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## Towards ecological governance in EU energy law

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# Chapter Three

## Ecological governance through the use of 'best available techniques'

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## Abstract

This article examines to what extent ecological governance can be implemented by extending the concept of Best Available Techniques (BAT) at the European Union level. It therefore firstly analyses what ecological governance would require and what this implies for employing the use of BAT. The article then argues that the use of BAT enables ecological governance to an extent, but that the BAT-concept needs to be modified internally to serve this purpose. Additionally, it needs to be extended to areas outside its original scope to maintain the holistic perspective of ecological governance. Here, biomass used for energy production serves as an illustration of such 'external' BAT application.

*Keywords:* Best Available Techniques (BAT), ecological governance, biofuels, biomass, energy, sustainability

### 3.1. Introduction

It is time to acknowledge that the current legal framework is inadequately equipped to avert climate change and to stop environmental degradation.<sup>1</sup> Global fossil fuel emissions are still on the rise<sup>2</sup> and many nations are not on track in meeting their various targets,<sup>3</sup> despite the fact that these are only intermediate goals and in themselves not sufficient to assume adequate mitigation of climate change.<sup>4</sup> In fact, all current national plans combined are insufficient to keep global average temperature rise well below 2 °C.<sup>5</sup> Since 'climate change represents an urgent and potentially irreversible threat to human societies and the planet',<sup>6</sup> societies must be decarbonized as soon as possible. To ensure planetary survival and a livelihood for future generations, we should start to truly respect our (natural) environment and acknowledge 'the importance of ensuring the integrity of all ecosystems, including oceans, and the protection of biodiversity, recognized by some cultures as Mother Earth'.<sup>7</sup> Laws have been put in place to protect the environment, but these rules are often subordinate, either literally or practically, to

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1 See also J. Hansen *et al.*, 'Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature', 8:12 *PLoS ONE* (2013), e81648.

2 International Energy Agency, 'CO<sub>2</sub> Emissions from Fuel Combustion' (2015), found at: <<http://energyatlas.iaea.org/?subject=1378539487>>.

3 On renewable energy, see: European Commission, Renewable Energy Progress Report, COM(2015) 293, at 5. However, the EU as a whole is on track, according to European Environment Agency (EEA), *Trends and Projections in Europe 2015: Tracking Progress towards Europe's Climate and Energy Targets* (EEA, 2015), at 9. At the same time, violations of air quality targets do still occur; see <<http://www.eea.europa.eu/themes/air/intro>>.

4 'World only Half Way to Meeting Emissions target with Current Pledges', *Euractiv* (6 November 2015).

5 As stipulated in UNFCCC, Decision 1/CP.21, Adoption of the Paris Agreement (UN Doc. FCCC/CP/2015/10/Add.1, 29 January 2016), at preamble.

6 *Ibid.*

7 Paris Agreement (Paris, 12 December 2015; in force 4 November 2016), at preamble.

laws that protect private property and/or economic (corporate) interests. This article argues that a radically different approach to climate change must be taken, coupled with a legal framework that goes well beyond the existing ones.

I argue that this altered legal framework must be based on an ecological governance policy approach, as developed by Woolley.<sup>8</sup> Woolley justly argues that current legal approaches to environmental protection are inadequate, because they overly rely on human capability to predict the environmental effects of our actions and ecosystems' responses to them.<sup>9</sup> In reality, our understanding of such causalities is limited and the functioning of ecosystems and their responses to pressures are neither linear nor as easily predictable as current regulations assume. Alternatively, Woolley proposes a policy paradigm that is not so much focused on causalities, but rather on a continuous effort to reduce the cumulative pressures from human activities on ecosystems.<sup>10</sup> Such stress reductions will have an overall positive effect on the functioning of ecosystems and will thus contribute to ecosystem resilience, i.e. the adaptive capacity of ecosystems to withstand (both internal and external) pressures.<sup>11</sup> As Woolley convincingly argues, the current sustainability paradigm is inadequate to protect this ecosystem functionality. The current paradigm is based on a balancing act, whereas the physical reality is that our (human) societies are fully sustained by, and dependent on, our planet and that our economies are only an element servicing these societies. The current paradigm does not acknowledge this factual hierarchy and thus results in severe imbalances.<sup>12</sup> Ecological governance requires (statutory) prioritization of environmental concerns over economic and social interests or, at least, taking away the current imbalances between these three interests in policy making.<sup>13</sup> Additionally, Woolley proposes a normative precautionary approach to all human activities.<sup>14</sup> In practice, this means that the basic goals underlying any policy should be the under-utilization of resources and minimizing our reliance on damaging activities.<sup>15</sup>

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8 O. Woolley, *Ecological Governance: Reappraising Law's Role in Protecting Ecosystem Functionality* (Cambridge University Press, 2014), at 6.

9 *Ibid.*, at 25-26; see also 158-162.

10 *Ibid.*, at 31.

11 *Ibid.*, at 55.

12 See also M. Scott Cato, *Green Economics: An Introduction to Theory, Policy and Practice* (Earthscan, 2009), at 37; D. Griggs, 'Redefining Sustainable Development' (Project Syndicate, 19 March 2013), found at: <<http://www.project-syndicate.org/commentary/redefining-sustainable-development-by-david-griggs>>; and P. Higgins, *Eradicating Ecocide: Laws and Governance to Stop the Destruction of the Planet* (Shepherd-Walwyn, 2010), at 128.

13 See O. Woolley, n. 8 above, at 71 and 155.

14 *Ibid.*, at 59-67.

15 See O. Woolley, n. 8 above, at 50.

In more concrete terms, Woolley distinguishes three leading principles for policy making.<sup>16</sup> The first principle is to reduce consumption and/or to avoid development where the necessity of a proposed activity cannot be demonstrated or where the proposed action can be avoided via a less environmentally consequential means.<sup>17</sup> The second principle is called the substitution principle, and it entails that only those activities that employ the least threat to ecosystems should be deployed.<sup>18</sup> Third, Woolley distinguishes the 'sunsetting' principle, which requires that the most polluting practices be phased out.<sup>19</sup> Implementing these principles demands a thorough assessment of alternative modes of action to identify the best means available. Hence, information is key throughout the process of decision making.<sup>20</sup> In addition, a focus on long-term planning is important to ensure a coherent policy,<sup>21</sup> which would ensure a comprehensive, life-cycle approach over time.

This article examines the role that the concept of best available techniques (BAT) could play in implementing the ecological governance approach described above. As defined in the European Union (EU) Industrial Emissions Directive (IED), BAT are those techniques that are:

the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for ... permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole:

- (a) 'techniques' includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned;
- (b) 'available techniques' means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator;

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16 Ibid., at 67-85

17 Ibid., at 71-74.

18 Ibid., at 74-76.

19 Ibid., at 76-77. A next step could be to extend this principle by criminalizing certain severely damaging practices through the implementation of Higgins' 'ecocide law'. See P. Higgins, n. 12 above.

20 See O. Woolley, n. 8 above, at 77-87 and 215-233. Important factors in the assessment of alternatives should be the manageability of impacts and the (ir)reversibility of effects. Additionally, the acquired knowledge can be used to determine which activities qualify for substitution and sunsetting. Ibid., at 99-101.

21 Ibid., at 85-98.

- (c) best' means most effective in achieving a high general level of protection of the environment as a whole;<sup>22</sup>

The BAT concept was chosen as a focus in this article, first, because when it was introduced in 1996, it represented a fundamental change in environmental regulation.<sup>23</sup> The concept has been developed under the legal regime for industrial emissions and its introduction meant a move away from a sectoral approach to more integrated environmental protection. The prior, fragmented approach to environmental regulation largely ignored the complex relations between the various elements of ecosystems and the media with which they interact.<sup>24</sup> The new approach introduced increased systemic regulation. This is rather similar to what an ecological governance approach aims to do, so that the concept can, by analogy, be applied here. A second reason to focus on BAT is that its mandatory use provides a legal driver for the displacement of technologies by less environmentally harmful alternatives, which is also a central feature of the ecological governance approach.<sup>25</sup> Third, since BAT are determined at the EU level, the concept provides a transboundary means to enhance environmental protection.

Under the current legal regime, stresses on the environment are reduced in the following manner. First, the IED imposes a general obligation of achieving 'a high level of protection of the environment as a whole'.<sup>26</sup> This level is then assured via mandatory permits for all large industrial installations.<sup>27</sup> In these permits, emission limit values must be imposed, which have to be based on the use of BAT.<sup>28</sup> Which techniques are considered 'BAT' and which emission levels correspond with these techniques is not described in the IED, but in more flexible documents, called BAT Reference Documents (BREFs). These BREFs describe the state-of-the-art in industrial technologies, emission abatement techniques and corresponding ranges of emission levels.

22 Directive 2010/75/EU of 24 November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control), [2010] OJ L334/17 ('IED'), Article 3.10.

23 Although the idea of an integrated approach dates back to the 1980s. See also: L. Squintani, *Gold-plating of European Environmental Law* (PhD thesis, University of Groningen, 2013), at 75.

24 See also J.H. Jans and H.H.B. Vedder, *European Environmental Law: After Lisbon* (Europa Law Publishing, 2012), at 360.

25 Statistics show that industrial emissions in the EU (apart from carbon dioxide) have overall been going down since the 1990s, largely as a result of technical innovations. On NOx emissions, see: EEA, 'Nitrogen Oxides (NOx) Emissions' (2015), found at: <<http://www.eea.europa.eu/data-and-maps/indicators/eea-32-nitrogen-oxides-nox-emissions-1/assessment.2010-08-19.0140149032-3>>. However, since it is difficult to establish a causal relationship between the use of BAT and the implementation of these innovations, there is no statistical proof of the effectiveness of the mandatory use of BAT. See M.E. Conti *et al.*, 'The Industrial Emissions Trend and the Problem of the Implementation of the Industrial Emissions Directive (IED)', 8:2 *Air Quality, Atmosphere & Health* (2015), 151, at 153.

26 IED, n. 22 above, Article 1.

27 *Ibid.*, Article 4.

28 *Ibid.*, Articles 14.1 and 15.2.

Additionally, they describe emerging techniques which are the BAT of the future. It is the BAT conclusions in these BREFs that are the reference for setting permit conditions by the local authorities.<sup>29</sup>

This 'layered' norm-setting allows for relatively easy adaptation of the BAT to technological developments, as the BREFs are reviewed outside the scope of (lengthy) legislative procedures. However, to ensure a balanced outcome, the IED does provide criteria that must be considered in determining BAT.<sup>30</sup> Some of these criteria emphasize the 'best' in 'best available technique', while others focus more on the element of availability of these techniques. The idea behind this way of regulating environmental impacts is that the broad definition of BAT combined with the additional criteria allows for a (relatively) flexible BAT concept, which enables a state-of-the-art interpretation of the required 'high protection of the environment as a whole'.<sup>31</sup> This process results in gradual replacement of techniques with environmentally less harmful ones.

This article aims to contribute to the transition of the legal framework by exploring the possibilities of using BAT to implement ecological governance. The focal point of the analysis in the article is the use of BAT in regard to energy production processes, as energy use is 'the lifeblood of society'.<sup>32</sup> As such, sustainable energy use and production lie at the very heart of the transition required to implement ecological governance. Furthermore, the regulation of 'biomass for energy', in particular the European legal framework on biofuels (which are a specific application of biomass), will serve as an example of how lengthy production chains with extraterritorial elements can be regulated to ensure a holistic legal approach to (sustainable) production processes.

The outline of the article is as follows. The next section analyses what changes are required in the interpretation and application of the BAT concept to implement ecological governance. The article then addresses how the new BAT concept can be applied to govern other areas of law. In this, 'biomass for energy' serves as an illustration. Next, it discusses the role of information in the new legal regime. The article's conclusions recapitulate the findings.

### **3.2. BAT under ecological governance**

Implementing ecological governance will have significant implications on how we perceive and interpret what the BAT are. Essentially, the IED's general obligation of 'achiev[ing] a high level

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29 Ibid., Article 14.3.

30 Ibid., Annex III.

31 Ibid., Article 1.

32 Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Region, Energy 2020 – A Strategy for Competitive, Sustainable and Secure Energy, COM(2010) 639, at 2.

of protection of the environment taken as a whole<sup>33</sup> would be replaced with an obligation to 'continuously reduce the cumulative stresses on ecosystems to improve ecosystem functionality and to enhance ecosystem resilience'. Thus, ecological governance goes beyond current requirements by demanding the highest possible level of environmental protection, rather than 'a high level'. This will also lead to a shift in the relative importance of the elements that are balanced within the definition of BAT. Ecological governance departs from the current balancing approach, and endorses a hierarchy in the relation between the environmental, social and economic dimensions.

Nevertheless, there are also quite a few similarities between the current BAT concept and an ecological governance approach. In fact, the three guiding principles underlying ecological governance (i.e., reducing consumption, substitution and sunseting) are to an extent all already imbedded in the framework of the IED. 'Substitution' essentially even comprises the overall purpose of the BREF system, as both this system and ecological governance entail a continuous effort to replace techniques with less disruptive alternatives. Additionally, the need to reduce consumption is also present in the BREF system as reduction of waste, emissions, impacts and raw material use are elements to consider when determining BAT. However, absolute consumption reductions are not (yet) an element of the BREF system. Lastly, the sunseting principle is less explicitly present. After all, as time and technological developments advance, old and polluting techniques will be superseded by new and cleaner ones. When new BREFs are drafted, the more damaging technologies will be phased out, because these will no longer be considered BAT. A major and important difference, however, between explicit sunseting and the current BREF system is that sunseting requires a more swift and explicit prohibition of the most damaging practices based on ecological grounds only,<sup>34</sup> whereas in the BREF system sunseting is more of an unintended side effect of substitution, rather than a guiding principle.

A further important similarity between the BREF system and an ecological governance approach is the prominent role of information supply and the expansion of knowledge used to assess and weigh alternatives.<sup>35</sup> As such, the BREF system is already aimed at progressively enhancing the environmental performance of production processes. However, compared to the approach advocated in this article, the current legal framework is quite moderate and rather slow in progressing environmental performances. Due to the length of the information exchange and political debate prior to the adoption of BREFs, they are only reviewed around every 10 years. As a consequence, the supposed state-of-the-art interpretation of the BAT is fundamentally static

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33 IED, n. 22 above, Article 1.

34 See O. Woolley, n. 8 above, at 78.

35 A difference between the current rules and Woolley's proposals is that she argues that an external review of decisions should be implemented. This will be addressed further below.

for the next ten years. A rolling review of BAT does not occur.<sup>36</sup> Furthermore, what information is deemed relevant in decision making and how this information is subsequently used, is very different under the two approaches.<sup>37</sup> To start with, the current system ignores many external costs and long-term effects of human activities. Incorporating these costs and effects would set the bar differently in the interpretation of the flexible norms 'economically and technically viable' and 'reasonably accessible' that partially determine what the BAT are.<sup>38</sup> Expanding the range of information that is considered relevant in decision making will therefore raise the level of emission and pollution abatement that can be demanded from operators. A second difference in the use of information is that the current approach does not allow taking decisions on purely ecological grounds, since it is based on the weighing of interests, rather than ecological prevalence.

Besides the 'internal' changes that are needed within the definition and determination of BAT, implementing ecological governance also means that we must consider (and regulate) production processes ever more systemically. The result of taking a life-cycle oriented approach is that the length of the chain of events and related impacts expands drastically. This creates complexities in regulating them, and it means that BAT should be used in (legal) areas outside its current scope. Now, using BAT is mandatory only under the IED-umbrella which regulates industrial installations. This means that the use of BAT is confined to actual production processes, i.e. applied only in the conversion of raw materials to (semi-)final products. However, a systemic approach requires that the use of BAT becomes mandatory in other phases of the life cycle, i.e. the cultivation and extraction of raw materials, transport and consumption. BAT could for instance be applied in the agricultural sector, if this sector supplies the raw materials for the subsequent industrial processes.<sup>39</sup> This 'external' application of the BAT-concept should also incorporate the necessary 'internal' changes to retain its focus on enhancing ecosystem resilience. Both the internal and external dimension will be discussed next.

### **3.3. Internal changes in the definition of BAT**

A fundamental first step in redefining BAT is to apply the best available techniques rather than the 'best available techniques not entailing excessive costs' (BATNEEC) as is commonly the case. As mentioned earlier, ecological governance demands that the 'reasonableness' of preventive measures to be taken by operators should be assessed at least on the basis of the actual societal (e.g., environmental and health-related) costs. Currently, a significant burden is placed

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36 See also O. Woolley, n. 8 above, at 99-101.

37 The role of information will be addressed in more detail below.

38 See its definition in IED, n. 22 above, Article 3.10.

39 As is the case for many biofuels. The use of BAT in agriculture will be addressed in more detail below.

on society in bearing the additional costs from pollution from industrial activities.<sup>40</sup> Holding operators to account for such costs would render more preventive measures 'reasonable'.<sup>41</sup> Since more ecologically protective measures will then be required, environmental improvements and benefits will be achieved, which will enhance ecosystem functionality and resilience.<sup>42</sup> Accounting for the external (societal) costs not only creates room for additional preventive measures, it can also have an influence on the choice of techniques that are considered BAT.<sup>43</sup> This manner of extending the range of costs that must be considered under the IED would not require any legislative changes to the definition of BAT.

In addition to wielding a different method for assessing costs, the ecological BAT concept primarily entails a different interpretation of what is 'best' in BAT. Two elements are important in this new interpretation. First, in determining what is 'best' in the individual case, not only the permit application under scrutiny should be relevant, but account should also be taken of the context of this permit application.<sup>44</sup> Under the current IED rules, such a systemic appraisal of permit applications is not possible. A good example of this is the fact that between 2006

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40 With regard to energy production, the EU external costs were identified through the ExternE project that ran from the early 1990s to 2005. See <<http://www.externe.info>>.

41 For instance, in the Netherlands nitrogen oxides (NOx) emission reduction measures are considered reasonable up to €4.60 per kilo of NOx reduction, while the health related costs of each additional kilo of NOx are estimated to be €6.60. For an elaboration (in Dutch) on this discrepancy see: R.A. Giljam, *Schone Lucht of Schone Schijn? Europese Regulering van de Emissies van NOx en Fijn Stof naar Lucht door Moderne Kolencentrales* (LLM thesis, University of Groningen, 2011), found at: <<http://api.commissiemer.nl/docs/mer/diversen/schonelucht-schoneschijn.pdf>>, at 109. To what extent operators can pass the additional costs on to consumers is a political discussion that is not addressed here.

42 A danger inherent in this 'costing approach' is that it relies (too) heavily on human capabilities to perform accurate and comprehensive calculations, and that it may invite manipulation of data and figures that serve as the input into the assessments.

43 V. Laforest, 'Assessment of Emerging and Innovative Techniques Considering Best Available Technique Performances', *92 Resources, Conservation and Recycling* (2014), 11, at 13.

44 Also, where Member States (such as the Netherlands) have implemented a multiple permit system, these permits need to be 'fully coordinated'. IED, n. 22 above, Article 5.2. Due to space limitations, the Dutch system will not be discussed comprehensively, nor will any other national approach be dealt with here.

and 2008 permits were issued for four new coal-fired power plants in the Netherlands.<sup>45</sup> The Dutch government argued that they were not in a position to reject these permits as both the technologies and the emission levels applied for fell within the range of the BAT conclusions for large combustion plants.<sup>46</sup> Upon questions posed by the nongovernmental organization Greenpeace, the competent authorities replied that assessing the desirability or the necessity of these installations is not an element of consideration under environmental permit applications. Hence, the competent authorities could only assess whether what had been requested fit within the applicable environmental legislation.<sup>47</sup> The government further argued that it is not up to them to decide what type of installations will be built, as this decision is for 'the market' to make; the government then only sets conditions to the construction and operation of these installations.<sup>48</sup> One of these conditions is that an environmental impact assessment (EIA) must accompany the permit application.<sup>49</sup> This EIA maps the anticipated effects of the proposed project and *inter alia* demands that the developer studies 'reasonable alternatives'.<sup>50</sup> However,

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45 The following permits were issued. To Electrabel: Gedeputeerde Staten der Provincie Zuid-Holland, 'Oprichtingsvergunning Verleend aan Electrabel Nederland N.V. voor de Productie van Elektriciteit in een Nieuw te Bouwen Kolen/biomassacentrale (Inclusief Bijbehorende Apparatuur en Activiteiten) met een Netto Elektrisch Vermogen van 750 MW' (11 March 2008), found at: <<http://dcmr.gisinternet.nl/downloads/pdf/b800888.pdf>> ('Permit Electrabel'); to E.ON: Gedeputeerde Staten der Provincie Zuid-Holland, 'Deelrevisievergunning voor de kolengestookte elektriciteitscentrale van E.ON op de Maasvlakte' (31 March 2006), found at: <<http://dcmr.gisinternet.nl/downloads/pdf/b798648.pdf>> ('Permit E.ON 2006'); and: Gedeputeerde Staten der Provincie Zuid-Holland, 'Deelrevisievergunning Verleend aan E.ON voor de Productie van Elektriciteit in een Nieuw te Bouwen Kolengestookte Eenheid (Inclusief Bijbehorende Apparatuur en Activiteiten) met een Bruto Elektrisch Vermogen van 1100 MW' (26 October 2007), found at: <<http://dcmr.gisinternet.nl/downloads/pdf/b803658.pdf>> ('Permit E.ON 2007'); to RWE: Gedeputeerde Staten der Provincie Groningen, 'Vergunning Wet Milieubeheer Verleend aan RWE Power AG te Essen, Elektriciteitscentrale (2 x 800 MWe) op Poederkool en Biomassa (Locatie: Eemshaven)' (11 December 2007), found at: <[http://www.provinciegroningen.nl/fileadmin/user\\_upload/Documenten/Milieuvergunning/2007rwe.pdf](http://www.provinciegroningen.nl/fileadmin/user_upload/Documenten/Milieuvergunning/2007rwe.pdf)> ('Permit RWE'); to Nuon: Gedeputeerde Staten der Provincie Groningen, 'Oprichtingsvergunning Wet Milieubeheer Verleend aan Nuon Power Projects 1 BV ten Behoeve van de Oprichting en het Bedrijven van een Multi-fuel Elektriciteitscentrale in de Eemshaven' (7 July 2009), found at: <[http://www.provinciegroningen.nl/fileadmin/user\\_upload/Documenten/Milieuvergunning/2009nuonpowerprojectsbvWm.pdf](http://www.provinciegroningen.nl/fileadmin/user_upload/Documenten/Milieuvergunning/2009nuonpowerprojectsbvWm.pdf)> ('Permit Nuon'). This last one is technically not a coal-fired power plant, because the coal would be gasified prior to its use as a fuel. Also, this installation will no longer be constructed.

46 IED, n. 22 above, Article 5.1 reads: '... the competent authority *shall* grant a permit if the installation complies with the requirements of this Directive' (emphasis added).

47 See Permit Electrabel, n. 45 above, at 31; Permit E.ON 2007, n. 45 above, at 42; Permit RWE, n. 45 above, at 33.

48 'Letter of minister of Housing, Spatial Planning and Environment' (28 June 2006), *Kamerstukken II* 2006/07, 28 240/29 023, no. 77; reiterated in: 'Letter of minister of Economic Affairs' (28 October 2009), *Kamerstukken II* 2009/10, 28 240, no. 104.

49 Directive 2011/92/EU of 13 December 2011 on the Assessment of the Effects of Certain Public and Private projects on the Environment, [2012] OJ L26/1.

50 *Ibid*, Article 5.1.

an EIA does not assess the necessity of an installation as such.<sup>51</sup> The term 'reasonable alternatives' also features prominently in the rules on nature conservation, which apply in parallel to the IED.<sup>52</sup> In practice, however, nature protection often gives way to social or economic considerations, since halting developments in favour of such conservation is seldom considered in earnest as a reasonable alternative.<sup>53</sup> This is illustrated by the fact that the coal-fired power plants were granted permits, while exceptions to nature protection are only permitted 'in the absence of alternative solutions'.<sup>54</sup>

Thus, permit applications are not fully assessed in the light of long-term policy objectives, such as moving towards a low-carbon society or implementing ecological governance. Furthermore, the permit authorities could not even demand the lowest possible level of emissions associated with the proposed techniques, as this was deemed to be an unreasonable burden on industry.<sup>55</sup> Partially as a result of this lack of systemic assessment, talks on closure of the power plants were already being conducted by the time they came into operation. On top of this, in a landmark court case last year, the district court of The Hague ordered the Dutch government to take more effective climate action to reduce its emissions by a minimum of 25% by 2020 compared to 1990.<sup>56</sup> A recent report argues that closure of two of the three new power plants is necessary if the Netherlands is to cost-effectively meet this emission reduction target.<sup>57</sup> If this goes through, it can be regarded as a rare example of sunseting. A specific category of energy production is then be regarded as 'outdated', despite the fact that the installations concerned are the most modern of their kind, i.e. they apply BAT and achieve much lower emissions than previous

51 Such an appraisal is also left out in more general strategic assessments of plans and programmes, as required by Directive 2001/42/EC of 27 June 2001 on the Assessment of the Effects of Certain Plans and Programmes on the Environment, [2001] OJ L197/30 ('SEA Directive'), in particular Article 5.2.

52 Directive 2009/147/EC of 30 November 2009 on the Conservation of Wild Birds, [2010] OJ L 20/7; and Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora, [1992] OJ L206/7 ('Habitats Directive'). These form the basis for the Dutch nature protection permit that is required in addition to the environmental permit.

53 See also N. De Sadeleer, 'Assessment and Authorisation of Plans and Projects Having a Significant Impact on Natura 2000 Sites', in: B. Vanheusden and L. Squintani (Eds.), *EU Environmental and Planning Law Aspects of Large-Scale Projects* (Intersentia, 2016), 308; but see also *ibid.*, at 318-319.

54 Additionally, such a derogation is only allowed 'for imperative reasons of overriding public interest' and to the extent that Member States 'shall take all compensatory measures necessary'. Habitats Directive, n. 53 above, Article 6.4.

55 See: Permit E.ON 2007, n. 45 above, at 6 and 40; Permit Electrabel, n. 45 above, at 3 and 36; Permit RWE, n. 45 above, at 11, 22 and 23; Permit Nuon, n. 45 above, at 38 and 52.

56 *Urgenda Foundation and 886 citizens v the State of The Netherlands*, [2015] C/09/456689 / HA ZA 13-1396 ('*Urgenda*'), found at: <<http://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RB-DHA:2015:7196>>, at paragraphs 4.83, 4.86, 4.93 and 5.1.

57 G. Warringa *et al.*, *Recht Doen aan Klimaatbeleid. Kosteneffectief naar 25% Reductie in 2020* (CE Delft, June 2016), found at: <[http://ce.nl/publicatie/recht\\_doen\\_aan\\_klimaatbeleid/1836](http://ce.nl/publicatie/recht_doen_aan_klimaatbeleid/1836)> (with English summary).

combustion installations. Had the permit authorities in 2006 been able (and willing) to take the context of constructing these power plants into consideration, or had they been given explicit permission to phase out this specific type of energy production, this situation could have been avoided altogether.<sup>58</sup> This example illustrates that, in implementing ecological governance, much can be gained by interpreting what is 'best' beyond the narrow assessment of mere technologies. Instead of such a narrow assessment, the broader aim of reducing stresses on ecosystems should be kept in mind in all decisions, so that each individual decision contributes to implementing the most sustainable means to meet energy demand in general. In this, the lower limit of achievable stress reductions would be formed by genuine concerns regarding security of energy supply. Alternatively, if such systemic appraisals prove to be too burdensome for the permitting authorities, the necessity of using specific types of energy production could be assessed thoroughly at a higher level, for instance as part of general strategic assessments of plans and programmes, which can then serve as guidance for local authorities in permitting procedures.<sup>59</sup>

The second important change in what is 'best' is that this term should be interpreted more dynamically to provide a continuous incentive to reduce stresses on our environment. To achieve this, increased normative flexibility must be implemented in two ways. First, it should be implemented in decision making in individual cases and, second, it should be used to avoid rigidity of the norms resulting from time passing. To start with the former, what is considered BAT is based on an EU-wide, sector average compromise, as the determination of BAT occurs at the EU level and for whole sectors only. However, what is best at the EU level is not necessarily best at the local level, and what is best on average in a sector may not be best for individual installations. The IED offers some leeway to consider local conditions in permit setting, but only to lower the emission standards to avoid 'disproportionate costs'.<sup>60</sup> Member States are allowed to set stricter permit conditions than those achievable by using BAT,<sup>61</sup> but this is only optional and Member States are not allowed to determine stricter (local) BAT. Laforest argues that certain innovative techniques that are discussed as 'emerging techniques' in a BREF could very well be 'local BAT' under specific local conditions.<sup>62</sup> By demanding that 'best' is interpreted on the basis of actual, site-specific (or national) conditions, a higher level of stress reduction is achievable. Similar to the current situation, EU law would set the minimum requirements on BAT. However,

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58 Alternatively, if this proves to be too burdensome, the necessity of specific types of energy production could be assessed at a higher level, for instance as part of general strategic assessments of plans and programmes under Article 3.2 of the SEA Directive, n. 51 above, which can then serve as guidance for local authorities in permitting procedures.

59 See also *ibid.*

60 IED, n. 22 above, Article 15.4.

61 *Ibid.*, Articles 14.4 and 18.

62 See V. Laforest, n. 43 above, at 14.

competent authorities would simultaneously be under an obligation to set stricter standards whenever they can. Imposing a (periodic) 'polluter explains duty' on operators, as discussed below, could aid the authorities in setting such stricter (local) standards.

The second element of change in the dynamic interpretation of 'best' concerns avoiding that the state-of-the-art norms become stifled as time passes and developments continue. The fact is that, once a BREF is drafted, the BAT and the related (emission) norms are static for roughly a decade, as this is generally how often BREFs are reviewed.<sup>63</sup> The IED does require a periodic review of all permit conditions, but only to bring them in line with (new) BAT conclusions or revised environmental quality standards.<sup>64</sup> As long as there is no consensus on new proven techniques, there is no EU incentive for innovation or further emission reductions.

### 3.3.1. *The Polluter Explains Principle*

To provide such a perpetual stimulus to reduce stresses on ecosystems, a rolling review of 'what is best' is required. Part of implementing such a rolling review could be imposing a 'polluter explains' obligation on operators. This obligation would require operators to explain, at regular intervals, why their (proposed) installation is necessary for society in the first place and, more particularly, why the technology they (propose to) use is the best in its kind for this particular task and why the associated emissions cannot be any lower.<sup>65</sup> Hence, the 'polluter explains principle' goes beyond the current obligation of assessing, in outline, the main alternatives to the proposed techniques, when applying for a permit.<sup>66</sup> In comparison, the 'polluter explains' obligation is stricter than the current rules in both a material sense and in a temporal sense. Under 'polluter explains', permits will not be granted if the necessity of an installation is not established.<sup>67</sup> As already discussed in the previous section, this is not possible under the current rules. Furthermore, currently, once a permit has been granted, there is no longer a need to justify the existence of an installation or its emission levels, at least as long as no new BREFs are adopted. The polluter explains obligation would introduce a regular check whether the installation itself as well as its environmental impacts are still necessary and acceptable and whether they still represent the state of the art. If any of these questions is answered negatively, this should be ground for closure or adaptation of the installation and/or amendment of its permit conditions. Providing the aforementioned explanation should be made part of the permit conditions, for

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63 As can be deduced from the website of the IPPC Bureau: <<http://eippcb.jrc.ec.europa.eu/reference/>>.

64 IED, n. 22 above, Article 21. After the adoption of new BAT conclusions, Member States have four years to update all permit conditions; see *ibid.*, Article 21.3.

65 This duty would apply to both new and existing installations, and in the latter case encompass both the continued use of a technology, as well as the introduction of new technologies in existing installations.

66 IED, n. 22 above, Article 12.1(k).

67 Since multiple permits require 'full coordination', there are several moments in decision making where the necessity would be assessed.

instance as an addition to the information that already annually needs to be supplied to the competent authorities.<sup>68</sup> An external body, as will be discussed further below, should assess the validity of these explanations.

### 3.3.2. *Substitution and Sunsetting*

Parallel to the implementation of the polluter explains principle, sunseting and substitution should be actively pursued to keep stresses on ecosystems as low as possible. Such stresses will already be reduced if strict BAT conclusions are implemented, but, subsequently, these BAT conclusions can also serve as the basis for the implementation and execution of sunseting and substitution. This could be done by adding a new chapter to BREFs that contains conclusions on 'phase out techniques' (POT) that must be substituted within a given amount of time, and 'worst available techniques' (WAT) that will be 'sunsetted' as soon as possible. Any technology could be subject to substitution if technologies whose use poses lower environmental impacts become available. Similarly, any technology could be earmarked for sunseting if its characteristics are judged to be too environmentally damaging for continued reliance on it. Decisions on which technologies to replace would be part of the process of BREF adoption. A percentage of the emission levels associated with the most recent BAT could be used as a threshold here. For instance, if a specific technique emits over 130% of the emissions achievable by using BAT it could be up for substitution, whereas it could be up for sunseting if it emits over 200% of the state-of-the-art emissions.<sup>69</sup> Another example of a threshold that could be used would be to include in the POT/WAT conclusions at least those technologies that have the potential to amount to or result in 'ecocide'.<sup>70</sup> Thus, the responsibilities of operators to prevent environmental degradation would be expanded and would become a regular element in permit conditions, similar to current provisions regarding accidents.<sup>71</sup> The new BREF chapter (with the POT/WAT conclusions) would essentially be the counterpart of the conclusions on emerging techniques which have already earned a place in the BREF system.<sup>72</sup>

## 3.4. External application of BAT

To achieve its holistic aims and to ensure coherence in the legal system, the newly defined BAT concept must also be applied outside its original scope. A more systemic approach is currently not possible, because the scope of IED is limited. This does not mean, however, that areas

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68 Hence, this would be an addition to the information requirements of the IED, n. 22 above, Article 14.1(d).

69 The percentages chosen here are random, and simply serve to illustrate a point.

70 Defined by P. Higgins, n. 12 above, at 63, as 'the extensive destruction, damage to or loss of ecosystem(s) of a given territory, whether by human agency or by other causes, to such an extent that peaceful enjoyment by the inhabitants of that territory has been severely diminished'.

71 IED, n. 22 above, Articles 7 and 11. An elaboration on this topic goes beyond the scope of this article.

72 For emerging techniques, it might be wise to allow for temporary exceptions from the stricter BAT conclusions for experimental techniques aimed at further alleviating stresses on ecosystems.

outside the scope of the IED have a smaller environmental impact. In fact, estimates show that 'agriculture now accounts for one quarter of the planet's [greenhouse gas] emissions'.<sup>73</sup> Because of this, Möckel questions the adequacy of current agricultural regulations as the emissions from agriculture are no less harmful than those arising from industrial installations.<sup>74</sup> He therefore pleads to extend the use of BAT as the standard to agricultural land use.<sup>75</sup> According to Möckel, the currently deployed standard of 'good practice' is lower than that of mandatory BAT, and extending the use of BAT to agricultural land use would thus heighten the level of environmental protection.<sup>76</sup> As such, it would contribute to ecosystem functionality and assist in implementing ecological governance. Möckel's article thus serves to illustrate that the BAT concept is also suitable to be applied to other sectors than it was originally drafted for.

However, despite the alleviation of stresses on ecosystems that this might bring, implementing the current BAT concept in new regulatory areas is insufficient to bring about ecological governance. For that, the 'internal' changes in the BAT concept that were discussed above would also have to be extrapolated to these newly governed sectors. Additionally, the legal system should stipulate more explicitly the interconnectedness of the various branches involved in a product's life cycle and acknowledge our lack of understanding about how these interact. Under an ecological approach, this ignorance requires us to maintain a high level of ecosystem protection, which can be expressed by demanding at least that our best means are employed during each phase of a product's life cycle. Thus, it is sensible to require the use of the ecological BAT concept throughout each of these phases. Moreover, to fully ensure a holistic focus in regulation, licensing conditions that reiterate the need to consider the manner of production of the raw materials could subsequently be imposed on users of these materials.

#### 3.4.1. Biofuels and biomass

An example of how the interconnected phases of a product's life cycle can be expressed and regulated by a single legal instrument can be found in the Renewable Energy Directive (RED) that contains sustainability criteria for biofuels.<sup>77</sup> Promoting the use of biofuels is part of the EU strategy to achieve overall 20% renewable energy consumption by 2020, and 10% renewable energy in the transport sector specifically.<sup>78</sup> This 10% target will be met primarily by using

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73 A. Robert, 'Can We Feed the World and Halt Climate Change?', *Euractiv* (25 January 2016).

74 S. Möckel, 'Best Available Techniques' as a Mandatory Basic Standard for More Sustainable Agricultural Land Use in Europe?', 47 *Land Use Policy* (2015), 342.

75 An additional argument to implement BAT in agriculture is to achieve more equitable burden sharing in emission abatement between agriculture and industry. However, for lack of space, this argument is not addressed further.

76 See S. Möckel, n. 74 above, at 344.

77 Directive 2009/28/EC of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources, [2009] OJ L140/16 ('RED'), Article 17.

78 *Ibid.*, Article 3.1 and 3.4.

biofuels made from agricultural crops instead of fossil fuels. However, land conversions to grow biofuel crops may lead to significant emissions and may thus cause specific biofuels to be more damaging than their fossil-fuel counterparts.<sup>79</sup> Sustainability criteria were adopted to ensure that the production of biofuels contributes to climate change mitigation, rather than aggravate it.<sup>80</sup> The criteria apply irrespective of whether the raw materials used for the biofuels are cultivated inside or outside EU territory.<sup>81</sup> According to the criteria, biofuels can only be counted towards the renewable energy target if (i) they achieve a greenhouse gas emission reduction of at least 60% compared to the fossil fuels they replace;<sup>82</sup> and if (ii) the raw materials do not stem from one of the three listed types of vulnerable areas. Put briefly, these areas are land with high biodiversity value, land with high carbon stock and peatland.<sup>83</sup> Additionally, the cultivation of agricultural crops within the EU must also comply with the rules of the Common Agricultural Policy.<sup>84</sup>

From an ecological governance perspective, the current rules on biofuels have several strengths. Foremost, the sustainability criteria are an exceptional example of life-cycle oriented legislation, as they explicitly link the raw materials to the final product and thus place fuel producers under an obligation (indirectly) to take account of effects occurring earlier in the production chain. A further strength of the rules in the RED is that they provide an additional incentive to produce the least harmful biofuels by allowing certain biofuels to be counted twice towards the 10% target.<sup>85</sup> In addition, the RED was recently amended to address concerns over indirect land-use change (ILUC). While the criteria already prohibited several types of direct land conversions, indirect conversions were not addressed. To mitigate further emissions from ILUC, a cap of 7% was set for so-called 'first generation' biofuels, while a minimum percentage of 0.5% was set for specific 'advanced' biofuels.<sup>86</sup> Additionally, more stringent monitoring and reporting obligations

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79 Directive 2015/1513/EU of 9 September 2015 Amending Directive 98/70/EC Relating to the Quality of Petrol and Diesel Fuels and Amending Directive 2009/28/EC on the Promotion of the Use of Energy from Renewable Sources, [2015] OJ L239/1 ('RED Amendment'), recital 5.

80 A more detailed discussion of the criteria can be found in: A. Schmeichel, *Towards Sustainability of Biomass Importation: An Assessment of the EU Renewable Energy Directive* (Europa Law Publishing, 2014).

81 RED, n. 77 above, Article 17.1.

82 This is for installations in operation after 5 October 2015. Older installations must achieve a greenhouse gas emission reduction of 35%, which will go up to 50% on 1 January 2018.

83 An extensive description can be found in RED, n. 77 above, Article 17.2-17.5.

84 *Ibid.*, Article 17.6. The Common Agricultural Policy imposes legal requirements from a list of EU (environmental) directives as well as more general conditions regarding the state of the land after production is ceased. The use of BAT is not required. For details, see Regulation 1306/2013/EU of 17 December 2013 on the Financing, Management and Monitoring of the Common Agricultural Policy and Repealing Council Regulations (EEC) No 352/78, (EC) No 165/94, (EC) No 2799/98, (EC) No 814/2000, (EC) No 1290/2005 and (EC) No 485/2008, [2013] OJ L347/549.

85 RED, n 77 above, Article 3.4(f) and Annex IX.

86 *Ibid.*, Article 3.4(d) and (e).

regarding ILUC-emissions were imposed.<sup>87</sup> The latter should help to develop a methodology to assess these emissions more accurately.<sup>88</sup>

Despite these amendments, the sustainability criteria in their current form still have several weaknesses. Primarily, they provide no specific incentive to make use of the best biofuels in terms of their greenhouse gas emission performance. Once the threshold for greenhouse gas emission reductions is passed, all fuels are equal in the eye of the law. In addition, indirect effects from crop cultivation and biofuel production are still not reflected in the greenhouse gas emission calculations, largely because no adequate models have yet been developed to estimate or calculate them. Despite the cap and required monitoring, ILUC emissions are in effect still set at zero in these calculations, even though they can be significant.<sup>89</sup> Lastly, an ecological systemic approach is further undermined by the fact that sustainability criteria apply to only a minor fraction (i.e., maximum 2.5%) of the EU's overall energy consumption,<sup>90</sup> and even to only a small fraction of all sources of biomass used for energy.

The sum of biomass used for energy consists of a wide variety of materials that have many applications, some of which can deliver emission reductions of up to 80-90% compared to fossil fuels.<sup>91</sup> These materials originate from various sectors, including agriculture, forestry, waste, fisheries and aquaculture, which all have their own specific regulations.<sup>92</sup> Thus, new sectors have become important players in energy production. To achieve the EU renewables' targets three (energy) products are of particular importance: biofuels, waste and solid (woody) biomass. The first has been discussed already, and the second will be left aside in this article due to space restraints.<sup>93</sup> The latter product, solid biomass, stems mainly from forestry and is used primarily to produce electricity by co-firing it with fossil fuels in 'regular' power plants.

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87 Ibid., Articles 22 and 23.

88 RED Amendment, n. 79 above, recitals 12 and 22.

89 See also: Scientific Committee EEA, 'Opinion on Greenhouse Gas Accounting in relation to Bioenergy' (EEA, 15 September 2011), found at: <<http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas/view>>, at 7.

90 D. Peters *et al.*, *Assessing the EC ILUC Proposal, Dutch National Impact Assessment* (Ecofys, 2013), at 39.

91 The exact reduction is dependent on the actual design and implementation of the projects. See H. Chum *et al.*, 'Bioenergy', in: O. Edenhofer *et al.* (Eds.), *IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation* (Cambridge University Press, 2011), 214, at 214-215.

92 RED, n 77 above, Article 2(e). For lack of space, only (the regulation of) agriculture and forestry will be briefly discussed here. A more elaborate discussion can be found in: R.A. Giljam, 'Towards a Holistic Approach in EU Biomass Regulation', 28:1 *Journal of Environmental Law* (2016), 95.

93 Also, waste 'production' is not a deliberate production process and from an environmental perspective sources of waste should be reduced, rather than increased.

In fact, such forest biomass is the source for 42% of all renewable electricity in the EU.<sup>94</sup> Put briefly, the forestry sector is regulated via the Timber Regulation, voluntary certification schemes and the non-obligatory Forest Strategy.<sup>95</sup> None of these documents provide mandatory or systemic rules on sustainability, although monitoring emissions from forestry activities, as well as providing information how such emissions will be limited, is obligatory.<sup>96</sup> To promote the use of renewable electricity in transport, the RED counts this electricity 2.5 times towards the EU targets if it is used in rail transport, and even five times if it is used in electric road vehicles.<sup>97</sup> However, the sustainability criteria of the RED do not apply here, so that there is no uniform standard for the sustainability of the various biomass sources. In fact, since the criteria apply only to biofuels and bioliquids<sup>98</sup>, the level of sustainability required in the production of the raw materials hinges upon the final application of the product that is subsequently made from it.<sup>99</sup>

Furthermore, the forestry sector is now a major supplier for the electricity sector and the agricultural sector plays a more prominent role in supplying fuel producers, but neither is fully subjected to the IED regime. The actual production of biofuels is covered by the IED, as well as the combustion of biomass and emissions from storage,<sup>100</sup> but the agricultural and forestry sectors themselves are not required to use BAT. To mitigate the (potential) negative environmental effects of activities in these sectors, other regulatory instruments were chosen, but their level of sustainability varies and the sum of the legislation in place does not amount to a coherent, let alone ecological, policy.

I argue that this can be overcome by requiring the use of BAT outside the scope of the IED and by imposing an overall obligation to retain a focus on enhancing ecosystem resilience. This would require using only those (biomass) sources and those techniques that put the least stresses on ecosystems. Clearly, the 'least stressful technique' is to reduce consumption. Energy is unique in this respect, as much can be gained by increasing the energy efficiency of building and appliances. This way, energy consumption can be significantly reduced without hampering

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94 Communication from the European Commission, A New EU Forest Strategy: For Forests and the Forest-based Sector, COM(2013) 659 ('Forest Strategy'), at 2.

95 Regulation 995/2010/EU of 20 October 2010 Laying Down the Obligations of Operators Who Place Timber and Timber Products on the Market, [2010] OJ L295/23 ('Timber Regulation'); see also Forest Strategy, n. 94 above.

96 Decision 529/2013/EU of 21 May 2013 on Accounting Rules on Greenhouse Gas Emissions and Removals Resulting from Activities Relating to Land Use, Land-use Change and Forestry and on Information Concerning Actions Relating to Those Activities [2013] OJ L165/80 (LULUCF Decision).

97 RED, n 77 above, Article 3.4(c).

98 Defined in *ibid.*, Article 2(h).

99 A flowchart on the applicability of the sustainability criteria can be found in R.A. Giljam, n. 92 above, at 119.

100 These are covered under the BREF LVOG (2003), BREF LCP (2006) and BREF EFS (2006) respectively. All BREFs can be found at: <<http://eippcb.jrc.ec.europa.eu/reference/>>.

human activities. Thus, actually obviating development would not be required. In addition, if we deploy only the BAT, a second wave of alleviating stresses on ecosystems is possible. For the new framework to be effective it is essential that all (indirect) effects are taken into consideration. Hence, implementing mandatory use of the new, holistic BAT concept outside its original scope is sensible. It would expressly acknowledge the interconnectedness of the various sectors and it would ensure that the renewable sources deployed to replace fossil fuels actually contribute to the health of ecosystems. A starting point would be to impose the use of BAT in the relevant parts of agriculture and forestry.

#### *3.4.2. BAT in agricultural land use and forestry*

The introduction of BAT in both agricultural land use and forestry can in outline be achieved in an identical manner. To start with, the overall standard of using BAT as the norm would have to be applied across the board in both agriculture and forestry. This is necessary to avoid omissions in the legal framework and to ensure a level playing field between different actors in the respective sectors. The use of BAT should therefore be prescribed in (for instance) the Common Agricultural Policy and the Timber Regulation.<sup>101</sup> Then, different BREFs that describe the material norms in more detail for different branches of each sector would have to be drafted. For agriculture, the BAT described in these BREFs would replace the use of 'statutory management requirements' and strengthen the 'standards for good agricultural and environmental condition'.<sup>102</sup> For forestry, it would mean the instruction of binding norms on sustainable production. In outline, the system would thus be the same as it is for industry under the IED, without having to implement a full permit system.<sup>103</sup> Additionally, the 'polluter explains principle' would have to be incorporated in permit conditions insofar as a permit is required. Thus, in those cases 'operators' will have to explain and justify why they chose a specific production process over any other option. The BREFs can serve as a reference in permitting procedures and can be used as the basis to assess the operators' pleas. As discussed above, the BREFs would also have to contain chapters on POT/WAT conclusions. In agricultural land use, the sustainability criteria for biofuels – despite their shortcomings – could serve as minimum requirements for biofuel-crop cultivation and any biofuel that falls below the thresholds would have to be sunsetted or substituted. Additionally, for both sectors, the listed 'vulnerable areas' of the sustainability criteria could be made off-limits for production, so that more holistic ecosystem protection is accorded.

For both sectors, the BREFs should not only consider what the BAT are, but also what I call the 'best available use' of land. The term BAT concerns the techniques for working on the land, whereas the term 'best available use' focuses on what is grown on the land (i.e., which crops or

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101 See Forest Strategy, n. 94 above; Timber Regulation, n. 95 above.

102 Now described in Regulation 1306/2013/EU, n. 84 above, Annex II.

103 This could also contribute to more equitable burden-sharing; see also n. 75 above.

trees) and for what purposes (e.g., for food, industry or energy). The importance of addressing best available use is more prominent in agriculture and forestry than under the IED framework, due to the potentially competing uses of the products within each sector. Increased demand for agricultural and forestry products creates tension between these uses and this will be aggravated further with the expansion of the bio-based economy, as new applications will be found for traditional sources. This competition also results in increased interconnectedness and interdependence of the various sectors that use agricultural or forestry products, either directly or as raw materials. This interdependency requires a holistic approach in regulation, not only to safeguard the functioning of ecosystems, but also to avoid detrimental effects from competition over these commodities.<sup>104</sup> One way of diminishing competition over biomass sources is to establish a hierarchy of uses. Such a hierarchy would lead to a mandatory cascading use, similar to the waste hierarchy.<sup>105</sup> What the exact order of uses should be is a matter of political debate, but imposing some sort of prioritization is vital to decrease the intensified competition over biomass.

Due to the rapid development of new applications for traditional agricultural and forestry products, the new BREFs would also have to have extensive and prominent chapters on emerging techniques both in regard to BAT and best available use. Furthermore, these chapters should expressly acknowledge that emerging techniques in other (industrial) areas may impact what is considered best available use in agriculture or forestry. For instance, breakthroughs in the development of electric vehicles may make the production of biofuels superfluous and may thus lead to the sunseting of biofuel crop cultivation as BAU. Hence, a rolling review (at short intervals) of both BAT and best available use is essential to facilitate new opportunities in this evolving market while retaining a focus on enhancing ecosystem functionality.

Furthermore, the BREFs on forestry must ensure that the capacity of forests to serve as carbon sinks is upheld and that the sector's potential to result in carbon debt is taken into consideration in decision making. The term 'carbon debt' refers to the time lapse between actual emissions from the combustion of biomass (e.g., in power plants) and the time it takes to regrow an equally sized carbon stock. Since the rotation time of forestry materials is generally much longer than that of agricultural crops, the time lapse between emissions and re-absorption thereof is also much longer. Thus, the extensive use of trees for electricity generation may lead to (temporary) increased atmospheric carbon. Whether this is actually the case, and for what amount of time, depends on what type of woody materials is used and in which manner. Mandatory use of BAT and best available use, combined with a rolling review thereof, could diminish the risk of the bio-economy resulting in carbon debt.

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104 An example of the latter is the much debated potential for rising food prices due to biofuel production.

105 Directive 2008/98/EC of 19 November 2008 on Waste [2008] OJ L312/3, Article 4.

### 3.4.3. Extraterritoriality

This article has so far focused on production activities that occur within the EU. However, it is likely that (parts of) the production chains under scrutiny are outside the territory of the regulating authorities, when regulating matters with a focus on ecosystems' functionality and particularly when regarding their relationship with the Earth system.<sup>106</sup> Hence, this article would not be complete without mentioning the issue of extraterritoriality, although an extensive discussion is outside scope of this article.<sup>107</sup> Extraterritoriality concerns the situation where jurisdiction is in effect extended beyond national borders to regulate impacts, events of behaviour outside one's territory. Due to the sovereignty of nation States, such an extension of one's jurisdiction is in principle not allowed.<sup>108</sup> Regulating extraterritorial elements can thus be problematic from a legal perspective, but such regulation is necessary to implement the proposed holistic, ecological governance approach. The topic is rather controversial, and politics and literature are divided on the matter. Some authors argue that regulators are inherently confronted with a territorial system boundary, while others argue that setting conditions to processes and production methods (PPMs) can be allowed, even if production occurs abroad.<sup>109</sup> Similarly, it is debated whether and when unilateral action is allowed, or even compulsory, to address the transboundary problem of climate change.<sup>110</sup> With regard to the latter, an important concept is that of addressing 'embodied emissions'. Embodied emissions are the sum of emissions that occur during the life cycle of a particular product. By attributing these emissions to the product, a measure can be taken of its 'environmental performance'. Subsequently, similar products can be ranked on the basis of their relative performance, thus allowing an informed choice on the best products or production processes. The current European biofuel rules are the prime example of using embodied emissions as a regulatory technique.

An important legal complication in attempting to regulate embodied emissions is the fact that international trade law is generally believed to prohibit import restrictions based solely on the

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106 On this, see O. Woolley, n. 8, at 23.

107 See L. Ankersmit, J. Lawrence, and G. Davies, 'Diverging EU and WTO Perspectives on Extraterritorial Process Regulation', 21 *Minnesota Journal of International Law Online* (2012), 14.

108 An exception to this concerns the realm of diplomatic agencies and ambassadors.

109 An example of regulation of PPMs are the EU's biofuel sustainability criteria; see also E. Ruozi, 'The EU Directive on Renewable Sources and WTO: Towards a Solution of the PPMs and Extraterritoriality Issues?' (Istituto Universitario di Studi Europei, 2012).

110 Scott distinguishes four situations in which States may depart from the general territorial system boundary as established by the Intergovernmental Panel on Climate Change. See J. Scott, 'The Geographical Scope of the EU's Climate Responsibilities' (2015), found at: <[http://discovery.ucl.ac.uk/1469256/7/Scott.1469256\\_.pdf](http://discovery.ucl.ac.uk/1469256/7/Scott.1469256_.pdf)>, at 13-16.

(external) effects of production processes.<sup>111</sup> In simple terms, under the rules of the General Agreement on Tariffs and Trade, differential treatment of products is allowed only if they are 'unlike'.<sup>112</sup> What constitutes 'likeness' is subject to severe controversy and is in practice assessed via criteria developed in jurisprudence on a case-by-case basis.<sup>113</sup> In regulating the sustainability of biofuels, the EU avoided the potential conflict with trade law by not imposing import restrictions as such, but by merely not counting certain biofuels towards the renewables target and by making them non-eligible for subsidies. As a result, the imposed restrictions are not a straightforward prohibition of specific (damaging) process and production methods outside the EU's jurisdiction. However, in order to implement a legal system aimed at ecosystem functionality it is exactly such prohibitions that are required to reduce stresses on the Earth system and to execute sunseting and substitution. As Scott points out, there might be room for this, as such prohibitions need not be a problem under trade law 'so long as the EU has clear criteria for assessing the relative responsibilities and capabilities of states, and so long as it applies these criteria in a manner which is consistent and transparent'.<sup>114</sup> Nevertheless, implementing such criteria will not be easy and developing them requires further research.

### 3.5. The role of information

As is clear from all the above, a key element in both the current use of BAT and the 'better BAT' concept is (access to) information on, *inter alia*, technological possibilities, emissions and impacts. Data and knowledge – and the development thereof – provide input for assessments and evaluations and are hence a precondition for improvements. However, this approach bears an inherent danger of putting too much faith in human capacities to accurately calculate and predict effects and events. In aiming for improved ecosystem functionality and resilience, it is vital to avoid exclusive reliance on accurate prediction of impacts.<sup>115</sup> Additionally, the provision and use of information should not become a purely procedural exercise, i.e. become a matter of simply 'ticking the box'. Rather than relying on procedures or predictions, information should be used to implement an adaptive approach by 'requiring the on-going monitoring and assessment

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111 On the basis of Article XI of the General Agreement on Tariffs and Trade 1994 (Marrakesh, 15 April 1994; in force 1 January 1995). Whether this is actually accurate is discussed in detail in: R.A. Giljam, 'Extended Application of 'Best Available Techniques' as a Means to Facilitate Ecological Governance: Assessing the Legality of an Ecologically Oriented Interpretation of 'Best Available Techniques' (BAT) under International Trade Law and in Particular in Relation to Energy Production' (2017, forthcoming).

112 General Agreement on Tariffs and Trade 1994 (Marrakesh, 15 April 1994; in force 1 January 1995, Articles I and III. However, if the conditions of Article XX are met, some import restrictions can be justified.

113 An extensive discussion of this topic is outside the scope of this article. See M.J. Trebilcock, R. Howse and A. Eliason (Eds.), *The Regulation of International Trade*, 4th edn (Routledge, 2013), at 74-76; see also the WTO's interpretive notes on 'like products', found at: <[https://www.wto.org/english/res\\_e/booksp\\_e/analytic\\_index\\_e/gatt1994\\_e.htm](https://www.wto.org/english/res_e/booksp_e/analytic_index_e/gatt1994_e.htm)>.

114 See J. Scott, n. 110 above, at 33.

115 See O. Woolley, n. 8 above, at 215.

of the effects of human activities ... to develop a deeper understanding of [complex] ecosystem dynamics ... and to use [this] knowledge ... to modify decisions where ... this is necessary'.<sup>116</sup>

### 3.5.1. Normative precaution

Supplementary to this adaptive approach, a normative precautionary approach must be taken in permitting human activities. The current interpretation of precaution entails that a potentially harmful activity is halted until sufficient knowledge becomes available to make an informed choice. However, the reality is that this moment may never come. Hence, we rather need to 'find a means of deciding how to control our activities with a view to maintaining systemic properties *despite* our ignorance of how they cause ecosystems to decline and fail'.<sup>117</sup> This has two major implications. Primarily, it means that uncertainties and a lack of information, data or knowledge are no reason for inaction. Quite the opposite: normative precaution requires a proactive approach in moving away from (societal) practices that present threats of harm.<sup>118</sup> Thus, the second implication is that the option of obviating development must be considered in all earnest when permits are applied for. Clearly, requiring such normative precaution in human activities bears the risk of fully paralysing such activities. A possible solution presented by Woolley is to allow trial phases aimed at research and gathering data. A final decision regarding the activity is then made once sufficient data is available.<sup>119</sup> I believe this is a good option if the business-as-usual scenario is that no activity is carried out. After all, allowing the activity to proceed would cause a deterioration of the current situation. However, if the proposed activity has the potential of replacing more harmful activities (e.g., replacing fossil fuels with more sustainable sources), conditional approval of the activity should be possible, so that the alleviation of stresses on ecosystems might be sped up.

Put briefly, under the new ecological paradigm, all decisions on development consent should be based 'on assessment of the likely compatibility of activities and uses with ecosystem functionality'.<sup>120</sup> To ensure that the required flow of relevant information is maintained, the gathering of data on the health of ecosystems and on the effects of human activities should be institutionalized.<sup>121</sup> This will hopefully improve baseline knowledge and deepen our understanding of how ecosystems function. This will then increase the capacity to adequately reduce the stresses we put on these ecosystems.

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116 *Ibid.*, at 216-217.

117 *Ibid.*, at 54-55.

118 *Ibid.*, at 66.

119 *Ibid.*, at 232-233.

120 *Ibid.*, at 219.

121 *Ibid.*, at 222.

### 3.5.2. *Independent auditor*

Much of the information and know-how that is required for the assessments lies with industry. Other valuable contributions come from (natural) science. The systemic nature of the new BAT approach demands that information regarding supply chains is also made available, as is information on the indirect effects of production paths.<sup>122</sup> Due to the prominent role of information in standard setting, an external audit to verify the accuracy of the information supplied is important. In addition, the general direction in which (permit) decisions in effect steer society as a whole would have to be monitored. As such supervision cuts across several layers of government and different levels of decision making, no existing governance institution is well-suited for the task. Therefore, an independent supervisory body should be established whose prime mandate would be to maintain the focus on enhancing ecosystem functionality and on reducing stresses on the environment.<sup>123</sup> This body would ensure that the BAT process is running appropriately within the new ecological framework, while the competent authorities concern themselves with the nitty-gritty technical details of the installations and the conditions for their operation. To fulfil its mandate, the independent body should have statutorily defined tasks, which will help to depoliticize the identification of problems and the setting of priorities for responding to them.<sup>124</sup>

The exact tasks and powers that should be attributed to this body is a matter open for debate, but I believe they should include at least the following. In addition to verifying the information supplied to it, the supervisory body should safeguard the dynamism of the BAT conclusions and steer decision making away from lock-in situations that could lead to stagnation in BAT development. Furthermore, the auditor should be able to assess the validity and adequacy of the 'polluter explains' pleas. To aid operators, the body could be given powers to issue guidelines on the minimum requirements for such pleas and on the dissemination of the requested information. In a nutshell, the independent body would be the guardian of the focus on ecosystem resilience in BAT determinations and subsequent permitting procedures. For this reason, the body should operate independently from the BAT determination process itself, and it should be made up primarily of a broad range of experts from various (natural) sciences.<sup>125</sup> Such a broad delegation from diverse disciplines would ensure that the body is fully equipped

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122 For instance, on the effects of land conversions for biofuel production.

123 See O. Woolley, n. 8 above, at 101-103, who elaborates on an advisory committee to review policy decisions.

124 *Ibid.*, at 224.

125 Addressing the more detailed institutional arrangements regarding this body goes beyond the scope of this article. However, it is worth noting that crucial considerations would be how and on which grounds the experts should be appointed or elected, and to what extent the body should be able to issue binding opinions or only advisory ones.

to assess whether all relevant decisions were made with a systemic view in mind and with due regard to normative precaution.

### **3.6. Conclusions**

In sum, this article has analysed to what extent a system of ecological governance as sketched by Woolley can be implemented by expanding the use of the familiar legal concept of BAT. It has found that Woolley's guiding principles of reduced consumption, substitution and sunseting are already elements that influence the choice of BAT. A further similarity is the central role of information and assessment of alternatives. However, to implement a legal system aimed at perpetually reducing stresses on ecosystems, the concept of BAT should be expanded significantly, both internally and externally. Internal expansion of BAT means that what is considered BAT must be assessed in a broader sense, *inter alia* by including indirect effects and seriously considering reducing development as an option. Additionally, POT/WAT conclusions should be drafted that describe techniques that are up for substitution or sunseting. In principle, any BAT could qualify for this when new techniques become available, but it might be easier to set a threshold. This could, for instance, take the form of a percentage of the emissions achievable with the latest BAT, or including those technologies that may amount to ecocide. In addition to this more systemic appraisal of BAT, the concept should also be wielded more dynamically in terms of both the time and place it is applied in, as this would improve the adaptability of the legal framework. This dynamism must be aimed at ensuring normative precaution in permitting human activities. Clearly, room must be left for such activities, but the current levels of large-scale destruction are untenable and must progressively be diminished to enhance ecosystem functionality and ecosystem resilience. Partially, this can be achieved by introducing a 'polluter explains' obligation in permit applications, and at regular intervals after that, to provide a check on the necessity of activities and the potential for further stress reductions.

The external expansion of the use of BAT means applying it outside its original scope to ensure coherence in the ecological governance approach. In theoretically applying BAT to agriculture and forestry, it became clear that the concept as such is suitable for implementation in other areas of law than it was originally designed for. Also, it became apparent that how the land is used and for which purpose is at least as important as which techniques are used. For this reason, the term best available use was introduced and it was argued that a description of the best available use should be incorporated in the relevant BREFs. Furthermore, it was concluded that what is considered best available use can be partly dependent on technical developments in seemingly unrelated areas.<sup>126</sup> This notion makes it all the more pressing to maintain a holistic view and to implement an adaptive legal system. Additionally, to safeguard the focus on enhancing

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126 Such as the relation between electric vehicles and agricultural crops, as mentioned above.

ecosystem resilience, the BAT determinations and permit conditions should be reviewed by an independent body.

This article has found sufficient leeway to implement (the basics of) ecological governance using an already familiar legal concept. Nevertheless, to actually implement and execute the ideas and visions discussed in this article, bold steps need to be taken by politicians and lawmakers. As also argued by Woolley and Higgins, a lack of sufficient political will to take the required measures is perhaps the most substantial obstacle in the transformation of the contemporary (economic) paradigms.<sup>127</sup> However, momentum may have changed with the recent entry into force of the Paris Agreement, as this treaty expresses near-global consensus on the need to urgently tackle climate change.<sup>128</sup> The Paris Agreement thus paves the way for drastic societal reform and may serve as an impetus to implement a (global) legal framework that promotes enhanced ecosystem health. Law will then prove to be a powerful tool in stimulating innovative powers and in implementing ecological governance, which will steer society in a more sustainable direction.

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127 See O. Woolley, n. 8 above, at 58; and P. Higgins, n. 12 above, at xiv.

128 Nevertheless, it remains to be seen what effects recent geopolitical developments (e.g., the elections in the United States) will have on this momentum and on the execution of the Paris Agreement.



