



Zervreila dam in Vals GR (Source: Alessandro della Bella / Keystone)



(source: Die Volkswirtschaft, Keystone)

# Royalties and Fiscal Equalization - The Case of Swiss Hydropower

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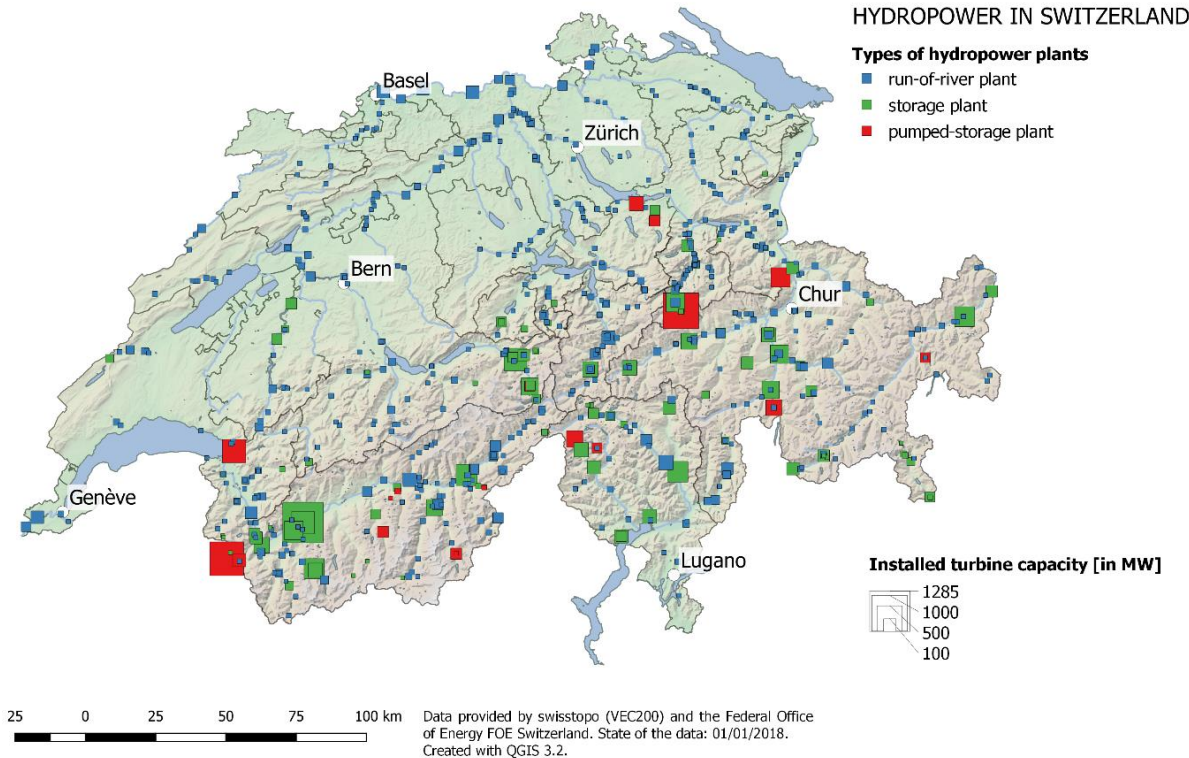
**IAEE Ljubljana 2019**

## Introduction / Background

- ✓ The distribution of resource rents has been an issue of **political economy** for many centuries and in different resource industries.
  - ✓ It is an issue of property rights and corporate governance/responsibility.
  - ✓ It is a global issue with regional dimension.
  - ✓ It is a distributional concern in many parts of the world ...
- Ricardo, D. (1817) On The Principles of Political Economy and Taxation.
  - Rothman, M. (2000) Measuring and Appropriating Rents from Hydroelectric Power Developments. The World Bank, Washington, D.C., USA.
  - Lund, D. (2010) Rent Taxation for Nonrenewable Resources. *Annu. Rev. Resour. Econ.* 1, 287–308.
  - Garnaut, R. (2010) Principles and Practice of Resource Rent Taxation. *Austral. Econ. Rev.* 43, 347–356.
  - Hediger, W. (2018) The Corporate Social Responsibility of Hydropower Companies in Alpine Regions—Theory and Policy Recommendations. *Sustainability* 10(10), 3594.
  - Hediger (2019) Corporate Social Responsibility and Governance of Hydropower – New Challenges in Energy Economics and Policy. *IAEE Energy Forum / Second Quarter 2019*, 23-25.

# Hydropower in Switzerland

An issue of political economy



Location of Swiss HP plants

## Switzerland:

- The «water tower of Europe»
- Hydropower (HP):
  - Main pillar of Swiss energy system & the Energy Strategy 2050
  - ca. 60% of domestic electricity production
  - Historically: a driver of economic development
- Federalist country (principle of subsidiarity):
  - 26 cantons & 2212 municipalities (1.1.2019)
  - Fiscal equalization to mitigate disparities
- The cantons hold the **property rights** in the water resources (in some cantons → municipalities etc.)
  - They receive royalties (water fees) from HP companies
- Lowland cantons are the **main shareholders** in HP companies

## Motivation → Research Design



### Energy policy reform of federal level:

- ✓ Energy Strategy 2050 proposed the Federal Council (2011)
- ✓ reformed Energy Act (approved in a public referendum, May 2017)
- reformed Water Rights Act (under review)
  - Proposals for new water fee system under review, including:
    - Flexible fees adjusted to market prices
    - Integration in fiscal equalization
    - Inclusion in electricity prices

### Analysis of

- a) Ownership in Swiss HP
  - «attributed» water fee payments
- b) Distributional effects of water fees and mitigation of resulting disparities through fiscal equalization

### Some facts:

Current water fee maximum:

110 CHF/kW (~ 14.5 CHF/MWh)

Market price:

~ 45 CHF/MWh (2014/15)

~ 75 – 115 CHF/MWh (2007/08)

### Research questions:

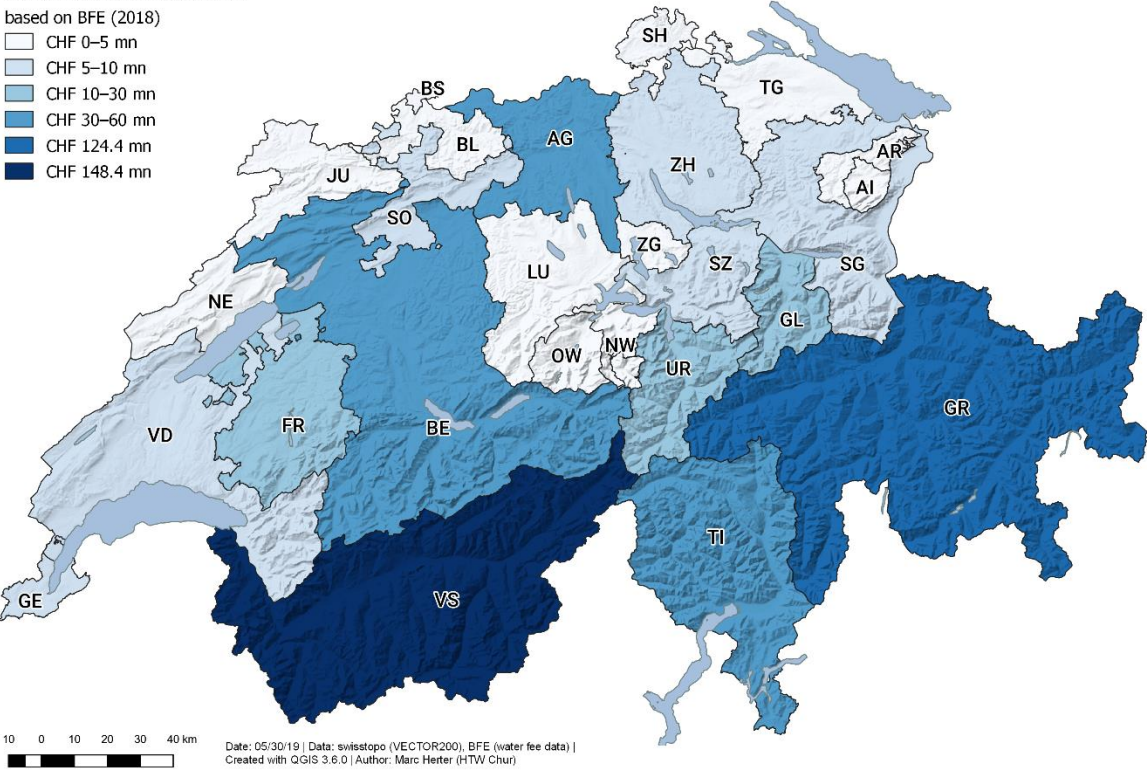
- Impact of changing water fees on
  - Profitability of HP plants
  - Financial flows (dividends, water fees, taxes, etc.) between cantons and within the Canton of Grisons (GR)
    - Municipal finance and fiscal equalization in GR
    - Regional development in GR



# Hydropower in Switzerland: Where does the money flow?

## Water Fee Revenues 2016

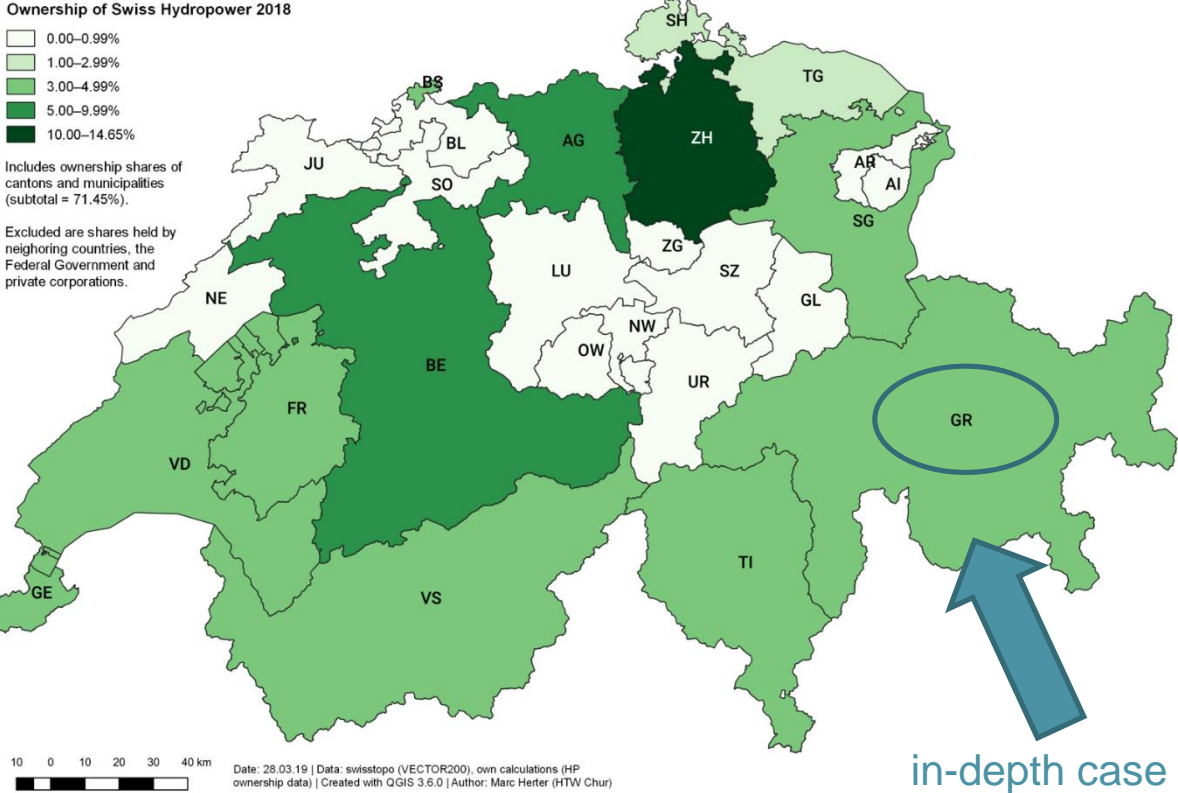
- based on BFE (2018)
- CHF 0–5 mn
  - CHF 5–10 mn
  - CHF 10–30 mn
  - CHF 30–60 mn
  - CHF 124.4 mn
  - CHF 148.4 mn



Water fee revenues (2016)

## Ownership of Swiss Hydropower 2018

- 0.00–0.99%
  - 1.00–2.99%
  - 3.00–4.99%
  - 5.00–9.99%
  - 10.00–14.65%
- Includes ownership shares of cantons and municipalities (subtotal = 71.45%).
- Excluded are shares held by neighboring countries, the Federal Government and private corporations.



in-depth case study for GR

Ownerships in Swiss HP (2016)

## Distributional effects of water fees

- The flow of money (resource rents) from HP:
  - Company profits
  - Royalties
  - Taxes
- The importance of water fees for public finance:
  - Cantons
  - Municipalities
- Mitigation of resulting disparities through fiscal / resource equalization:
  - On national level (between cantons)
  - Within the canton of Grisons (GR)

## Who finally pays the water fees?

- Owners (shareholders)
- “attributed” water fee payments

Attribution of water fee payments to GR:

19.0% Canton ZH

15.5% City of Zurich

10.4% Canton GR

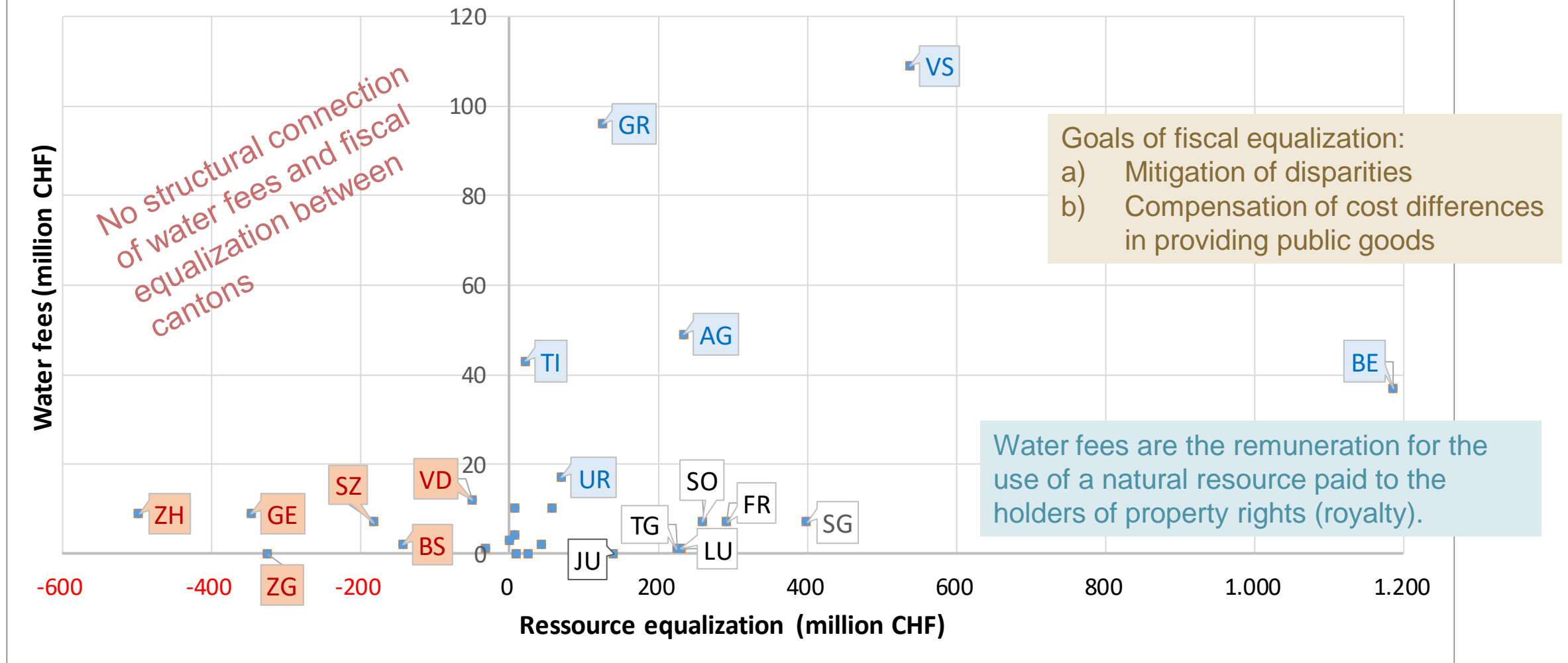
09.7% Canton AG

06.9% Municipalities GR

Rest: others

No comparable data on dividends and retained profits

## Water fees and fiscal equalization on the national level (2018)





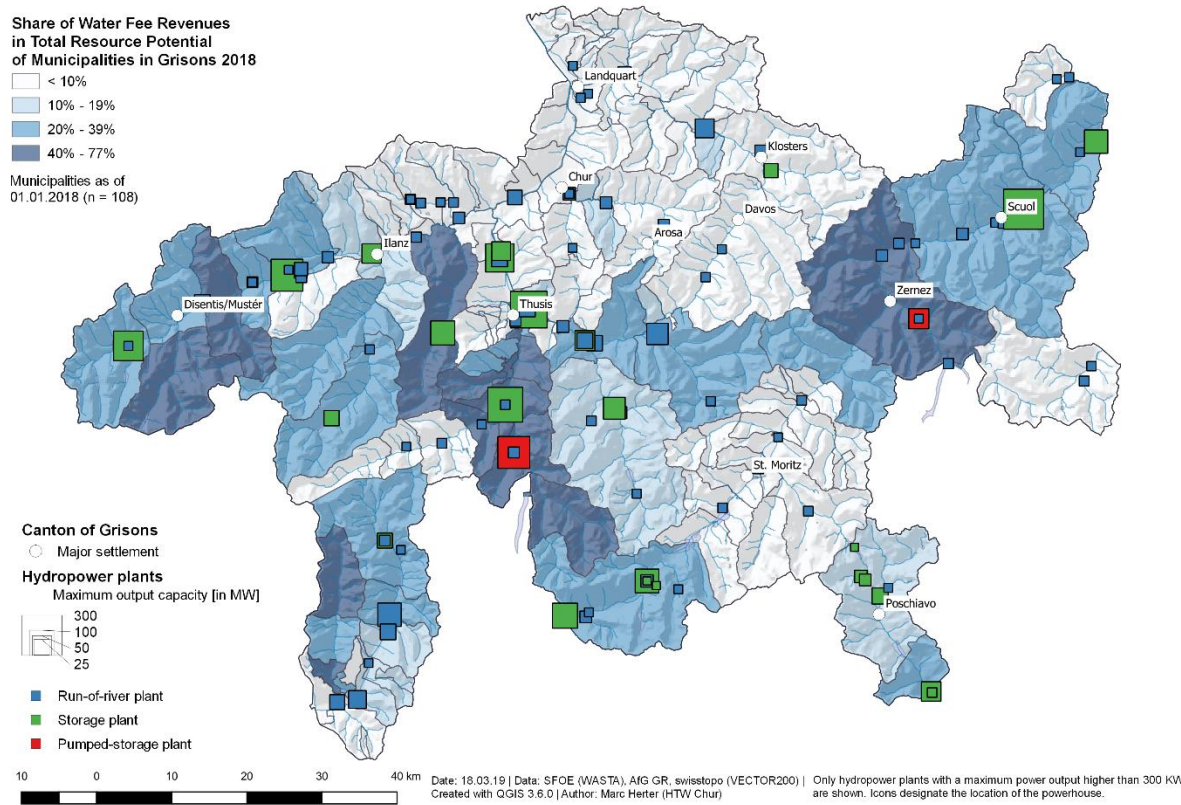
# Municipalities in Grisons: water fees and resource potential

## Importance of water fees in resource potential

Share of Water Fee Revenues  
in Total Resource Potential  
of Municipalities in Grisons 2018

- < 10%
- 10% - 19%
- 20% - 39%
- 40% - 77%

Municipalities as of  
01.01.2018 (n = 108)



Date: 18.03.19 | Data: SFOE (WASTA), AIG GR, swisstopo (VECTOR200) | Only hydropower plants with a maximum power output higher than 300 kW are shown. Icons designate the location of the powerhouse.  
Created with QGIS 3.6.0 | Author: Marc Herter (HTW Chur)

## Resource potential

- Private + corporate taxes
- Share of real estate and land taxes
- Water fees

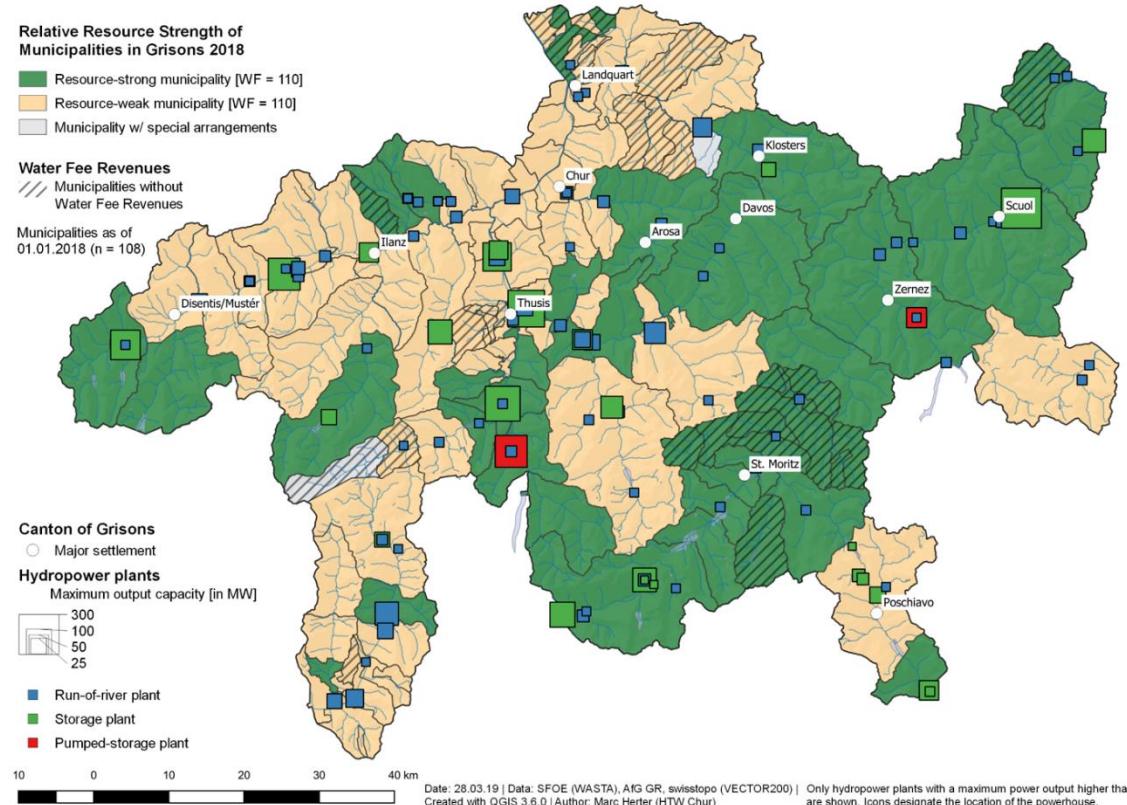
## Relative resource strength

Relative Resource Strength of  
Municipalities in Grisons 2018

- Resource-strong municipality [WF = 110]
- Resource-weak municipality [WF = 110]
- Municipality w/ special arrangements

Water Fee Revenues  
Municipalities without  
Water Fee Revenues

Municipalities as of  
01.01.2018 (n = 108)



Date: 28.03.19 | Data: SFOE (WASTA), AIG GR, swisstopo (VECTOR200) | Only hydropower plants with a maximum power output higher than 300 kW are shown. Icons designate the location of the powerhouse.  
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What are the impacts of different water fee options on municipal finance and resource equalization in GR?



## Impact of different water fee levels on municipal finance and resource equalization

Typology	Effects of changes in water fee level on resource equalization (RE)	Number of municipalities (fiscal year 2018)		
		with water fees	without water fees	TOTAL
<u>Type A</u>	<b>Resource-strong municipalities</b> that pay more into RE in case of lower water fees, and less in case of higher water fees	11	8	19
<b>Type B</b>	... pay less into RE in case of lower water fees, and more in case of higher water fees	19	-	19
<b>Type C</b>	<b>Resource-weak municipalities</b> that receive more from RE in case of lower water fees, and less in case of higher water fees	25	-	25
<u>Type D</u>	... receive less from RE in case of lower water fees, and more in case of higher water fees	30	13	43
not classified	(excluded from RE)	1	1	2
<b>TOTAL</b>	All municipalities are directly or indirectly affected from changes in water fee levels: lower water fees => lower revenues, higher water fees => higher revenues.	<b>86</b>	<b>22</b>	<b>108</b>
		Some resource-weak municipalities might become resource-strong.		

# Impact of different water fee levels on resource equalization, 2018

Municipalities in GR would be differently affected by changes in water fees (directly / indirectly).

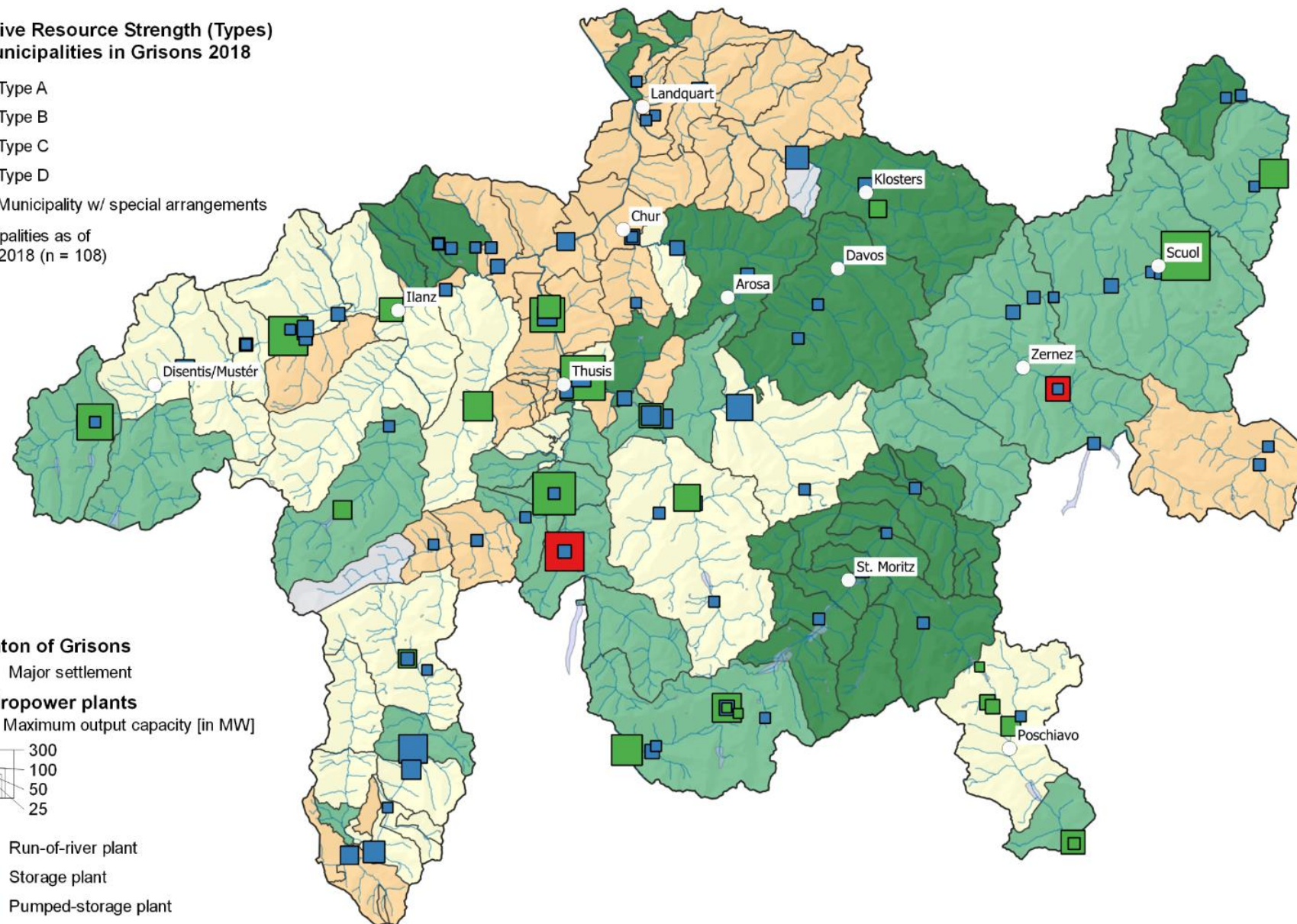
The most affected would be municipalities of **Type A** and **Type D**.

Relative Resource Strength (Types) of Municipalities in Grisons 2018

- Type A
- Type B
- Type C
- Type D
- Municipality w/ special arrangements

Municipalities as of 01.01.2018 (n = 108)

- Canton of Grisons**
- Major settlement
- Hydropower plants**  
Maximum output capacity [in MW]
- 300
  - 100
  - 50
  - 25
- Run-of-river plant
  - Storage plant
  - Pumped-storage plant



Date: 22.03.19 | Data: SFOE (WASTA), AfG GR, swisstopo (VECTOR200) | Only hydropower plants with a maximum power output higher than 300 KW are shown. Icons designate the location of the powerhouse.  
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## Conclusion

- Water fees and profits from HP are unevenly distributed among cantons and municipalities.
  - On national level, they are not a cause of disparities.
  - Within the canton of Grisons, this looks different, as the analysis of the cantonal fiscal equalization reveal:
    - Thanks to fiscal equalization (resource equalization), all municipalities directly or indirectly benefit from water fees (royalties).
    - As a consequence, all municipalities would be affected by declining water fees & benefit from rising water fees.
    - But, municipalities would be differently affected:
      - Tourist destinations and more industrialized municipalities would be more affected than municipalities that mainly rely on water fees.
      - The effects on the most resource-weak municipalities would be mitigated the most.
- These distributional effects and the importance of HP and water fees for local economies must be taken into account when designing new water fee schemes.
  - Water fees are an issue of sharing resource rents – thus, an issue of ownership in HP plants.
  - Altogether, this is key to the Energy Strategy 2050, as new and retrofitting investments are needed.



Thank you for your attention.

