

# Why it is so hard to lower greenhouse gas emissions – The economics and politics against climate change mitigation

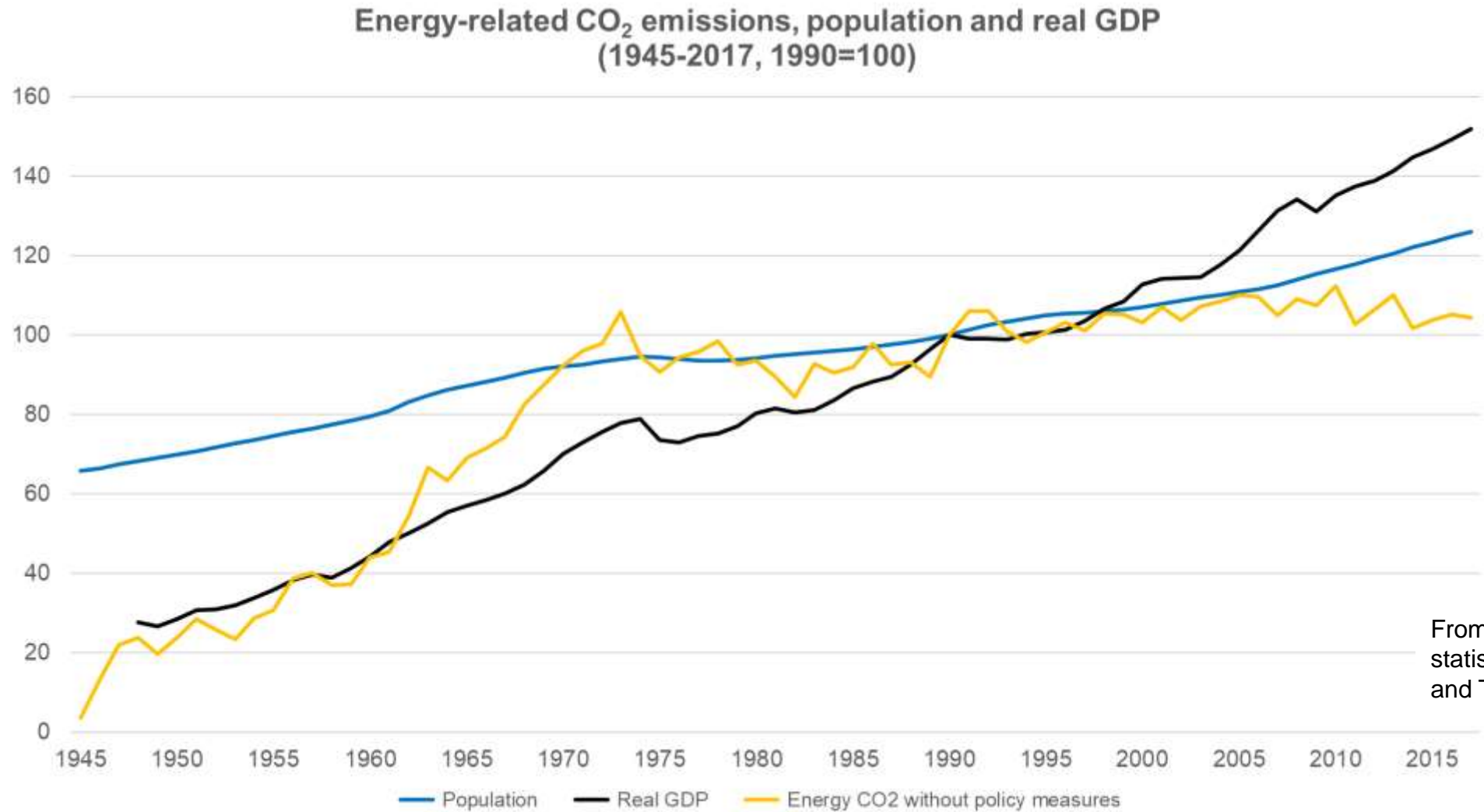
Geneva, January 26, 2005



Philippe Thalmann

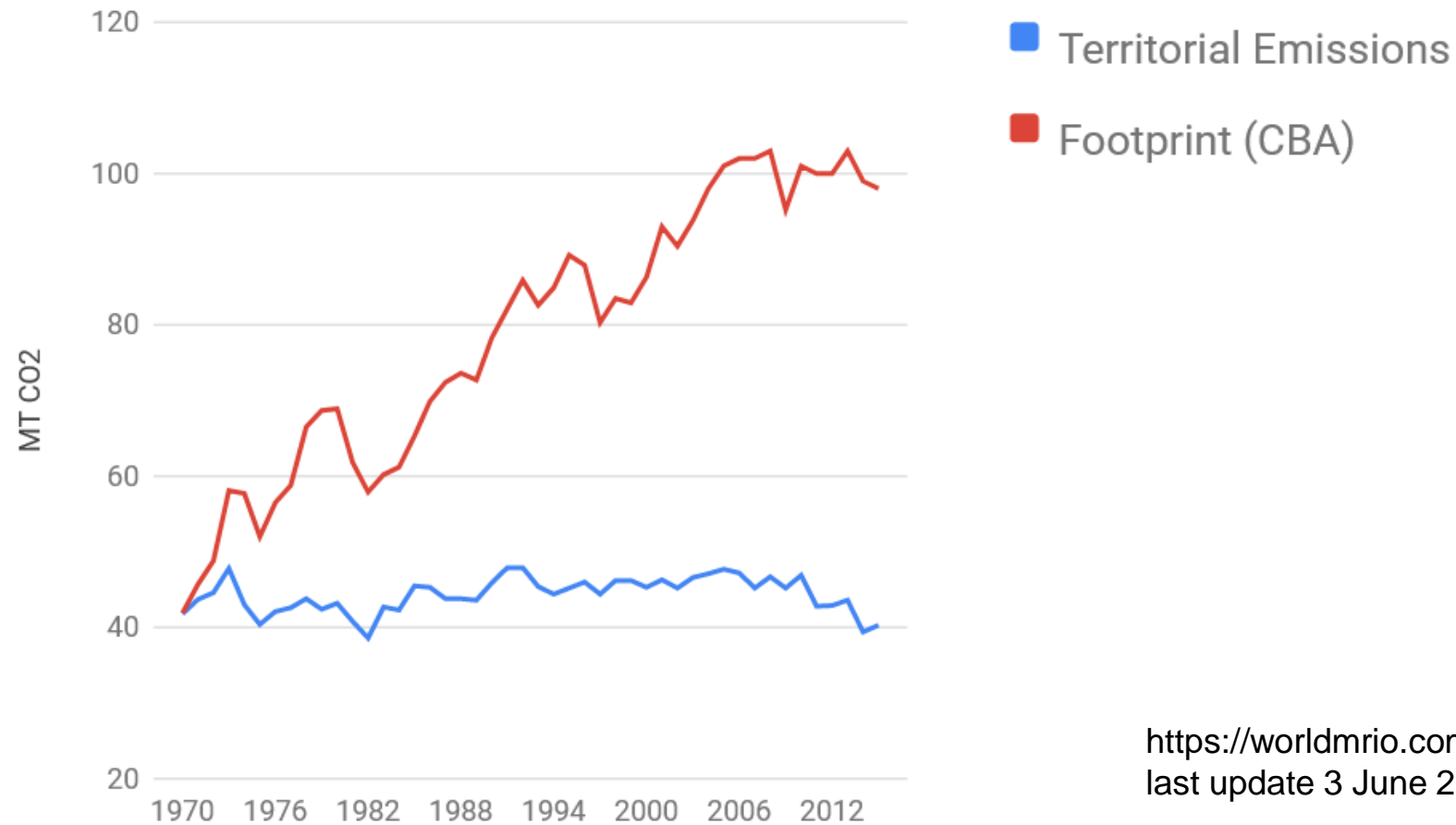
Laboratory of Environmental and Urban Economics, EPFL

# Maybe it is not that hard...

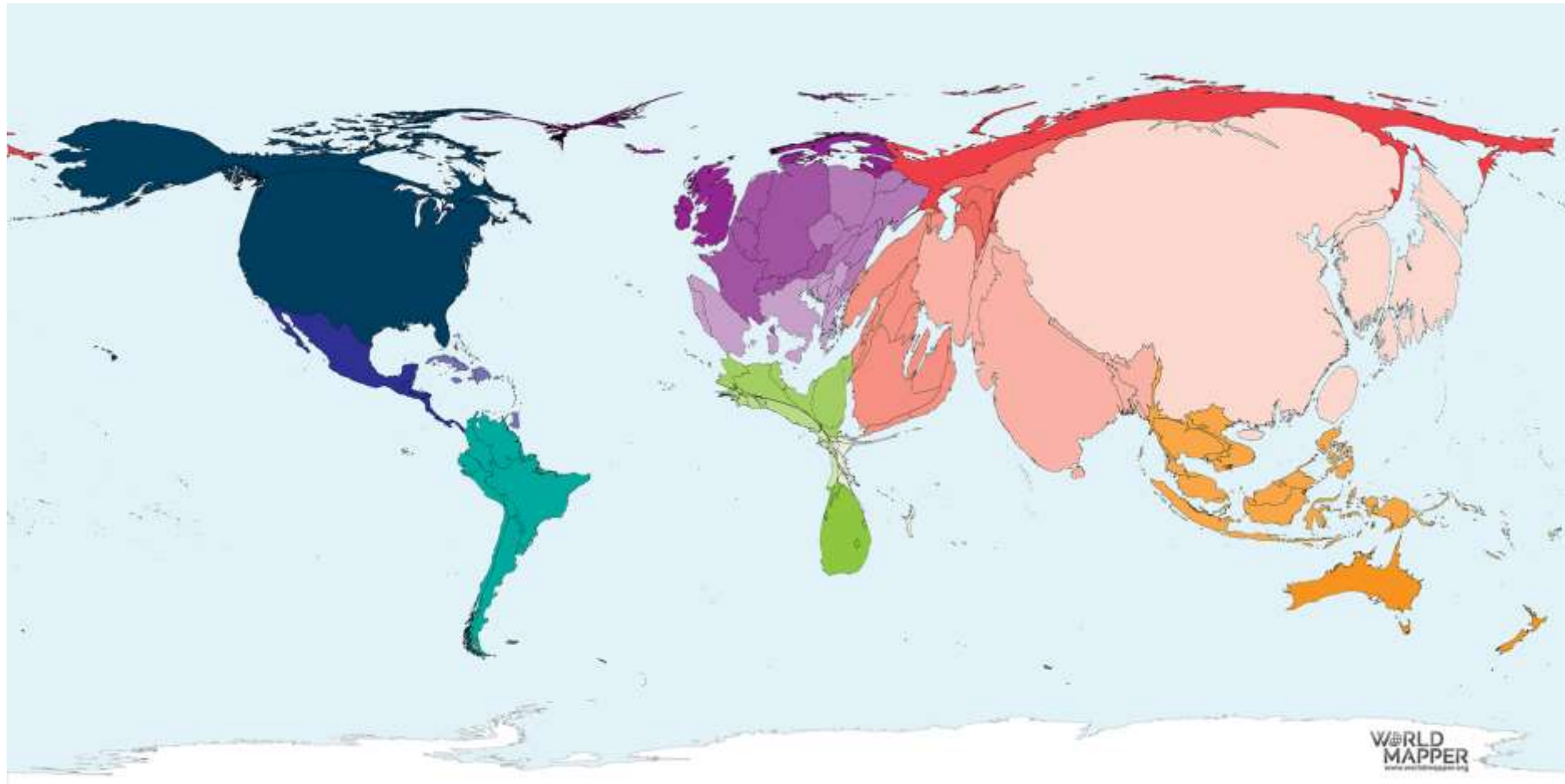


# It helped to externalise industrial production and reserve power generation

Carbon Footprint for Switzerland (1970-2015)



<https://worldmrio.com/footprints/carbon/>  
last update 3 June 2018



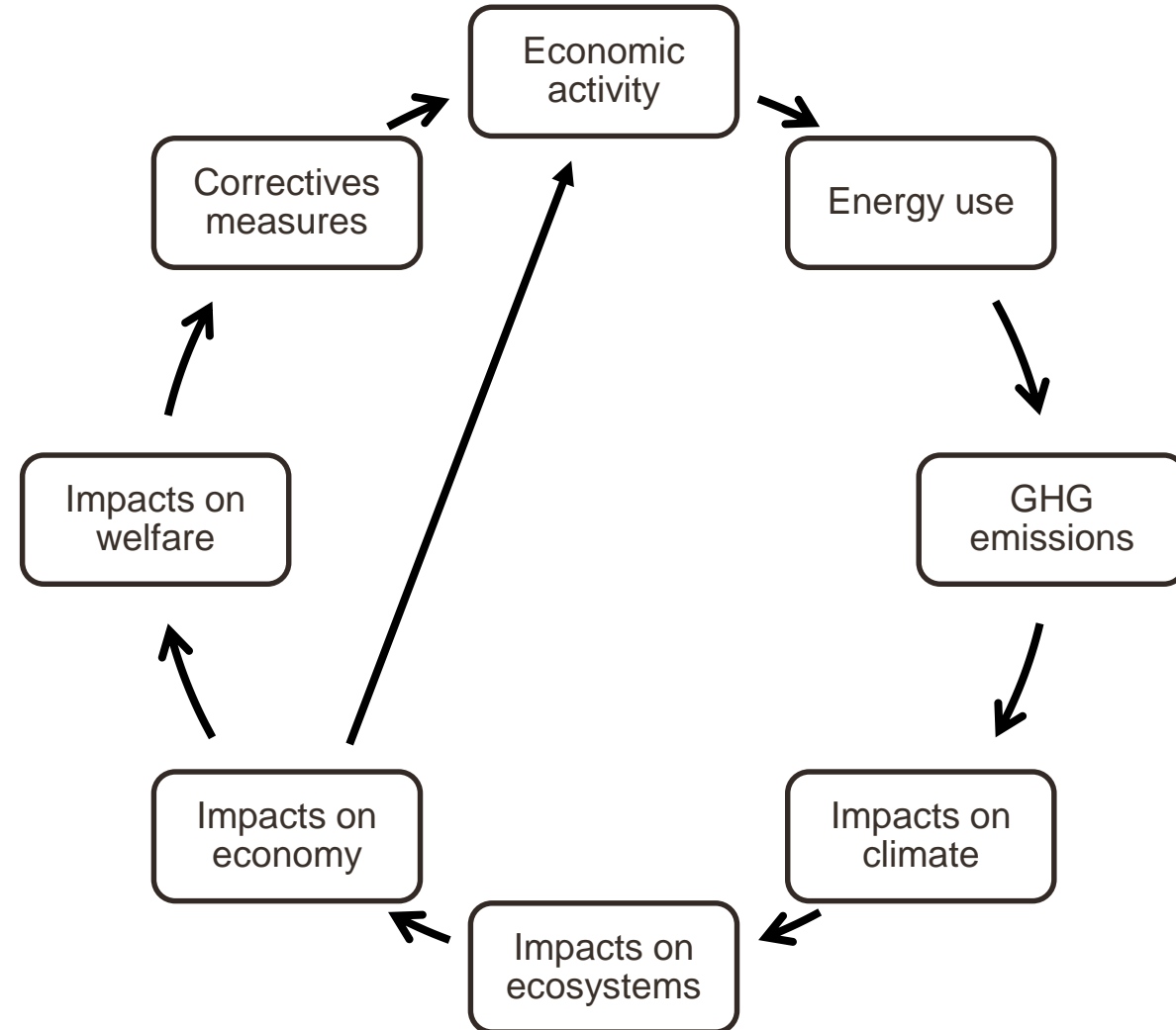
Country shares of world CO<sub>2</sub> emissions in 2015 represented by their surface

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

# THE CHALLENGES

# The general climate challenge

- The World cannot externalize its CO<sub>2</sub> emissions!
- It is costly to reduce fossil fuel use
- Most of the CO<sub>2</sub> emissions come from the combustion of fossil energy (coal, oil, natural gas)
- Fossil energy is burned to heat, to move, to operate machines, etc., so it is for our comfort and economic activities
- The same applies to other sources of GHG emissions: cement production, waste incineration, agriculture and livestock, forest use, etc.



# The general climate challenge

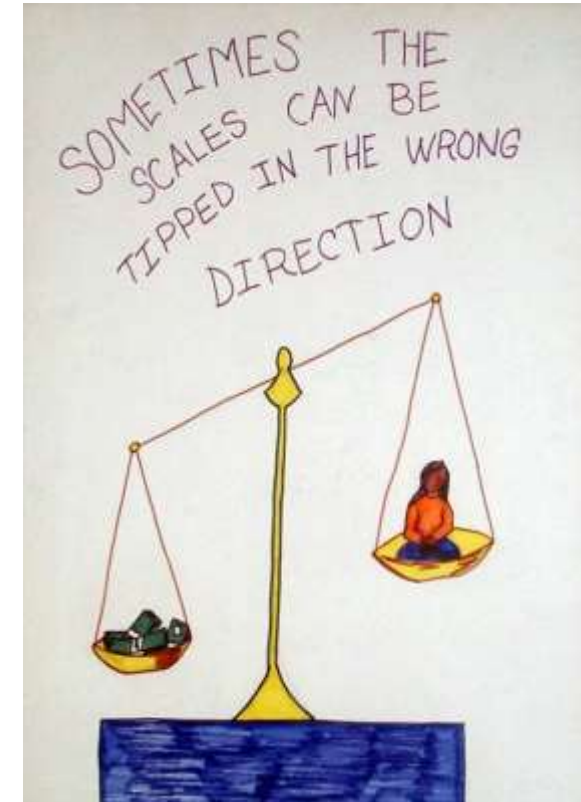
- Trade-off between climate protection (= avoiding damages from climate change) and economic prosperity
- Cost-benefit analysis (CBA)
- $\min_{\Delta} D(E_0 - \Delta) + C_{\Delta}(\Delta)$
- Integrated assessment models (IAM)
- E.g. William Nordhaus, Stern Review, etc., etc.





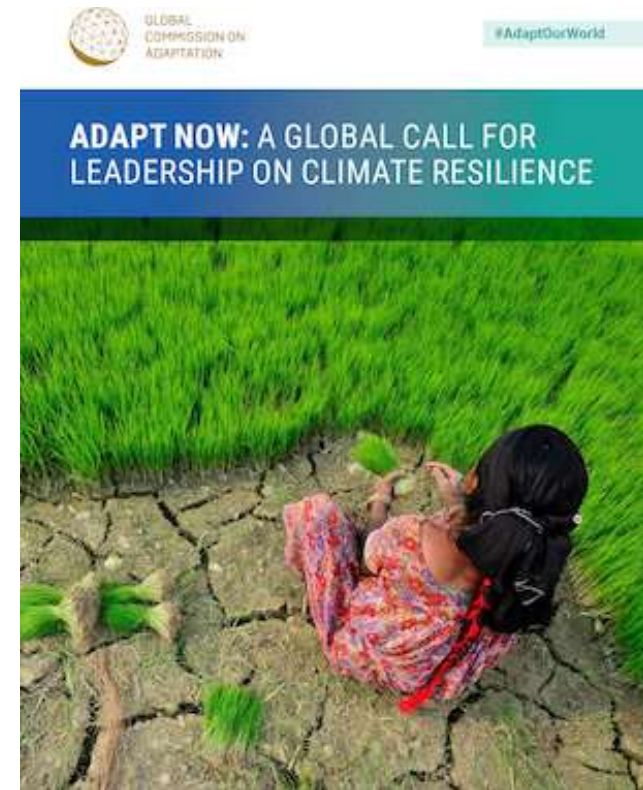
# The scientific difficulties of this approach (1/2)

- Donald's golf holiday against Manuelito's hut...
- Costs today ... benefits tomorrow (discounting, costs are more visible and better known)
- Uncertainty 1: what demographic and economic development? (baseline)
- Uncertainty 2: what future (mitigation) technologies? (e.g. CCS)



# The scientific difficulties of this approach (2/2)

- Uncertainty 3: what future impacts of climate change? (e.g. tipping points)
- Impacts depend on adaptation, which is also costly
- $\min_{\Delta, A} D(E_0 - \Delta, A) + C_{\Delta}(\Delta) + C_A(A)$
- Impacts depend on cumulated emissions (long life of GHG): How to allocate mitigation efforts across time?
- Cumulated emissions are the sum of those of all countries: How to allocate mitigation efforts among countries? (public good, burden sharing)



*09.10.2019: Global Commission on Adaptation report finds that investing \$1.8 trillion globally from 2020 to 2030 in five areas could yield \$7.1 trillion in net benefits.*



# The political difficulties of this approach (1/2)

- Private costs ... collective benefits  
external costs of GHG emissions, free-riding  
on adaptation
- Private costs amplified by global  
competition  
beggar-thy-neighbour, first-mover  
disadvantage, pollution heavens, carbon  
leakage, race to the bottom
- Future generations do not vote  
short-sightedness ... but climate school  
strikes



Chappatte, New York Times, June 2017

# The political difficulties of this approach (2/2)

- Uneven distribution of mitigation costs
- Uneven distribution of climate change impacts
- Unequal levels of development
- Historic debt



Somalian climate refugees,  
Somalia, July 2011  
*Roberto Schmidt - AFP*

# It is easy to oppose ambitious mitigation

## PROCRASTINATION

- There are large uncertainties (merchants of doubt, **wait** till we know more)
- Job destruction (competition for attention, **slow** transition, let's grow first)
- Losers mobilize much more than winners / mitigation losers are much richer than winners
- Mitigation is only effective if all (big emitters) participate (**wait** for international agreement / **wait** for all to move / we have done our fair share)
- Technology will solve it and save us (optimal **waiting**)
- Better to invest in adaptation (private costs, private benefits)



<https://www.youtube.com/watch?v=eMXmMHVNx4U>



LE PROBLEME



LA SOLUTION

**LET'S BE PRAGMATIC**

# Pragmatic global goals

To stabilize atmospheric concentrations of greenhouse gases at a level that will prevent dangerous interference with the climate system

Limit global warming to +2°, better +1.5° relative to pre-industrial era

Carbon budget

Net-zero emissions around 2050



# No brainers (1/2)

- Better climate science, more R&D for mitigation solutions
- Stop subsidies for fossil fuels and fossil-fuel intensive activities (e.g. Lugano airport)
- Avoid more sunk costs (stranded assets; lock-in effect; no more oil/gas/coal exploration)
- Replace fossil-powered 'engines' by fossil-free at end of life



**Oil and gas companies approve \$50 billion of major projects that undermine climate targets and risk shareholder returns** 05 September 2019

No major oil company invests to support Paris goals of keeping well below...

[READ MORE](#) >





# No brainers (2/2)

- Undertake negative or low-cost mitigation
- Undertake mitigation with large ancillary benefits (clean air)
- Emphasize job creation (green jobs, green growth, Green New Deal, first-mover advantages)
- Share pro-mitigation innovation; help other countries mitigate (tech transfer)
- Start adaptation; help poorer countries adapt

***Low Hanging Fruit***



Do you think that  
will make them  
interested in us?



# FROM GLOBAL RESPONSIBILITY TO SPECIFIC POLICIES

# 1) Should Switzerland commit itself to climate protection?

- The Federal government and Parliament responded with the signature and ratification of the Paris Agreement
- In fact since 1999 with the first CO<sub>2</sub> law; and even before that, in 1990, as the Energy 2000 Programme already had an objective of stabilising CO<sub>2</sub> emissions
- There are still many influential politicians who claim that Switzerland has done enough or that its efforts are useless

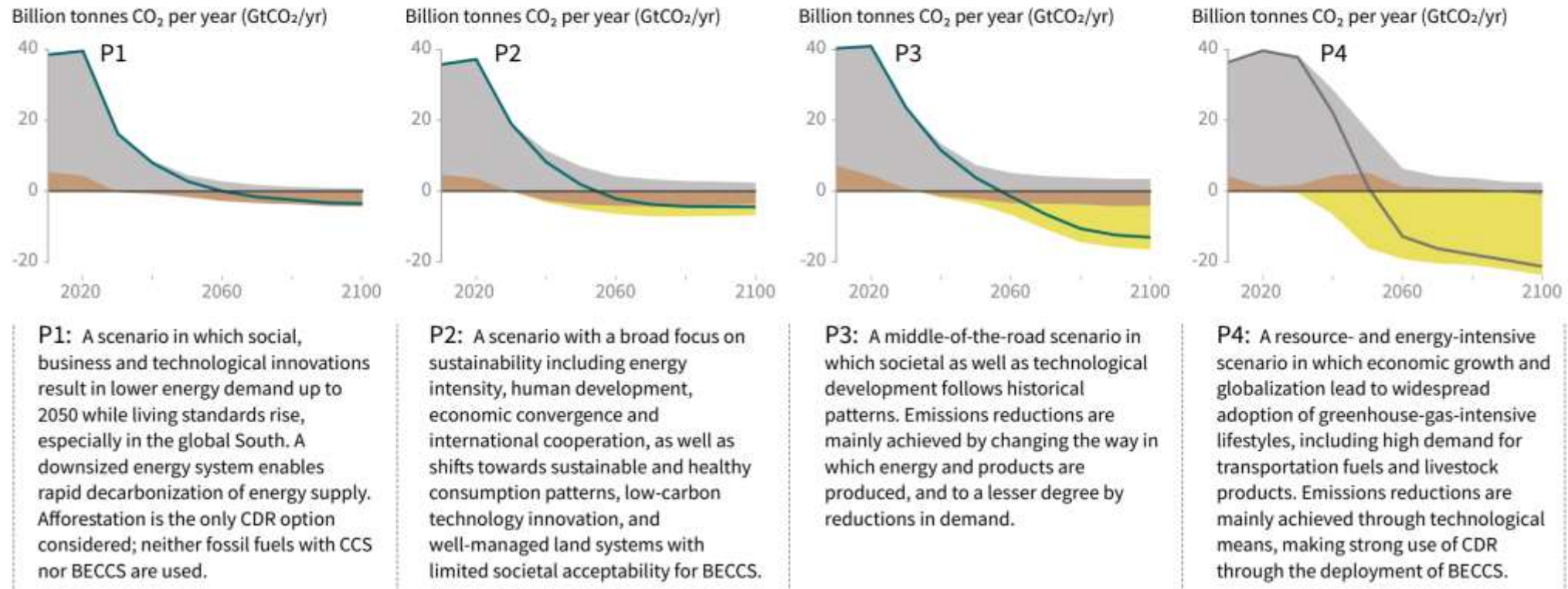
## 2) How intensively should Switzerland commit itself to climate protection?

- In other words: what is the target for GHG emissions?
- Actually, two questions:
  - (a) What is the overall reduction (because Switzerland does not decide on climate alone)
    - +1.5° → globally net-zero by 2050
  - (b) What is the share of this reduction that Switzerland must contribute?
    - A rich country that imports all its fossil energy → net-zero well before 2050

# 3) Which path to reach the objective?

## Breakdown of contributions to global net CO<sub>2</sub> emissions in four illustrative model pathways

● Fossil fuel and industry ● AFOLU ● BECCS



IPCC Special Report: Global Warming of 1.5 °C, Fig. SPM.3b

- The longer we wait, the faster we have to reduce later and the more we need negative emissions...
- There are arguments in favour of waiting (more information, better solutions), but there is also a great risk of procrastination.



# 4) How to engage Switzerland on this path?

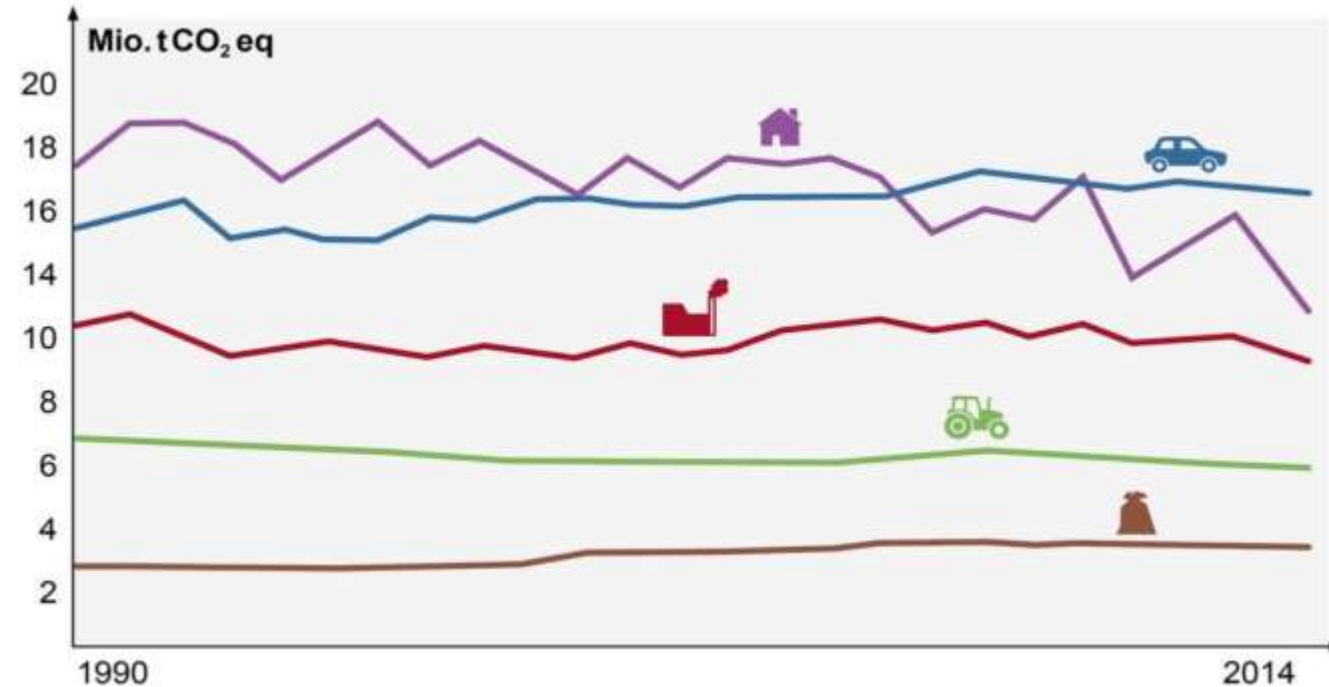
Before going into the individual practical measures, we need to discuss questions of principle. For example:

- What if the majority of the population does not want to make this effort for future generations? This is the challenge of the concept of climate crisis: the authorities could mobilize efforts as during a security crisis. But what if the authorities do not want to do this?
- Green economic growth (technology is the key) or degrowth (emphasis on sufficiency, prosperity without growth)?
- Maintain the current socio-economic system or aim for its transformation?
- Limit Switzerland's efforts to Switzerland or collaborate with the rest of the world?
- Focus on soft measures or hard measures?



# 5) Which sectoral targets?

- In other words: who should do what?
- Example of sectoral targets:
  - quickly decarbonize building heating
  - electrify mobility
  - divest from fossil fuels
- Sectoral targets require agreeing on the distribution of efforts, considering feasibility and fairness



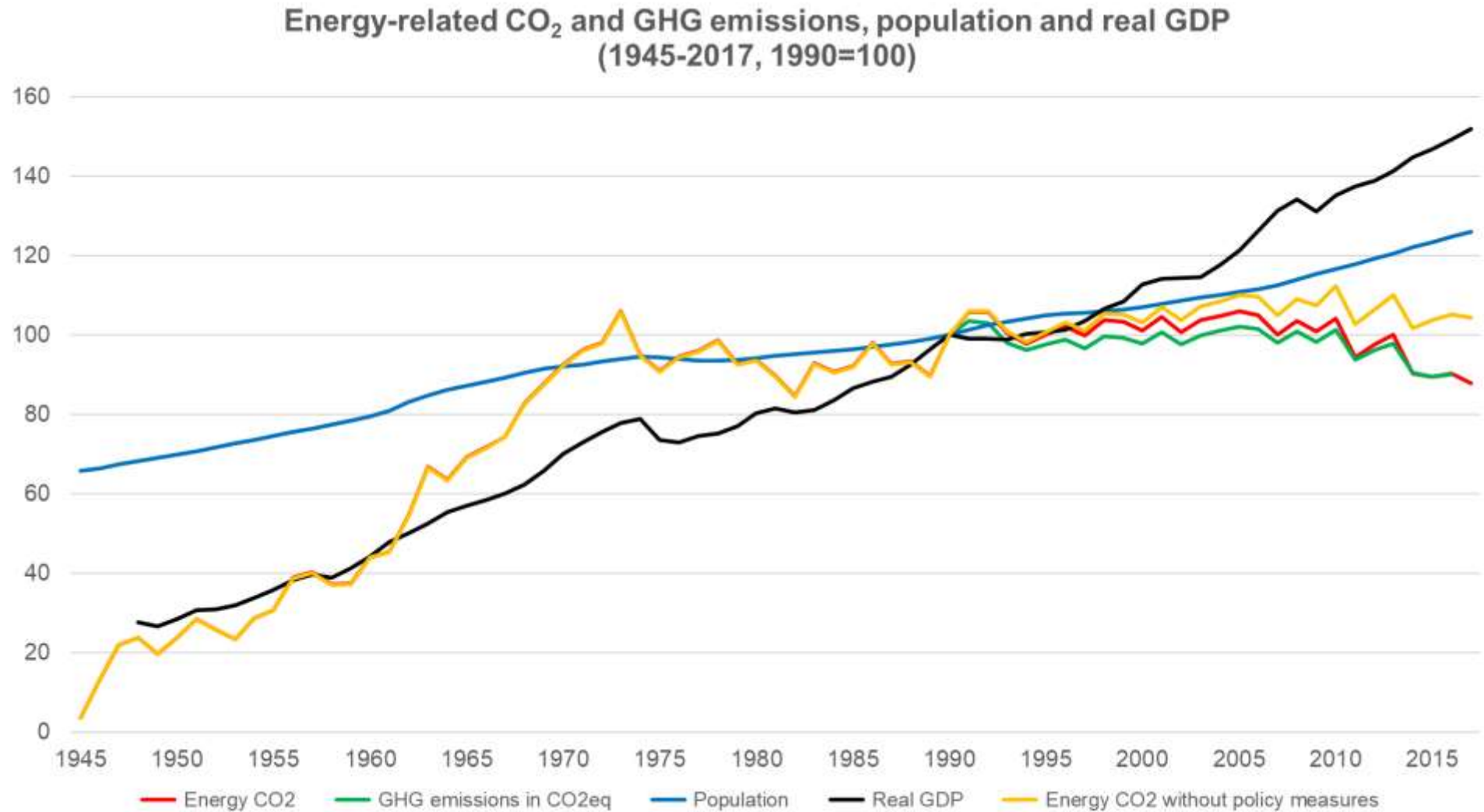
## 6) What concrete measures?

- Soft measures: information, communication, education, nudges, subsidies, conditions for public procurement, ESG criteria, innovation, increase efficiency and reduce waste
- Hard measures: taxes, cap and trade, bans, requirements
- Another way of life: happiness through sufficiency



# WHAT WAS ACHIEVED IN SWITZERLAND?

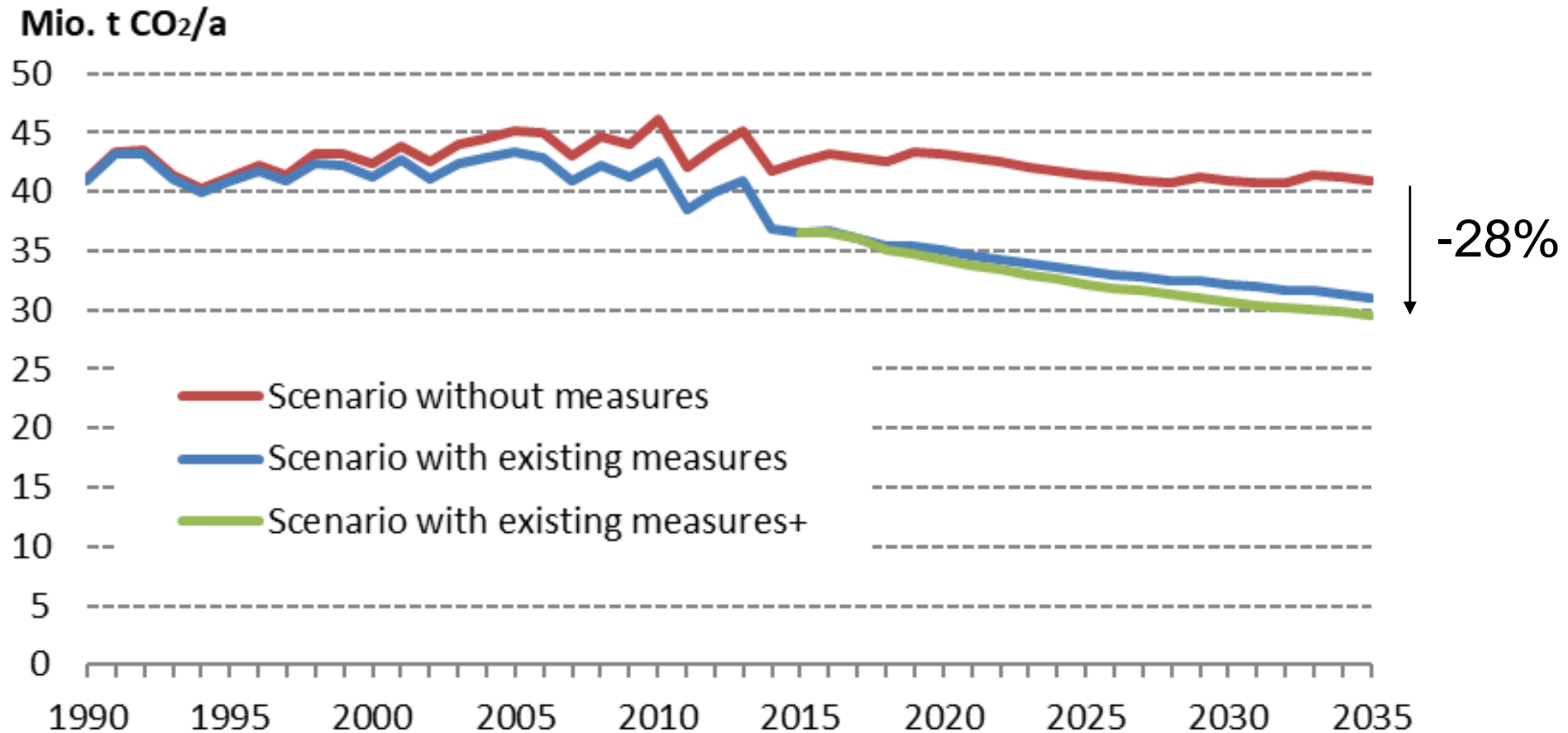
# Switzerland barely stabilized its CO<sub>2</sub> emissions (which is quite good)



From Fed. off. env. and Fed. off. of statistics  
data + Vielle and Thalmann (2017)

# How much is attributable to policy?

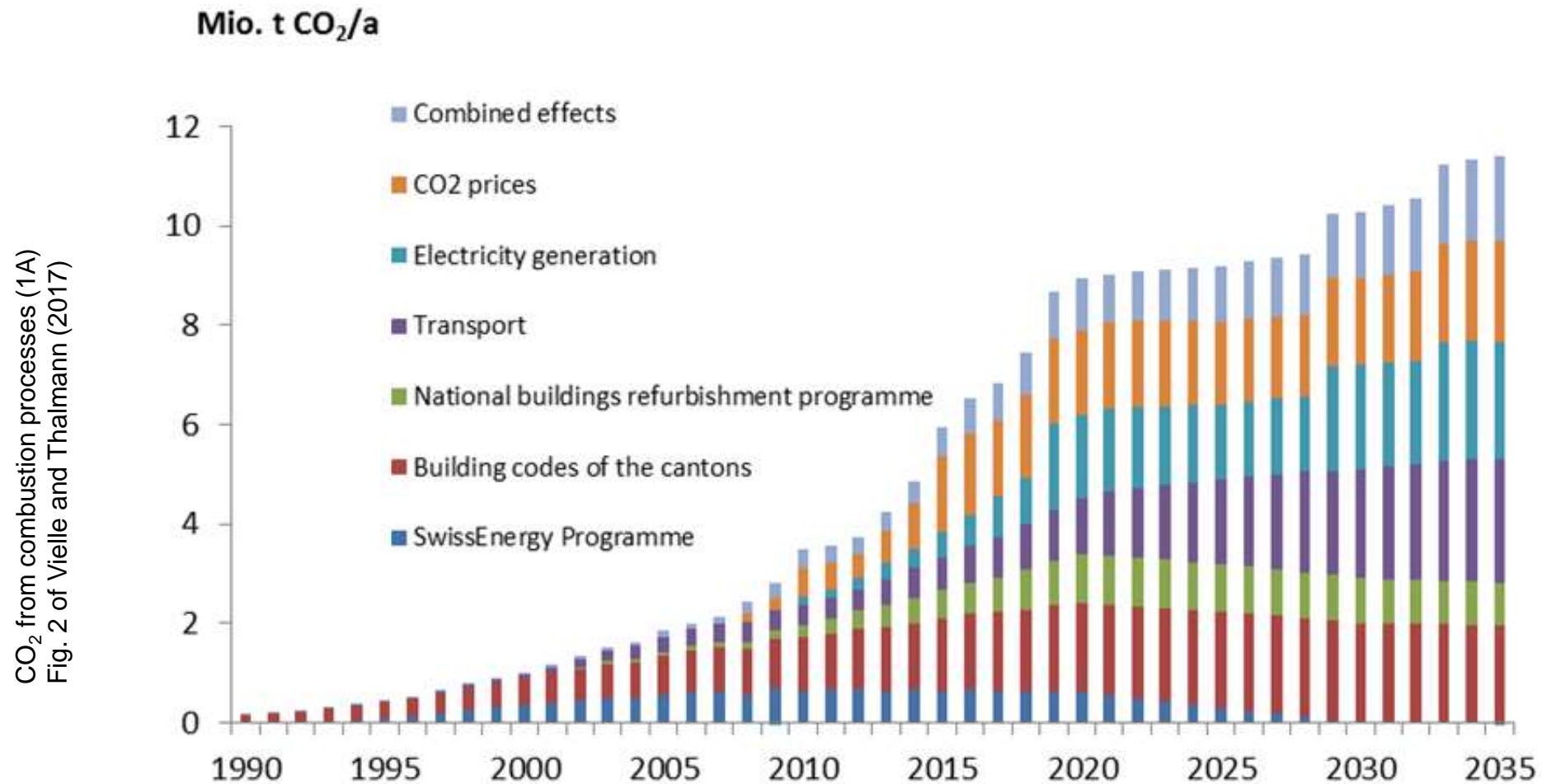
Energy-related CO<sub>2</sub> emissions in a scenario without measures and two scenarios with existing and announced measures (1990-2035)



CO<sub>2</sub> from combustion processes (1A)  
Fig. 1 of Vielle and Thalmann (2017)

# Effectivity of different components of "climate policy"

Total reduction of CO<sub>2</sub> emission in scenario with decided measures compared to scenario without measures, by group of measures (1990-2035)





# CONCLUSIONS



Climate strike Lausanne  
Sébastien Anex 15-03-2019

# Conclusions

- Every country must get free of fossil fuels and reduce as much as possible its emissions of other greenhouse gases
- The longer it waits, the steeper the path
- High-income, high-tech countries should pave the way
- Pushing firms and households to decarbonize through price signals will call for high taxes ... hardly acceptable, hardly doable (even if actual welfare cost is small)
- A 'New Climate Deal' is needed
- Example: decarbonisation of Swiss railway transportation between 1918 and 1950!

# Thank you for your attention



Une troisième place en Sports pour ce ski sur gazon photographié par Karin Hofer.  
(SWISS PRESS PHOTO/  
KARIN HOFER)

Le Temps 04.03.2017