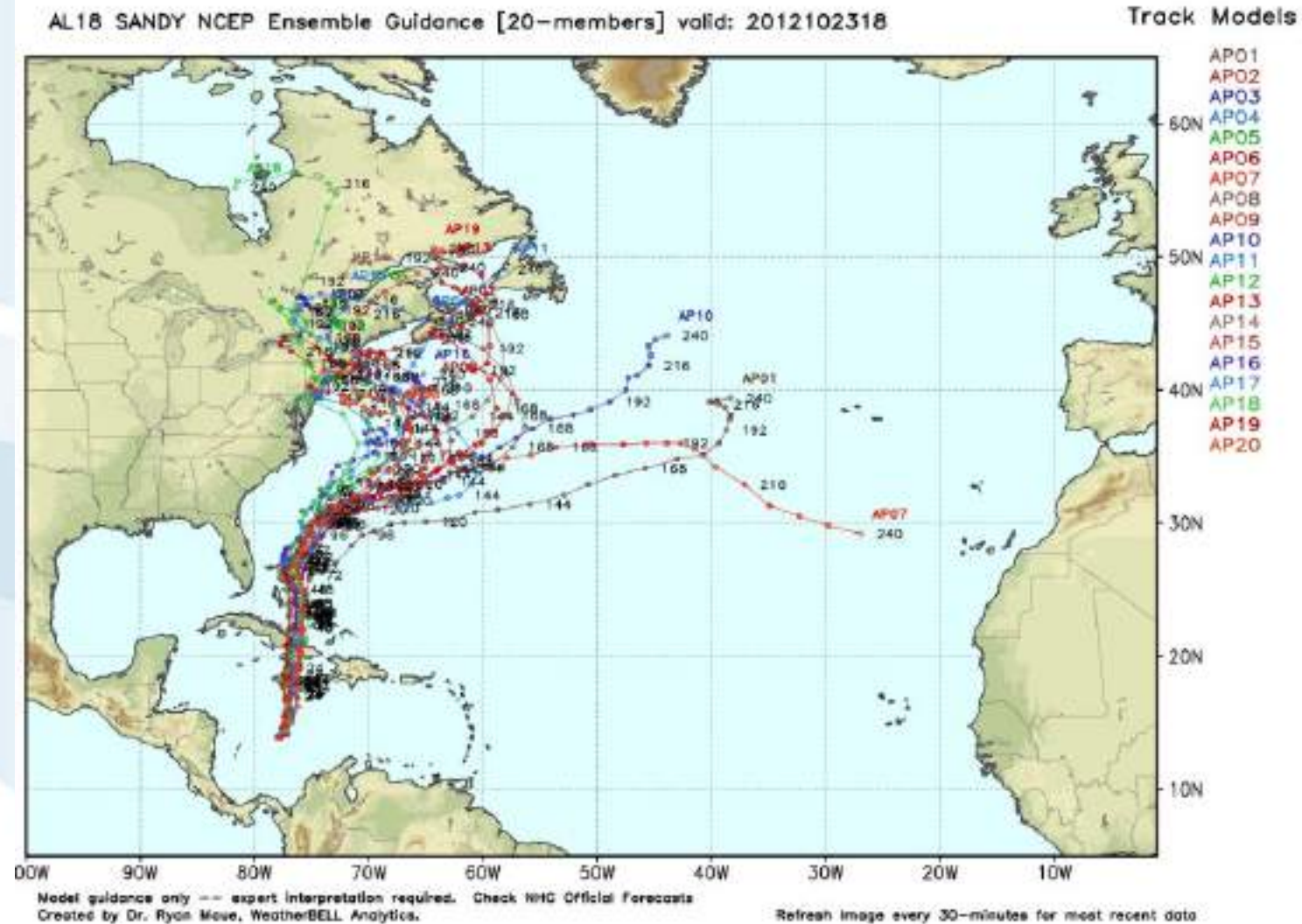
The elevator pitch:
You have 3 minutes to get the message across



Timing is extremely important in politics



Communicate uncertainty – and what it means



Be aware of cognitive biases on both sides



Source: Paul Leonard

Politicians don't like to be told what to do –
scientists need to provide options that are
implementable in a real world



Equip the politician with the arguments
to defend the evidence in public



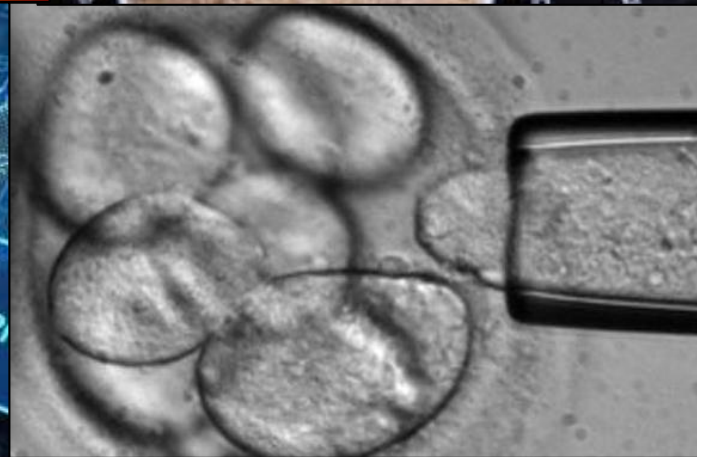
Most politicians are open to listen to science,
but they struggle to engage with it

Politicians who hate science

Politicians who have not discovered
how science can help them or
have not found an easy access to science

Politicians who love science

Scientists need to show empathy for public concerns and ethical issues



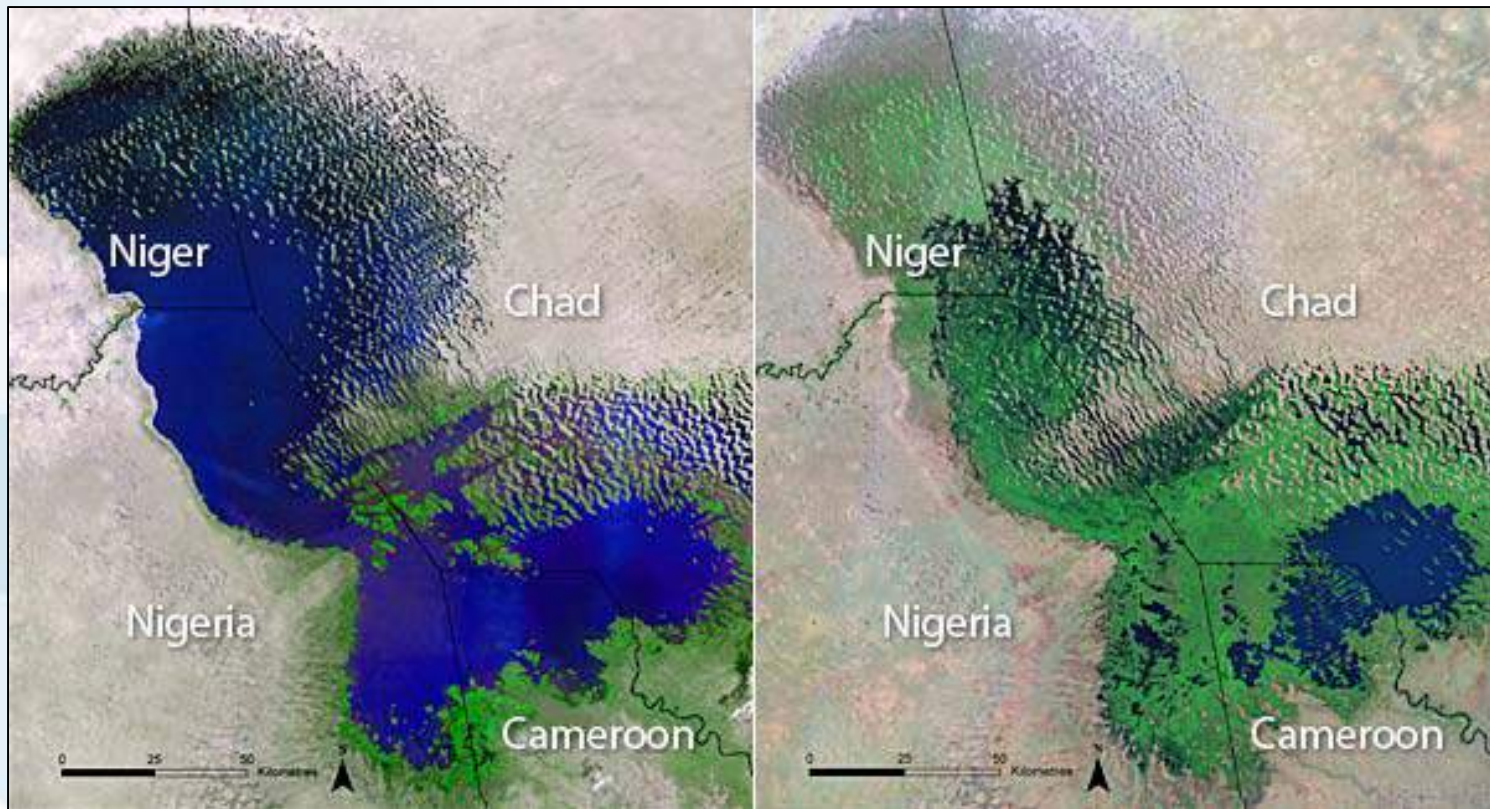
We have to engage with citizens
(there is no point in preaching to the converted)



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Policies based on robust scientific evidence are more sustainable than those that are not



Lake Chad 1972

Lake Chad 2007

When science and policy work together,
great things can be achieved



Haile Gebrselassie



“When you run the marathon, you run against the distance, not against the other runners and not against the time.”

አመሰግናለዎ



muellerj@iiasa.ac.at



@JanMarcoScience