

# Large-scale Water-related Innovative Renewable Energy Projects and the Water Framework Directive

## *Legal Issues and Solutions*

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### Abstract

This article discusses two legal issues that relate to the conflict between the interest of protecting water quality under the Water Framework Directive (WFD), versus the interest of promoting the use of innovative water-related renewable energy, with regard to the quota in the Renewable Energy Directive. These legal issues are: *first*, the conflict between the provisions of the WFD and the Renewable Energy Directive as expressed by the no-deterioration obligation, and *second*, the lack of integration between the Renewable Energy Directive and the derogation clause of the Water Framework Directive. Tidal energy and salinity gradient energy (blue energy) are used as a case study to show the practical relevance of the legal issues for innovative water-related renewable energy techniques. The final section discusses solutions to the legal issues. These are *first*, the application of adaptive management in combination with phased deployment in order to deal with uncertainty, and *second*, the introduction of detailed renewable energy plans per Member State in order to increase integration between the WFD and the Renewable Energy Directive.

### Keywords

Renewable Energy Directive – Water Framework Directive – tidal energy – salinity gradient energy – blue energy

## 1 Introduction

Since the introduction of the renewable energy directive (RED) in 2009, the Member States of the European Union are bound to mandatory renewable energy targets.<sup>1</sup> Under this directive Member States must encourage the production of energy from ‘all types of renewable sources’<sup>2</sup> in order to meet the renewable energy production targets for the year 2020 as set out in the directive. Apart from wind and solar energy, these also include sources that require innovative water-related techniques, such as tidal energy, wave energy, and salinity gradient energy (blue energy). According to the European Commission, such renewable energy techniques can play an important role with respect to energy security and contribution to the Europe’s decarbonisation goals.<sup>3</sup> At the same time, there are fields of EU law that can get into conflict with the ‘producing more renewable energy’-objective. These fields of EU law include nature protection law, state aid law, free movement law, and water law. This article discusses two legal issues related to the conflict between the interest of protecting water quality under the Water Framework Directive (WFD), versus the interest of promoting the use of innovative renewable energy, which follows from the Renewable Energy Directive. Tidal energy and salinity gradient energy are two innovative water-related renewable energy sources that may in particular face legal issues related to the WFD,<sup>4</sup> especially when implemented on a large scale in the future. These renewable energy techniques fall within

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- 1 For instance, in 2020 the share of energy use from renewable sources should be 14% in the Netherlands, 23% in France, and 15% in the UK. See Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources, OJ 2009 L 140/16, annex I.
  - 2 Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources, OJ 2009 L 140/16, articles 6 and 14.
  - 3 European Commission, Communication, ‘Blue Energy – Action needed to deliver on the potential of ocean energy in European seas and oceans by 2020 and beyond’, COM(2014) 8 final (20 January 2014), pp. 2–3. The Commission uses the term ‘ocean energy’, which is somewhat confusing as some of the techniques that are covered by this term (tidal energy and salinity gradient energy in particular) can also be used in an in or on-shore configuration. This is further discussed in the next section.
  - 4 They may, however, also face legal issues related to the Habitats and Birds Directive. See Section 6, second paragraph, for further elaboration on this.

the scope of application of the WFD as they can be implemented in inland surface waters, transitional waters, and coastal waters.<sup>5</sup>

The first legal issue concerns a potential conflict between the goals of the two directives. The purpose of the Water Framework Directive is to establish a framework for the protection of waters that prevents further deterioration and protects and enhances the status of aquatic ecosystems. The WFD's ultimate goal is to achieve a 'good status' for all of the European Union's surface waters and groundwater.<sup>6</sup> It is likely that this goal of no-deterioration of water quality will sometimes come into conflict with Member State's efforts to promote an increased production of renewable energy, as required by the Renewable Energy Directive. This may especially be the case when it concerns water-related energy forms – such as tidal energy and salinity gradient energy – that may have a negative effect on fish and other elements of water quality. An additional issue in this regard is the scientific uncertainty that often exists with regard to the existence and scope of such negative effects.

The second legal issue discussed in this article concerns the lack of integration between the two directives, which is demonstrated most clearly by the WFD's derogation clause: article 4(7) WFD. This clause offers a possibility to exempt certain projects that are of overriding public interest from the no-deterioration obligation after a balancing act is carried out. There is however no actual integration between the derogation clause and the Renewable Energy Directive (RED). Nor is there an obligation to apply the clause in cases where a renewable energy project risks to cause a prohibited deterioration of water quality. Therefore, there is no guarantee that applications for the authorisation of renewable energy projects that are important for achieving the RED's goals will actually be weighed under the WFD. Nor is there a guarantee that a serious balancing of interests will take place.

These two legal issues are discussed in the following sections, followed by a section that discusses possible solutions to the issues. First, however, this article features a brief case study of the two innovative water-related renewable

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5 The scope of application of the WFD is indicated in article 1: "The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater [...]".

6 Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, article 1; Opinion of Advocate General Jääskinen in Case C-461/13, *Bund für Umwelt und Naturschutz Deutschland (Weservertiefung)* [2014], paras. 38–39.

energy forms ‘tidal energy’ and ‘salinity gradient energy’, which serve to illustrate the practical relevance of the two legal issues for future innovative renewable energy projects.

## 2 Case Study: Tidal Energy and Salinity Gradient Energy

Tidal energy uses the power that is produced by tidal ebb and flow currents. Tidal energy turbines are usually installed at sites with high-speed currents, such as narrow straits, inlets,<sup>7</sup> or channels between islands.<sup>8</sup> One technique to harvest tidal energy is by using tidal stream turbines.<sup>9</sup> Tidal stream technology harvests the energy from water streams that are moving due to the tides. The design of tidal stream turbines is similar to the design of wind turbines, but ‘due to the higher density of water the blades are smaller and turn more slowly than wind turbines’.<sup>10</sup> This type of turbine will normally be placed in barriers, under bridges or they can be fixed to the sea-bed.

Salinity gradient energy is electrical energy which is harvested by the mixing of two water streams of different salinity. Salinity gradient power could be produced everywhere in the world where salt solutions of different salinity (for example fresh river water and seawater, or brine waste water and sea water) are available.

Both are relatively new techniques. Currently there are only a few small-scale tidal stream developments in operation, including in the *Oosterschelde* and the *Afsluitdijk* storm surge barriers in the Netherlands, and in the *Pentland Firth* straight in the north of Scotland. Momentarily a small-scale salinity gradient energy testing installation is installed at the *Afsluitdijk* storm surge barrier. Both techniques have in common that they have a predictable and often constant energy output, as opposed to wind and solar energy, which have a variable revenue. Therefore, they can help to achieve security of supply on the

7 For instance: the *Oosterschelde tidal energy project* in the Netherlands, see: <http://www.tocardo.com/Project/oosterschelde/>.

8 For instance: the *Pentland Firth tidal energy project* in Scotland, see: <https://www.atlantisresourceltd.com/projects/meygen/>.

9 Another – and slightly more established – tidal energy technique is ‘tidal range energy’. Tidal range devices make use of the vertical difference in the water level between a high tide and a low tide. They usually do this by ‘trapping or impounding the sea water within a flooded basin behind a large tidal barrage before releasing it back to the sea via turbines.’ See <http://www.alternative-energy-tutorials.com/tidal-energy/tidal-power.html>.

10 International Renewable Energy Agency, *Tidal Energy – Technology Brief*, 2014, p. 11.

EU's renewable energy market. Moreover, they have the potential to produce a considerable percentage of the EU's renewable energy needs.<sup>11</sup>

Both techniques do, however, have the potential to negatively impact water quality elements that are protected by the Water Framework Directive. These include the composition and abundance of fish fauna, the tidal regime, thermal conditions and salinity. These are all quality elements that are linked to the ecological status of a water body.<sup>12</sup>

Environmental assessments<sup>13</sup> that have been carried out for the authorisation procedure of current small-scale tidal energy developments indicate that tidal turbines may have negative effects on fish. With respect to the tidal energy project in the *Oosterschelde*, it was indicated that the underwater turbulence caused by the turbines could cause fish to become disorientated and therefore they could be easier to catch by birds. Fish are also at risk of being hit by a rotor blade and they may be sensitive to underwater noise.<sup>14</sup> Moreover, fish might be prevented from migrating to the fresh water side of the dam in which the tidal

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11 For instance, with respect to tidal energy in the UK: Marine Scotland, MeyGen Decision, Decision Letter and Conditions, <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/MeyGen/DecisionLetter>, pp. 14 and 22: "Wave and tidal stream energy technology have the potential to play an important role in decarbonising our energy supply, increasing energy security and reducing our dependence on fossil fuels. The Carbon Trust has estimated that wave and tidal resources could provide 20 per cent of the UK's electricity if fully developed." [...] "Due to the intermittent nature of renewables generation, a balanced electricity mix is required to support security of supply requirements." And for instance, with respect to salinity gradient energy: J.W. Post, *Blue Energy: electricity production from salinity gradients by reverse electrodialysis*, 2009, p. 187: "The technical potential for [the Rhine and Meuse (with their river mouth located in The Netherlands)] – as derived from the global datasets – is 2.4 GW. The economic potential is estimated to be 1.5 GW, when looking into more detail to the Dutch Delta."

12 For an overview of the quality elements for the qualification of ecological status of a water body, see: Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, annex V.

13 The environmental assessments referred to in this section are 'appropriate assessments' that were carried out pursuant to the Natura 2000 rules. These assessments do, however, also mention possible negative effects on water quality that are covered by the Water Framework Directive.

14 IMARES, Institute for Marine Resources & Ecosystem Studies, 'Passende Beoordeling van een getijdencentrale in de Oosterscheldekering' [Appropriate Assessment of a tidal energy plant in the Oosterschelde storm surge barrier], 27 April 2010, p. 34.

turbines are placed because of their passage being blocked by the turbines.<sup>15</sup> With respect to the tidal energy project in the *Pentland Firth* an assessment indicated similar potential impacts from the tidal array on fish species, including: collision risks, noise (during installation, operation, maintenance and decommissioning) and effects on fish passage.<sup>16</sup> The assessment of the *Oosterschelde* project also indicate that tidal energy turbines may reduce the tidal flow in the water body where they are installed.<sup>17</sup> In both small-scale projects these possible effects have not led to a prohibition based on the non-deterioration rule of the Water Framework Directive. The assessments do show, however, that tidal energy may cause risks for fish and the tidal flow. As ‘the composition and abundance of fish fauna’ and ‘the tidal regime’ are quality elements<sup>18</sup> under the WFD, negative effects on fish and the tides may play an important role in the authorisation procedure of future large-scale tidal energy projects.

As salinity gradient energy is in its very early stages of development, there are no project-related environmental assessments that indicate possible negative effects on water quality. There are, however, some academic publications that give some suggestions in this regard. First, as salinity gradient energy mixes two streams of different salinity to produce energy, it will always discharge a brackish residue. When this brackish water is discharged in superficial layers of the ocean, it would release nutrients at the surface layer that originate from the fresh water side, ‘and subsequently lead to local eutrophication’.<sup>19</sup> Eutrophication is the addition of nutrients (mainly phosphor) to water, which allows organisms to grow which would otherwise not be able to grow there.<sup>20</sup>

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- 15 IMARES, Institute for Marine Resources & Ecosystem Studies, ‘Passende Beoordeling van een getijdencentrale in de Oosterscheldekering’ [Appropriate Assessment of a tidal energy plant in the Oosterschelde storm surge barrier], 27 April 2010, pp. 45–47.
- 16 Marine Scotland, MeyGen Decision – Appropriate Assessment, September 2013, <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/MeyGen/AppropriateAssessment>, pp. 84–85 and 90–92.
- 17 IMARES, Institute for Marine Resources & Ecosystem Studies, ‘Passende Beoordeling van een getijdencentrale in de Oosterscheldekering’ [Appropriate Assessment of a tidal energy plant in the Oosterschelde storm surge barrier], 27 April 2010, p. 17.
- 18 Effects on tidal flow relates to water quantity rather than water quality. Under the WFD it is qualified, however, under ‘Hydromorphological elements supporting the biological elements’ and it is used in the assessment process of the water quality of transitional waters.
- 19 F. Helfer, C. Lemckert and Y.G. Anssimov, Osmotic power with Pressure Retarded Osmosis: Theory, performance and trends – A review, *Journal of Membrane Science* 2014 (1) p. 33.
- 20 Based on <http://dictionary.cambridge.org/dictionary/english/eutrophication>, and on an interview with a developer of salinity gradient energy in the Netherlands (transcript available from the author upon request).

This may be seen as pollution under the physico-chemical quality elements as protected by the WFD. Moreover, the discharge of brackish water may also alter the local aquatic environment due to salinity changes.<sup>21</sup> 'Salinity' also is a quality element under the WFD.<sup>22</sup> These two environmental effects would, however, only be an issue for the authorisation of a salinity gradient energy project if the brackish water is discharged at a site where it would not end up without the presence of the salinity gradient plant.<sup>23</sup> Second, the energy output of salinity gradient installations can be increased by adding industrial waste heat in the form of warm water to the energy production process.<sup>24</sup> As a result, thermal pollution could occur in the water body that receives the brackish water stream. As 'thermal conditions' are a quality element under the WFD, this aspect may play a role in the authorisation procedure of large-scale salinity gradient energy installations. Third, large-scale salinity gradient energy plants will abstract large quantities of water, creating a risk that fish are sucked into the installation and will suffer physical damage and disorientation, which can lead to increased fish mortality.<sup>25</sup> As seen before, 'the composition and abundance of fish fauna' is a quality element under the WFD, and negative effects on fish may therefore play a role in the authorisation procedure of future large-scale salinity gradient energy projects. Moreover, the abstraction of large quantities of water from rivers or other water bodies influences the water body's 'hydrological regime', or more specific 'the quantity and dynamics of water flow'. This also is a quality element under the WFD.<sup>26</sup>

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- 21 F. Helfer, C. Lemckert and Y.G. Anssimov, Osmotic power with Pressure Retarded Osmosis: Theory, performance and trends – A review, *Journal of Membrane Science* 2014 (1) p. 33; A. Cipollina, G. Micale (eds.), *Sustainable Energy from Salinity Gradients*, 2016, pp. 317–318.
  - 22 For an overview of the quality elements for the qualification of ecological status of a water body, see: Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, annex v.
  - 23 In the situation of the test-installation on the *Afsluitdijk* there is, for instance, probably no issue as the installation is built at a site where fresh water discharges into the sea also without the presence of a salinity gradient plant.
  - 24 M. Janssen, A. Härtel, R. van Roij, Boosting capacitive blue-energy and desalination devices with waste heat, *Phys. Rev. Lett.* 2014 (113) p. 1.
  - 25 A. Cipollina, G. Micale (eds.), *Sustainable Energy from Salinity Gradients*, 2016, p. 316.
  - 26 This element actually concerns water quantity rather than water quality. Under the WFD it is qualified, however, under 'Hydromorphological elements supporting the biological elements' and it is used in the assessment process of the water quality of rivers.

### 3 Legal Issue 1: Conflict between the Provisions of the WFD and the Renewable Energy Directive

With respect to surface waters, the Water Framework Directive requires the Member States to achieve two separate, though linked,<sup>27</sup> objectives. First, Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water (the no-deterioration obligation). And second, Member States shall protect, enhance and restore all bodies of surface water, with the aim of achieving ‘good surface water status’ or ‘good ecological potential’.<sup>28</sup> Both a water body’s ecological status and its chemical status must at least be ‘good’ in order to reach this goal.<sup>29</sup> In order to achieve these objectives Member States shall establish ‘programmes of measures’ and ‘river basin management plans’.<sup>30</sup> As shown by the case study in the former section, innovative water-related renewable energy projects could cause a deterioration of some of the quality elements that are used for the qualification of the ecological status of a water body. Therefore, the no-deterioration obligation could form a barrier to the development of this type of projects. At the same time, those projects may actually be necessary to achieve an increased production of renewable energy, as required by the Renewable Energy Directive. In this sense there is a potential conflict between the provisions of the WFD and those of the Renewable Energy Directive. This section explains

27 “Both the obligation to enhance and the obligation to prevent deterioration of the status of bodies of water are designed to attain the qualitative objectives pursued by the EU legislature, namely the preservation or restoration of good status, good ecological potential and good chemical status of surface waters.”, see Case C-461/13, Bund für Umwelt und Naturschutz Deutschland (Weservertiefung) [2014], para. 41.

28 ‘good ecological potential’ applies when the water body in questions is designated as an ‘artificial and heavily modified body of water’. See Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, article 4(1)(a).

29 Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, article 2(18).

30 “The management plan is both a *descriptive document* of the status of the river basin district and an *action plan* in so far as it refers to new measures designed to achieve the objectives of the WFD. On the basis of the estimation of all existing impacts and the outlook for change, a Member State determines the *necessary measures for achieving the environmental objectives* laid down under Article 4 of the WFD.”, see Opinion of Advocate General Jääskinen in Case C-461/13, Bund für Umwelt und Naturschutz Deutschland (Weservertiefung) [2014], para. 52; Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, articles 11 and 13, and annexes VI and VII.

the functioning of the no-deterioration obligation and assesses the extent to which projects such as large-scale tidal and salinity gradient energy may be caught by it.

### 3.1 *The No-deterioration Obligation*

In its seminal *Weser*-judgement the European Court of Justice decided that Member States are required 'to refuse authorisation for an individual project where it may cause a deterioration of the status of a body of surface water or where it jeopardises the attainment of good surface water status or of good ecological potential and good surface water chemical status [...]'. Authorisation does, however, not have to be refused if 'the view is taken that the project is covered by a derogation under Article 4(7)' of the WFD.<sup>31</sup> This is a strict interpretation of the WFD, which differs from the initial interpretation used by the Dutch and German governments. They were of the opinion that the water quality standards of the WFD were only relevant for the river basin management plans and the Member States' programmes of measures for water, and that they do not play a role in the approval of individual projects.<sup>32</sup> In the *Weser*-judgement the ECJ clarified that an individual project's influence on the water quality standards is a decisive factor in the authorisation procedure on the Member State level. As the types of water-related renewable energy projects described in the case study may cause a deterioration of water quality, they risk to be denied authorisation pursuant to this new interpretation of the WFD.

The *Weser*-case also clarified what must be understood by 'a deterioration' in the sense of the WFD. In order to understand this, first some remarks have to be made on how the water quality of a water body is established in the first place. Following from the WFD, the ecological quality of a surface water body is expressed by designating it to one of the following classes: high, good, moderate, poor or bad. The status of the water body is further specified by breaking it down into 'quality elements', which may include elements related to 'fish' or 'salinity', depending on the characteristics of the water body in question.<sup>33</sup> Quality elements for the classification of ecological status are split

31 Case C-461/13, Bund für Umwelt und Naturschutz Deutschland (*Weservertiefung*) [2014], paras. 50–51.

32 H.F.M.W. van Rijswijk, C.W. Backes, Ground Breaking Landmark Case on Environmental Quality Standards? The Consequences of the CJEU '*Weser*-judgment' (C-461/13) for Water Policy and Law and Quality Standards in EU Environmental Law, *Journal for European Environmental & Planning law* 2015 (12) pp. 368–369.

33 Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, annex v.

up into 'biological', 'hydromorphological' and 'physico-chemical' elements. As mentioned in the case study, quality elements that are relevant to tidal and salinity gradient energy include the composition and abundance of fish fauna (a biological quality element), the tidal regime (a hydromorphological quality element), and thermal conditions and salinity (physic-chemical quality elements). The status of the water body as a whole is established according to the 'one out all out' principle, meaning that a water body's status is equal to the status of the quality element with the lowest classification.<sup>34</sup> For example, even as a body of water has excellent thermal and salinity conditions, but the quality element relating to fish is designated as 'poor', then the water quality of the water body as a whole is also qualified as 'poor'.<sup>35</sup>

Having established this, we can now assess the meaning of 'deterioration' in the sense of the WFD. According to the ECJ in *Weser*, one can speak of 'deterioration of the status' of a body of surface water as soon as the status of at least one of the quality elements of the water body falls by one class.<sup>36</sup> This is even the case 'if that fall does not result in a fall in classification of the body of surface water as a whole.'<sup>37</sup> However, if the quality element concerned is already in the lowest class, then 'any deterioration of that element constitutes a "deterioration of the status" of a body of surface water.'<sup>38</sup> This explanation is different from what some Member States and academic literature have

34 Case C-461/13, *Bund für Umwelt und Naturschutz Deutschland (Weservertiefung)* [2014], para. 59; and Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, annex V, Section 1.4.2(i).

35 See also J.J.H van Kempen, *Kroniek jurisprudentie waterrecht*, M&R 2016 (89) p. 523, and H.F.M.W. van Rijswijk, C.W. Backes, *Ground Breaking Landmark Case on Environmental Quality Standards? The Consequences of the CJEU 'Weser-judgment' (C-461/13) for Water Policy and Law and Quality Standards in EU Environmental Law*, *Journal for European Environmental & Planning law* 2015 (12) p. 373.

36 Case C-461/13, *Bund für Umwelt und Naturschutz Deutschland (Weservertiefung)* [2014], para. 69.

37 With reference to the example given earlier, this could for instance be the case if the quality element 'salinity' drops from a 'high' to 'good' class, while the water body as a whole was qualified as 'poor' due to the bad situation of its fish stock. In that situation the fall of the quality element 'salinity' by one class does not result in a fall in classification of the body of surface water as a whole. Nevertheless, it will result in a 'deterioration' in the sense of the WFD.

38 Case C-461/13, *Bund für Umwelt und Naturschutz Deutschland (Weservertiefung)* [2014], para. 69.

suggested in the past.<sup>39</sup> When applying these rules to tidal energy this could for instance mean that a turbine's negative effects on the quality element 'composition and abundance of fish fauna' may cause a prohibited deterioration of the water quality, even when the rest of the water body's quality elements are in a good conditions and the status of the water body as a whole would remain unchanged.

It must be noted, however, that not *every* deterioration of a quality element will immediately lead to a deterioration in the sense of the WFD.<sup>40</sup> As long as quality elements stay within their present class, deterioration is allowed. With respect to 'biological quality elements' this aspect is explained quite well by Annex V of the WFD. According to the WFD the Member States have to establish so-called 'limit values'<sup>41</sup> for the biological quality elements<sup>42</sup> in order to indicate the boundaries between the different classes.<sup>43</sup> There is some room for deterioration as long as a new renewable energy project does not cause the quality element in question to fall below the limit value. In that case, it will remain in the same class and there will be no deterioration in the sense of the

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39 France, for instance, codified a 'lenient interpretation', 'according to which a water body only deteriorates if it passes to a lower water class', see for further elaboration on this discussion H.F.M.W. van Rijswijk, C.W. Backes, Ground Breaking Landmark Case on Environmental Quality Standards? The Consequences of the CJEU 'Weser-judgment' (C-461/13) for Water Policy and Law and Quality Standards in EU Environmental Law, *Journal for European Environmental & Planning law* 2015 (12) p. 372.

40 See in this regard: H.F.M.W. van Rijswijk, C.W. Backes, Ground Breaking Landmark Case on Environmental Quality Standards? The Consequences of the CJEU 'Weser-judgment' (C-461/13) for Water Policy and Law and Quality Standards in EU Environmental Law, *Journal for European Environmental & Planning law* 2015 (12) p. 374, and K Faßbender, *Wasserrechtliche Ausnahmeprüfung nach dem EuGH-Urteil zur Schwarzen Sulm*, *Natur und Recht* 2017 (39) p. 435.

41 These values are so-called 'ecological quality ratios' (EQR's), which are numerical values that represent the relationship between the current water conditions and the situation that the water body would be in a normal, undisturbed condition. The ratio is expressed 'as a numerical value between zero and one, with high ecological status represented by values close to one and bad ecological status by values close to zero.' See Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, annex v, Section 1.4.1(ii).

42 The WFD does not explain in detail how this works for 'hydromorphological' and 'physico-chemical' quality elements.

43 Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, annex v, Section 1.4.1(ii).

WFD. This is also what a Dutch court concluded in the *Borgharen*-case (2017), which is a case on the authorisation of a hydro-energy<sup>44</sup> plant in the Meuse river in the south of the Netherlands. In that case the lower limit value for the class 'poor' for the quality element 'fish' in the Meuse river was an EQR<sup>45</sup> of 0.40, while the present EQR value of that quality element was 0.47. This means that there was room for a deterioration of the fish stock of 0.07 before it would be a prohibited deterioration in the sense of the WFD. In the *Borgharen*-case the Dutch court concluded that the competent authority in question had presented sufficient proof that deterioration caused by the hydro-energy plant would stay above the lower limit mentioned above.<sup>46</sup> Hence, the quality element 'fish' would not fall to the class 'bad' and the Dutch court decided that the project was therefore permissible on the basis of the WFD.<sup>47</sup>

The Weser case shows that the ECJ takes a strict approach to the no-deterioration obligation, which leaves no room for substantial deteriorations of water quality unless the derogation clause applies. With respect to innovative renewable energy technologies it is, however, often uncertain whether or not deterioration of water quality will occur at all. The next section elaborates on this kind of situations.

### 3.2 *Uncertainty*

There is still a considerable lack of scientific knowledge on the nature and the extent of the environmental effects of innovative water-related renewable energy technologies. This is mainly caused by the fact that these are relatively new technologies and that few projects have been realised so far. Therefore there is limited environmental monitoring data available. These knowledge gaps get more problematic as the size of projects grow.<sup>48</sup> Moreover, as different project locations and different project scales have different characteristics, findings on the environmental effects of one project, may not automatically

44 See footnote 64 below for a technical explanation of hydro-energy.

45 See footnote 41 above for an explanation of 'ecological quality ratios' (EQR's).

46 Rechtbank Midden-Nederland, Case ECLI:NL:RBMNE:2017:2109, Waterkrachtcentrale Borgharen ['Borgharen hydro-energy plant'] paras. 29 and 34.

47 However, unfortunately for the project developer there also was a national Dutch policy rule that applied to the project in this case. As that rule was stricter than the WFD requirements it caused the court to annul the project authorisation after all.

See: Rechtbank Midden-Nederland, Case ECLI:NL:RBMNE:2017:2109, Waterkrachtcentrale Borgharen ['Borgharen hydro-energy plant'] paras. 51 and 56.

48 G. Wright, et al., Establishing a legal research agenda for ocean energy, Marine Policy 2016 (63) p. 128.

be transferable to another project.<sup>49</sup> These issues are reflected in the prior-authorisation assessments for the small-scale tidal energy projects referred to in the case study above.<sup>50</sup> These assessments only talk about 'potential' and 'expected' environmental effects, and they indicate the need for post-construction monitoring in order to gain more knowledge on these environmental effects.<sup>51</sup>

The Court in *Weser* decided that project authorisation should be denied if a project causes deterioration of water quality. It did not, however, explain what happens if there is scientific uncertainty on whether deterioration of water quality will occur or not. In its judgements on the application of the Natura 2000 rules, the ECJ was more specific on the issue of scientific uncertainty. In its *Sweetman* judgement it stated that projects under the Habitats Directive may be given authorisation *only* when the competent authorities 'are certain' that the project will not have lasting adverse effects on the integrity of a protected nature site. According to the ECJ this certainty exists 'where no reasonable scientific doubt remains as to the absence of such effects'.<sup>52</sup> Arguably, the 'no reasonable scientific doubt' interpretation should also be applied to the WFD. By deciding that a deterioration of a water quality element by one class leads to refusal of project authorisation, the ECJ in *Weser* seems to have given the WFD's no-deterioration obligation an equally strict interpretation as the Natura 2000's authorisation rules for projects that may harm the integrity of protected nature sites. The practical implication of the ECJ's ruling in *Sweetman* is that authorities must refuse to authorise a project where uncertainty remains.<sup>53</sup> If the same approach is indeed applied to the WFD in relation to tidal and salinity gradient energy, then it could well mean that authorisation of many projects will have to be rejected because of the existence of unresolved uncertainties about their effect on water quality.

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49 G. Wright, Environmental Impact Assessment to Support Marine Innovation: The 'Rochdale Envelope' and 'Deploy & Monitor' in the UK's Ocean Energy Industry, in B. Vanheusden and L. Squintani (eds.) *EU Environmental and Planning Law Aspects of Large-Scale Projects*, 2016, p. 191.

50 See Section 2.

51 Marine Scotland, *MeyGen Decision – Appropriate Assessment*, September 2013, <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/MeyGen/AppropriateAssessment>, for instance p. 90, and IMARES, Institute for Marine Resources & Ecosystem Studies, 'Passende Beoordeling van een getijdencentrale in de Oosterscheldekering' [Appropriate Assessment of a tidal energy plant in the Oosterschelde storm surge barrier], 27 April 2010, for instance p. 48.

52 Case C-258/11, *Sweetman*, para. 40.

53 Case C-258/11, *Sweetman*, para. 41.

Another interesting case in this regard is the abovementioned Dutch *Borgharen* hydro-energy case (2017). This case featured a discussion on the type of risk assessment to be used in the face of uncertainty about the hydro-energy plant's effects on fish mortality. In the *Borgharen* case, the prevailing norm<sup>54</sup> describing the maximum fish-mortality was a very precise and strict one. Therefore, the Dutch court considered it appropriate to use a 'worst case scenario', leaving no doubt that the maximum fish-mortality norm would be respected. The court decided to annul the project authorisation as the competent authority was not able to prove beforehand that the worst case scenario would not occur. The competent authority's argument, that a more flexible test should be used because a certain amount of uncertainty is inherent to the application of a new technique, was rejected by the court.<sup>55</sup>

Both the *Sweetman* and *Borgharen* cases show how strict environmental norms may have to be applied in the face of uncertain environmental effects. In both cases the courts decided that uncertainty should be taken away, and that, in the case this is not possible, project authorisation should be refused. The ECJ's *Weser* judgement advocates a strict interpretation of the no-deterioration obligation, and seems to leave few room for uncertainty and experimenting with new technologies.<sup>56</sup> It would therefore be a logical consequence of the *Weser*-judgement to also apply the interpretations used in *Sweetman* and *Borgharen* to the no-deterioration obligation under the WFD. A strict interpretation, which entails project refusal in cases that uncertainty cannot be taken away, would also be in line with the precautionary principle, which is one of the principles that are at the basis of the Water Framework Directive.<sup>57</sup>

In conclusion, it is argued in this article that in the face of lasting uncertainty about an innovative water-related renewable energy project's effects on water quality, a competent authority will have to decide to refuse project authorisation. Possible paths that could lead to evading such refusal are *mitigation* and a *derogation under Article 4(7) WFD*. These options are discussed in the following sections.

54 In this case this was not the WFD's no-deterioration obligation but an even stricter Dutch policy rule on hydro-energy plants.

55 Rechtbank Midden-Nederland, Case ECLI:NL:RBMNE:2017:2109, Waterkrachtcentrale Borgharen ['Borgharen hydro-energy plant'] paras. 40–42 and 49–51.

56 T. Paloniitty, *The Weser Case: Case C-461/13 Bund v Germany*, *Journal of Environmental Law* 2016 (28), pp. 157–158.

57 Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, para. 11 of the preamble.

### 3.3 *Mitigation*

Mitigation measures can be described as ‘measures aimed at minimising or even cancelling the negative impact’ of a project.<sup>58</sup> Mitigation measures usually are an integral part of the project and are aimed at preventing deterioration of water quality from occurring in the first place. Unfortunately, neither in academic literature, nor in reports from practice, descriptions are given of effective methods for mitigating negative effects on water quality caused by tidal and salinity gradient energy plants. Fish barriers are sometimes mentioned as a possible mitigation measure for preventing fish-turbine collisions. These are, however, problematic as they cause a loss of hydraulic power which is needed for energy production, and it is difficult to keep them clean.<sup>59</sup>

Nonetheless, even if suitable mitigation measures will be found in the future, these can only be successful at preventing a refusal to grant project authorisation if they succeed at taking away the negative effects on water quality or any remaining uncertainty with regard to the occurrence of such effects. This will often be difficult to prove beforehand as innovative water-related renewable energy projects often concern first-of-a-kind projects. Moreover, the results of mitigation measures applied in small-scale projects are not automatically transferable to large-scale projects. Hence, the burden of proof for mitigation measures is high and therefore mitigation measures will not normally be an easy project-saver in the case of possible negative effects caused by new and innovative renewable energy techniques. This is also shown by the Dutch *Borgharen* hydro-energy plant case (2017), which – although not technically comparable to tidal or salinity gradient energy – also used new techniques that were not previously tested elsewhere. In that case the project developer was not able to prove beforehand that the planned fish passages would indeed succeed in sufficiently mitigating the negative effects of the turbines.

### 3.4 *Conclusion*

It is argued in this article that in the face of lasting uncertainty about an innovative water-related renewable energy project’s effects on water quality, a competent authority will have to decide to refuse project authorisation. It is expected that mitigation measures will not always be effective at preventing

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58 See for instance: European Commission, ‘Managing Natura 2000 sites – Provisions of Article 6 of the “Habitats” Directive 92/43/CEE (2000)’, [http://ec.europa.eu/environment/nature/naturazoo0/management/docs/art6/provision\\_of\\_art6\\_en.pdf](http://ec.europa.eu/environment/nature/naturazoo0/management/docs/art6/provision_of_art6_en.pdf), pp. 36–37.

59 Based on an interview with Dr. ir. J. van Berkel, Professor of Sustainable Energy in Delta Areas at the HZ University of Applied Sciences in Vlissingen, the Netherlands. The interview transcript is available from the author.

deteriorations or at taking away uncertainties. In that situation only the derogation clause of Article 4(7) WFD can be used to prevent project authorisation from being refused.

#### 4 Legal Issue II: Lack of Integration between the Renewable Energy Directive and the Derogation Clause of the Water Framework Directive

Article 4(7) WFD contains a derogation clause that allows for the weighing of water quality interests against other interests.<sup>60</sup> Its application could, if all conditions are fulfilled, lead to a renewable energy project's derogation from the WFD's obligation to prevent deterioration of water quality. There is however no actual integration between the derogation clause and the Renewable Energy Directive (RED). Nor is there an obligation to apply the clause in cases where a renewable energy project risks to cause a prohibited deterioration of water quality. Therefore, there is no guarantee that applications for the authorisation of renewable energy projects that are important for achieving the RED's goals will actually be weighed under the WFD. Nor is there a guarantee that a serious balancing of interests will take place.

The following sections first discuss the scope of the derogation clause, and secondly its lack of integration with the Renewable Energy Directive.

##### 4.1 Article 4(7) WFD: The Derogation Clause

According to Article 4(7) WFD, Member States are not in breach of the WFD if failure to achieve good water status, or failure to prevent deterioration of water status, is the result of 'new modifications to the physical characteristics of a surface water body'.<sup>61</sup> Moreover, the article mentions four conditions that

60 Case C-461/13, Bund für Umwelt und Naturschutz Deutschland (Weservertiefung) [2014], para. 68.

61 According to Article 4(7) WFD also 'failure to prevent deterioration from high status to good status of a body of surface water' is not in breach with the WFD if such failure is the result of 'new sustainable human development activities'. Up until now it is, however, unclear what this latter phrase entails and to what kind of situations it applies. See in this regard: K. Faßbender, *Wasserrechtliche Ausnahmeprüfung nach dem EuGH-Urteil zur Schwarzen Sulm*, *Natur und Recht* 2017 (39) p. 434, footnote 20, and also: Common Implementation Strategy for the Water Framework Directive, Guidance Document no. 20 'Guidance document on exemptions to the environmental objectives', 2009, p. 24. Due to the lack of clarity on the practical relevance of this phrase it is not further dealt with in this article.

should be met in order for the derogation clause to be applicable. Before discussing these conditions it is important, for the purposes of this article, to determine if renewable energy projects such as tidal and salinity gradient energy are covered by 'new modifications to the physical characteristics of a surface water body'. The WFD does not specify the scope of this concept.

#### 4.1.1 New Modifications to the Physical Characteristics of a Surface Water Body

Arguably, renewable energy project such as tidal and salinity gradient energy can be qualified as 'new modifications to the physical characteristics of a surface water body'. A first argument in that regard can be derived from the seminal *Schwarze Sulm* case of the European Court of Justice. This judgement shows that at least some renewable energy projects may be regarded as 'new modifications' in the sense of Article 4(7) WFD. In *Schwarze Sulm* the European Commission issued an infringement procedure to contest the authorisation – given by the local Austrian authorities – of the construction of a hydropower plant on the Schwarze Sulm river. The project would affect the course of the river over a stretch of 8 kilometers and would cause a deterioration of the status of the body of surface water of the Schwarze Sulm river. The Austrian authorities successfully relied on the derogation provided by Article 4(7) WFD.<sup>62</sup> The ECJ seems to accept without any reluctance that the hydro-energy plant is a 'new modification to the physical characteristics of a surface water body', as it moves on to the discussion of the four conditions set out in Article 4(7) without bothering to discuss the pre-condition of the existence of 'new modifications' at all.<sup>63</sup> This finding does, however, not automatically mean that also tidal and salinity gradient energy projects can be qualified as 'new modifications' in the sense of the WFD. Tidal and salinity gradient energy use significantly different techniques than hydro-energy plants.<sup>64</sup> There is, however, sufficient technological overlap in order to reasonably argue that the techniques researched in this article are also eligible for a derogation under Article 4(7). This is most clear for salinity gradient energy, which extracts water

62 Case C-346/14, *European Commission v Republic of Austria (Schwarze Sulm)* [2016], paras. 60–61.

63 Case C-346/14, *European Commission v Republic of Austria (Schwarze Sulm)* [2016], paras. 64–66.

64 Hydro-energy usually implies the diversion of a substantial amount of water from the river through a pressurised pipe into a turbine, after which the used water is redirected back into the river downstream. This is also the technique envisaged for the hydro-energy plant in the Schwarze Sulm, see: <http://www.sulmkraft.at/Sulmkraft/FUNKTIONSPRINZIP.html>.

from a surface water body in a way similar hydro-energy plants, albeit for a different purpose and possibly in different amounts. Tidal stream energy does not require abstraction of water,<sup>65</sup> but it does influence the water flow as turbines form a barrier in the surface water body. Arguably, this must also be qualified as a 'modification' in the sense of the WFD. Like hydro-energy devices, tidal stream turbines modify the normal water flow, albeit through a different method. Moreover, in academic literature it is argued that even changes in *water quality* could be regarded as 'modifications to the physical characteristics of a surface water body'.<sup>66</sup> Such a broad interpretation of Article 4(7) would make it even more likely that all kinds of water-related renewable energy projects can be fitted under the 'new modifications' concept. A final contribution to support the argument that tidal energy projects can be qualified as 'new modifications' in the sense of Article 4(7) is given by the 'Common implementation strategy for the Water Framework Directive' (CIS). One of the Guidance documents of this strategy states that 'Modifications to the physical characteristics of water bodies mean modifications to their hydro-morphological characteristics.'<sup>67</sup> According to this interpretation, tidal energy would fall under the 'new modifications' concept as tidal energy can bring about 'changes in the tidal regime', which is a modification of hydro-morphological nature. The CIS is, however, not of a legally binding nature, but rather a consensus document on 'best practices' agreed on by the Member States, the Commission and other WFD stakeholders. It is therefore unsure if this interpretation would also be accepted by the ECJ.

While the above shows that it is likely that tidal and salinity gradient energy projects can be regarded as 'new modifications', these projects can only benefit from the derogation clause if the four conditions discussed in the following section are fulfilled.

#### 4.1.2 Conditions 1 and 2: Mitigation and Reference in the RBMP

The first two of Article 4(7)'s conditions are merely procedural and relatively easy to be met. The *first condition* requires that all practicable steps are taken

65 This is different for *tidal range energy* which does not only require the abstraction of water, but usually also requires a barrage to be built in order to create two separate water basins. Therefore, tidal range energy projects will probably easily qualify as 'new modifications to the physical characteristics of a surface water body'.

66 K. Faßbender, *Wasserrechtliche Ausnahmeprüfung nach dem EuGH-Urteil zur Schwarzen Sulm*, *Natur und Recht* 2017 (39) p. 437.

67 Common Implementation Strategy for the Water Framework Directive, Guidance Document no. 20 'Guidance document on exemptions to the environmental objectives', 2009, p. 24.

to mitigate the adverse impact on the status of the body of water. See Section 3.3 above for further elaboration on mitigation measures for tidal and salinity gradient energy. The *second condition* requires that the reasons for the 'new modifications to the physical characteristics of a surface water body' are specifically set out and explained in the river basin management plan and the objectives are reviewed every six years.<sup>68</sup>

The third and the fourth conditions, however, offer the Member State's competent authorities a considerable amount of discretionary power and require them to weigh water quality interests against non-water quality interests.

#### 4.1.3 Condition 3: Reasons of Overriding Public Interest and Weighing of Interests

The *third condition* requires that 'the reasons for [the modifications] are of overriding public interest and/or the benefits to the environment and to society of achieving the [no-deterioration objective] is outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development.' The first question that has to be answered in this respect is if renewable energy projects may be considered to be 'of overriding public interest'. In its aforementioned *Schwarze Sulm* judgement the ECJ answers this question in the affirmative. It states that Member States have 'a certain margin of discretion for determining whether a specific project is of such interest'. Austria was therefore entitled to consider that the hydro-energy project in question was an overriding public interest. Moreover, the Court refers to the EU's environmental and renewable energy policy to support its findings.<sup>69</sup> Subsequently, the third condition requires a balancing of interests to be made between the benefits of the renewable energy project in question and the deterioration of the water body caused by that project. In *Schwarze Sulm* the competent authority concluded that the public interest of constructing the hydro-energy project was clearly higher than the harm done to the environmental objectives mentioned in the WFD. It reached this conclusion due to the project's 'major importance for the region's sustainable development', the project's positive energy result, its 'positive contribution towards the reduction in global warming', and the 'economic aspects of the project for the local economy'. The competent authority also took account of the very high ecological quality of the Schwarze Sulm river, but found that

68 Section 5.2, fourth paragraph, of this article discusses a possible approach to increase integration between River Basin Management Plans and renewable energy policy and law.

69 Case C-346/14, European Commission v Republic of Austria (*Schwarze Sulm*) [2016], paras. 70–73.

the project's advantages for the public interest outweighed its negative effect on the WFD's non-deterioration objective.<sup>70</sup> According to the ECJ, the Austrian competent authority 'based himself on a detailed and specific scientific analysis of the contested project, before going on to conclude that the conditions for a derogation from the prohibition of deterioration were met'. Moreover, the ECJ emphasises that the competent authority 'reached a decision on the basis of a study from the Institute which was such as to provide him with relevant information on the impact of the contested project'. The Court therefore considered that the competent authority could rightly consider the conditions of Article 4(7) to be met.<sup>71</sup> It follows from the foregoing that Member States have a high level of discretionary power as it comes to balancing water quality interests against renewable energy interests. As long as they present a well-founded analysis, the result of the balancing act is likely to be accepted by the ECJ.<sup>72</sup>

#### 4.1.4 Condition 4: There are No Suitable Alternatives

The fourth and final condition mentioned by Article 4(7) requires that 'the beneficial objectives served by [the modifications] of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.' Neither the WFD, nor the ECJ in *Schwarze Sulm* give any further clarification on what type of alternative options should be investigated in this regard, nor do they specify what 'a significantly better environmental option' entails. Instead – similarly to its reasoning in relation to the third condition – the ECJ leaves the appraisal of whether there are suitable alternatives completely to the Member States.<sup>73</sup>

70 Case C-346/14, European Commission v Republic of Austria (*Schwarze Sulm*) [2016], paras. 77–80.

71 Case C-346/14, European Commission v Republic of Austria (*Schwarze Sulm*) [2016], paras. 80–81.

72 It must be observed, however, that the *Schwarze Sulm* had a very high water quality. Arguably, the evidence that a renewable energy project outweighs water quality interests should be stronger in situations where the deterioration concerns a water body that is in a much lower quality class, or where it concerns an artificial and heavily modified body of water.

73 The Court simply observes in this regard: "[...] the national authorities weighed up the expected benefits of the contested project with the resulting deterioration of the status of the body of surface water of the *Schwarze Sulm*. On the basis of that weighing-up, they were entitled to find [...] that the objectives pursued by the project could not, for reasons of technical feasibility or disproportionate cost, be achieved by other means which would

By reaching this conclusion, the Court leaves open an important issue that has been raised by the Commission in *Schwarze Sulm*. According to the Commission, the fourth condition of Article 4(7) requires Member States to conduct investigations into 'potential substitute sites' and 'other renewable energy sources'.<sup>74</sup> Interpreting article 4(7) WFD in such a way that it requires stakeholders to research the possibility to use different energy sources, such as wind or solar power, may cause problems for a Member State's renewable energy policy. Article 4(7) requires a choice for the significantly better environmental option, if available. It is likely to be easier to prove the absence of negative environmental effects for established renewable energy techniques, such as wind and solar energy. The aforementioned interpretation could therefore require competent authorities to give precedence to these techniques over innovative ones. Such an interpretation of the fourth condition of Article 4(7) could therefore frustrate a government's policy to create a healthy energy mix including renewable energy sources which provide a continuous (base load) supply of energy, such as tidal and salinity gradient energy. It does not follow from the *Schwarze Sulm* case if the Austrian authorities have conducted investigations into other renewable energy sources. The Court dismissed the Commission's allegations that the authorities had not lived up to their obligations under the fourth condition of Article 4(7) on the basis that the Commission presented insufficient arguments to that end.<sup>75</sup> The exact scope of the fourth condition therefore remains unclear. Based on the foregoing the author of this article takes the position that it is better if Article 4(7) does not require Member States to consider alternatives that entail a completely different type of project. This position is also taken elsewhere in legal literature.<sup>76</sup>

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have been a significantly better environmental option." See Case C-346/14, European Commission v Republic of Austria (*Schwarze Sulm*) [2016], para. 74.

74 Case C-346/14, European Commission v Republic of Austria (*Schwarze Sulm*) [2016], para. 33.

75 Case C-346/14, European Commission v Republic of Austria (*Schwarze Sulm*) [2016], paras. 82–83.

76 K. Faßbender, *Wasserrechtliche Ausnahmeprüfung nach dem EuGH-Urteil zur Schwarzen Sulm*, *Natur und Recht* 2017 (39) p. 436. A similar discussion is taking place with respect to the 'no-alternatives' condition of the derogation clauses in the Habitats and Birds directives, see for instance: R. Frins and H. Schoukens, *Balancing Wind Energy And Nature Protection: From Policy Conflicts Towards Genuine Sustainable Development?*, in L. Squintani and H.H.B. Vedder (eds.) *Sustainable Energy United in Diversity – Challenges and approaches in energy transition in the EU*, 2014, p. 93.

#### 4.2 *Lack of Integration*

Having discussed the various aspects of the derogation clause of article 4(7), this section further elaborates on the lack of integration between article 4(7) and the goals of the Renewable Energy Directive.

While the WFD's no-deterioration obligation can form a barrier for innovative water-related renewable energy projects, the WFD also offers the possibility for a derogation for such projects. The mere fact that there is a possibility to derogate from the WFD's objectives for the benefit of renewable energy shows that the concept of 'policy integration'<sup>77</sup> is embedded in the WFD at least to some extent. Policy integration – which is one of the main aspects of sustainable development – requires the EU and its Member States to take all sustainability-related policy objectives into account in all the decisions that they take.<sup>78</sup> These policy objectives include the protection of water quality, but also the promotion of renewable energy production. Nevertheless, the mere existence of a procedure that allows for weighing various policy objectives does not as such guarantee that that procedure is also used in practice, nor does it guarantee that the weighing exercise is carried out in a manner that fits both in the water *and* in the renewable energy policy of the Member State in question. In other words, the existence of a procedure that embodies aspects of sustainable development, does not automatically lead to a sustainable outcome.<sup>79</sup>

While it is possible to take renewable energy into account under Article 4(7) WFD, that article does not specify *to what extent* renewable energy *can and should* be taken into account. It is also unclear what the importance of renewable energy is compared to the protection of water quality. By not specifying

77 In this article 'policy integration' is defined in conformity with its definition within European Union law and policy, notably Articles 7 and 11 TFEU and the Renewed EU Sustainable Development Strategy. According to these sources the European Union "shall ensure consistency between its policies and activities" (Article 7 TFEU) and shall "Promote integration of economic, social and environmental considerations so that they are coherent and mutually reinforce each other by making full use of instruments for better regulation, such as balanced impact assessment and stakeholder consultations." (the Renewed EU Sustainable Development Strategy). For further elaboration on policy integration see: S. van Hees, Sustainable Development in the EU: Redefining and Operationalizing the Concept, *Utrecht Law Review* 2014 (2), Sections 2.1 and 2.3.1.

78 S. van Hees, Sustainable Development in the EU: Redefining and Operationalizing the Concept, *Utrecht Law Review* 2014 (2) pp. 66–68.

79 S. van Hees, Sustainable Development in the EU: Redefining and Operationalizing the Concept, *Utrecht Law Review* 2014 (2) p. 76.

this, there remains a considerable amount of fragmentation<sup>80</sup> between the Water Framework Directive and the Renewable Energy Directive. Whether or not integration will occur under Article 4(7) is completely dependent on the – often decentralised – national authorities that are responsible for the implementation of the WFD. As discussed before, these authorities have a considerable amount of policy discretion, especially when it comes to the appraisal of the third and fourth conditions of Article 4(7) WFD.<sup>81</sup> These authorities can decide to take renewable energy into account under the derogation clause, which happened in the *Schwarze Sulm* case. However, they can also decide not to do so, as there is no obligation to actually apply the derogation clause in a specific case. It may be difficult for authorities that have enforcement of the water quality rules as their primary task, to take renewable energy into account at all times. These authorities could be tempted to focus on the protection of water quality. If a competent authority decides to refuse the authorisation of a future innovative water-related renewable energy project, this could be a very good decision from a case level perspective. The project's impact on water quality might in that specific case indeed seem to be higher than its contribution to renewable energy production. However, in order to achieve a fair balancing act, the role that a specific renewable energy project plays within the broader renewable energy strategy of the Member State in question should also be taken into account in that decision. The WFD does currently not guarantee that this will happen in practice.

80 In this article 'fragmentation of law' is understood as a situation in which areas of law that are interrelated are in practice partially or fully dealt with in isolation. In relation to water quality and renewable energy policy both horizontal and vertical fragmentation can be distinguished. There is horizontal fragmentation, as the policy areas *water quality* and *renewable energy* are dealt with in separate sectoral directives (multi-sector governance), and vertical fragmentation, as both policy areas are often dealt with by separate governmental bodies that are responsible for just one of the two policy areas (multi-level governance). For further analysis on fragmentation in EU law in relation to renewable energy, see: K. Van Hende, *Offshore Wind in the European Union – Towards Integrated Management of Our Marine Waters*, 2015, pp. 68–69 and 77–78. For an overview of the history of the concept of fragmentation in legal literature, see: H.K. Gilissen, et al., *Bridges over Troubled Waters: An Interdisciplinary Framework for Evaluating the Interconnectedness within Fragmented Flood Risk Management Systems*, *Journal of Water Law* 2016 (1) pp. 13–14.

81 In this regard, also see: S. van Holten and M. van Rijswijk, *The consequences of a governance approach in European Environmental directives for flexibility, effectiveness and legitimacy*, in M. Peeters and R. Uylenburg (eds.) *EU environmental legislation – Legal perspectives on regulatory strategies*, Cheltenham, 2014, pp. 35–36.

The following sections deal with the question how the two legal issues mentioned in this article can be dealt with.

## 5 Solutions to the Legal Issues: Dealing with Uncertainty and Towards Better Integration in the Energy-Water Nexus

The former sections of this article discussed two legal issues that relate to the conflict between the interest of protecting water quality under the Water Framework Directive (WFD), versus the interest of promoting the use of innovative water-related renewable energy, with regard to the quota in the Renewable Energy Directive. These issues are: *first*, the conflict between the provisions of the WFD and the Renewable Energy Directive as expressed by the no-deterioration obligation, and *second*, the lack of integration between the Renewable Energy Directive and the derogation clause of the Water Framework Directive. Tidal energy and salinity gradient energy have been used as a case study to show the practical relevance of the legal issues at hand. This final section discusses possible solutions to the abovementioned legal issues.

### 5.1 *Dealing with Uncertainty*

In Section 3.2 it has been argued that the no-deterioration obligation leaves no room for uncertainty concerning the effects of a renewable energy project on water quality. Uncertainty needs to be taken away, and if that is not possible then project authorisation should be refused. In cases in which it is not possible to take away scientific uncertainty about a project's negative effects on water quality, the most straightforward solution is to invoke the derogation clause of Article 4(7) WFD. There might, however, be situations in which it is undesirable to do so. This could be the case, for instance, if the water body in question is in a very bad status and that further deterioration is undesirable, even if it would be for the benefit of renewable energy production. Moreover, from the perspective of the precautionary principle Article 4(7) should arguably only be used as a last resort, when all other policy options are exhausted.

In this regard 'adaptive management in combination with phased deployment' could be an interesting alternative policy option. Adaptive management is a flexible way of taking a licensing decision, which can be relevant for situations where there is an important enough problem to necessitate taking action in the face of uncertainty. It requires a strong monitoring and evaluation process. The lessons learnt from this process will lead to better scientific understanding over time. These lessons are subsequently used to take a better

informed decision at the next decision point.<sup>82</sup> A disadvantage of this definition of adaptive management is that it allows for possible negative effects to occur initially, so that they can be taken into account in the decision for a second project. This may not be compatible with the WFD's non-deterioration obligation, which – as argued before – does not allow for uncertainty with regard to a project's negative effects. This issue can be solved by applying adaptive management in combination with 'phased deployment'.

Phased deployment means that the development will start at a small scale, for instance with a few tidal stream turbines only. This first phase will – although the exact scope of its negative effects on water quality may be unknown – because of its small size never cause a deterioration that is prohibited under the WFD.<sup>83</sup> There will however be a clear intention to considerably scale up the array in the future. In order to inform future phases of development the initial small-scale project will be bound to intensive monitoring requirements. The approval of subsequent phases of development will only be granted if the competent authority is certain that water quality-related risks of the larger-scale development are well understood (based on the information gathered from the monitoring of the small-scale project).<sup>84</sup> An example of how the phased deployment approach can be applied is provided by the *Pentland Firth* tidal energy project in Scotland. In this project the competent authorities main concerns were related to the Natura 2000 rules on biodiversity. While the project proposal refers to a deployment of up to 61 tidal turbines,<sup>85</sup> the turbines will be installed in stages and the first phase has been restricted to 6 turbines. Monitoring is required to inform decisions on future deployments and further environmental assessments will be required before further deployments are

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82 This explanation of adaptive management is derived from the technical guide on adaptive management of the U.S. Department of the Interior; see: B.K. Williams, R.C. Szaro and C.D. Shapiro, *Adaptive Management: The U.S. Department of the Interior Technical Guide*, 2009, Adaptive Management Working Group, U.S. Department of the Interior, Washington, DC.

83 As mentioned before, the WFD allows for some degree of deterioration. See Section 3.1 of this article.

84 This explanation is derived from Marine Scotland's 'survey deploy and monitor' policy, which combines adaptive management with phased deployment. Marine Scotland is the competent authority for most offshore energy projects in Scotland. See: Marine Scotland, *Survey, deploy and monitor licensing policy guidance (version 2)*, <http://www.gov.scot/Topics/marine/Licensing/marine/Applications/SDM>, pp. 6–7.

85 Marine Scotland, *MeyGen Decision, Decision Letter and Conditions*, <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/MeyGen/DecisionLetter>, p. 25.

authorised in order to ensure that full consideration is given to any potential increase in impacts on the relevant Natura 2000 site an species.<sup>86</sup>

Adaptive management combined with phased deployment is an interesting policy option for renewable energy developments that are coping with uncertainty, as it allows these developments to proceed anyway – although on a small scale – while gaining more scientific knowledge over time.<sup>87</sup> A clear disadvantage of phased deployment is, however, that it risks to slow down the transition to an increased innovative renewable energy supply in 2020, which actually requires a rapid development of large-scale – rather than small-scale – energy projects. Moreover, initial phases of the project may point out that not all negative effects of innovative water-related energy projects can be prevented. Therefore, subsequent phases may be denied authorisation after all. In that case the only solution left might be to use the derogation clause of Article 4(7) WFD. Yet, even when the derogation clause is applied it may still be useful to apply an adaptive management approach combined with phased deployment. When Article 4(7) is used, no absolute certainty as to the absence of negative effects of the first phase on water quality is required. The first phase may therefore consist of a larger and more risky project than in a situation without application of the derogation clause. However, monitoring results collected during the first phase of the project could still be used to feed into the decision making process of future phases. If these results show that negative effects do not occur, then it would not longer be necessary to invoke Article 4(7) for future phases of the project.

## 5.2 *Towards Better Integration*

In Section 4.2 it has been argued that there is fragmentation between the WFD's derogation clause on the one hand, and the goals of the Renewable Energy Directive on the other hand. This fragmentation is caused by the lack of specification in Article 4(7) WFD of *to what extent* renewable energy *can and should* be taken into account in that article. It is also remains unclear what the importance of renewable energy is compared to the protection of water

86 Marine Scotland, MeyGen Decision – Appropriate Assessment, <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/MeyGen/AppropriateAssessment>, p. 77.

87 Or as Marine Scotland puts it: '[the Survey, deploy and monitor licensing policy guidance] is designed to enable novel technologies whose potential effects are poorly understood to be deployed in a manner that will simultaneously reduce scientific uncertainty over time whilst enabling a level of activity that is proportionate to the risks.' Marine Scotland, Survey, deploy and monitor licensing policy guidance (version 2), <http://www.gov.scot/Topics/marine/Licensing/marine/Applications/SDM>, p. 1.

quality. These unclaritys may hamper the carrying out of a fair balancing act between water quality and renewable energy interests under Article 4(7) WFD.

The introduction of detailed national renewable energy plans per Member State could be a practical solution to the issue of fragmentation. Such plans would indicate *which types of projects at which sites* are essential in the light of achieving the Member State's renewable energy quota under the Renewable Energy Directive, and which are not.<sup>88</sup> It should be flexible plans, that allow for additions and alterations, as policy and technological developments progress over time. The guidance given by a national renewable energy plan can be used by competent authorities to justify and explain the use of their discretionary powers under the derogation clause of the Water Framework Directive. If a competent authority is aware at an early stage of the great importance – or the low importance, for that matter – of a specific renewable energy project, then it will be better positioned to weigh the interest of that specific renewable energy project against the interest of preventing deterioration of water quality. In some Member States innovative water-related forms of energy production – such as tidal and salinity gradient energy – would feature in the national renewable energy plan, while other Member States may choose to focus on other forms of energy. This may for instance be the case if the Member State in question does not have water bodies that are suitable for tidal and salinity gradient energy developments, or if a Member State can reach its renewable energy targets by using other sources of energy that have less negative environmental impacts. In that sense, the national renewable energy plan would also, in an early stage, contribute to fulfilling Article 4(7)'s fourth condition on research into suitable alternatives. The main advantage of introducing national renewable energy plans is that such plans could help competent authorities to take decisions under Article 4(7) that fit within the broader renewable energy strategy of the Member State in question. Without such a plan there is a chance that these decisions are taken in isolation, resulting in arbitrary decisions that are founded in the individual enforcement priorities of the competent authority in question rather than in broader policy objectives.

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88 In that sense the plans proposed here differ from the 'National renewable energy action plans' that Member States are required to make under the Renewable Energy Directive. These plans set out the measures that the Member States plan to take to promote and support the use renewable energy. They do not, however, contain a list of specific renewable energy projects that are essential in the light of achieving the Member State's renewable energy quota under the Renewable Energy Directive. See Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources, OJ 2009 L 140/16, article 4 and annex VI.

Moreover, the importance of having a well thought out and detailed renewable energy plan of the type described above, is emphasised by the European Commission's arguments in the *Schwarze Sulm* case. In that case the Commission questioned the relevance of the hydro-energy plant for Austria's energy supply by arguing that 'hydroelectricity is only one source of renewable energy among others and that the energy produced by the hydropower plant [...] will have only a minor impact on the regional and national energy supply'.<sup>89</sup> In other words, the Commission suggested that the hydro-energy plant was not sufficiently important in the light of Austria's renewable energy strategy, and is therefore not suitable to justify a deterioration of water quality. In this specific instance, the ECJ dismissed the Commission's arguments because they were insufficiently substantiated. The arguments do show, however, that Member States need to present strong arguments under the third condition of Article 4(7) WFD to show why a specific renewable energy project is necessary in the context of the Member State's renewable energy strategy. If Member States fail to do so, subsequent and better substantiated infringement procedures initiated by the Commission may at some point result in annulment of project authorisations of renewable energy projects. Detailed national renewable energy plans could contribute to a Member State's argumentation in this regard.

Ideally, the national renewable energy plans would be linked to the River Basin Management Plans<sup>90</sup> (RBMPs) that the Member States are required to produce for each river basin district within their territory.<sup>91</sup> According to Article 4(7) WFD one of the conditions that need to be fulfilled for a derogation to be valid, is that the reasons for '*New modifications to the physical characteristics of a surface water body*' are specifically set out and explained in the River Basin Management Plan. Hence, the reasons for the construction of new renewable energy projects that cause deterioration of water quality should be explained in the RBMP. The importance of the River Basin Management Plans in this regard is also emphasised by the ECJ, which states in *Weser* that

89 Case C-346/14, *European Commission v Republic of Austria (Schwarze Sulm)* [2016], para. 82.

90 The RBMP is 'both a *descriptive document* of the status of the river basin district and an *action plan* in so far as it refers to new measures designed to achieve the objectives of the WFD.' See Opinion of Advocate General Jääskinen in Case C-461/13, *Bund für Umwelt und Naturschutz Deutschland (Weservertiefung)* [2014], para. 52; and Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, articles 11 and 13, and annexes VI and VII.

91 Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, article 13.

'it is impossible to consider a project and the implementation of management plans separately'.<sup>92</sup> In that regard it would be practical if the national renewable energy plans directly feed into the RBMPs. The insertion of an explanation of the importance of certain renewable energy projects in the relevant RBMPs in an early stage improves integration between the WFD and renewable energy policy. Moreover, it contributes to compliance with the second condition of Article 4(7). Pursuant to the WFD, the RBMPs are reviewed and updated once every six years.<sup>93</sup> According to the Common Implementation Strategy for the Water Framework Directive this does, however, not mean that the implementation of new renewable energy projects that cause deterioration of water quality will have to wait until the publication of a new RBMP. Arguably, new renewable energy projects may simply be implemented and the derogation clause may be invoked to this end, as long as the reasons for that renewable energy project are set out in the subsequent update of the relevant RBMP.<sup>94</sup> The CIS is, however, not of a legally binding nature, but rather a consensus document on 'best practices' agreed on by the Member States, the Commission and other WFD stakeholders. It is therefore unsure if this interpretation would also be accepted by the ECJ.<sup>95</sup>

In conclusion, this article recommends the development of a practical framework to bring about an increased integration between the Water Framework Directive and the Renewable Energy Directive. This framework could take the form of Member State-specific detailed renewable energy plans which are linked to the WFD's River Basin Management Plans. The proposed renewable energy plans would list the renewable energy projects that are important for reaching the Member States renewable energy quota under the Renewable Energy Directive (RED). These plans must be drafted on a Member State level rather than on an EU level, as the RED sets Member State-specific renewable energy quotas and leaves the Member States a considerable amount of policy discretion as to how to reach those quotas.

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92 Case C-461/13, *Bund für Umwelt und Naturschutz Deutschland (Weservertiefung)* [2014], para. 47.

93 Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy, OJ 2000 L 327/1, article 13(7).

94 Common Implementation Strategy for the Water Framework Directive, Guidance Document no. 20 'Guidance document on exemptions to the environmental objectives', 2009, p. 29.

95 For further elaboration on possible interpretations of the relationship between the derogation clause and RBMPs, see: K. Faßbender, *Wasserrechtliche Ausnahmeprüfung nach dem EuGH-Urteil zur Schwarzen Sulm*, *Natur und Recht* 2017 (39) pp. 437–439.

## 6 Conclusion

The development of innovative water-related renewable energy techniques – such as tidal energy and salinity gradient energy – risks to be hampered by the no-deterioration obligation of the Water Framework Directive. This may especially be the case if those techniques are applied on a large scale, and when there is ongoing scientific uncertainty concerning the negative effects on water quality of these techniques. While mitigation measures and adaptive management are expected to be insufficiently effective to solve this issue, the use of the WFD's derogation clause is expected to play an important role in authorisation procedures of future large-scale tidal and salinity gradient energy projects. Nevertheless, due to a lack of integration between the WFD's derogation clause and the goals of the Renewable Energy Directive, there is currently no guarantee that a fair balance will be struck between water quality and renewable energy interests under the WFD. This article recommends to solve this lack of integration by introducing detailed national renewable energy plans per Member State, which would give a detailed overview of important renewable energy projects. These plans could help competent authorities in weighing the interest of a renewable energy project against the interest of preventing deterioration of water quality. Further integration can be achieved if these renewable energy plans subsequently feed into the drafting and reviewing process of the River Basin Management Plans which Member States have to set up pursuant to the Water Framework Directive.

The solutions that are discussed in this article help to address legal issues that arise at the interface between renewable energy policy and the Water Framework Directive. Water-related innovative renewable energy projects may, however, also have negative effects on Natura 2000 sites and species that are protected under the Habitats and Birds Directives.<sup>96</sup> Solving issues that are related to the WFD does therefore not automatically mean that a specific project will be permissible under EU law. It will often also need to undergo the authorisation procedure prescribed by the Habitats and Birds Directives.<sup>97</sup>

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96 S van Hees, EU legal barriers to innovative forms of energy production: analysis based on water-related case studies, *Journal of Water Law* 2015 (24) pp. 283–284.

97 Specific mitigation and adaptive management strategies that are targeted at dealing with the WFD's no-deterioration obligation may not automatically also solve a project's negative effects on habitats and species that are protected by the Habitats and Birds Directives. Moreover, it has been argued in academic legal literature that 'the invocation of the derogation regime of the WFD cannot be used to derogate from the objectives and

The interaction between innovative water-related renewable energy projects and the Habitats and Birds Directives raises legal issues of its own. These are, however, similar to the ones discussed in relation to the WFD. Legal issues on the interface between large-scale water-related innovative renewable energy projects and the Habitats and Birds Directives, and possible solutions, will be discussed in a future article of this author.

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obligations laid down in other directives'. See in that regard P. De Smedt and M. van Rijs-  
wick, *Nature conservation and water management – One battle?*, in C-H Born, A. Cliquet  
et al (eds.) *The Habitats Directive in its EU Environmental Law Context – European Na-  
ture's Best Hope?*, Routledge, 2015, 425.