

THE DISTRIBUTION OF INCOME IN THE SWISS HYDRO POWER SECTOR AND OPTIONS FOR REFORM



Building Competence. Crossing Borders.



Betz, Regina; Cludius, Johanna; Geissmann, Thomas

betz@zhaw.ch, 6.9.2017 IAE Vienna, <https://www.zhaw.ch/de/sml/institute-zentren/cee/>

Overview

- Motivation
- Background
- Reserach Questions
- Ownership
- Water fees compared to dividend development
- Total income at cantonal level from hydro power
- Water fee reform proposal
- Conclusion and outlook

Motivation

Hydro power is most important electricity source of Switzerland (around 60% of production).

Situation until 2009: Hydro power plants made large profits due to high electricity prices and low variable costs as well as large differences between peak midday and low consumption during night.

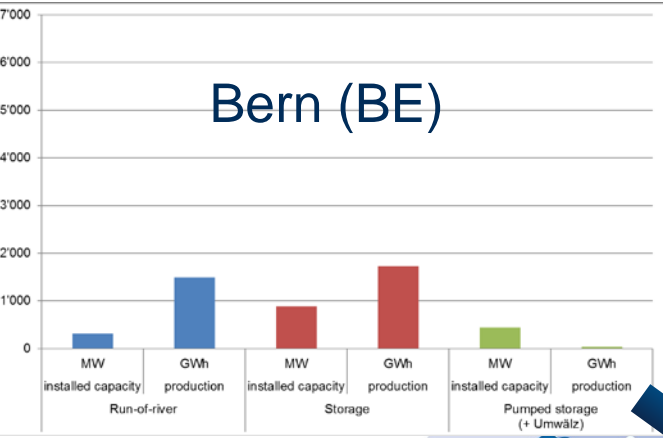
The profits were mainly made by those cantons who owned the large utilities (valley)

Situation Today: Lower returns (problems in covering fixed costs) due to low fossil fuel prices, low CO2 allowance prices and larger shares of renewables (lowering spread).

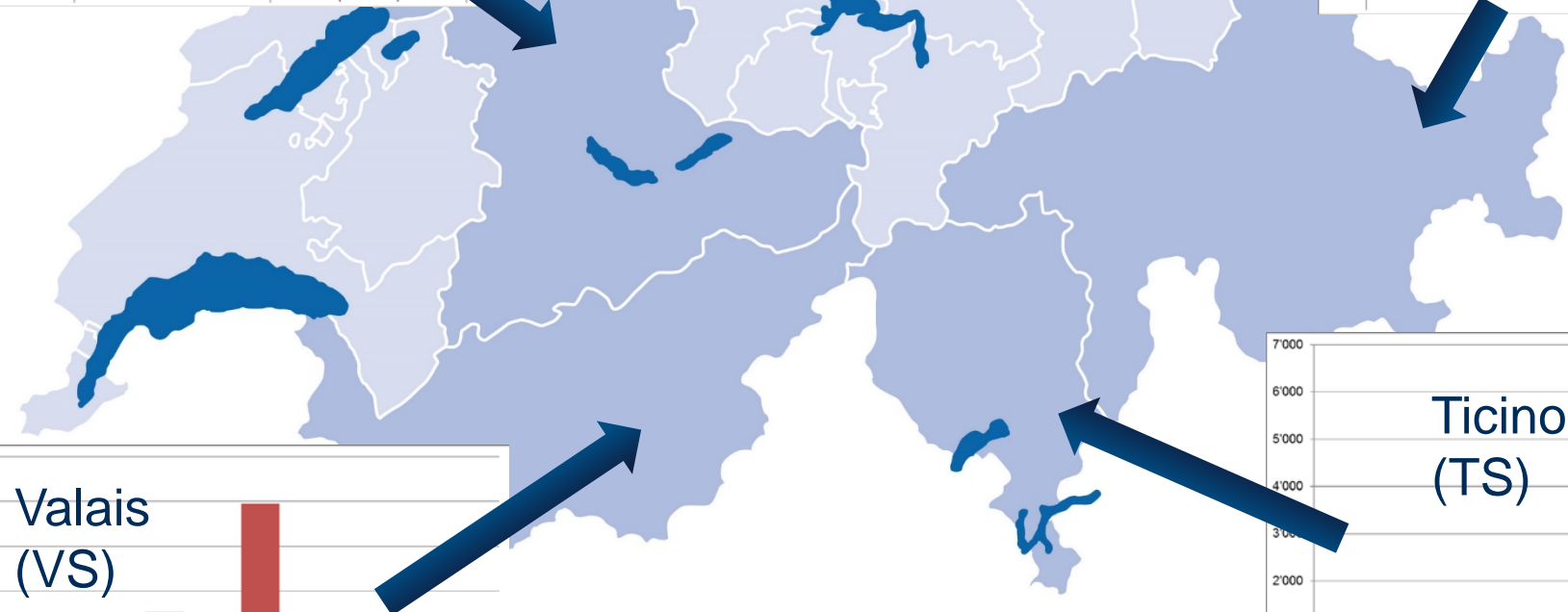
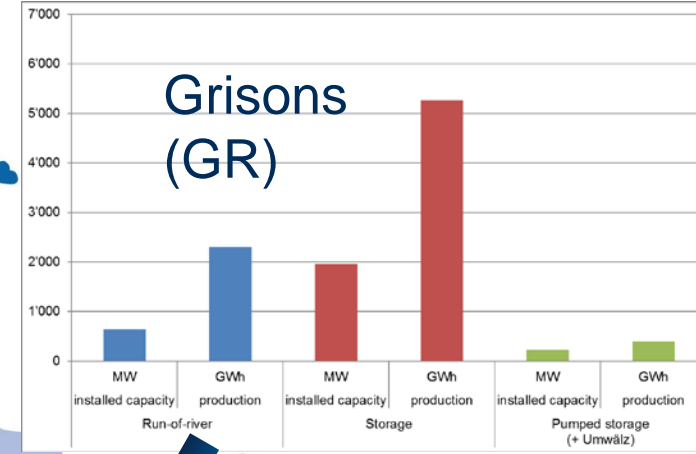
Reform: Water fees are under reconsideration since the Swiss Water law will be revised. Consultations are ongoing and interim solutions and long-term options are suggested. Sensitive topic due to distributional consequences.

Swiss hydro power electricity in 2016 (selected cantons)

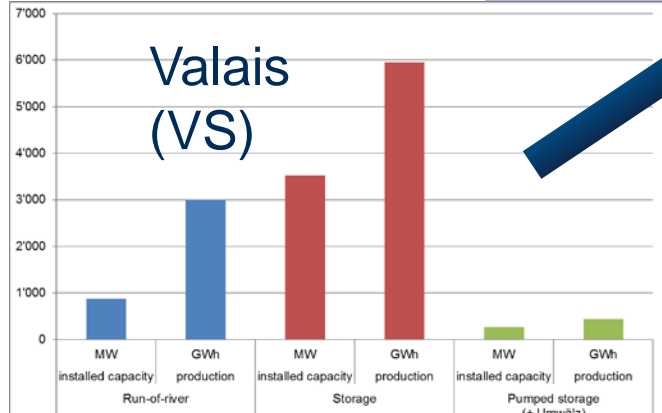
Bern (BE)



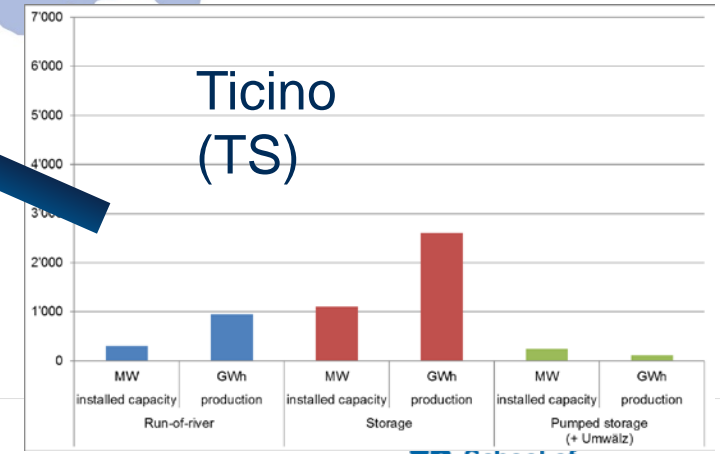
Grisons (GR)



Valais (VS)

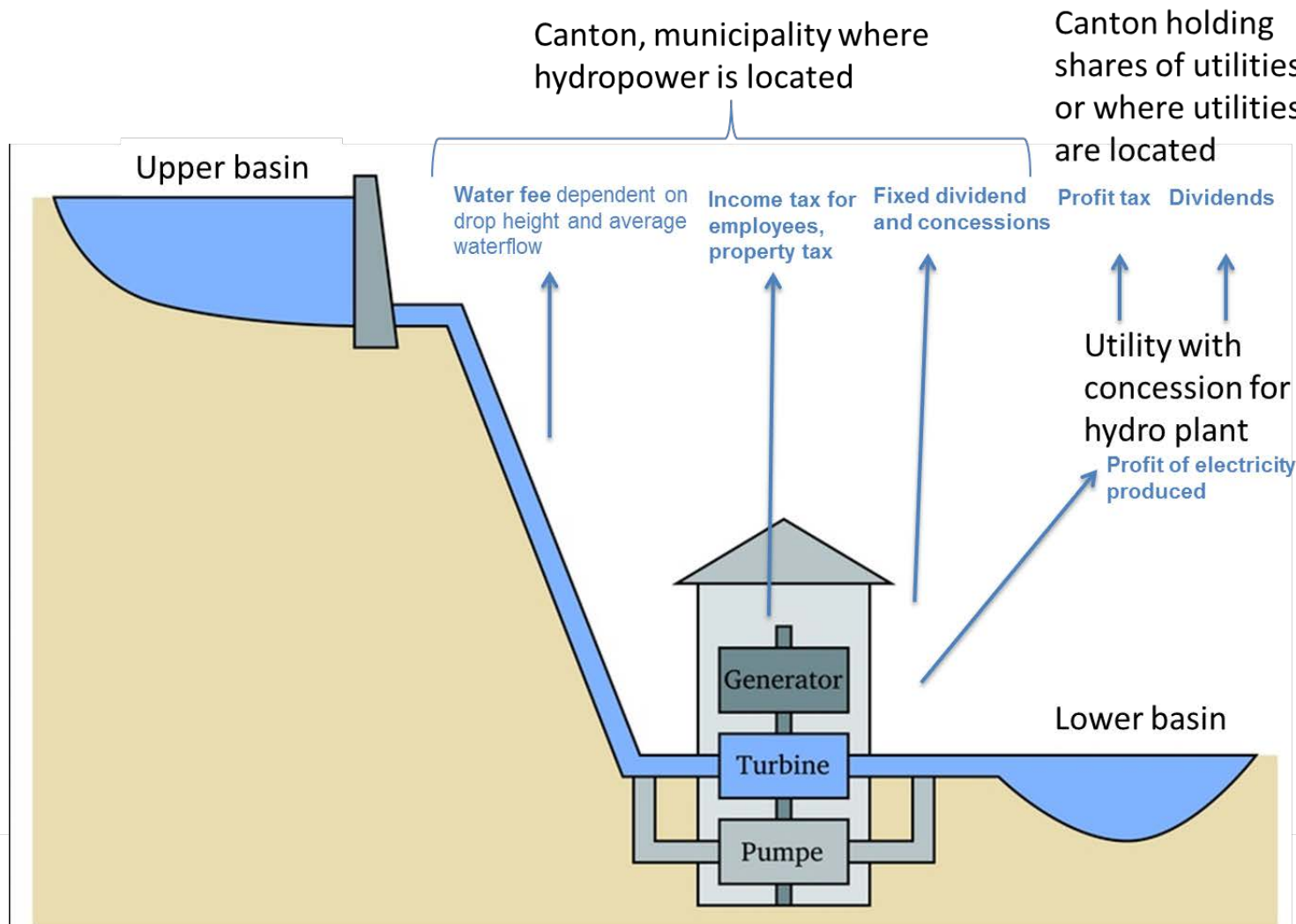


Ticino (TS)



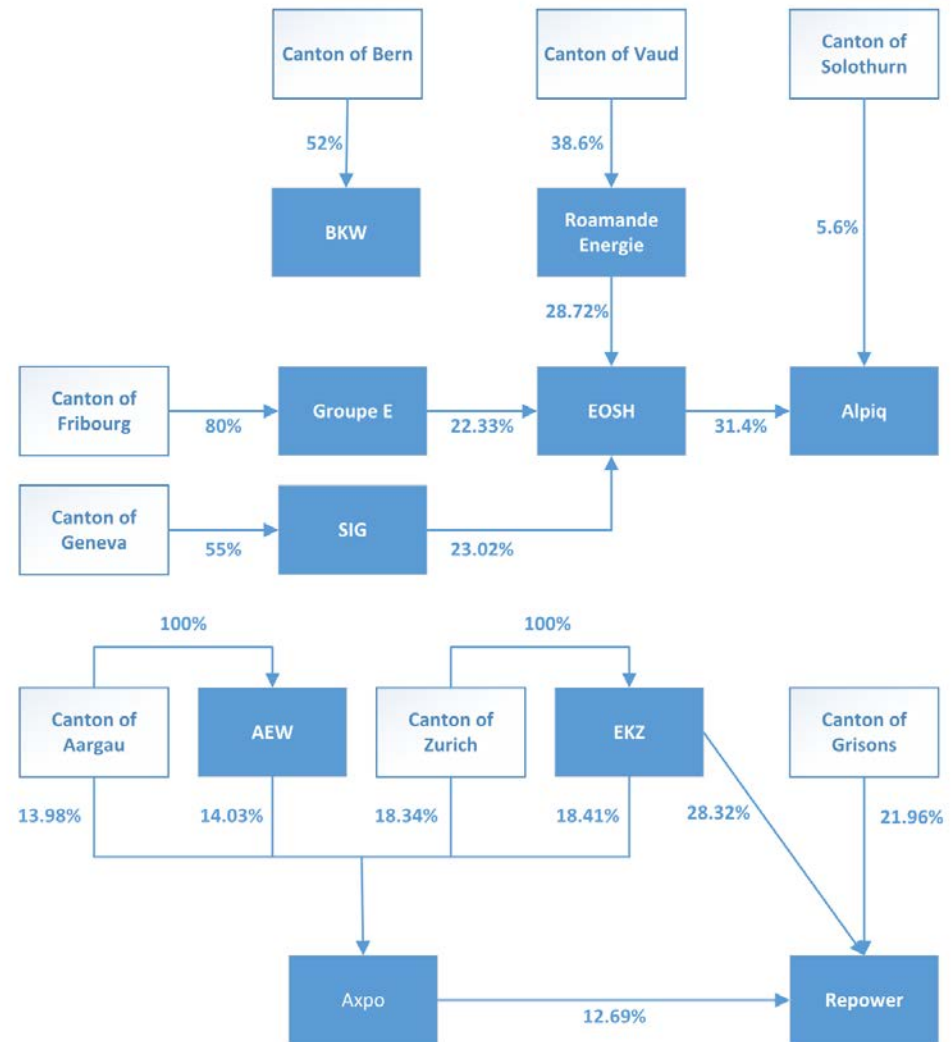
Research Questions

- What **money flows** exist between **hydro power stations and cantons**?
- How did they change over time?
- What are the **distributional effects** of a water fee reform?



Ownership is rather complicated....

- Some hydro power plants are directly owned by cantons or municipalities
- Some hydro power plants are temporarily owned (based on concessions) by utilities
- Some shares of utilities are owned by cantons (see graph). Those are usually not the mountain cantons but rather the lowland cantons.



Source: updated based on Fuchs et al. 2016

Swiss hydro power ownership in 2016 (selected cantons)

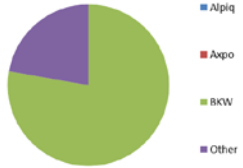
Bern (BE)

Grisons (GR)

Valais (VS)

Ticino (TS)

Run-of-river



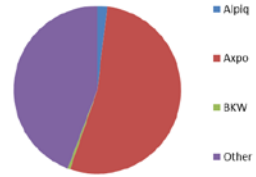
Storage



Pumped storage



Run-of-river



Storage



Pumped storage



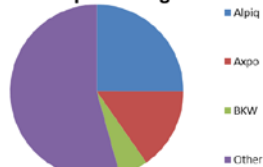
Run-of-river



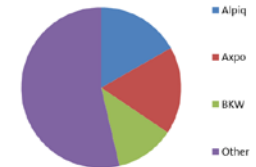
Storage



Pumped storage



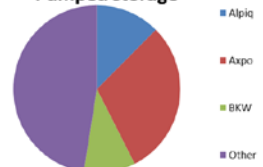
Run-of-river



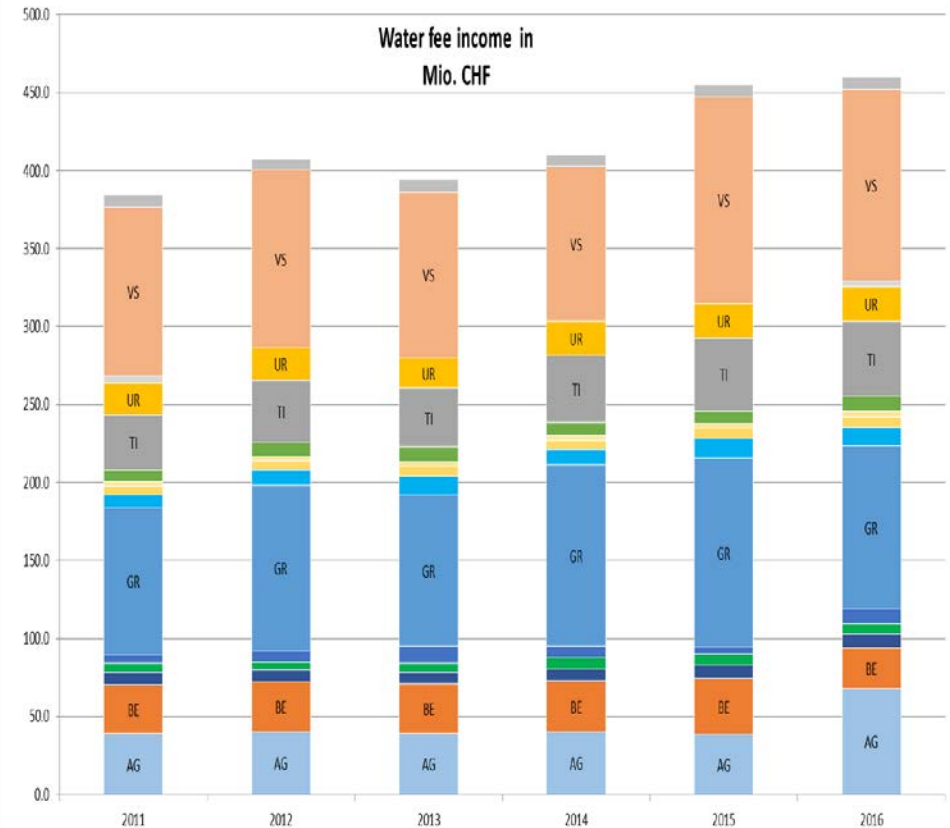
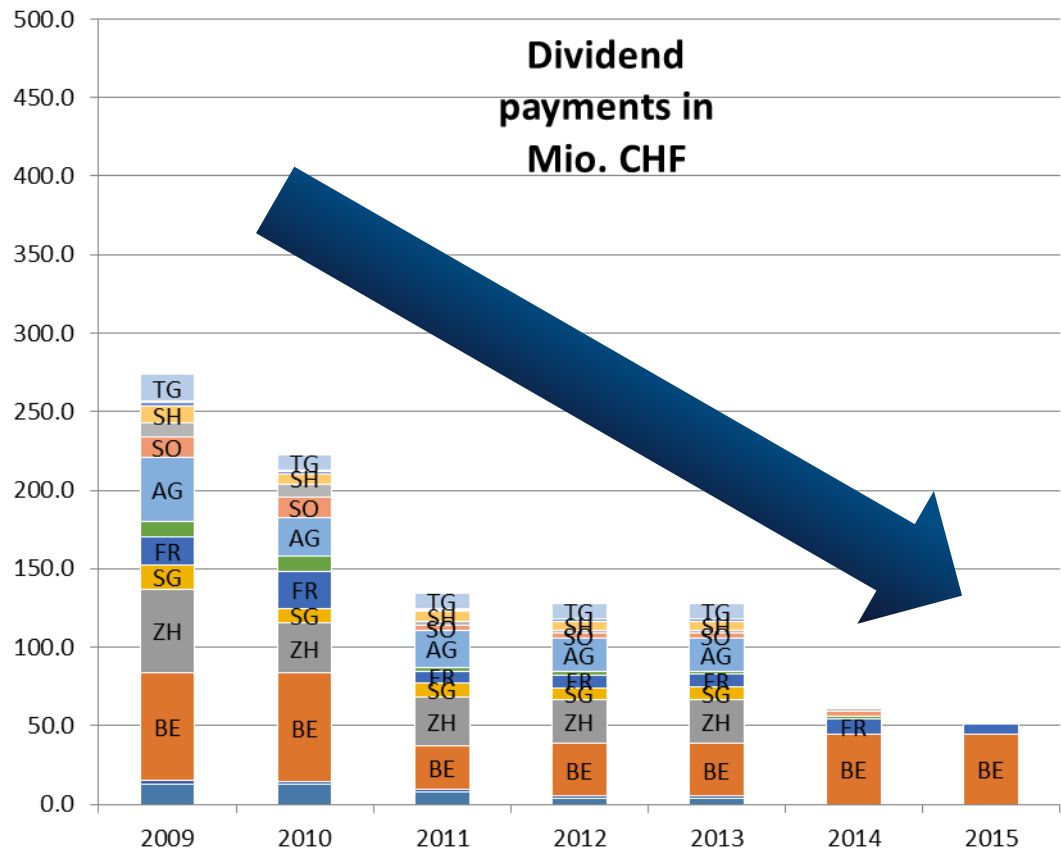
Storage



Pumped storage



Development of dividends and water fees

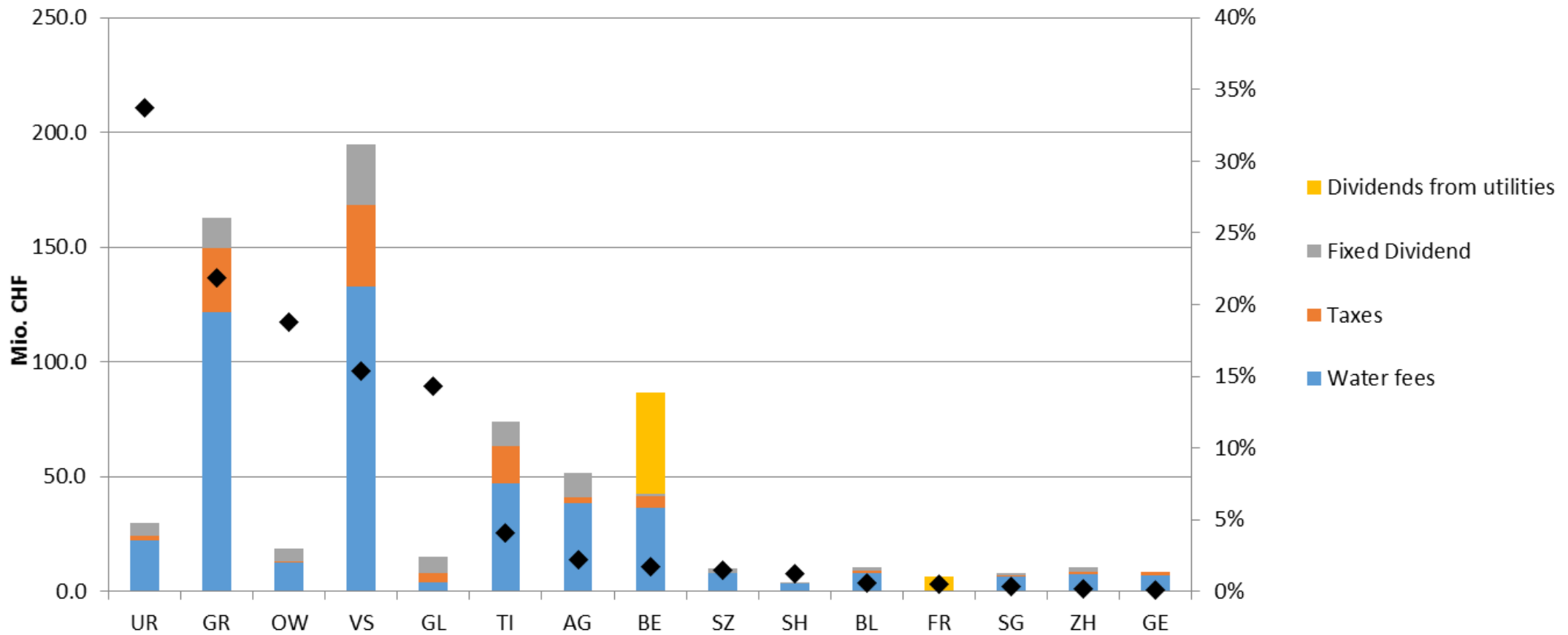


- Dividends sharply decrease since 2009
- Bern still highest income from dividends (owns distribution network and has households paying costs), followed by Fribourg
- Zurich and Aargau lost all income since 2014

- Valais & Grison highest water fees income
- Ticino and Bern some income from water fees
- Aargau increasing income since 2016

Source: Own data from annual business reports

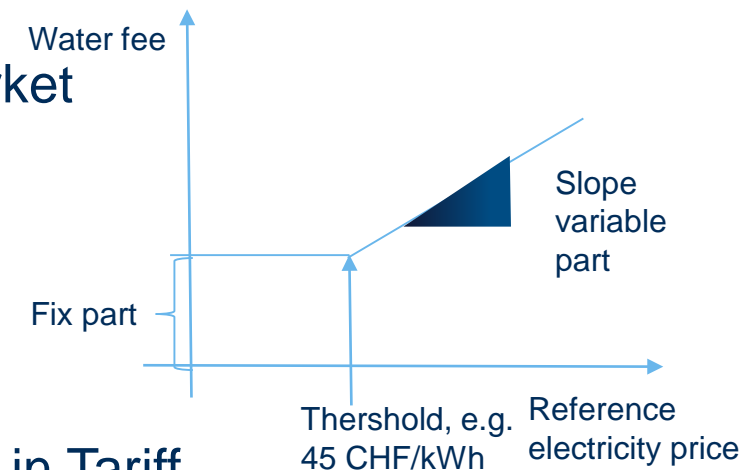
Total income at cantonal level from hydro power (2015)



Water fee reform proposals

Water fee reform proposal (in consultation)

- 2019: max. of 110 CHF/kWbr: total of 550 Million, 1.55 Rp/kWh, around 19% of production costs
- 2020-2022: max. 80 CHF/kWbr (-27%) (only for those which can not cover costs?)
- 2023 - : fix part of 50 CHF/kWbr and flexible part dependent on reference electricity price
- 2023 - : New Market design for Swiss electricity market



Other support mechanism for hydro power in Switzerland:

- 2022: New Small Hydro power plant receive Feed in Tariff
- 2018-2023: 120 Mio. CHF for large hydro power plants which can not cover costs
+ investment support and no water fee payment for new or substantial renovations

Conclusion and outlook

- Water fees have increased over time and mountain cantons receive a fixed income, which can be a substantial share of their overall budget.
- The income from dividends of larger utilities for lowland cantons (e.g. Zurich, Aargau) decreased substantially due to lower electricity prices and price spreads. At the same time the fixed nature of the water fee makes life hard for utilities which are dependent on electricity market.
- Cantons holding shares of utilities supplying households and small customers do not suffer as much as they receive a cost related electricity tariff (e.g. Canton Bern).
- In the short term Swiss government has introduced several support mechanisms for hydro power in order to ensure operation and investments.
- Long term discussion on a reform of the water fee is ongoing and market design reform.

Future work: Simulate the effects (for cantons and some municipalities) of different interventions for the future

- Change in water fee structure (part fixed and part related to reference electricity price)



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**THANK YOU FOR YOUR ATTENTION
QUESTIONS?**

