Patent law's role in the protection of the environment: Re-assessing patent law and its justifications in the 21st century

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Abstract

The question this article addresses is whether patent law is the appropriate forum to ban polluting inventions, especially those that emit greenhouse gases. To answer this question, the paper scrutinises the functions and justifications for patent law, the morality and *ordre public* provision (art. 53(a) European Patent Convention) and supplementary protection certificates along with the relevant case law and literature. The paper finds that patent law is only apparently neutral, and therefore this is not a hindrance to it having a role to play in prohibiting polluting technologies and also in encouraging the invention and use of clean technologies. This is also congruent with current patent law rationales and arguments advanced by commentators and others advocated by the author. The paper concludes that European patent laws should be modified to strengthen the prohibition of polluting inventions and grant favoured treatment to green inventions especially those reducing greenhouses gases in the earth's atmosphere.

Introduction

Few would now deny that humans are causing the global warming of the planet to the extent that our survival is threatened.[1] The also called "greenhouse effect" or "climate

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[1] I therefore make the assumption that humans are responsible for the best part of the *increase* of CO2 and other greenhouse gases emissions and therefore follow the opinion of the majority of the scientific community. For recent authoritative views, see the Intergovernmental Panel on Climate Change

change" is mainly caused by the release in the atmosphere of too many "greenhouse gases" (GHG).[2] Numbers speak for themselves. For instance, about 80% of the extra man-made CO2 comes from burning oil, coal and gas and 20% from deforestation or other land changes.[3] In the European Union (EU), the transport sector is the fastest growing source of CO2 emissions.[4] In 1990 already, the Intergovernmental Panel on Climate Change (IPCC) stated that to stabilise concentrations of CO2, current emissions would have to be reduced between 60 and 80 percent.[5]

The main cause of increase in GHG emissions is no doubt industrial development. A major inducement of industrial development is arguably the law itself. Patent law, and its alternative (confidential information or trade secrets), were created chiefly as an incentive to innovate[6] and thus put new technologies on the market. Patent protection was launched at the same time as industrialisation.[7] And 'each increase in the level of patent protection corresponds to progress in the industrialisation process'[8] although there is no conclusive evidence of a link between the two.[9] Since the 1990s, the EU has done a lot to reduce GHG emissions by way of environmental Directives and Regulations. As bluntly stated by one of the chief architects of solutions to global warming, Yvo de Boer, we need regulation; the lack of legal framework is one of the factors why nothing happens.[10] The question this statement triggers is whether patent laws should do something too. Can patent law be a 'tool of environmental policy'?[11] Is it the role of patent law to further environmental protection? Wouldn't an eco-friendly patent law send a message to inventors that they cannot patent "everything under the sun"? If it does not, the sun might stay but the earth, including inventors and inventions, might disappear…

The question this article poses is whether patent law is an appropriate forum to protect the environment and more particularly, reduce the release of GHG in the atmosphere.

("IPCC", established in 1988) conclusions November 07, available at http://www.ipcc.ch/ipccreports/ar4-syr.htm (last visited 7 August 2008).

[2] For an explanation of global warming, see eg P. Davies 'Global Warming and the Kyoto Protocol' (1998) 47 International and Comparative Law Quarterly 446-461. The main GHG are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6) as listed in the Kyoto Protocol.

[3] J. Thornton and S. Beckwith, *Environmental Law* (London: Sweet & Maxwell, 2nd ed, 2004), 52, citing B. Lomborg, *The sceptical environmentalist: measuring the real state of the world* (Cambridge: Cambridge University Press, 2001), 258, although according to the same author 'approximately 30 to 55 per cent of CO2 produced by burning fossil fuels is absorbed by the sea, forests and plants.' Ibid, 260.

[4] S. Bell and D. McGillivray, *Environmental Law* (Oxford: Oxford University Press, 6th ed, 2006), 646 (detailing that 'passenger vehicles comprise some 12 per cent of the EU's total emissions').

[5] Thornton and Beckwith, n 3 above, 55.

[6] On patent law justifications, see below next section.

[7] P. Torremans, *Holyoak & Torremans Intellectual Property Law* (Oxford: Oxford University Press, 5th ed, 2008), 20.

[8] Ibid.

[9] Ibid. There may be other factors which contribute to the higher level of industrialisation. Ibid, citing R. Benko, *Protecting Intellectual Property Rights: Issues and Controversies* (Washington, D.C.: American Enterprise Institute, 1987), 17.

[10] Executive Secretary, United Nations Framework Convention on Climate Change, during his presentation to the European Patent Forum 2008, Ljubljana, available at http://documents.epo.org/projects/babylon/eponet.nsf/0/9D0B55A30B48010FC12574440046F844/$File/yvo_de_boer_en.pdf (last visited 7 August 2008).

[11] Title of a section of B. Sherman and N. Atkinson, 'Intellectual Property and Environmental Protection' (1991) EIPR 165.

The underlying aim of the article is to discover whether patent law is intrinsically, explicitly or implicitly, directly or indirectly, geared to the protection of the environment or not. To answer this question, the article first reminds of the roles and justifications for patent law (section 1). After having discovered that none of the patent functions and justifications refer to the environment let alone to the reduction in GHG emissions, an analysis of the positive law shows that despite patent law's apparent neutrality, it carries the seeds of differentiation and therefore, can allow for special treatment of "green inventions" (section 2). The so far very few commentators which have written on the topic also agree that patent law should differentiate in some cases, including for environmental protection (section 3). The article answers the question from a European perspective, therefore concentrating on EU and European law (mainly the European Patent Convention (EPC)) as well as national patent laws (with an avowed bias towards UK law).

1. Patent law rationales: justifications, functions and roles, or ideology?

There are four main justifications for having patents. As has been noted, these were the original ones proposed to introduce patents in the 19th century and they have not changed much today.[12] One first simple reason is that it is just that the inventor be granted exclusive property rights on his or her invention. In other words, it is fair that inventors should be *rewarded* for their innovations. A second reason, which can be said to be a sub-category of this "justice argument", is the so-called labour (based on John Locke's writings[13]) or natural rights theory. A third justification for having patents is to give an incentive to inventors to innovate (utilitarian rationale). Finally, patent laws can also be based on a social contract. According to this theory, the patentee obtains an exclusive right on his invention but in return he must disclose it to the public in such a way that it can be understood and reproduced by persons skilled in the art. According to this theory, patent law's function is an informative one.

There is a fifth justification that Machlup and Penrose did not, not too unsurprisingly, mention. It is based on Kant's and Hegel's writings.[14] The theory can be briefly summarised as follows. 'Property rights are crucial to the satisfaction of some fundamental human needs; policymakers should thus strive to create and allocate entitlements to resources in the fashion that best enables people to fulfil those needs.'[15] Therefore, intellectual property rights should be recognised to protect the personality that creators express through their intellectual productions or because the

[12] F. Machlup and E. Penrose, 'The patent controversy in the nineteenth century' (1950) 10(1) *Journal of Economic History* 10 (one of the seminal articles on patent justifications).
[13] John Locke, Second Treatise on Civil Government of 1690, published eg by Peter Laslett ed., *Two Treatises of Government ch. V*, Cambridge: Cambridge University Press, 1988.
[14] See eg J. Hughes, 'The philosophy of intellectual property' (1988) 77 Georgetown Law Journal 287, at 330-350; P. Drahos, *A Philosophy of Intellectual Property* (Dartmouth: Aldershot, Brookfield, USA, Singapore, Sydney, 1996), 73ff.; W. Fisher, 'Theories of Intellectual Property' in S. Munzer (ed.), *New Essays in the Legal and Political Theory of Property* (Cambridge University Press, 2001), available at http://cyber.law.harvard.edu/people/tfisher/iptheory.pdf (last visited 1 April 2008, now unavailable but on file with the author and referred to at http://www.tfisher.org). See also R. Peritz, 'Patents and Progress: the Incentive Conundrum', Paper delivered at the Annual ATRIP Congress 2008 'Can one size fit all?', in *Proceedings of the ATRIP conference 2008*, 10 (on file with the author) stating that Machlup and Penrose could also have cited a fifth justification 'the personal value of inventions to their inventors, along the Hegelian lines of a "droit moral"'.
[15] Fisher, n 14 above, 3.

rights will 'create conditions conducive to creative intellectual activity, which in turn is important to human flourishing.'[16] Fisher summarises as follows J. Hughes' reading of Hegel's philosophy as applied to intellectual property, which is, he notes, probably one of the most developed. Hughes 'derives from Hegel's *Philosophy of Right* the following guidelines concerning the proper shape of an intellectual property system. (a) We should be more willing to accord legal protection to the fruits of highly expressive intellectual activities, such as the writing of novels, than the fruits of less expressive activities, such as genetic research. (b) Because a person's "persona" – his "public image including his physical features, mannerisms and history" – is an important "receptacle for personality", it deserves generous legal protection, despite the fact that ordinarily it does not result from labour. (c) Authors and inventors should be permitted to earn respect, honour, admiration and money from the public by selling or giving away copies of their works, but should not be permitted to surrender their right to prevent others from mutilating or misattributing their works'.[17] As can readily be seen, this theory has been mainly used to justify the granting of moral rights (paternity, integrity) to authors of literary works and the like. As patent law much less than copyright law is the expression of the personality of the inventor, the justification is less important in the field of patents. It has therefore has generally been less referred to as and has traditionally and still currently not played a great role.[18] We will therefore not analyse it here in more detail.

Machlup & Penrose have summarised very well the logic behind each of the four above mentioned justifications and we cannot do better than quote them here:

Argument type one: A man has a natural property right on his own ideas. Their appropriation by others must be condemned as stealing. Society is morally obligated to recognise and protect this property right. Property is in essence exclusive. Hence enforcement of exclusivity in the use of a patented invention is the only appropriate way for society to recognise this property right.
Argument type two: Justice requires that a man receive and therefore that society secure him, reward for his services in proportion as these services are useful to society. Inventors render useful services. The most appropriate way to secure to inventors rewards commensurate with their services is by means of exclusive patent rights in their inventions.
Argument type three: Industrial progress is desirable to society. Inventions and their exploitation are necessary to secure industrial progress. Neither invention nor exploitation will be obtained to any adequate extent unless inventors and capitalists have hopes that successful ventures will yield profits which make it worth their while to make their efforts and risk their money. The simplest, cheapest, and most effective way for society to hold out these incentives is to grant exclusive patent rights in inventions.
Argument type four: Industrial progress is desirable to society. To secure it at a sustained rate it is necessary that new inventions become generally known as parts of the technology of society. In the absence of protection against immediate imitation of novel technological ideas, an inventor will keep his invention secret. The secret will die with him, and society will thereby lose the new art. Hence it is in the interest of

[16] Ibid.
[17] Ibid, 3-4, referring to 330-350 of Hughes, n 14 above.
[18] In the EPC and national patent laws, though, there is a right for the inventor to be named in the patent application (art. 62 EPC; s 13 UK Patents Act 1977).

society to induce the inventor to disclose his secret for the use of future generations. This can be best done by granting exclusive patent rights to the inventor in return for public disclosure of his invention.[19]

There is general agreement that each of these four theories can alone justify the introduction of patent laws and are therefore independent, and also that they can be combined.[20] This also means that they are not (necessarily) conflicting. It is also clear that none of the patent justifications refer to the environment let alone to the reduction in GHG emissions. It is not proposed to detail the content of the justifications as they are well-known to intellectual property lawyers; the reader will be usefully referred to the literature.[21] Nevertheless, a few words need to be added about a significant feature of the incentive theory, as this theory provides the single most important justification at the basis of current patent laws in Europe.[22] Underlying this justification is the principle of neutrality of patent law.[23] Neutrality means that patent law 'makes no value judgements'[24] and treats all inventions equally.[25] In other words, there is no special regime or priority given to certain types of inventions.[26] This is reflected in the Paris Convention of 1883. The neutrality principle is linked to the idea of legal specialisation which also pervades other areas of the law and means that 'each area of the law has a discrete and separate function which it should pursue and, correspondingly, that it is wrong for these functions to be confused or conflated.'[27]

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[19] Machlup and Penrose, n 12 above, at 10.

[20] Ibid, 11 adding that any one of them may be upheld if the other three should be rejected; V. Denicolo and L. Franzoni, 'The contract theory of patents' (2003) 23 *International Review of Law and Economics* 365 ('the disclosure motive alone suffices to justify the grant of patents.' and 366: 'Clearly, the reward and the contract theory are complementary, rather than alternative. However, each of them is logically independent of the other'); M. Fisher, 'Classical economics and philosophy of the patent system' (2005) IPQ 1, 5, 21; J. Phillips and A. Firth, *Introduction to Intellectual Property Law* (London: Butterworth, 4th ed, 2001) 24 (there is 'justification for adopting a position which seeks to recognise the essential attractive force of each [justification], by maintaining that the continental approach emphasises the importance of man's aspirations to justice under the law, while the common law approach focuses firmly upon the concept of *lex lata* as the final arbiter of man's claims to justice'). *Contra*: W. Cornish and D. Llewelyn, *Intellectual property: patents, copyright, trade marks and allied rights*, London: Sweet & Maxwell, 6th ed, 2007) 141-142: 'The experience with biotechnology underscores how the justifications for the patent system are not independent. Rather they are cumulative, and each imposes its limitations.'

[21] See eg Fisher, n 20 above; Drahos, n 14 above.

[22] F.-K. Beier, 'Future problems of patent law' (1972) IIC 423, 425-426; *Asahi Kasei Kogyo* [1991] RPC 485, 523 (HL) (the 'underlying purpose of the patent system is the encouragement of improvements and innovation', per Lord Oliver).

[23] Fisher, n 14 above, 20 thinks this notion of neutrality is also present in the labour theory.

[24] W. van Caenegem, 'Intellectual Property Law and the Idea of Progress' (2003) IPQ 237, 250.

[25] Beier, n 22 above, 443; N. Pires de Carvalho, *The TRIPs Regime of Patent Rights* (The Hague: Kluwer Law International, 2002), 1, 3; D. Alexander, 'Some themes in intellectual property and the environment' (1993) 2(2) *Review of European Community and International Environmental Law*, 113, 114 ('It does not contain particularly strong incentives for research and development in particular areas, not [sic] does it seek to "penalise" inventions which have undesirable effects, except in extreme cases').

[26] F.-K. Beier, 'Exclusive rights, statutory licences and compulsory licences in patent and utility model law' (1999) IIC, 255-256, 257, citing H. Ullrich, 'Die wettbewerbspolitische Behandlung gewerblicher Schutzrechte in der EWG' (Dealing with Industrial Property Rights Under EEC-Competition Policy)' (1984) GRUR Int. 89, 92; Sherman and Atkinson, n 11 above, 169; Van Caenegem, n 24 above, 250.

[27] Sherman and Atkinson 1991, n 11 above, 169. B. Sherman and L. Bently, 'The question of patenting life', in L. Bently and S. Maniatis, *Intellectual Property and Ethics*, *Perspectives on Intellectual Property, Vol. 4* (London: Sweet & Maxwell, 1998), 109, 117 noting that in contrast with the 19th century, questions of judgement have not been made in intellectual property in the 20th century. We

A final aspect should be mentioned: the patent system also acts as a way of knowing which inventions the state considers deserving protection.[28] This is actually quite an important aspect of the patent system for our discussion as, if the state is happy to grant patents to polluting inventions, it arguably sends the wrong signal. As has been noted, this "public sanction" function was considered very seriously 'in the ethical debates about whether patents should be granted for genetically modified humans, animals and plants.'[29]

2. Not so neutral: the underlying belief in progress, the notion of *ordre public* and the special treatment given to some inventions

When patent law is scrutinised more closely, one discovers that it is not completely neutral. Underlying the still dominant incentive function, which includes this notion of neutrality, is the intrinsic assumption that progress is good for society (sub-section 2.1.). In any case, whatever the rationale on which current patent laws are based, it appears that European (through the EPC), EU and by domino effect, national patent laws provide special regimes for some inventions. Some are excluded (those that are contrary to morality and *ordre public*) whilst some are favoured (pharmaceutical and plant protection products) (sub-section 2.2.). Furthermore, some commentators have encouraged the questioning of patent law's traditional functions or even further, called for the patent system to change and grant special treatment to some inventions, in view of their utility to society (sub-section 2.3.).

2.1. Scratching under the surface of the incentive theory: revisiting the idea of progress

As stated in the first section, the incentive theory is still the main justification in Europe for patent laws nowadays, together with the disclosure function. At the core of the incentive function, lies the important assumption that technical progress is socially desirable.[30] This assumption has not been discussed much as it is a generally accepted notion in today's society. However, because of this assumption, it can be said that patent law is not neutral. It is neutral in the sense that it will treat all technical inventions equally but above this level of abstraction, it is not neutral in the sense that it affirms that all technical inventions are necessarily desirable. By this assumption, patent laws take the view that technical progress is *per se* a good thing.[31] The assumption hides a belief, if not an ideology, that technical progress will always improve human conditions. A summary of the "progress ideology" is therefore in order.

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only agree in part as the notion of morality is present in intellectual property laws in the 20th century (see eg art. 8 Design Directive, art. 3(1)(f)Trade Mark Directive; there is no similar rule in EU copyright Directives but UK copyright decisions embrace this notion. See *Glyn v Weston Feature Film Co.* [1916] 1 Ch 261 (Ch D); *Attorney General v Guardian No. 2* [1990] 1 AC 109 (HL)). For the discussion of patents, see below, section 2.

[28] L. Bently and B. Sherman, *Intellectual Property Law* (Oxford: Oxford University Press, 2nd ed, 2004), 328; Cornish and Llewellyn, n 20 above, 142.

[29] Bently and Sherman, n 28 above, 328.

[30] Machlup and Penrose, n 12 above, 10.

[31] Bently and Sherman, n 28 above, 328-329, at fn. 24.

In his very informative article, W. Van Caenegem shows that much of intellectual property law, and patent law in particular, is underpinned by the idea of and belief in progress.[32] The idea of progress was developed during the Enlightenment period, in the 17th and 18th centuries continuing in the 19th century, and rested upon three precepts: (1) the continuous increase of human knowledge (intellectual enlightenment); (2) 'the practical usefulness and application of knowledge for the satisfaction of material wants and the solution of social problems; and [3] the belief that the application of knowledge would lead to a perfected man living in perfect conditions in a perfected world'.[33] In other words, progress will lead to greater happiness, liberty and justice for all.[34] Viewed in this way, 'the belief in progress was akin to a religion (…) and it gave rise to a new science of political economy, specifically aimed at maximising the satisfaction of want, ie material welfare.'[35] The focus was therefore on material wealth and social advancement, not personal spiritual development.[36] This idea of progress is based on the satisfaction of a desire for material improvement in contrast with (specifically) the Christian values of simplicity and frugality. In our contemporary society, this idea of progress that science is there to satisfy humans' every want is still alive and well.[37] This belief 'also tends to automatically equate technological change with an increase in the welfare of the individual, elevating innovation to the position of a good *per se*.' [38]

However, this belief is not without its limits, negative consequences and critics. One limit is that posed by our environment. By definition, the earth has finite resources so that progress cannot be continuous. This shows the danger of the belief. A counter-argument is to say that the answer is in progress itself. Technology will solve all problems even that of finite resources.[39] A negative consequence of the progress ideology is that it can lead to cultural annihilation and imperialism. The introduction of material acquisitions of "more advanced" societies will generally 'result in a partial destruction of the "primitive" society's culture.'[40] This example shows that the progress ideology behind most intellectual property laws (as most of them were introduced by the West where the ideology was sparked) is not universal.[41] Some

[32] Van Caenegem, n 24 above, 239. Apart from the quoted contribution, to the author's knowledge, this issue has not been debated in European intellectual property legal scholarship. Some American commentators have discussed the issue in relation to the meaning of the U.S. Constitution's Patent and Copyright Clause. See eg M. Chon, 'Postmodern "Progress": Reconsidering the Copyright and Patent Power' (1993) 43 *DePaul Law Review* 97; M. Pollack, 'What is Congress Supposed to Promote?: Defining "Progress" in Article I, Section 8, Clause 8 of the United States Constitution, or Introducing the Progress Clause', (2001) 80 *Nebraska Law Review* 754; M. Birnhack, 'The Idea of Progress in Copyright Law' (2001) 1 Buffalo Intellectual Property Law Journal 3; A. Moore 'Intellectual Property, Innovation, and Social Progress: The Case Against Incentive Based Arguments' (2003) 26 *Hamline Law Review* 601. In any case, Van Caenegem's in-depth comments are more than sufficient for our limited purposes.
[33] Van Caenegem, n 24 above, 241-242.
[34] Ibid.
[35] Ibid, 242.
[36] Ibid, 241.
[37] Ibid, 242.
[38] Van Caenegem, n 24 above, 247. See also J. Aubrey, 'A justification of the patent system', in J. Phillips (ed), *Patents in perspective: a collection of essays* (Oxford: ESC Publishing, 1985), 1 who bluntly affirms that patents increase consumer choice and thereby improve the consumer's standard of life.
[39] Van Caenegem, n 24 above, 245-246.
[40] Ibid, 246.
[41] Ibid, 254.

cultures still favour imitation over innovation. Recently, the ideology of material progress has also been criticised by environmentalists, religious groups or political activists.[42] One such criticism is that whilst to a certain extent it is undeniable that material progress brings happiness - if human beings lack basic food, medicine and shelter, they will inevitably be unhappy - there may come a point where the satisfaction of *desires* rather than *needs* is not necessary.[43]

In sum, Western intellectual property laws are still imbued with the progress ideology and are thereby in this sense not neutral. Patent law is no exception.

2.2. Special treatment in patent laws

Apart from this "hidden" subjective justification of current patent laws in Europe, there are also specific provisions which disprove patent laws' apparent neutrality. There are mainly two types of provisions: article 53(a) of the EPC which excludes inventions contrary to morality and *ordre public* (sub-section 2.2.1.) and supplementary protection certificates which grant a longer protection to medicinal and plant protection products (sub-section 2.2.2.). The content of these provisions is analysed hereunder in some detail. As will be seen, and in relation to this article's inquiry, the *ordre public* provision as interpreted also prevents the patentability of environmentally-damaging inventions.

2.2.1. Morality and *ordre public*

It has been said that until the issue of biotechnology arose, patent law was considered 'closed off from external considerations'[44], ie neutral. This is not entirely correct as at least in the UK, section 19 of the predecessor to the current patent act already provided that immoral inventions should be refused.[45] Right from the origins of patent law, the first patent statute of 1623 already provided that a patent could only be granted if it was 'not contrary to law or mischievous to the State'[46] and in fact, every patent act in the UK carried this provision until now.[47] Biotechnology and the issue of the patenting of life has not created but only exacerbated the issue.

Article 53(a) EPC prevents the patenting of immoral inventions and inventions that are contrary to *ordre public*.[48] This is also reflected at international level (albeit as an

[42] Ibid, 251.
[43] One can easily make the comparison between this idea and that of a spoilt child who always wants the latest gadget.
[44] Sherman and Bently, n 27 above, 109.
[45] Section 19 of the Patents Act 1949 stated: 'refusal of application in certain cases (1) if it appears to the comptroller in the case of any application for a patent – (a) that it is frivolous on the ground that it claims as an invention anything obviously contrary to well-established natural laws; or (b) that the use of the invention in respect of which the application is made would be contrary to law or morality (…)'.
[46] Statute of Monopolies, section 6. Drahos, n 14 above, 32; Armitage and Davis, *Patents and Morality in Perspective* (Common Law Institute of Intellectual Property, London, 1994), 27.
[47] S. 86 of the Patent and Designs Act 1883 gave power to the Comptroller General of the Patent Office to refuse to grant a patent where 'the use would, in his opinion, be contrary to law or morality'. Cited by Armitage and Davis, n 46 above, 28.
[48] In French in the text (the term comes from the French civil code). It was not really translatable in English but it roughly means public policy. Armitage and Davis, n 46 above, 18. D. Beyleveld & R. Brownsword, *Mice, Morality and Patents* (Common Law Institute of Intellectual Property, London, 1993), p. 58-62 give an interpretation of the concepts of morality and *ordre public* in the EPC and conclude that both terms fall within the concept of "public morality", which concerns conduct

option to countries rather than an obligation as in the EPC) in article 27(2) of the TRIPs agreement.[49] It can therefore be said that such inventions enjoy a special treatment, albeit negative. This treatment compares with the exclusion of computer programs, presentations of information, discoveries etc. from patentability in article 52(2) EPC. Article 53's simple statement could by itself prove that patent law is not neutral as it discriminates between certain types of inventions. But one still needs to examine how the provision has been interpreted. For about two decades, the article did not come to be interpreted through case law.[50] The EPO's Official Guidelines for Examination recommended a very narrow interpretation to the provision[51], the origins of article 53(a) also favour such restrictive interpretation and this was also the case in national patent laws in the past.[52] But these guidelines are not binding and then came the *Oncomouse* and *Plant Genetic Systems* cases.[53]

These two cases considered what is meant by an invention contrary to *ordre public* or morality under the EPC. The rulings can be summarised as follows. Article 53(a) is an exception and must be narrowly construed.[54] Morality and *ordre public* are two different concepts.[55] Morality refers to 'the belief that some behaviour is right and acceptable whereas other behaviour is wrong, this belief being founded on the totality of the accepted norms which are deeply rooted in' the European culture and *ordre public* 'covers the protection of public security and the physical security of the individuals as part of society. This concept encompasses also the protection of the environment.'[56] For a polluting invention to be contrary to *ordre public*, the prejudice

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legitimately subject to public regulation. O*rdre public* is only concerned with the foundations of civil governance ie with the Rule of Law whilst morality covers all other aspects of public morality.

[49] Article 27(2) TRIPs states that 'Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law'. R. Pavoni, 'Biosafety and intellectual property rights: balancing trade and environmental security – the jurisprudence of the European Patent Office as a paradigm of an international public policy issue', in F. Franconi (ed), *Environment human rights and international trade*, Oxford: Hart, 2001), 89 mentions that 'no judicial decisions have been taken at WTO level specifically dealing with the environmental exception to patentability provided for in article 27(2) TRIPs.'

[50] The decisions have also been sparse in Members of the EPC, with as unpatentable subject-matter on the basis of the morality provision, only gambling devices and contraceptives. Armitage and Davis, n 46 above, 29-39 (they surveyed the UK, France, the Netherlands and Germany up to 1994).

[51] Alexander, n 25 above, 115. The guidelines, (at IV, 3.1) state that 'the purpose of this is to exclude from protection inventions likely to induce riot or public disorder or to lead to criminal or other generally offensive behaviour'. See Armitage and Davis, n 46 above, 41. *Contra*: Beyleveld & Brownsword, n 48 above, 115 who argue that reading article 52(1) EPC as enshrining a general principle of narrow interpretation of the Convention's exceptions is erroneous.

[52] Armitage and Davis, n 46 above, 26.

[53] *Harvard/Onco-Mouse* [1990] EPOR 4; [1989] OJEPO 451 (Exam.); case T 19/90 [1990] EPOR 501; [1990] OJ EPO 476 (Technical Board of Appeal); [1991] EPOR 525 (Exam.); case T 315/03 (EPO Board of Appeal, July 2004) (*Onco-Mouse*). The latter is the final authoritative decision on *Onco-Mouse*. *Plant Genetic Systems (PGS)*, 21 February 1995, case T 0356/93 [1995] OJEPO 545; [1995] EPOR 357 (*PGS*). Another case, dating from 1991 and involving a patent by Upjohn for a mouse genetically modified to lose hair, simply applies the rationale in *Onco-Mouse*. For a report of the case, see The Independent, 2 February 1992, cited by Bently and Sherman, n 28 above, 436.

[54] *Onco-Mouse* [1991] EPOR 525, at 527; *Plant Genetic Systems*, n. 53 above, 367, 372.

[55] *PGS*, 366; *Onco-Mouse*, case T 0315/03, n. 53 above, point 10.2 of the Reasons.

[56] *PGS*, 366. For A. Plomer et al., *Stem cell patents: European patent law and ethics Report*, FP6 'Life sciences, genomics and biotechnology for health' SSA, LSSB-CT-2004-005251, 109, available at http://www.nottingham.ac.uk/law/StemCellProject/project.report.pdf (last visited 7 August 2008), the EPO's definition of the notion of *ordre public* is clearer than that of the notion of morality. We can

to the environment must be serious.[57] Further, according to the EPO, technology is neutral. It can be used 'for constructive or destructive purposes. It would undoubtedly be against "ordre public" or morality to propose a misuse or a destructive use of these techniques. Thus, under Article 53(a) EPC, no patent may be granted in respect of an invention directed to such a use.'[58]

Even if it might be difficult to judge whether an invention is immoral or contrary to *ordre public*, the EPO agreed that it should nevertheless do so.[59] This judgement cannot be made by way of surveys or opinion polls.[60] This is because they can fluctuate according to various factors. To be relied on, they would have to be made *ad hoc* which is scarcely feasible. There are two ways in which to evaluate whether an invention is contrary to morality or *ordre public*. One is a cost/benefit analysis (CBA). In other words, one should weigh up the risks and benefits of the invention. This is the approach adopted in the *Onco-Mouse* case, which dealt with the patenting of a genetically modified mouse so that it is more likely to develop cancer.[61] There were three interests to be weighed in *Onco-Mouse*: the interests in reducing human disease, in not having animals suffering and in protecting the environment against uncontrolled dissemination of unwanted genes. As far as protection of the environment is concerned, the examining division said that the animals were only to be used in laboratories in controlled conditions by qualified staff. 'Therefore the risk of an uncontrolled release is practically limited to intentional misuse or blatant ignorance on the part of the laboratory personnel carrying out the tests. The mere fact that such uncontrollable acts are conceivable cannot be a major determinant for deciding whether a patent should be granted or not.'[62] Weighing up these three interests, the examining division considered the invention patentable and not immoral or contrary to *ordre public*. It added that an invention is not immoral because it is beneficial to mankind. This test (CBA) can be used in morality cases, *ordre public* cases or both.[63]

Another approach is that taken in the *Plant Genetic Systems* case. This case dealt with the patenting of plants genetically modified to resist to herbicides. The board held that the "balancing exercise" of benefits and disadvantages used in *Onco-Mouse* is 'not the only way of assessing patentability with regard to Article 53(a) EPC, but just one possible way, perhaps useful in situations in which an actual damage and/or disadvantage (for example, suffering of animals as in the case of Decision T 19/90 above) exists.'[64] The facts of the *PGS* case led to the application of another test, that

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agree with the report (95) that morality is a flexible concept: it is different in different countries and changes over time.

[57] *PGS*, n 53 above, 366.

[58] Ibid, 370.

[59] Ibid, 368 referring to case T19/90, *Onco-Mouse,* in particular, point 5 of the Reasons. As noted by Sherman and Bently, n 27 above, 116, the EPO does not have any choice as article 53(a) forces it very clearly to assess the potential immorality or offence to *ordre public* of every invention.

[60] *PGS* n 95 above, 369. In short, the Board almost completely ruled out the possibility to use surveys. See also case T 0315/03, *Onco-Mouse*, n 53 above, point 10.2 of the Reasons. T. Sommer 'Interpreting *ordre public* and morality in a patent law context: which is the correct approach?' (2006-07) 2 BLSR 62, 68 is in favour of this position.

[61] Case T 315/03, *Onco-Mouse*, n 53 above, point 10.5 of the Reasons.

[62] *Onco-Mouse* [1991] EPOR 525, 528.

[63] Case T 315/03, *Onco-Mouse*, above n 53, point 10.5 of the Reasons.

[64] *PGS*, n 95 above, 373. Subsequently, in case T 315/03, *Onco-Mouse*, n 53 above, point 10.7-10.10 of reasons, the board also said that 'in animal manipulation cases, the test in T 19/90 is appropriate.' It

of sufficient evidence of actual disadvantages.[65] This evidence must exist at the time the EPO is asked to revoke the patent.[66] If no such evidence exists, there is no reason for not allowing the grant of, or for revoking, the patent on the basis of article 53(a). In the *PGS* case, the threat to the environment which the invention may cause was not sufficiently substantiated and the invention could therefore be patented.[67]

In relation to the evaluation of the risks of the invention, the EPO held that whilst 'patent offices are placed at the crossroads between science and public policy'[68], they are not alone as there are authorities and bodies, in particular regulatory ones whose role it is *inter alia* to assess the hazards linked to the exploitation of a given technology.[69] It previously held that it was not its task to regulate the handling of dangerous materials but that of specialised entities.[70] This remains good law but the EPO will still be compelled by article 53(a), on the basis of the patent application and the evidence submitted by the parties, to refuse the patenting of an invention contrary to morality or *ordre public*. To this extent, its role overlaps slightly with that of those bodies. Indeed, the board specifically held that it is not *always* possible just by looking at the patent application to know the risks associated with the exploitation of the invention.[71] However, the interpretation of the *PGS* case on this point is not unanimous. It has been argued, erroneously in our view, that the board meant that only the regulatory bodies can check the risks of the invention.[72]

The above summary is in essence how the EPO evaluates the "moral merit" of an invention. It must be stressed that as the moral standards have been shaped by the TRIPs Agreement, the EPC and the EU through the so-called Biotechnology Directive[73], so by three different legal systems, the interpretation of the standard may differ.[74] It has been argued that there is no understanding on the correct interpretation of the concepts of morality and *ordre public*.[75] The interpretation above is that of the EPO and only binds the EPO and not always national courts.[76] It does not bind the EU; therefore the ECJ does not have to follow this definition of morality and *ordre public* if it has to interpret the Biotechnology Directive. In the same vein, a TRIPs WTO panel's interpretation of serious prejudice to the environment may be different

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added that it is "mainly" the test but other arguments can be made out so long as they are evidenced (therefore not disagreeing with the ruling in *PGS*).

[65] *PGS*, n 53 above, 373.

[66] In case T 315/03, *Onco-Mouse*, n 53 above, point 10.9 of the Reasons, the board notes that 'Article 53(a) EPC assessment is to be made must be the effective date (filing or priority date) of the patent or application in suit although later evidence may also be taken into account provided it is directed to the position as at the effective date'.

[67] *PGS*, 372.

[68] Ibid, 371. The board stated they 'find themselves *side-by-side* with an increasing number of other authorities' (emphasis added).

[69] Ibid, 371. The board gives the example of pharmaceutical patents which are granted on basis of preliminary *in vitro* testing or animal data before any human clinical data is available.

[70] *Onco-Mouse* [1991] EPOR 525, 527.

[71] *PGS*, n 53 above, 18.4.

[72] Sommer, n 60 above, 69.

[73] Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions, OJEC L 213, 30 July 1998, 13-21.

[74] Sommer, n 60 above, 62.

[75] Ibid, 65. See also implicitly, case T 315/03, *Onco-Mouse*, n. 53, point 10.4 and 10.10 of the Reasons on the morality concept.

[76] In the UK, courts are bound by the EPO's appellate decisions. See s 91(1) of the Patents Act 1977.

from that of the EPO. It is to be hoped however that national patent offices and courts would try and align themselves on the EPO's case law, as the UK would do.

2.2.2. Supplementary protection certificates

In contrast with morality and *ordre public* which apply negatively (ie to prevent the patenting of certain inventions), but also despite its apparent neutrality, patent law favours certain inventions according to the field of technology concerned. This consists of the special regime for medicinal and plant protection products by way of supplementary protection certificates (SPCs).[77]

Because it often takes a long time for a patentee to receive the marketing authorisation for medicinal and plant protection products from the relevant European and/or national agency[78], he or she has less time than other patentees to reap the benefits of his or her patent as time passes between the grant of the patent and that of the authorisation. Therefore, the EU took two Regulations to grant an additional term of protection for medicinal and plant protection products.[79] These are new rights and they do not apply to patented inventions as such, so as not to conflict with article 63 EPC which sets out the maximum term of protection.[80] But in practice, the SPCs can be said to extend the patent term beyond 20 years when the authorisation has been long awaited. The maximum duration of an SPC is five years.[81] The SPCs do not apply if the patent is at some point invalidated or revoked.

The SPCs arguably show that the EU favours inventions involving pharmaceuticals and plants over other types of inventions. However, it could also be argued that SPCs do not confer a special treatment but are simply there to restore the imbalance created by the difference between inventions that require an authorisation and those that do not and which the patent owner can exploit right from the moment his or her patent is granted by the EPO or national office. Notwithstanding this argument, it can still be argued on the exclusive basis of article 53(a) EPC that patent law is not totally neutral. If one wanted even more proof of this differentiation, one could also cite the exclusion of certain inventions, especially methods for treatment of the human or animal body by surgery or therapy (art. 52(4) EPC), which like article 53(a) negatively treats such inventions by excluding them from patentability.

2.3. Conclusion

At the close of this subsection, it is therefore disputable that patent law is totally neutral, especially towards environmentally damaging inventions. Even if it can be argued that the protection of the environment and by implication, the reduction of GHG, is not one of the patent goals, the existence of article 53(a) EPC and its

[77] Sherman and Atkinson, n 11 above, 169-170 (who also briefly mention that selection patents and military and Crown inventions also benefit from a favoured regime).
[78] See eg the European Medicines Agency (EMEA).
[79] Regulation n. 1768/2 of 18 June 1992 concerning the creation of a supplementary protection certificate for medicinal products, OJ 1992, L 182/1; Regulation n. 1610/96 of the European Parliament and the council, of 23 July 1996 concerning the creation of a supplementary protection certificate for plant protection products, OJ 1996, L 198/30.
[80] Article 63(2)(b) nevertheless allows members to prolong the patent term if the product or process has to undergo an administrative authorisation procedure required by law before it can be put on the market in that State.
[81] For more information on the system and the calculation of the term, see Bently and Sherman, n 28 above, 586; Torremans, n 7 above, 152 ff.

interpretation by the EPO shows that patent law has the potential to be congruent with it, at least in principle, as the excessive release of GHG, and definitely that of other *per se* polluting substances, by an invention can potentially seriously damage the environment. In any case, the fact that the EPO has agreed to look at the impact of patents on the environment may show that the case law already develops towards recognition of another role of patent law, that of the protection of environment.

However, neither the EPC nor national laws do take a clear stance in respect of eco-friendly inventions. In other words, they do not treat them specifically. Article 53(a) as interpreted by the EPO does not encourage the patenting of eco-friendly inventions, but merely discourages inventions damaging the environment and prevents those seriously damaging it. Patent law is still neutral in the sense that all inventions, whatever their utility, are treated in the same way. The next section reviews arguments to change patent law to take account of the utility of inventions.

3. Should the patent justifications be revisited and green inventions be treated differently?

At different periods, an – albeit small - number of authors has called for a reconsideration of the neutrality of patents, and even further of its justifications. Underlying their reflections are two related ideas: the purpose of granting patents is to benefit society and the blind belief in progress should be reconsidered. Some even called for a modification of the patent system to grant special treatment to some inventions, depending on their utility to society. Section 3 first retraces the history of these arguments and then examines which patent justifications are more apt to take these ideas into account before concluding.

3.1. What does the literature say?

The idea that patents should only be granted to socially useful inventions is not a new idea. Already in the 19th century, it was argued that the social utility of an invention should determine its fate. R. Macfie, one of the fiercest anti-patent advocates of the 19th century, recommended this idea. Although he was against patents, Macfie was in favour of rewarding inventors in function of the invention's social utility (by way of prizes rather than patents).[82] In fact, until the middle of the 19th century, the quality of the invention mattered a lot.[83] In the UK for instance, the 1852 Patent Law Amendment required that the invention be of great public utility.[84] Then this idea was abandoned as it was gradually believed that the law 'was ill equipped to make subjective, qualitative decisions'.[85] It was thought that since the value of an invention can only be known retrospectively, one should not make value judgements when granting patents.[86] Thus questions of judgement have not been made in 20th century intellectual property.[87] Merit or value is (still) irrelevant in copyright law for instance.

[82] Fisher, n 20 above, 11 citing R. Macfie, *The patent question under free trade: a solution of the difficulties by abolishing or shortening the inventor's monopoly and instituting national recompenses* (London: W. Johnson, 2nd ed, 1863).
[83] Sherman and Bently, n 27 above, at 117.
[84] Ibid, 118.
[85] Ibid, 120.
[86] Ibid.
[87] Ibid, 117.

The idea of discriminating between patents according to their value came back in fashion in the 1970s probably because this was the time when Japan and the United States introduced a special regime for environmentally friendly inventions.[88] This change was probably triggered because commentators started doubting that progress has only beneficial effects.[89] Two authors re-proposed special treatment of certain inventions at the dawn of the 1970s. For Blum, who notes the devastating effects that the application of some inventions emanating harmful substances can have on human beings and the environment in general[90], patents can have a role in the protection of the environment.[91] Accordingly, patent law should stimulate inventions which preserve the environment or repair environmental damage. Beier, more generally makes the case that patent law should discriminate according to the social utility of the invention.[92] In other words, patent law's neutrality should be scrapped.[93] Present patent laws have a meaningless requirement of utility as it is fulfilled so long as any sort of utility exists.[94] On the other hand, whilst it is true that the idea of social utility also appears in the exclusions to patentability, mainly the exclusion of inventions that are immoral or offend *ordre public*[95], patent laws do not make differentiations between inventions of great and little social utility. As Beier's image clearly puts it, '[t]he improvement of a shoelace is treated the same as the pioneer invention of a new antibiotic.'[96] In his view, '[i]f it is the purpose of patent protection to encourage inventions which are useful to society, then two conclusions should be self-evident; first, inventions that are of no use or even damaging to society should not be patented and second, inventions that are of special and particular utility for the economy or for society should be patentable and even enjoy preferential treatment.'[97] These ideas meet with the prohibition of inventions contrary to morality and *ordre public*, and more specifically with the ruling in *Plant Genetic Systems*[98], and with Blum's more specific proposal that patent law should stimulate green technologies.

[88] R. Blum, 'The threat to our environment and the protection of intellectual property' (1973) *Industrial Property* 243, 248-249 citing 29 January 1970, 871 Official Gazette 673 (for the U.S.) and Patent and Engineering, Tokyo, Vol. 1, N. 1, 20 May 1971. See also Beier, n 22 above, 445.
[89] Beier, n 22 above, 444.
[90] Blum, n 88 above, at 243-244.
[91] Ibid, 247.
[92] Beier, n 22 above, 423. More recently, this seems to also be the view of the Vice-President of the EPO, Manuel De Santes, in his oral comments at the Annual ATRIP Congress 2008.
[93] Beier, n 22 above, p. 444.
[94] Ibid, 442. Incidentally, an American author recently reminded that originally and technically still now, in the United States, patents are granted if they are socially useful. See F. Washko 'Should ethics play a special role in patent law?' (2006) *Georgetown Journal of Legal Ethics*, 1027 stating that 'Thomas Jefferson saw no natural property rights in inventions, instead believing that the "embarrassment" of a public monopoly should only be granted where there is a clear benefit to society'. Notably, the United States patent law does not ban inventions contrary to morality or *ordre public*.
[95] J. Phillips, 'Editorial, Green patents' (1990) Patent World, 2 had not seen the possible application of article 53 to prevent the patenting of environmentally damaging patents ('If an invention is pollution-causing, its patentability is not called into question, nor is the validity of any granted patent assailable because of the environmental impact of the invention it describes') but argued that this should change and proposed to make "environmental impact" a patentability requirement along with inventive step and industrial application.
[96] Beier, n 22 above, 443.
[97] Ibid, 441.
[98] See section 2.2., n 53 above.

These ideas have probably re-emerged in the 1990s because of the development of biotechnology and the subsequent debate about the appropriateness of patenting life. Whilst not elaborating new theories and proposals, several authors have simply pointed out that the current justification of patent law based on the blind belief in progress should be reassessed because of the negative consequences it can have on society, the environment and culture.[99] Patent law is not 'a neutral instrument and technological innovation is not a "good" in itself'.[100] As the granting of a patent 'corresponds to a *public reward* for a contribution to scientific progress and consequently to the well-being of humankind: thus inventions which create threats of irreversible damage to the global environment do not fulfil this basic requirement.' [101] In sum, as Beier already proposed, patent law should cover for human *needs*.[102]

3.2. Are the justifications amenable to the goal of environmental protection?

The relevance of these proposals has increased in the 21st century. In light of the current global warming problem, it is arguably time to seriously review the tercentennial patent law theories and their underlying assumptions to see if they still make sense.[103] Some justifications are more easily reconcilable with or can integrate the protection of the environment better than others. The reward theory makes the assumption that all inventions are useful. This assumption is arguably incorrect. Some are not useful (for instance if they are trivial or offensive to morals or *ordre public*) and some are less useful than others. So perhaps it is possible to keep the reward theory to justify patents by modifying its underlying assumption as follows: *if* an invention is useful, it is just to reward the inventor. It may be easier to re-shape the justification of patent law if it is made on the labour theory. According to Locke's writings, humans must leave enough and as good in the commons and cannot destroy or spoil the commons (so-called 'non waste condition').[104] If this does not provide an argument to discriminate between inventions, it definitely means that no one is allowed to harm the commons. Therefore, an invention may not harm the environment, as the environment is indisputably the commons.[105] Also as opposed to the incentive theory, the concept of neutrality is not inherent to these two justifications so that they are more amenable to differential treatment.[106]

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[99] Sherman and Atkinson, n 11 above, 169-170 also noting that '[O]ne should begin to question the appropriateness and relevance of the ideas and assumptions of patent law formed a century or more ago to the modern world'; Van Caenegem, n 24 above, 256.

[100] Pavoni, n 49 above, 92-93, citing P. Drahos 'Biotechnology patents, markets and morality' (1999) EIPR 441, 449 'no regulatory system connected with technology can remain aloof from moral debate and the responsibility of control'.

[101] Pavoni, n 49 above, 93. Some commentators have however disagreed with giving a broader interpretation to the concept of morality in article 53(a) EPC, arguing that historically its ambit was narrow and there is currently no justification to extend it. For them, there should be a light regulatory regime with a summary moral judgement 'justified only in the clearest cases'. Armitage and Davis, n 46 above, 2, 43, 75. *Contra*: Beyleveld & Brownsword, n 48 above.

[102] Beier, n 36 above, 444, also mentioning environmental problems as an example of the 'dangers resulting from uncontrolled use of modern technology.'

[103] For the assumptions behind the theories, see the clear explanatory summaries by Machlup and Penrose, n 12 above, section 1 above.

[104] John Locke, n 13 above, Book II, section 31 ('[N]othing was made by God for man to spoil or destroy').

[105] D. Alexander, n 25 above, 113 believes that the approaches based on "inherent rights" seem to make intellectual property 'a less malleable instrument of policy' but does not explain this statement further.

[106] However, see below, n 110 the argument made by Alexander, n 25 above, 116.

It is arguably more difficult to re-shape patent law's role under the incentive theory because of the belief in material progress.[107] Indeed, as implied in part of the literature, the themes of technology and the environment are intrinsically linked; technology has an impact on the environment because it changes previous environmental conditions.[108] Therefore, patent laws, as engines driving technological advance, are responsible for the impact patented inventions have on the environment. Pollution comes mainly from industrial activity[109] and therefore from new products that were once or are still patented, and if not on which there were or are still trade secrets. One could therefore argue that the progress ideology is one of the causes of environmental damage, including the increase of GHG in the earth's atmosphere. If technological progress had not been encouraged through patents, then less (no additional) environmental damage would have occurred. This may have been the case originally but now with the EPO's broader interpretation of the *ordre public* provision so as to exclude the patenting of inventions seriously damaging the environment, it is arguably not the case anymore or at least to a lesser extent. On the other hand, the utilitarian rationale presupposes that patent laws are to function as incentives to invent new technologies. Therefore, it should not prevent the patent laws from granting greater incentives to the development of especially valuable new technologies.[110] This simple line of reasoning could solve the problem.

Nevertheless, there is scope for argument that the progress ideology includes the protection of the environment. A first reason is that it aims at the improvement of human material conditions. A healthy environment is part of these material conditions. Even so, the religious-like belief that science will solve all problems including that of global warming and more generally pollution fails to convince everyone.[111] A second, and arguably stronger reason, is that "progress" is a vague and malleable concept. The initial 18th century notion is limited to material progress. The belief is that material progress will lead to greater happiness, liberty and justice for all. It is easy to see with hindsight that this is not (always if at all) the case. The link between the two is less than certain (are we necessarily happier because we have mobile phones or bigger cars?). But progress is not limited to material progress.

[107] Alexander, n 25 above, 113 simply states that if the utilitarian argument is favoured, 'it is much easier to treat this area of law as an instrument of public policy which can be used to promote particular public goals such as environmental protection.' This may accord either with the belief that science can solve all problems or with the argument that patent law is simply a regulatory tool (see below).

[108] Blum, n 88 above, 243; Sherman and Atkinson, n 11 above, 169-170; Torremans, n 7 above, 20.

[109] Pollution can arise from natural causes such as the entry on earth of cosmic gases or rays or from the dust and other noxious particles following the eruption of volcanoes.

[110] Alexander, n 25 above, 116.

[111] Chris Green interviewing Dr Kate Rawles of the University of Cumbria, 'Technology alone won't solve climate change', The Independent of 1 May 2008, available at http://www.independent.co.uk/news/education/higher/against-the-grain-technology-alone-wont-solve-climate-change-818380.html (last visited 7 August 2008), citing the World Wildlife Fund's Living Planet Report stating that 'if everybody on earth was to enjoy the lifestyle of the average Western European, we would need three planets' and that academics should play a stronger role in tackling the question of climate change and 'in encouraging critical thinking about the values that underpin Western industrialised societies'. P. Stookes, *A Practical Approach to Environmental Law* (Oxford: Oxford University Press, 2005), 27, similarly states that the world is currently 'using three planet's worth of resources'. See also Van Caenegem, n 47 above, 245-246 who mentions these issues as well. *Contra*: the IPCC thinks that technology alone will solve the problem, quoted by Y. De Boer, European Patent Forum 2008, n 10 above, slide 5.

Progress can also consist in individual or collective spiritual happiness, including better social relationships. If the original 18th century belief is modified to focus on human *needs* rather than human *wants,* and beyond to social progress (better human relationships), and yet even further, the earth's needs (as encompassing all living and inanimate things), then there may be some hope to "ethically" justify and thereby give a more solid and socially acceptable basis to patent law. With this extended notion of progress, the furtherance of environmental protection is fully within the utilitarian function, which is, as we know, still the dominant justification for patents. In other words, it can be said that it is the function of patent law to promote eco-friendly inventions because progress must better not only human but also animal and plant life. From being anthropocentric, patent law becomes biocentric or even ecocentric.[112] Remodelling the incentive function in this way, that is away from 18th century Western Enlightenment view of purely material progress, allows the taking into consideration within patent laws of environmental concerns.

As to the disclosure function, the same assumption that industrial progress is desirable to society underlies it and therefore, it can also be retained if the belief is modified in the same way. Thus the argument made above for the incentive theory is equally applicable.

Some commentators have made arguments beyond the patent law rationales, on general terms, not linked to the environment. Simply, there is no compelling reason why patent law cannot be used for ends other than purely economic[113], for instance as a tool to regulate the impact of technology on the environment or health.[114] Further, some have even argued that we can perhaps re-shape our intellectual property laws as we go along as the prescriptive power of any of the current theories is very limited, notwithstanding their value.[115] Others have recently challenged the view, which is generally taken for granted, that intellectual property protection has an objective at all or, else, is an end in itself.[116] Others argue that based on the information we have, we could differentiate.[117] Accordingly, the invention would have to pass a test to be treated differently. For instance, we have information that patents are different in the IT and the pharmaceutical industry. Whilst the IT industry does not generally need patents in order to innovate, the pharmaceutical industry heavily depends on it. To differentiate, we would need to devise a "stable test".[118] Others have asked

[112] The reasoning in the *Onco-Mouse* case illustrates the current anthropocentric concerns of patent law. The examining division considered the invention was not immoral because it is beneficial to *mankind.* Current environmental is however also anthropocentric although this is changing. See Thornton and Beckwith, above n 3, 6-7.

[113] Bently and Sherman, n 27 above, 329 (adding that 'given that modern patent law already performs a number of, sometimes surprising, non-economic roles, this is not as alien a proposition it might first appear.' However they do not give example of such other roles.)

[114] Ibid (noting that such regulatory function (ie which modifies behaviour) was seen as the first notable feature of patent law, and that the trend has so far been to see these non-economic factors as 'external (*negative*) constraints upon the core activities of the patent system, or as undesirable side effects that need to be mitigated').

[115] Fisher, n 14 above, 20.

[116] A. Peukert, comments delivered at ATRIP Annual Congress 2008, in *Proceedings of the ATRIP conference 2008*, on file with author. At this stage, these are only ideas which, to the author's knowledge, have not been further developed by A. Peukert.

[117] M. Carroll, oral presentation at the ATRIP Annual Congress 2008.

[118] Ibid. not further elaborating on how this test would be devised apart from stating that it would also have to be feasibly politically.

themselves, again generally, whether, as the evidence that patents incentivise inventive activity is inconclusive, we should perhaps look at other reasons for keeping patents.[119] Implicitly this may mean we should be "freed" from an exclusively economic approach to patents. 'The indeterminacy of economic analysis, at the very least, should be understood as an opportunity, an obligation, to engage in a qualitative analysis of patent policy that takes into account not only economic growth but other values including the content and process of production, and fair distribution of social goods'.[120] Finally, recent economic studies also lead to believe that uniformity within intellectual property laws leads to welfare losses, meaning that differentiation makes sense economically.[121] But beyond that, in our view, we may also need more differentiation, not only for economic reasons, but because differentiation leads to more justice. Whilst law may be guided by economics, it must not forget other aspects like the public interest and human rights[122], including more broadly sustainable development. To be subversive but only to spur the debate, who said we were constrained by goals or functions?

If some or all the arguments made in this sub-section are valid, patent laws should be modified according to the general criterion of social utility and the more specific criterion (sub-category of utility) of the environmental impact of the invention, and even more specifically its carbon footprint. The first question to ask before granting a patent would be: how is this invention benefiting society as a whole, taking into account not only humans but the environment (ie plants, animals, climate, earth)? What are the consequences of the invention on the environment? It is not because it is new and inventive that it is necessarily always good or useful to society.

But the ultimate question before thinking further is: is this the right way to cater for environmental concerns? Shouldn't this be the exclusive role of environmental laws? Aren't environmental laws already providing for the answer? In other words, how should environmental concerns including the reduction of GHG be addressed in general, within patent laws, environmental laws, other laws? The question whether the protection of the environment is part of patent law's role or is extrinsic to it (in other words that it is the role of environmental laws only) has significant consequences. If the first approach is adopted, patent laws must either discourage polluting inventions or encourage green ones, or both. On the other hand, if the regulation of the environment is entirely left to environmental law, patents can still be granted on some polluting inventions. However, this would send conflicting messages to inventors. It is right for me to obtain a patent on a polluting product or process, but on the other hand, I cannot exploit it as such (because environmental law prohibit it). On the one hand, the state endorses the invention, on the other, it condemns it.[123] Incidentally,

[119] Peritz, above n 14, 18.
[120] Ibid, 18.
[121] W. Cohen, R. Nelson and J. Walsh, 'Protecting their intellectual assets: appropriability conditions and why U.S. manufacturing firms patent (or not)', NBER Working Paper 7552, Cambridge, Mass.: National Bureau of Economic Research, 2000, available on http://www.nber.org/papers/w7552 (last visited on 7 August 2008). Incidentally, the vice-president of the EPO, Manuel De Santes also pointed out at the Annual ATRIP Congress 2008, that the pressure for differentiation is enormous in the European Patent Office.
[122] On these aspects as applied to investment in database creation, see E. Derclaye, *The Legal Protection of Databases* (Cheltenham: Edward Elgar 2008,) chapter 1.
[123] There is value in the argument that 'it might be in principle wrong to give a seal of approval to an invention which was highly damaging.' 'To adapt the words of article 16(5) of the Convention [on

this does not sit well with the public sanction "justification". Moreover, if environmental concerns are not integrated within patent laws, there is no incentive to invent green technologies as they will not be more rewarded than others, so why bother and make this extra effort?

These questions are answered in another previously published article.[124] For the benefit of the reader, they are briefly summarised here. The environmental provisions of the EC Treaty (ECT) require that patent laws take environmental concerns and especially the problem of global warming into account. According to article 6 ECT, "environmental protection requirements must be integrated into the definition and implementation of the Community policies and activities referred to in article 3, in particular with a view to promoting sustainable development". Article 3 lists among others: (h) the approximation of the laws of Member States to the extent required for the functioning of the internal market, (m) the strengthening of the competitiveness of Community industry and (n) promotion of research and technological development. These three policies are the most relevant in respect of intellectual property.

Currently, patent laws do not integrate the environmental principles. A reform of patent law is therefore in order. Concretely, how can patent laws be reshaped to respect the principle of integration of environmental principles? Three systems can be envisaged: negative, positive or mixed. In all cases, patent laws would add a requirement of eco-friendliness for each invention. Within this sub-category, one could further distinguish inventions emitting less or no GHG. A negative system (preventing the patenting of polluting inventions) is already to some extent in place through the interpretation of article 53(a) EPC. Concretely, only inventions meeting a certain threshold would be considered "green" and therefore patentable. A positive system is not yet in place but would require a preferential treatment of green inventions in comparison with other inventions. If the invention were to exceed the eco-friendliness requirement, it would get favoured treatment.[125] Several treatments can be envisaged and can be applied alone or in combination to such especially green inventions (e.g. faster examination, reduction of patent office fees, longer term of protection…).[126] A mixed system would prohibit polluting inventions and at the same time favour eco-friendly ones and is, it is submitted, the best system. The way the system would work is as follows. The inventor would indicate in his patent application that its invention fulfils the criterion of eco-friendliness. This criterion needs to be tailored to respect the targets set by environmental law. As far as global warming is concerned, it could be said that in order to be patented, every process or product that emits GHG should emit 8 percent less of them compared to the same product's emissions in 1990 (the target the EU agreed to respect in the context of the ratification of Kyoto Protocol). If the invention emits even less than this target, it would be classified to receive preferential treatment. This treatment can be modulated

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biological diversity]: intellectual property law should cooperate in order to ensure that patents and other intellectual property rights are supportive of and do not run counter to the objectives of environmental protection.' Alexander, n 25 above, 119, fn. 5.

[124] E. Derclaye, 'Should patent law help cool the planet?' (2009), *forthcoming*. [note for the editor / publisher: I will send over the exact details of the publication once I have them, which should be very soon]

[125] Determination of criteria to decide whether an invention is generally useful (in the sense of socially useful) and even more generally to decide when technical progress is desirable is beyond the scope of this and the previously published articles and would deserve discussion in another article.

[126] On these, see eg Blum, n 88 above and Beier, n 22 above.

in function of the degree of eco-friendliness of the invention. The relevant regulatory body (eg European Environmental Agency) would check whether the product or process fulfils these requirements and advise the patent office.

Conclusion

It is generally agreed that patent laws in Europe are in the main neutral. They neither encourage nor prevent the patenting of certain inventions over others. But this statement is a façade. Patent laws are not as neutral as they may seem at first glance, unless it can be argued that the "exceptions" reviewed in this article are there to confirm the rule. In fact, patent laws even cater, to some extent and among others, for the protection of the environment. A closer look shows that through article 53(a) EPC and corresponding national provisions, patent laws albeit "negatively" and partially[127] fulfil this latter aim. The century-long prohibition of immoral inventions may provide an argument for the continuing prevention within patent law of polluting inventions and beyond, may somewhat encourage green patenting. But this role is not precisely defined in the case law let alone in the statutory law. In view of the urgency of the present climatic situation, we need to do more. Current justifications do not prevent taking environmental concerns, and more particularly climate change, into account and some seem even amenable to it. Also, since each justification is arguably independent from one another[128], ie we do not need to follow them all to justify having patents, it is easy to re-shape patent laws so that they cater for the protection of nature, including cooling the planet. The incentive and disclosure functions, which still underlie current patent laws, can accommodate environmental protection. Although the specific issue of patent laws' role in environmental protection has until now not been much debated, let alone recently[129], the majority of commentators who discussed it is also in favour of treating beneficial inventions, and specifically green ones, differently. In addition, in a more general way, minds seem recently to be open to the fact that patent justifications may, perhaps owing to many changing factors this century, have to be completely re-assessed. It would definitely be worth rethinking justifications for and roles of patent laws in depth as transformations have occurred since legislation was drafted in the 19th century given two centuries of tremendous, incredibly fast and sometimes wild scientific development. In this light, and concerning specifically environmental protection, it is submitted that patent laws should be rethought to aim to cover for human needs rather than wants but also for those of the planet as a whole. The fact that patents could become more ecocentric and yes, in a way "ethical", would be more than welcome now, at a time when the public's resentment towards intellectual property in general and patents in particular, is growing rapidly. We disagree with the view that the EPO should not be promoting and preserving morality and that a change from the current light touch regime, would not be justified because the three necessary conditions - 'some event impelling a re-think and consequent change; some significant benefits for society; no impairment of the patent system in serving its primary purpose' - are not fulfilled.[130] On the contrary, global warming is such an event, society would greatly benefit from "ever greener patent laws" and this does not detract from patent law's primary purpose, if by that is

[127] Because of the adjective "*serious* prejudice".
[128] See above, section 1.
[129] The 2008 ATRIP conference only addressed the general idea of differentiating within intellectual property laws and the specific issue of environmental protection was not addressed.
[130] Armitage and Davis, n 46 above, 43-44.

meant the incentive and/or disclosure functions. Finally, a favoured treatment could be crafted without contradicting the EPC or TRIPs so that we would respect our international obligations.[131]

This article has shown that patent law already, even if partially and timidly, safeguards the environment and also that it is open to a fuller role in this respect. The next question is whether patent law should be fulfilling this role in addition to environmental law. And if so, what role - modest or more pronounced - it should play in the prevention of pollution and the reduction of GHG and how it should be implemented in practice. In a previous publication[132], the author provided positive answers to these questions which were summarised here.

[131] For instance, granting a longer term to environmentally-friendly inventions could still respect article 63 EPC and 33 TRIPs (which provides that states 'the term of protection available shall *not end before* the expiration of a period of twenty years counted from the filing date', emphasis added). In addition, TRIPs specifically allows more protection if it is not in contradiction with it (art. 1).
[132] E. Derclaye, 'Should patent law help cool the planet?' (2009), *forthcoming*.