In January this year, the latest research on small hydropower plants was published by scientists from the NOVA University in Lisbon, Portugal. The aim of their research was to assess the impact of small hydropower plants and their importance as electricity suppliers in the European part of the Mediterranean.
Small hydropower plants (SHPs) are defined as “small” because they have a capacity of no more than 10 MW. Because they do not require dams, in previous years they were considered to have less negative impact1 on rivers and ecosystems than large HPPs, so the European Union favored them as a way to increase energy produced from renewable sources, and accordingly as a way to reduce greenhouse gases. But with a growing number of such power plants across the Balkans and the European part of the Mediterranean, they are proving to be far more harmful than previously thought. Certainly, it can be argued that the problem actually lies in the greedy number of SHPPs built and planned, and that it is actually a political problem and greed, not a problem with mini hydropower plants, but the study in question in this text shows just the opposite: that the share of SHPPs in total energy production is small and that there is no potential for growth given the climate change that is already happening in the Mediterranean. In other words, the hyperinflation of SHPP construction cannot increase the amount of electricity produced as much as it can do environmental damage. Moreover, economic calculations show the same.
The study is based on a pre-existing list of current and projected SHPPs. For each site, the theoretical hydropower potential was calculated, based on climatological, hydrological and altitude data, and on the usual criteria for the design of SHPP plants. Results for 14 countries in two different modeling scenarios (built: SHPP 4177 and planned: 9925) were compared for the first time with national gross electricity consumption and primary energy consumption. The estimated potential was then compared with actual data on SHPPs and the study concluded that the efficiency factor was in fact overestimated and that existing projects have about 3.5 times lower average productivity than theoretical (overestimated) potential. The figures are even more devastating if global warming climate scenarios that predict long periods without precipitation in the Mediterranean and shorter ones with abundant precipitation. However, due to low power, SHPPs cannot utilize excess water in heavy rainfall, so their efficiency remains low again. In short, the study concludes that the potential (overestimated) contribution to the energy mix of existing SHPPs in the European Mediterranean is only about 2.6 percent of gross electricity consumption, and 0.47 percent of primary energy consumption. The actual contribution is about 3.5 percent lower and falls to about 0.74 percent of gross electricity consumption and 0.12 percent of primary energy consumption. Furthermore, construction of 5,748 new plants and more than doubling the

number of SHPPs but their potential (overestimated) energy contribution is growing from 2.6 percent to 4.4 percent of gross electricity consumption, and from 0.47 percent to 0.79 percent of primary energy consumption. Electricity production in SHPPs largely depends on meteorological conditions and can vary by more than 50 percent of annual production in good and bad years. Results vary by region because drought in one region usually means high productivity in another. SHPPs have a higher and more stable potential in mountainous areas (due to the combined effect of height and rain caused by the shape of the relief). Thus, the Balkans have greater hydro potentials than Spain, Italy, Greece and France.
However, even the Balkans are not safe from climate change, moreover, we already feel the warning of long dry periods and short but abundant precipitation on our own skin, so more and more often in the last five years we find ourselves in a situation of droughts and floods. In a scenario of global warming averaging 2 degrees Celsius per year (although we are currently warming to three average degrees), the flow of streams and rivers is projected to drop by 10 to 30 percent. And with droughts and water shortages, the potential of hydropower plants will fall even more). High rainfall levels followed by long droughts will mean an even greater decline in electricity production from hydropower, as water scarcity would encourage greater competition for this resource, with water availability for human consumption, ecosystems and agriculture a priority. Consequently, most of the flow will exceed the design capacity of the turbine and will not be used for energy production and long periods of low flow will produce little electricity. These two combined effects will greatly reduce the production of Mediterranean hydropower and make SHPPs unusable. Exceptions are locations where the impacts of network connectivity are greater than the impacts of installing SHPPs in ubiquitous systems such as irrigation, water supply or wastewater systems. The latter are mainly located in places where environmental damage has already been caused. Furthermore, the cost of electricity from SHPPs ranges from 40 to 300 MWh, which is very expensive, since the wholesale market price of electricity in Europe is from 40 to 60 euros per MWh, all without the cost of investing in energy efficiency and without leveling for the cost of emerging competitive technologies (such as advances in photovoltaic cells). Mini hydropower plants have therefore rang, both economically and environmentally, and why they are still being forced is still only a political and corrupt issue.
Source: bilten.org