

Social justice and economic impacts of the energy transition

“Fireside” event with EPFL Master students in Energy Science and
Technology 7th march 2024

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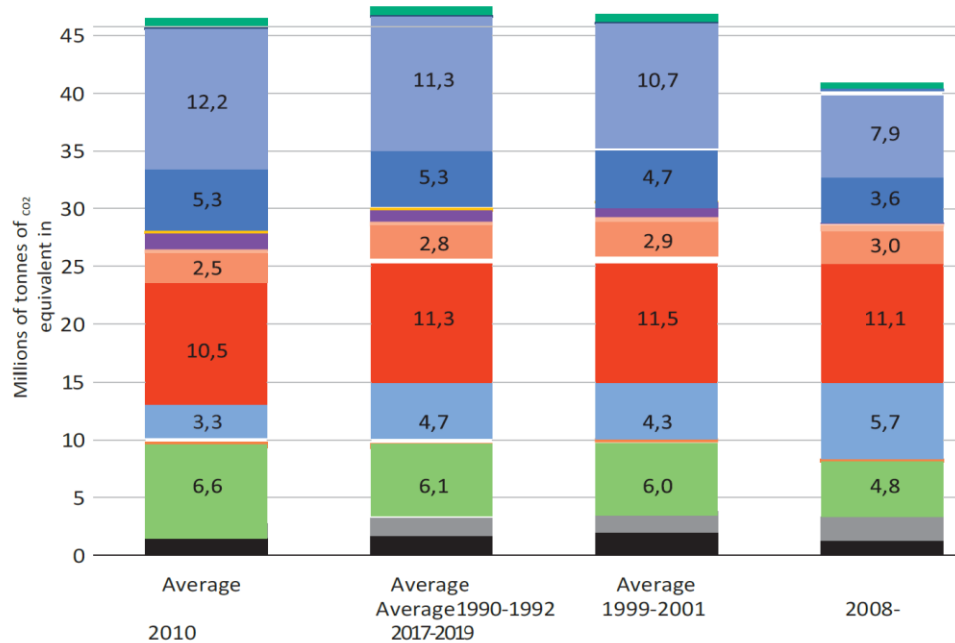
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The greenhouse gas emissions in Switzerland

Figure 9. Trends in greenhouse gas emissions from Switzerland over three decades, by sector

Fossil fuel emissions (79% of GHG)

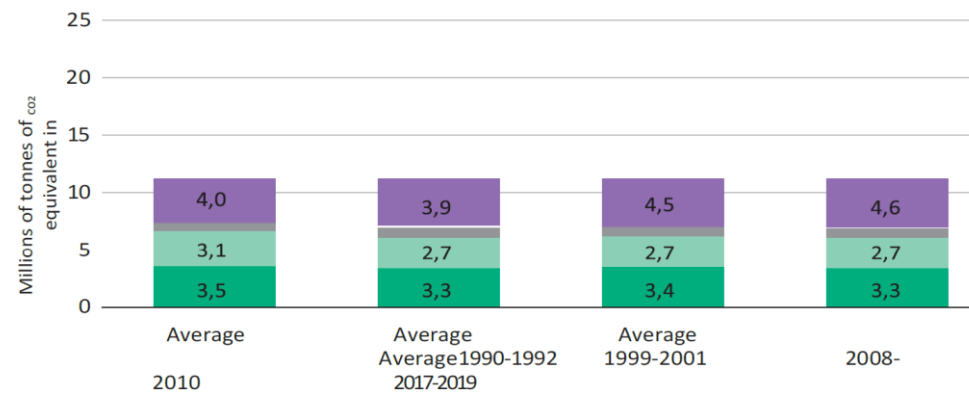
(including combustion of plastics with energy use) 50



- Agriculture and forestry (fossil fuels)
- Army
- Private households (mainly heating and hot water)
- Crafts and services (mainly heating and hot water)
- National and international shipping
- Trains
- Tourism at the pump and statistical difference
- Bus
- Delivery vehicles and lorries
- Cars and motorbikes
- National and international aviation
- Oil and gas evaporation
- Fossil energy in industry including pipelines
- Household waste incineration plants
- Energy transformation (e.g. fossil fuel electricity production and refineries)

GHG emissions CH & World: it is the Energy!
(Special in CH: almost zero carbon Power generation)

Non-fossil fuel emissions (21% of GHGs)



- Agricultural livestock (mainly cattle)
- Soil and fertilisers
- Waste and landfill (without MWIPs, with fires)
- Industrial products and processes (including cement, but excluding energy)

The transformation path

By Hypothesis: Following the transformation path presented in my recent book *“Urgence Energie et climat – Investir pour une transition rapide et juste”* (all graphs for there).

The path to “Zero” Greenhouse gas GHG:

- 2/3 technical improvements
- 1/3 Change of behaviour and consumption in the fields where technical solutions at large scale are lacking (→ less flying, less concrete, less meat)

Technical improvements:

- Needs retrofitting equipment and infrastructures + changing technology.
- Needs financing investments and secure long-run use of the new technology

→ 2 questions:

- How can the state trigger the investments (in addition to the economy's natural tendency to innovate)
- Who carries the initial cost?

Possible policy instrument

1) bans and technical requirement /standards

2) Information / education / campaigning /nudges

3) Pricing negative externalities

- Correction of the relative prices and/or market failures, according to the causality principle “the polluter pays”.
- Also in order to incentive use of clean technologies and discourage the use of dirty technologies.
- Also to switch consume form damageable consume to less damageable

4) Subsidises to invest in clean technologies or to use them (included production of clean electricity).

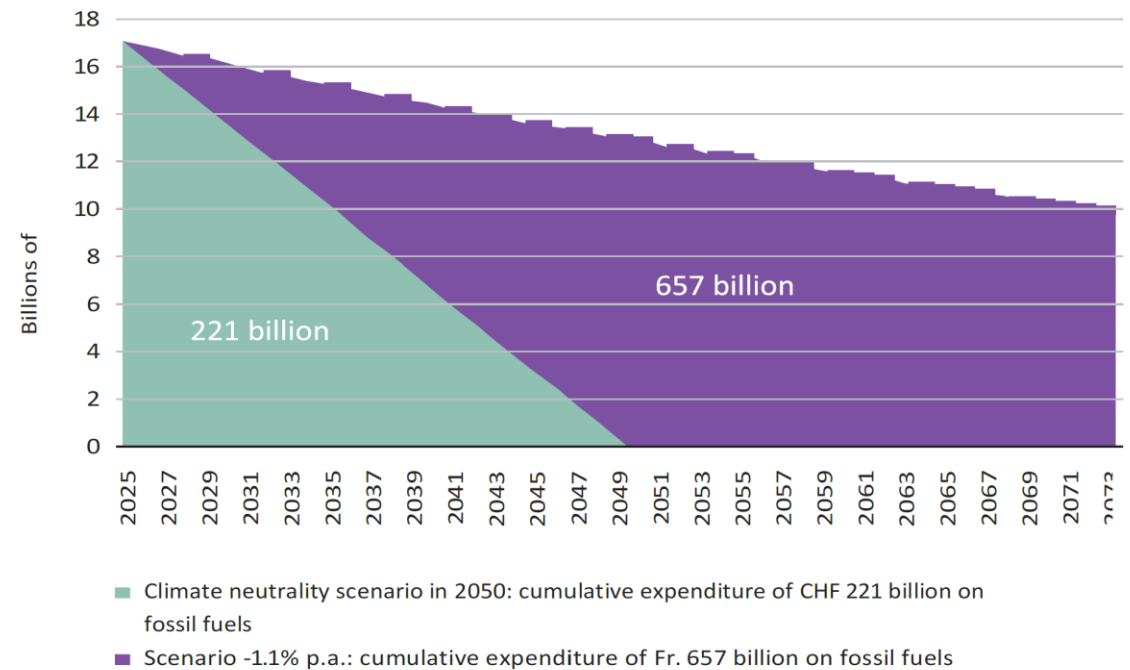
→ Before we can discuss who should bear the cost of investment, have a look on the overall need for investment.

The investment costs

| Billions CHF (constant value) | Cumulative Investment cost for "net zero" over 25 Years |
|--|---|
| Buildings | 167 |
| Land mobility | 15 |
| Electricity generation, transmission and temporary storage | 158 |
| Syngas or other forms of long-term storage | 47 |
| Waste, agriculture, negative emissions | 25 |
| Formation | 13 |
| Miscellaneous /Reserve | 5 |
| Total | 430 |
| | =17 / year = 2,2 GDP |

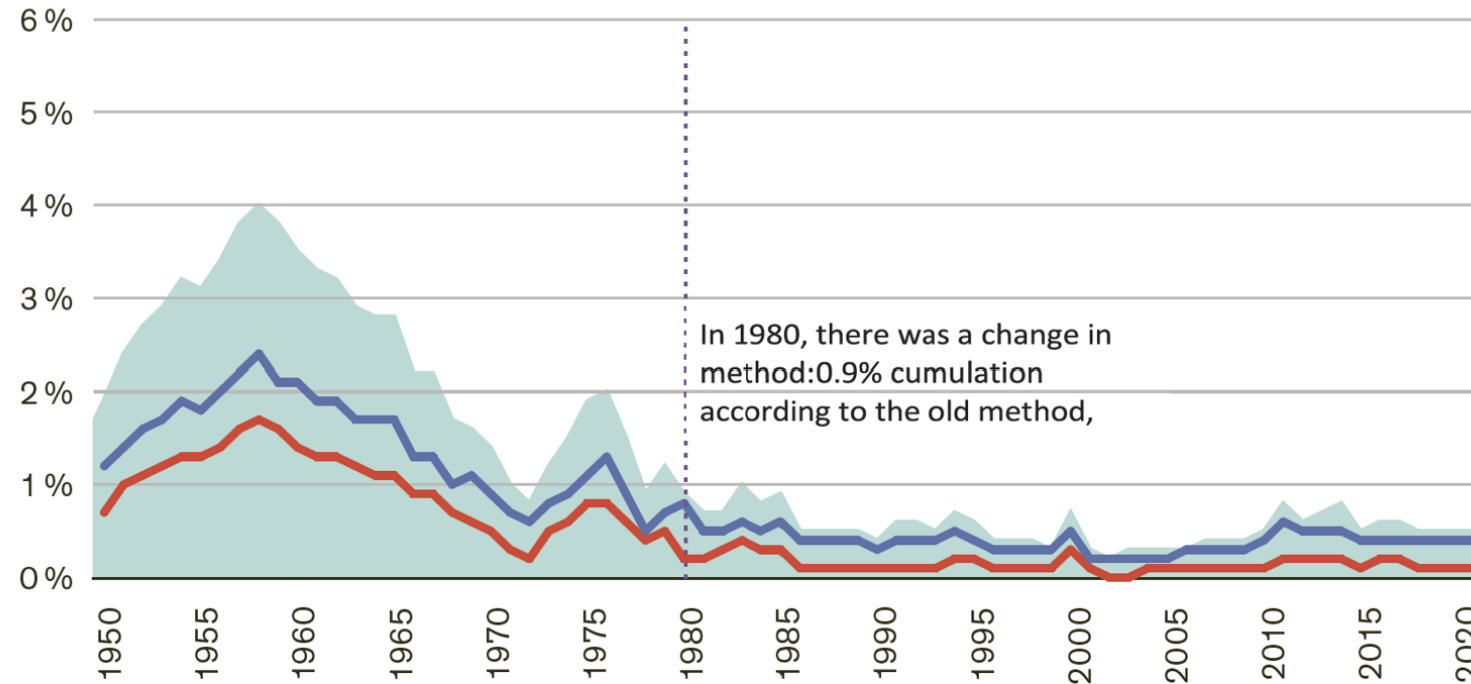
Seems huge amount, but not-investing is clearly more expensive.

Figure 36. Schematic representation of end-user spending on fossil fuels (constant 2021 francs)



Investment track-back for electricity

Figure 15. Investment trends in the electricity sector, as a % of GDP

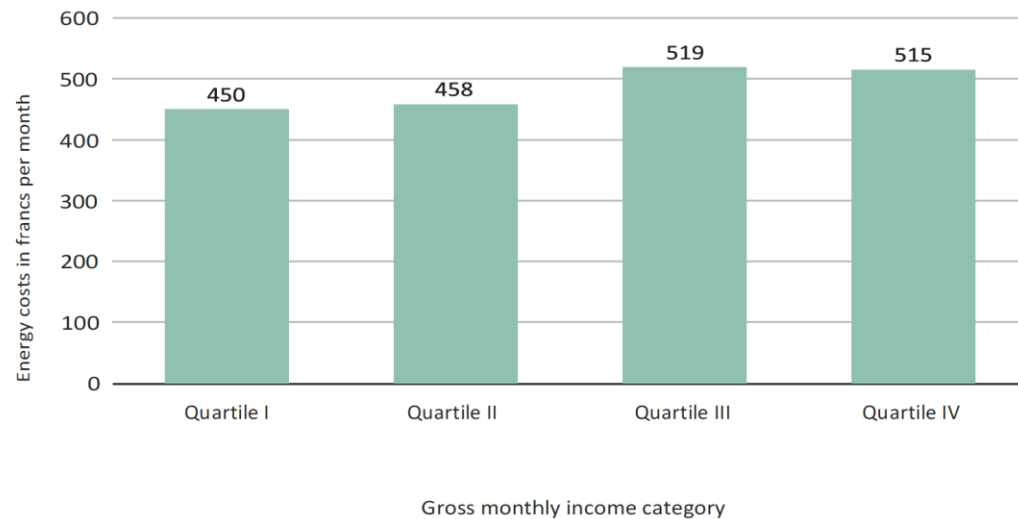


Net zero: it is feasible, as our historical experience shows

- Investment in electricity generation as a % of GDP
- Investment in transport and distribution networks as a % of GDP
- Cumulative

The burden of the energy bill

Figure 18. Monthly direct energy expenditure for a household of 2 adults and 2 children, according to income category



Quartile I: less than frs 8582
Quartile II: from frs 8562 to 10
963

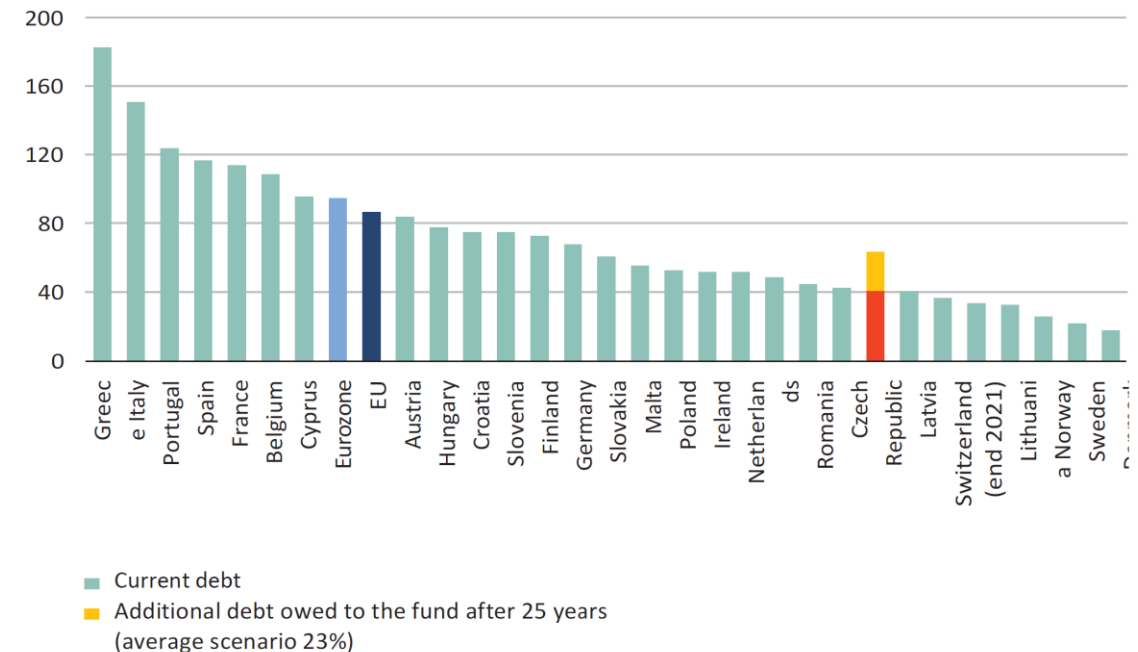
Quartile III: frs 10,964 to 14,383
Quartile IV: frs 14,385 and over

- Energy is an essential commodity, whose consumption doesn't increase much with increasing income.
- Investment frequently proportional to current energy consumption.
- If the investment are paid proportionally to current energy bill of household, it will be hard (or very hard) for low and middle incomes.

Public climate fund

- We propose a public co-financing of by a public fund (about 1% of GDP, average co-financing almost half of the Investment)
- Popular constitutional initiative, backed by over 100'000
- Emitting public debt, which is absolutely appropriate to finance investment.
- Interest will be paid by future economically well situated tax payer in the next decades.
- And the society will enjoy strongly improved infrastructures, with enhances efficiency (like for instance new alpine train tunnels decided 25 year ago),

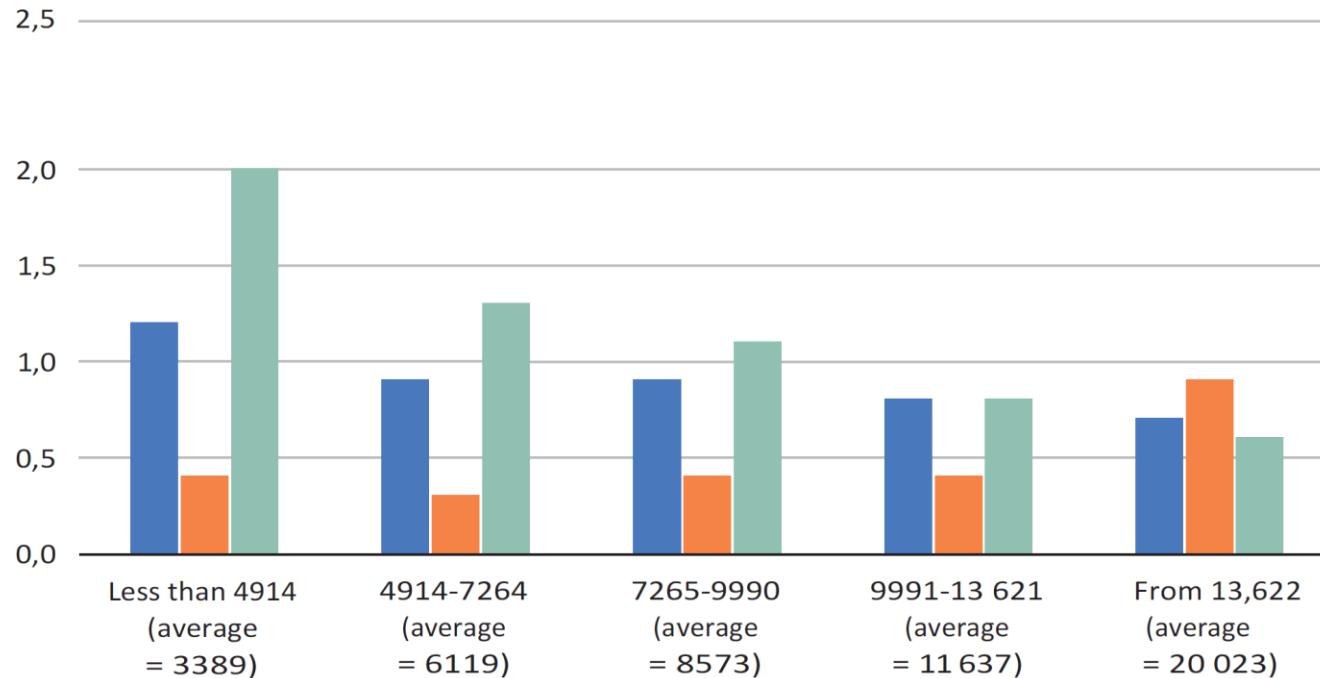
Figure 39. Switzerland's indebtedness in international comparison and impact of the Fund (medium scenario)



The rejected hypothesis of additional tax

Figure 37. Comparison of the impact on households of financing the Fund using three variants tax (as a % of pre-tax household income)

In order to fill the fund with 1% of GDP

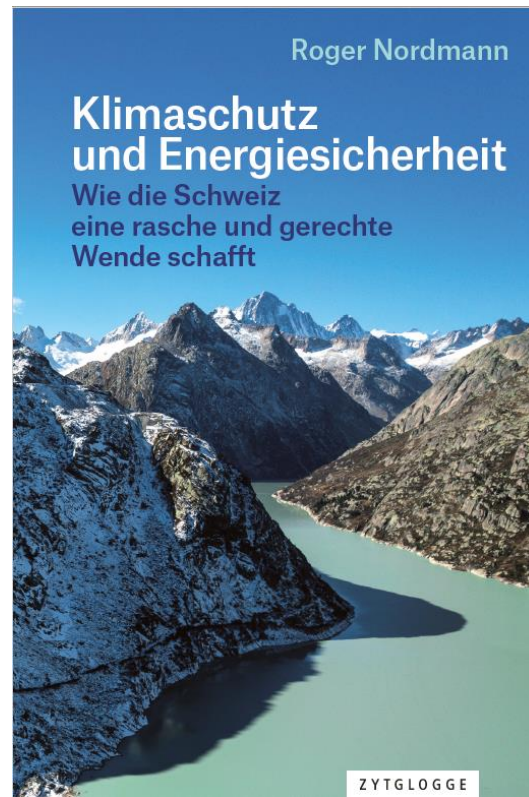
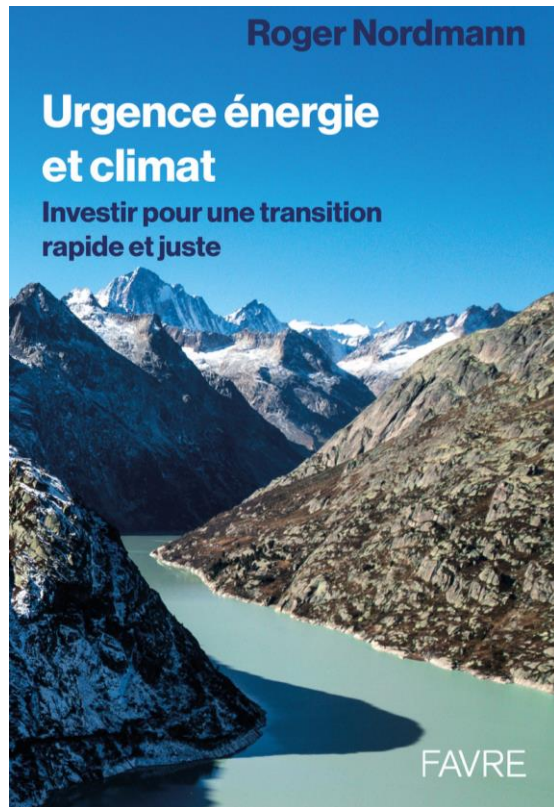


- If the entire project is financed by a 29% increase in VAT
- If the whole is financed by a 39% increase in the IFD
- If the entire system is financed by a 27% tax on final energy prices

Conclusion

- Not investing is more expensive.
- Escaping negative effects of climate change and adaptation strategy are easier and affordable for the rich.
- While the poor are trapped in climate change.
- Possibility of double vicious circle:
 - Lack of solidarity block sufficient Investment
 - Poor can not afford investment and get poorer and poorer due to worsening climate change.

Inside every country and between the countries: Solidarity and justice are necessary to prevent this vicious circle!



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