River under current

September 3, 2019 | Andri Bryner
Topics: Society | Climate Change & Energy | Ecosystems | Biodiversity

The energy strategy calls for a further expansion of hydropower. This puts pressure on Swiss water bodies and water landscapes. At today's Eawag Info Day, some 200 experts from practice, research and administration will discuss how the various interests in water can be met in a sustainable manner and where the competition between these interests calls for priorities to be set. The Eawag researchers will demonstrate that it is not only a question of technical solutions, but also of social acceptance, for example when measures in favour of water ecology lead to an increase in the price of electricity.

Switzerland is proud of its strongly developed use of hydropower. This covers almost 60% of the country's electricity needs. The production of around 36 terawatt hours (TWh) per year is now to be increased by a further 3 TWh by 2050 as part of the energy strategy. Eawag, the water research institute, is today presenting internal and external experts at the Swiss Museum of Transport in Lucerne on the challenges this poses for water bodies and the approaches society can take to meet these challenges. More information can be found in the conference proceedings [pdf].

Taking better account of the ecological impacts of small hydropower plants

70 percent of Swiss hydropower plants - around 1500 - are considered small. They have outputs of less than ten megawatts and can benefit in part from the cost-covering feed-in remuneration (KEV). However, their share of Switzerland's total hydropower production is relatively low at around 10%. This is even more evident in the case of very small plants. All 300 KEV-supported micro plants (outputs below 100 kW) together produce 40 GWh/a. This corresponds to about one thousandth of Swiss hydropower production. Researchers have now investigated the assumption that small power plants also have small effects. **[1]** They come to the conclusion that plans for the use of small hydropower often take too little account of the long-range ecological effects and the cumulative effects of several

Überlandstrasse 133
CH-8600 Dübendorf
T +41 58 765 55 11
F +41 58 765 50 28
info@eawag.ch
www.eawag.ch
eawag aquatic research

plants in the same catchment area. For example, the number of species of invertebrate organisms is halved on residual water stretches. This in turn affects species that live along the watercourse, for example because the spiders on the bank lack food.

Using lakes as batteries, taking climate change into account

Natural lakes are increasingly being included in pumped storage systems. Water is pumped up from Lake Zurich to Lake Sihl or from Lake Geneva to Lac de l'Hongrin to produce electricity when needed. One project has investigated how such shifts in entire water packages affect the physical, chemical and biological situation in the lakes: large fluctuations in lake levels, for example, can endanger near-natural shores, cloudy glacier water can inhibit the growth of plants in clear lakes, or water withdrawals and returns lead to temperature differences and changes in the seasonal stratification in the lake. The researchers' conclusion: With appropriate measures, negative impacts of such changes can usually be mitigated. It is important, however, that the influence of climate change is also taken into account, as pumped storage plants have been in operation for many decades.

The same applies to the extraction of large quantities of water from lakes and rivers for heating or cooling purposes. A study by Eawag has identified enormous potential here. With clever planning of new plants, the use of heat or cold can even be used to compensate for the negative effects of climate change: Cooling water from great lake depths, for example, can help prevent rivers from becoming too warm in hot summers, even after it has been used.

Hydropower enjoys high acceptance

A social science study has investigated the acceptance of renewable energies. **[2]** According to the results, there is strong support for the expansion of large-scale hydropower, and the respondents are also prepared to pay for it - for example with higher electricity prices if the plants have to invest in ecological clean-up measures. As soon as the local population has a say in decision-making, projects are questioned more critically or, in some cases, even combated.

Publications

[1] Basin- scale effects of small hydropower on biodiversity dynamics; Katharina Lange et al.; Front Ecol Environ 2018; https://doi.org/10.1002/fee.1823 (siehe auch Beitrag “Wasserkraftwerke umsichtig planen”).

[2] Akzeptanz erneuerbare Energie; Isabelle Stadelmann-Steffen, Karin Ingold et al. ; 2018; ISBN: 978-3-03825-010-4

Further information

We will be happy to put you in touch with the conference venue (Verkehrshaus Luzern) or via Telephone conversation partners. Contact the Eawag media officer:
Andri Bryner 058 765 51 04 / 079 721 19 93

Pictures

Use free of charge only in connection with reporting on the info day, no archiving.

The Sihlsee dam is part of the Etzelwerk pumped storage power plant.
(Photo: Alessandro Della Bella, Eawag)

The weir of the Wannebode small hydroelectric power station near Reckingen (VS) interrupts the continuum of the Blinnenbach.
(Photo: Eawag)

A calming basin reduces the negative ecological effects of hydropeaking in the Aare river near Innertkirchen.
(Photo: Markus Zeh)

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CH-8600 Dübendorf
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F +41 58 765 50 28
info@eawag.ch
www.eawag.ch
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From Thursday, September 5th you will also find the presentations and some impressions (photos) of the Infoday 2019 on the Infoday page.

Related Files

Proceedings Info day 2019 (german) Eawag [pdf, 2 MB]

to the picture gallery

Contact

Anne Dietzel
VSA platform «water quality»
Tel. +41 58 765 5060
anne.dietzel@eawag.ch

Andri Bryner
Media officer
Tel. +41 58 765 5104
andri.bryner@eawag.ch

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