

Energy Turnaround National Research Programme





SWISS COMPETENCE CENTER for ENERGY RESEARCH SUPPLY of ELECTRICITY

3rd Workshop: The Future of Swiss Hydropower Market Realities

29.03.2019

Bern









What is the Problem?



Convergence of Prices...



...Convergence of Revenues



Agenda

- 1. Market Outlook
- 2. Short to Medium-Term Options
- 3. Medium to Long-Term Options
- 4. Recommendations





What do the Markets say?





Sources: VIK



Can we Trust the Market???



What do Scientist say?



Depends on:

Fuel and carbon prices, conventional and RES policies, transmission management, network investments, technology progress etc.

→ Everything possible!

Hes·so WALAIS UNIVERSITÉ University DE GENÈVE Of Basel Sources: Schillinger et al. (2017) Betz et al. (2019)



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Best Bet for Sufficient Prices?



A *real* climate policy means *real* carbon prices

If Coal is marginal: 20€/t for 40€/MWh 40€/t for 60€/MWh *in a low coal price world*

If Gas is marginal: 20€/t for 40€/MWh 60€/t for 60€/MWh *in a low gas price world*





What about Price Variation?



Interplay of:

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- Fuel and carbon prices (price spread coal vs gas) + RES
- New conventional capacities/retrofits

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Sources: University AFEM project of Basel

70 NRP

Unto the Valley of Profit... ...trough the Flat Fields of Death



RES should lead to a 'Duck Curve'

But before: Relatively flat profile!



Competition through Technology Development



Pumped-storage no longer has a monopoly!



Sources: Gaudard&Madani (2019)



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What about?

• Liberalization

Will put everybody in the same market driven boat

Local and green base tariff

Wont help if consumers really switch

• **Storage Reserve** Wont make a (income) difference if designed correctly

European Linkage

Important for short-term optimization

- Capacity Markets/Mechanisms
 Foreign: lower prices become more likely
 Swiss: depends on design but likely 'money for free'
- Electrification (Mobility/Heat) Higher demand but also more flexibility in the system



And Climate Change?

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Sources: Schillinger et al. (2018)



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Benefiting from Flexibility? Balancing Markets

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Sources: University Schillinge of Basel

Schillinger et al. (2017)



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Balancing Price Level reflects **Opportunity Costs**

 \rightarrow On average not much additional profit possible



Sources: Schillinger&Weigt (2019)



Benefiting from Flexibility? Short Term Trading

Intraday Markets become increasingly important for trade:

- Significant increase in *price volatility* over the last years (especially in the early morning and afternoon hours)
- Ex-post assessment shows significant *revenue potential* from *Asset-backed Trading* from 2011 to 2015
- Require continuous *trading management*

	Spot	Asset Based Trading	Total
11/12	7.83	2.16	9.98
12/13	6.92	2.19	9.11
13/14	5.91	1.83	7.73
14/15	5.19	1.38	6.57
15/16	4.69	1.05	5.73
16/17	5.18	2.12	7.3
17/18	5.24	1.38	6.62
18/19	5.06	1.13	6.18
19/20	5.02	1.1	6.11
20/21	5.07	1.18	6.25
Average Outlook	5.1	1.2	6.3



Sources: Frauendorfer (2018) Frauendorfer&Schürle (2017)



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Which renewable energy should I invest in?





Operational Flexibility: Higher revenue

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Managerial Flexibility: Value if uncertainty







Shorter Lifetime = More Managerial Flexibility







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Price Uncertainty is Central



Advantage for managerial flexibility



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Adaptable HP projects: Start small, Think large



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Sources: Gaudard et al. (2016)



A New Framework Proposal





Sources: Gaudard&Romerio (forthcoming)



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Adopt your Company to Risky Business!

- Flexibility won't save you (for now): Energy prices form the bulk with flexibility gains as topping; focus on solid energy trade gains first
- Hope for high prices, plan for low prices: The next price drought will come; manage your liquidity and built up financial reserves
- Learn to live with the risk: Electricity markets will remain a risky business; hedge, diversify, and stay alert
- Stop optimizing, start managing: Include uncertainty in your investments; consider different options and scenario sets

