



Brussels, June 2020

Subject: Session outcome letter: Water quantity governance in the context of climate change

Dear colleagues,

In this session outcome letter I intend to summarize the insights and views shared during [the online working session](#) on water quantity governance in the context of climate change. The session was held by the EEAC Working Group on Fresh Water Affairs on 16 June 2020, and included contributions from a variety of European, national and regional stakeholders.

Thematic introduction

Climate change will affect the availability, quality and quantity of the water needed to keep ecosystems in good condition and to meet basic human needs. The changes we face will inevitably increase risks in energy production, food security, human health, economic development and poverty reduction, and consequently represent a serious threat to the achievement of the Sustainable Development Goals. At the same time, both climate change and the human responses to it will add to the existing pressures on water systems and ecosystems.

There are many policy initiatives, at various levels, intended to counter the effects of climate change on our freshwater resources. At the European level, the recent fitness check of the EU Water Framework Directive (WFD) concluded that the Directive is sufficiently prescriptive with regard to the pressures to be addressed and yet flexible enough to accommodate emerging challenges such as climate change and water scarcity. In reality, however, plenty of challenges remain.

Achieving a sustainable society will require transitions in multiple domains. Some of these transitions are mutually reinforcing, but they may also conflict. During the online working session three specific challenges were highlighted and discussed: firstly, the opportunities and threats of hydropower (i.e. an effort to curb climate change while meeting the goals of EU fresh water policies); secondly, the opportunities and bottlenecks faced by the water-production sector in relation to mitigation; thirdly, and more generally, the water/energy nexus in the wider framework of various climate scenarios and their anticipated impacts.

Conflicting ambitions between hydropower and water policies

The first part of the working session concentrated on the ambition to produce low-carbon energy through hydropower plants, an ambition which conflicts with the ambition to enhance the status of fresh water bodies in the European area. What are the reasons for the tension between these two aims and what are possible solutions?

An impossible equation

Although the goal of producing low-carbon energy in order to curb climate change is broadly supported, Claire Baffert ([WWF EU](#)) questioned whether hydropower plants are desirable instruments for doing so. A recent study¹ by the Worldwide Fund for Nature showed that the 21,387 existing hydropower plants in Europe generally do have a negative effect on fish migration, and furthermore may cause habitat loss, water temperature changes, alteration of water levels, alteration of sediment transport and erosion of river banks. Furthermore, the study showed that 33% of all 5,734 future plants (i.e. which are planned or under construction in the EU) are to be built in protected areas. In addition, 91% of existing and future plants have a production capacity of less than 10 MW, making their contribution to low-carbon energy production relatively modest, while negative impacts on the status of fresh water bodies remain substantial.

Insufficient implementation and loopholes

The Water Framework Directive aims to enhance the quality of European fresh water bodies, in part through the “non-deterioration principle”. In the scheme of this Directive, the potential negative impacts of hydropower plants on fresh water bodies would, if significant, normally lead to negative environmental impact statements and to permissions not being granted. However, Baffert referred to a study done in Austria showing that 30% of the proposed hydropower plants that had been granted permits in reality would cause significant deterioration of the quality of the water bodies on which they were to be built. Baffert explained that loopholes in the Water Framework Directive in combination with insufficient implementation by Member States are to blame.

The Water Framework Directive and its Article 4.7

The WFD should ensure that any projects that could have a significant negative impact on the condition of fresh water bodies are not approved. However, article 4.7 lists some conditions that, if met, allow for exemptions. These include: **A)** All practicable mitigation measures are taken, **B)** The project and the reasons for it are set out and explained in the River Basin Management Plans, **C)** The benefits of the development outweigh the benefits of achieving the WFD objectives/the development is of overriding public interest, and **D)** There is no better environmental option.

¹ https://www.wwf.eu/wwf_news/publications/?uNewsID=356638

In several cases where hydropower plants were built, these conditions were not properly reviewed. In addition, the mitigation measures (which are supposed to prevent or reduce an effect on the status of a WFD quality element) were not defined by the impacts of the projects, but rather by their objectives. This means that the contribution to low-carbon energy production was taken as the main argument and for granted, while the negative impact on fresh water bodies was left out of consideration. This is a failure in implementation, Baffert argues.

Besides the impediments to implementation it represents, Article 4.7 is not structured sufficiently clearly, as a result of which it creates loopholes. First of all, there is no definition of “overriding public interest”. This lack of clarity is often utilized to push matters forward without regard to possible (negative) impacts. Secondly, problems occur when quantifying environmental damage and benefits in monetary terms, as the more long-term and/or non-tangible damages and benefits are often left out of consideration. Due to these problems, assessments are often unbalanced.

Financing and fair cost-benefit analyses

Besides the difficulties with the Water Framework Directive, there are also complications with regard to the financing mechanisms in support of investments in low-carbon electricity production: these mechanisms may very well be detrimental to the ambition to enhance the status of fresh water bodies in Europe.

The first issue raised was the usage of public money to fund small hydropower plants (< 0.5 MW). It has been claimed that such small plants are economically not viable without the influx of public money through “feed-in tariffs”. The fact that state aid (public money) is only allowed to finance the smallest kind of plants entails an additional negative impact in that these small plants are built in the smallest, most pristine river ecosystems. Although steps are being taken at the European level to redesign state aid rules on this issue, difficulties remain.

In addition, further remarks were made about the unbalanced cost/benefit studies made to justify the use of hydropower plants. The impacts of the construction activities (including greenhouse gas emissions), the methane emissions by these plants while in operation, the systemic overestimation of their operating lifetime, as well as the exclusion of maintenance and ultimate decommissioning costs, all together contribute to a systemic imbalance in the debate about the costs and benefits of such plants, some experts argued.

What needs to be done

Three tracks should be followed to reestablish the balance between the ambition to curb climate change and the goal of enhancing the status of fresh water bodies in the EU: A) Better implementation of the Water Framework Directive, B) Redirecting of public money, and C) Better alignment with key policy initiatives.

Better implementation

In her closing remarks, Baffert called for an improved governance structure, to ensure better usage of the exemptions introduced in Article 4.7 of the EU Water Framework Directive. She also stressed that EU Member States need to ensure that policy interventions do not permanently exclude or compromise the achievement of the objectives of the Water Framework Directive in other bodies of water and are kept consistent with the implementation of other Community environmental legislation (WFD Article 4.8). In the discussion that followed, the approach of strategic planning² as described in the [Guiding Principles on Sustainable Hydropower](#) developed in the Danube Commission was mentioned as a possible solution in this perspective, but the included concept of defining "go zones" was not supported by Ms. Baffert.

Redirect the money

With regard to financing mechanisms, Baffert proposed ceasing the financing of new plants in favour of investing in the refurbishment of existing ones. Baffert also argued that the cost-recovery principle (part of the Water Framework Directive) should also apply for the hydropower sector and that state aid should no longer be provided to new hydropower plants.

Better alignment: One of the targets in the EU Biodiversity Strategy for 2030 is to restore at least 25,000 km of rivers into free-flowing rivers by 2030. The first demolitions of obsolete dams have been carried out, but it is clear that reaching this target is at odds with the building of large numbers of new hydropower plants.

Alongside this, it is important that in the EU taxonomy for sustainable activities, stricter criteria need to be defined to make sure that any hydropower projects developed are truly sustainable.

An energy-neutral water sector?

The challenge to make the relationship between water policy ambitions and curbing climate change one that is mutually beneficial requires the commitment of a variety of stakeholders, including businesses and service providers. On this the event highlighted the role of water service providers. What are the opportunities and possible bottlenecks in the attempt by drinking water and wastewater service providers to combine their efforts to curb climate change, while providing sufficient and clean fresh water for an affordable price?

The water sector operates in a challenging environment, Bertrand Valle ([EurEau](#)) stated. The sector faces challenges due to climate change, but also due to agricultural activities and emerging pollutions, as well as aging infrastructure and an energy-intensive modus operandi. However, several

² Such "strategic planning approach" to new hydropower development is based on, in particular: 1) identification and designation of areas where new hydropower should be forbidden and where it should be allowed (go and no-go areas); 2) priority to large hydropower (less damage per MW of capacity than small hydropower), and 3) mitigation measures (fish passes, no hydropeaking, etc.).

opportunities to serve efforts to curb climate change while providing sufficient and clean fresh water for an affordable price were identified. These included: A) Reduced consumption, B) Improved efficiency, C) Energy production on site, and D) A corporate approach.

A series of opportunities

A first opportunity lies in the reduction of energy consumption. For the drinking water sector this would in practice mean that providers would seek cleaner water at the closest possible water resource. Also, more should be done to enhance pressure and leakage management. This is, however, complex since many providers struggle with aging infrastructure. Waste water service providers could make additional efforts to reduce the actual waste water collected. Natural advantages should also be better utilized. Providers could, for example, maximize the use of gravity to transport water and/or sewage through the system.

Besides reduced consumption, there are also opportunities to improve efficiency. First of all, energy efficiency should no longer be seen as a “plus” or “add on”: it should become a decision criterion like any other, Vallet stated. In addition, efficiency should also play a major role when new machinery is taken into service. Furthermore, current process control mechanisms should be replaced by online, automated processes, which would deliver major efficiency gains.

The production of renewable energy on site offers many opportunities as well. Five ways of doing so were presented. For example, in Austria, Belgium, Finland and Greece examples can be found of providers that use turbines in their sewage systems to produce electricity. This can only be done in situations where gravity can be utilized. Biogas from sewage sludge offers a second possibility for the production of renewable energy, and examples of such systems are plentiful. Several experts argued that since waste water providers handle sewage anyway, generating biogas would be most promising. Providers could also use, as a third possibility, heat recovery from sewers and networks as a source for producing renewable energy. A fourth manner includes heat recovery from incineration, while a fifth manner is provided by the physical space that many operators have at their disposal. Utilizing roof and ground space to produce solar and wind energy is a frequently used opportunity.

A fourth and final opportunity for the water sector to combine their efforts to curb climate change while providing sufficient and clean fresh water for an affordable price is referred to as the “corporate approach”. Vallet argued that energy is everywhere, not only in water infrastructure, and so expertise gained by individual players should be shared and utilized. Providers should also make an effort to take action towards consumers and could use their insights to influence other stakeholders to contribute to meeting the challenge.

Limitations

While there are a variety of opportunities, there are also a number of limitations. Local topographical conditions are heavily determinate for the potential options, and sometimes act as limiting factors.

The same goes for the local situation in terms of financial strength vis-à-vis investment needs. When investments are needed to ensure the renovation of aging infrastructure, this is often prioritized over investing in energy neutrality, Vallet explained. In essence it's a balance between performance and economic feasibility. He added that the ability to invest is in practice determined by, on the one hand, the balance between the cost recovery principle, and on the other the social remit of drinking and waste water providers, i.e. to ensure affordable and clean fresh water.

Bottlenecks

There are several bottlenecks that stem from existing regulations and financing mechanisms. In some cases regulation hinders market access for recovered products. In others, providers have been curtailed in their attempt to finance efficiency measures by local regulations that dictated that this activity was outside their remit. On the other hand, regulation should halt the increase of new pollutants, ensuring that no further investments need to be made to face the specific challenges presented by these pollutants, since it would reduce the amount of money available to invest in measures to curb climate change.

Also, some existing financing mechanisms make it difficult to deliver energy neutrality in the water sector, Vallet explained. The long-term investment cycles in water services should be better taken into account and financial support should be provided for promoting better efficiency in the long term. If such financial support does not emerge, either the end consumer will have to pay or private investment will need to be combined with public funds.

The way forward

In his final remarks, Vallet argued that a three-track approach is required to move towards an energy-neutral water sector. Firstly, supportive legislative frameworks need to be put in place, to ensure things like market access for recovered products. Secondly, investments in innovation will help overcome some of the limitations and bottlenecks. Thirdly, a clear governance structure, including long-term strategies and financing mechanisms along with cooperation between government levels has to be assured.

The water nexus in the context of Climate Change

Climate change will have far-reaching, lasting and unequal effects on the availability of fresh water in the European area, bringing stress and risks to bear on the water-energy-food-nexus. This third and final session introduced several climate scenarios and possible impacts. In addition, the role that sectors such as agriculture and energy play in the context of increasing water stress, as well as the viability of current efficiency measures, were also discussed.

A dire prospect

Ad de Roo ([JRC](#)) emphasized that Water Exploitation Indexes³ show a North-South pattern emerging across Europe for water availability. Overall, Southern European countries, particularly Spain, Greece, Cyprus, and Italy, are projected to face significantly increased water shortages. In the event of a 2°C increase of average temperatures, the level of water scarcity will increase in these countries, whereas the number of other European regions affected by water scarcity will remain the same.

The picture changes dramatically if Europe faces a 3°C increase of average temperatures. Although the Southern part of Europe would again be expected to be hit the hardest, the situation for the EU as a whole then looks rather dire. In this event A) the number of people affected by water scarcity may increase from 70.7 million under current climate conditions to a total of 79.8 million people, while B) the number of people affected by severe water scarcity in the Mediterranean is projected to increase from 24.4 million to 34.4 million people.

While the Water Exploitation Indexes takes an annual average, the situation on the ground will be challenging in any case, since the expectation is that winters will become particularly rainy and wet, whereas summers will become increasingly dry. Consequently, it is rather clear that mitigation alone is not enough to avoid adverse climate change impacts; adaptation strategies such as water savings and efficiency measures will be needed too.

The nexus

Sectors that will be particularly challenged by the anticipated water stress are energy and agriculture. Energy production requires substantial fresh water resources. In 2015, for example, water withdrawal and usage for electricity generation amounted to 65,000 Mm³ on an annual basis. However due to decarbonization measures, a decline to an anticipated 40,000 Mm³ per year in 2050 is expected. Similarly, in the Mediterranean water withdrawal and usage are expected to decrease significantly due to decarbonization measures, but will nevertheless remain high in 2050. De Roo underlined that a decrease of carbon-intensive energy production has a double advantage: A) it reduces emissions, which would help reach the target 1.5°C average temperature rise as agreed in the Paris Agreement, while B) also reducing the cooling water requirements of the energy sector.

Another activity that requires substantial freshwater resources is agriculture. Special attention was paid to the relation between groundwater resources and irrigation. Groundwater depletion seems to be an underappreciated problem, De Roo argued. Being already an issue now, it will get worse under any climate scenario. A mindset change in agriculture and CAP-subsidies seems to be needed. This primarily goes for agricultural activities in Southern Europe. Although several solutions to water

³ The water exploitation index (WEI), or withdrawal ratio, in a country is defined as the mean annual total abstraction of fresh water divided by the long-term average freshwater resources. It describes how the total water abstraction puts pressure on water resources. As such, it identifies those countries having high abstraction in relation to their resources and therefore prone to suffering problems of water stress.

shortages and groundwater depletion⁴ are at hand, critical remarks were made with regard to the extent efficiency measures will provide an adequate answer to the crisis.

It was noted that there is a “[passerelle clause](#)” in the treaty⁵ which allows for (faster) decision-making on water quantity policy, and that this option might need consideration in the context of the recent EU recovery plans. Particularly in reference to agriculture, it doesn’t seem wise to invest in developments that will put further pressure on water sources in regions with high water stress. Especially in the southern regions, where climate change will have a big impact on the WEI, the better option might be to finance the transition with the EU funding (CAP and others).

Insufficient measures

Although the EU Water Framework Directive (WFD) includes several mechanisms to protect the water systems that provide for ecosystems and enhance water efficiency, it seems that these measures will not be enough in the context of the expected consequences of climate change. When assessing the (known) efficiency measures⁶ as implemented by EU Member States, it is abundantly clear that such measures would only make a sufficient contribution under the current climate situation. An increase in temperature would, however, immediately lead to further worsening of water stress, especially in southern Europe. It was therefore concluded that the Member States’ ambitions with regard to water efficiency measures in the WFD are likely not sufficient (especially in the Mediterranean region) to compensate the increased water scarcity as a consequence of climate change. This conclusion, coupled with the findings that that mitigation alone is not enough to avoid adverse climate change impacts, shows the need for more and immediate action.

To conclude

Climate change will affect the availability, quality and quantity of the water needed to keep ecosystems healthy and to meet basic human needs. In particular, many significant challenges seem to be emerging for the water-energy-food nexus, bringing all three dimensions of this triangle under pressure. In this session, we paid particular attention to the water-energy dimension of this triangle. In one direction, mitigation policies, such as the development of hydropower, can be detrimental to water policy ambitions. In the other direction, water production and sewage activities are significant users of energy and thus have the potential to contribute to mitigation ambitions. At the end of the session, we recapitulated with a general overview of the pressures that are likely to arise in the future and impact the water-energy-food-nexus in Europe.

In December 2019, the EU Water Framework Directive was deemed “fit for purpose”: the directive in itself appears to be sufficiently prescriptive while still exhibiting adequate flexibility. And just recently,

⁴ Options include Deficit irrigation, shifting crop types, water re-use, aquifer recharge, and desalination with renewables

⁵ [Treaty on the functioning of the European Union](#), art 192, 2 (b) -

⁶ Efficiency measures include: water reuse, better irrigation efficiency, leakage repair, and energy transition



EEAC Working Group on Fresh Water Affairs

Virginijus Sinkevičius, Commissioner for the Environment, Oceans and Fisheries, definitively declared he will not “open” this directive for refitting-operations. Though this decision may in itself be some reason for encouragement, it is no reason for complacency.

The question remains whether the system of the WFD has enough incentives, robustness and resilience to cope with the effects of climate change. In this session we saw that Member States and several funding mechanisms often turn a blind eye to the consequences of investments in hydropower. We saw that when water production or sewage firms want to invest in energy savings, regulations have not always been helpful. And we saw that the WFD is not yet pushing Member States to ambition levels that are sufficient for coping with the consequences of climate change. This last in particular is all the more reason to keep a close eye on the future developments of European water policy and its implementation in the Member States.

This session outcome letter reflects the perception of the debate by myself and my colleagues; it does not necessarily reflect the exact wording used or arguments made by the participants or speakers. I hope that the letter is useful to you in some way.

Sincerely yours,

Jan Verheeke

Chairman, EEAC Working Group on Fresh Water Affairs