

MASTER THESIS | MASTER'S THESIS

Titel | Title

Green Patents in the European legal landscape – How the European Union, the European Patent Organisation and the Unified Patent Court can establish a common Green Patent Strategy

verfasst von | submitted by
Adrian Höhn

angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of
Master of Laws (LL.M.)

Wien | Vienna, 2025

Studienkennzahl lt. Studienblatt | Degree
programme code as it appears on the
student record sheet:

UA 999 082

Universitätslehrgang lt. Studienblatt |
Postgraduate programme as it appears on
the student record sheet:

Europäisches und Internationales Wirtschaftsrecht
[Vollzeit Englisch]

Betreut von | Supervisor:

Univ.-Prof. i.R. Dr. Dr. h.c. Peter Fischer

TABLE OF CONTENT

TABLE OF CONTENT	II
TABLE OF ABBREVIATIONS	V
TABLE OF CASES	VI
TABLE OF LEGISLATION	VII
HOW THE EUROPEAN UNION, THE EUROPEAN PATENT ORGANISATION AND THE UNIFIED PATENT COURT CAN ESTABLISH A COMMON GREEN PATENT STRATEGY	1
A. Introduction	1
I. Opening remarks and problem identification.....	1
II. Research question and structure	4
III. Methodology and limitations.....	5
B. Outline of the European Patent System	6
I. European patent titles and legislative foundation	6
II. Patent litigation – Establishment and competence of the Unified Patent Court.....	9
III. Legislative impact of the European Union.....	11
IV. Interim result	11
C. What are Green Patents?.....	12
I. Green Patent Classification at the EPO.....	14
1. Patent classification standards and practice at the EPO	14
2. Green classification internationally and at the EPO.....	16
a. World Intellectual Property Office – IPC Green Inventory	16
b. CPC Y02/Y04S tagging scheme	17
3. Shortcomings and possible improvements of the EPO’s Y02/Y04S scheme	19
4. Interim result	21
II. The impact of Green Patents on a sustainable development	22
III. Green Patent applications in the international and European landscape.....	23
D. Approaching a European Green Patent Strategy	26
I. (Non-)existence of a Green Patent Strategy in Europe	26
1. Establishing Green patent strategies through international agreements?	26
2. EU green legislative measures and policies	27
3. Green strategies of the EPOrg and the UPC and interim result	29
II. Procedural incentives.....	30
1. A Fast-track programme for Green Patent applications at the EPO.....	31
a. Benefits and disadvantages of fast-tracking patents.....	31
b. Fast-Track programs at the EPO	33
aa. PACE	33

bb. Patent Prosecution Highways and further options for acceleration	35
cc. Interim result	37
c. Green Patent fast-tracks in the international context.....	38
aa. National programs for accelerated Green Patent prosecution.....	38
(a) United States of America	39
(aa) Climate Change Mitigation Pilot Program.....	39
(i) Programme outline	39
(ii) National qualification standard and burden of proof.....	42
(bb) Patents for Humanity Award: Green Energy	43
(b) United Kingdom	44
(aa) Programme outline	44
(bb) National qualification standard and burden of proof	45
(c) Republic of Korea	47
(aa) Programme outline	47
(bb) National qualification standard and burden of proof	49
(d) Peru	50
(aa) Programme outline	50
(bb) National qualification standard and burden of proof	51
bb. Interim result - Categorising the different approaches	51
(a) Green Patent Tracks	51
(b) Green Patent qualification standards	52
(c) Burden of proof levels	53
d. Integration of a Green Patent fast-track into the system of the EPO	54
aa. Suitable track	54
bb. Access requirements and burden of proof level	54
cc. Legal integration of the programme at the EPO	55
2. Fast-tracking of the application for the Unitary Patent effect at the EPO.....	56
a. Duration of grant and date of effect.....	57
b. Patent enforcement within the granting period	58
c. Interim result.....	59
3. Accelerated “Green” litigation proceedings at the Unified Patent Court.....	60
a. General procedural speed at the UPC.....	60
b. Expedited procedural options and conflict with procedural principles.....	61
c. Interim result.....	63
III. Material law incentives	65
1. “Negative” regulation of the European Union	65

2. Green Supplementary Protection Certificates	67
a. Outline of SPCs in the legal framework of the EU	67
b. General legislative purpose of SPCs	68
c. Conformance of the current SPCs regimes with Green Energy Patents.....	69
aa. Practical and regulatory similarities of green energy products with pharmaceutical products.....	69
bb. Key differences.....	72
d. Interim result	74
e. Outline of a Green Patent SPCs regime.....	75
D. Conclusion and outline of a common Green Patent Strategy	78
Bibliography.....	81
Abstract	102

TABLE OF ABBREVIATIONS

CBAM = carbon border adjustment mechanism

CCMPP = Climate Change Mitigation Pilot Program

CCMTs = low-carbon, sustainable and climate change mitigation technologies

EPC = European Patent Convention

EPO = European Patent Office

EPOrg = European Patent Organisation

EST = Environmental Sound Technologies

EU = European Union

INDECOPI = Peruvian National Institute for the Defense of Free Competition and the Protection of Intellectual Property

IPC = International Patent Classification

IPO = Intellectual Property Office

IR EPC = Implementing Regulations to the European Patent Convention

JCR = Joint Research Centre of the European Commission

KIPO = Korean Intellectual Property Office

NDCs = Nationally Determined Contributions

PCT = Patent Cooperation Treaty

PPH = Patent Prosecution Highway

PPP = Plant Protection Products

R & D = Research and Development

SEPs = Standard Essential Patents

SPCs = Supplementary Protection Certificates

UK IPO = Intellectual Property Office of the United Kingdom

UNFCCC = United Nations Framework Convention on Climate Change

UPC = Unified Patent Court

UPCA = Agreement on a Unified Patent Court

US = United States

USPTO = United States Patent and Trademark Office

TABLE OF CASES

EPO Board of Appeals, *Euthanasia Compositions/MICHIGAN STATE UNIV.*, Decision of 11 May 2005 [2005] T 0866/01

Nicoventures Trading Ltd v Philip Morris Products, SA (A Company Formed Under the Laws of Switzerland) & Anor [2020] England and Wales High Court 1594

UPC CFI 177/2023 Local Division Duesseldorf, order of the Court of First Instance of the Unified Patent Court of 22 June 2023

UPC CFI 363/2023 Local Division Duesseldorf, order of the Court of First Instance of the Unified Patent Court of 20 January 2024

UPC CFI 395/2023 Local Division Paris, procedural Order of the Court of First Instance of the Unified Patent Court of 12 February 2024

UPC CFI 412/2023 Central Division Paris, order of the Court of First Instance of the Unified Patent Court of 9 February 2024

UPC CoA 388/2024, Court of Appeal, order of the Court of Appeal of the Unified Patent Court issued on 19 August 2024 concerning an application pursuant to R.223 RoP (Application for suspensive effect)

UPC CoA 188/2024, Court of Appeal, order of the Court of Appeal of the Unified Patent Court issued on 3 September 2024

WL Gore & Associates GmbH v Geox SPA [2008] England and Wales Court of Appeal Civ 622

TABLE OF LEGISLATION

European Legislation:

Consolidated text: Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy [2022] OJ L 335/36

Consolidated text: Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) (Renewable Energy Directive III) [2018] OJ L 328/82

Consolidated text: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy [2000] OJ L 327/1

Consolidated text: Directive 2001/83/EC of the European Parliament and of the Council of 6 November 2001 on the Community code relating to medicinal products for human use [2001] OJ L 311/67

Consolidated text: Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment [2011] OJ L 026/1

Consolidated text: Regulation (EC) No 1610/96 of the European Parliament and of the Council of 23 July 1996 concerning the creation of a supplementary protection certificate for plant protection products [1996] OJ L 198/30

Consolidated text: Regulation (EC) No 469/2009 of the European Parliament and of the Council of 6 May 2009 concerning the supplementary protection certificate for medicinal products [2009] OJ L 152/1

Consolidated text: Regulation (EC) No 726/2004 of the European Parliament and of the Council of 31 March 2004 laying down Union procedures for the authorisation and supervision of medicinal products for human use and establishing a European Medicines Agency [2004] OJ L 136/1

Consolidated text: Regulation (EU) 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011 [2019] OJ L 169/1

Consolidated Text: Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013 [2021] OJ L 170/1

Consolidated text: Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure [2022] OJ L 152/45

Consolidated Text: Regulation (EU) 2023/2405 of the European Parliament and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport (ReFuelEU Aviation) [2023] OJ L 2023/2405

Consolidated Text: Regulation (EU) No 1215/2012 of the European Parliament and of the Council of 12 December 2012 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters [2012] OJ L 351/1

Consolidated version of the Treaty on European Union [2016] OJ C 202/13

Consolidated version of the Treaty on the Functioning of the European Union [2016] OJ C 202/47

Council Decision (EU) 2016/1841 of 5 October 2016 on the conclusion, on behalf of the European Union, of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change [2016] OJ L282/1

Council Decision (EU) 2021/764 of 10 May 2021 establishing the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation, and repealing Decision 2013/743/EU [2021] OJ L 167/1

Council Regulation (EU) 1260/2012 of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection with regard to the applicable translation arrangements [2012] OJ L 361/89

Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment [2019] OJ L 155/1

Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 [2023] OJ L 2023/2413

Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning [2014] OJ L 257/135

Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions [1998], OJ L 213, 13 (Biotechnology Directive)

European Parliament legislative resolution of 28 February 2024 on the proposal for a regulation of the European Parliament and of the Council on standard essential patents and amending Regulation (EU) 2017/1001 (COM(2023)0232 – C9-0147/2023 – 2023/0133(COD)), P9_TA(2024)0100 <https://www.europarl.europa.eu/doceo/document/TA-9-2024-0100_EN.html> accessed 19 November 2024

Regulation (EU) 1257/2012 of the European Parliament and of the Council of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1

Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law') [2021] OJ L 242/1

Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism [2023] OJ L 130/52

Regulation (EU) 2024/590 of the European Parliament and of the Council of 7 February 2024 on substances that deplete the ozone layer, and repealing Regulation (EC) No 1005/2009 [2024] OJ L 2024/590

Documents of the Commission of the European Union:

Commission Staff Working Document, ‘First annual report on key findings from the European Monitor of Industrial Ecosystems (EMI)’ [2024] SWD/2024/77 final

Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions ‘The European Green Deal’ [2019] COM/2019/640 final

Commission Decision (EU) 2015/1753 of 30 September 2015 on confirming the participation of Italy in enhanced cooperation in the area of the creation of unitary patent protection [2015] OJ L 256/19

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions making the most of the EU’s innovative potential An intellectual property action plan to support the EU’s recovery and resilience [2020] COM/2020/760 final

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, ‘The 2024 Annual Single Market and Competitiveness Report’ [2024] COM(2024) 77 final

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society [2024] COM/2024/63 final

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Empty 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality [2021] COM/2021/550 final

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Making the most of the EU’s innovative potential, An intellectual property action plan to support the EU’s recovery and resilience [2020] COM/2020/760 final

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A New Industrial Strategy for Europe [2020] COM/2020/102 final

European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions ‘European Wind Power Action Plan’ [2023] COM/2023/669 final

European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the

Committee of the Regions ‘A hydrogen strategy for a climate neutral Europe’ [2020] COM/2020/301 final

Proposal for a regulation of the European Parliament and of the Council on standard essential patents and amending Regulation (EU) 2017/1001 [2023] COM (2023) 232 final, 2023/0133 (COD)

Proposal for a Regulation of the European Parliament and of the Council on the unitary supplementary protection certificate for plant protection products [2023] COM/2023/221 final

Proposal for a Regulation of the European Parliament and of the Council on the supplementary protection certificate for plant protection products (recast) [2023] COM/2023/223 final

Legislation of the European Patent Organisation:

European Patent Office, Notice from the European Patent Office dated 30 November 2015 concerning ways to expedite the European grant procedure [2015] OJ EPO 2015, A94

European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115

Implementing Regulations to the Convention on the Grant of European Patents of 5 October 1973 as adopted by decision of the Administrative Council of the European Patent Organisation of 7 December 2006 and as last amended by decision of the Administrative Council of the European Patent Organisation of 10 December 2024 as in force as from 16 December 2024 [2024] OJ EPO 2024, A105, (CA/D 13/24) (Implementing Regulations to the European Patent Convention)

Rules relating to Unitary Patent Protection as adopted by decision of the Select Committee of the Administrative Council of the European Patent Organisation of 15 December 2015 and as last amended by decision of the Select Committee of the Administrative Council of 23 March 2022 [2022] OJ EPO 2022, A41

New agreement between the European Patent Organisation and the International Bureau of the World Intellectual Property Organization in relation to the functioning of the European Patent Office as an International Searching Authority and International Preliminary Examining Authority under the Patent Cooperation Treaty [2017] OJ EPO 2017, A115

Decision of the Select Committee of the Administrative Council of 15 December 2015 adopting the Rules relating to Unitary Patent Protection (SC/D 1/15) [2016] OJ EPO 2016, A39

Convention on the Grant of European Patents of 5 October 1973 as revised by the Act revising Article 63 EPC of 17 December 1991 and the Act revising the EPC of 29 November 2000, adopted by the Administrative Council of the European Patent Organisation by decision of 28 June 2001 [2001] OJ EPO 2001, Special edition No. 4, p. 55 (European Patent Convention)

European Patent Office, London Agreement dated 17 October 2000 on the application of Article 65 EPC [2001] OJ EPO 2001, 549 Supplementary publication 4, OJ EPO 2016, 506

Notice from the European Patent Office dated 30 November 2015 concerning the programme for accelerated prosecution of European patent applications ("PACE") [2015] OJ EPO 2015, A93

Legislation of the Unified Patent Court:

Agreement on a Unified Patent Court [2013] OJ C 175/1

Rules of Procedure of the Unified Patent Court as adopted by decision of the Administrative Committee on 8 July 2022 entry into force: 1 September 2022 <<https://www.unified-patent-court.org/en/court/legal-documents?page=0>> accessed 20 December 2024

Other international agreements and legislation:

Code of Federal Regulations Title 37 Part 1 Subpart B - Examination of Applications (United States) <<https://www.ecfr.gov/current/title-37/part-1/subject-group-ECFR4f6faa3f96af06d>> accessed 9 January 2025

Convention on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters [2007] OJ L 339, 21.12.2007 (Lugano Convention)

Enforcement Decree of the Patent Act, Republic of Korea, Presidential Decree amended up to No. 32590, 19 April 2022 [2022] article 9f. <https://elaw.klri.re.kr/eng_service/lawView.do?hseq=60677&lang=ENG> accessed 11 January 2025

Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (National Institute for the Defense of Free Competition and the Protection of Intellectual Property) Resolución N.º 001160-2024/DIN-INDECOPI, 24 April 2024 [2024] <<https://www.gob.pe/institucion/indecopi/normas-legales/5494153-001160-2024-din-indecopi>> accessed 12 December 2025

Paris Agreement [2016] OJ L 282/4

Patent Act (Korean language), Republic of Korea, amended up to Act No. 20322, 20 February 2024 [2024] article 61 <<https://www.wipo.int/wipolex/en/legislation/details/22666>> accessed 11 January 2025

Patent Act, Republic of Korea, amended up to Act No. 19714, 14 February 2023 [2023] article 61 <https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=64605&type=sogan&key=35> accessed 11 January 2025

Patent Cooperation Treaty (PCT) done at Washington on June 19, 1970, amended on September 28, 1979, modified on February 3, 1984, and on October 3, 2001 <<https://www.wipo.int/pct/en/texts/articles/atoc.html>> accessed 15 November 2024.

Presidential Documents (United States), Executive Order 14008, 'Tackling the Climate Crisis at Home and Abroad' (January 27, 2021) 86 FR 19 <<https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad>> accessed 9 January 2025

Regulations under the Patent Cooperation Treaty (as in force from July 1, 2024)
<<https://www.wipo.int/pct/en/texts/rules/rtoc1.html>> accessed 10 November 2025

Singapore Rules of Court 2021 [2021] No. S 914/2021, order 46A & 65
<<https://sso.agc.gov.sg/SL/SCJA1969-S914-2021?DocDate=20240610&WholeDoc=1>> accessed 18 January 2025

The White House, Presidential Action Executive Order, ‘Putting America first in International Environmental Agreements’ (*whitehouse.gov*, 20 January 2025)
<<https://www.whitehouse.gov/presidential-actions/2025/01/putting-america-first-in-international-environmental-agreements/>> accessed 25 January 2025

UNFCCC Decision 15/CMA.1, Technology framework under Article 10, paragraph 4, of the Paris Agreement FCCC/PA/CMA/2018/3/Add.2 (19 March 201)

United Kingdom, Patents Act 1977, 1977 c. 37, amended up to 24.05.2024
<<https://www.legislation.gov.uk/ukpga/1977/37/contents>> accessed 8 January 2025

United Kingdom, Patents Act 1977, 1977 c. 37, amended up to 24.05.2024
<<https://www.legislation.gov.uk/ukpga/1977/37>> accessed 8 January 2025

United Kingdom, The Patents Rules 2007, 2007 no. 3291, amended up to 01.01.2021
<<https://www.legislation.gov.uk/uksi/2007/3291>> accessed 8 January 2025

United Nations Framework Convention on Climate Change (UNFCCC) (1992) United Nations FCCC/INFORMAL/84 GE.05-62220 (E) 200705

United Nations Resolution adopted by the General Assembly on 25 September 2015, ‘Transforming our world: the 2030 Agenda for Sustainable Development’ [2015] A/RES/70/1

United States Code, title 35 <<https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title35-section2&num=0&edition=prelim>> accessed 9 January 2025

United States Patent and Trademark Office, Notice of information collection; request for comment, ‘Agency Information Collection Activities; Submission to the Office of Management and Budget (OMB) for Review and Approval; Comment Request; Patents for Humanity Program and Trademarks for Humanity Program’ (October 25, 2024) 89 FR 8571
<<https://www.federalregister.gov/documents/2024/10/25/2024-24920/agency-information-collection-activities-submission-to-the-office-of-management-and-budget-omb-for>> accessed 10 January 2025

United States Patent and Trademark Office, Notice, ‘Climate Change Mitigation Pilot Program’ (June 3, 2022) 87 FR 33750 <<https://www.federalregister.gov/documents/2022/06/03/2022-11930/climate-change-mitigation-pilot-program>> accessed 9 January 2025

United States Patent and Trademark Office, Notice, ‘Expansion and Extension of the Climate Change Mitigation Pilot Program’ (June 1, 2023) 88 FR 35841 <<https://www.federalregister.gov/documents/2023/06/01/2023-11660/expansion-and-extension-of-the-climate-change-mitigation-pilot-program>> accessed 9 January 2025

United States, H.R. 7259 — 116th Congress: Patents for Humanity Program Improvement Act.” [2020] (*GovTrack.us*) <<https://www.govtrack.us/congress/bills/116/hr7259>> accessed 10 January 2025

WIPO, Strasbourg Agreement Concerning the International Patent Classification of March 24, 1971, as amended on September 28, 1979, 1160 UNTS 483

HOW THE EUROPEAN UNION, THE EUROPEAN PATENT ORGANISATION AND THE UNIFIED PATENT COURT CAN ESTABLISH A COMMON GREEN PATENT STRATEGY

A. Introduction

I. Opening remarks and problem identification

"In our times, innovation could not be more important. The European Union has set itself the mission to be climate neutral before 2050. The success of the green transition also hinges on the development and implementation of efficient and sustainable technology solutions. The good news is that Europeans are also more innovative than ever. Last year, we witnessed an all-time high for patent filings (...). Many of these patents are in sectors that are crucial for sustainable innovation. For example, in hydrogen (...). Here, EU countries are world leaders."¹

With global warming of up to two degrees Celsius expected by 2050 and the associated increase in hydrological weather extremes, climate change is a worldwide reality.² As a result, global political stakeholders are increasingly addressing the challenge to mitigate the causes and effects of climate change, and have established “green” policies through international treaties, self-binding legislation and political incentives.³ This includes the European Union, which has not only signed and ratified the Paris Agreement, an international partly legally binding global climate change agreement, but has also set even higher ambitions with the Commission’s policy package, the European “Green Deal”.⁴ The European Union has the goal of becoming the first continent to achieve climate neutrality.⁵

¹ Ursula von der Leyen, ‘Speech by President von der Leyen at the 50th anniversary of the European Patent Convention, via video message’ (European Commission Press Corner, 5 October 2023) <https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_23_4785> accessed 1 October 2024.

² James E. Hansen and others, ‘Global warming in the pipeline’ (2023), 3 no. 1 Article kgad008 Oxford Open Climate Change 1 <<https://academic.oup.com/oocc/article/3/1/kgad008/7335889>> accessed 10 October 2024; Taejin Park and others, ‘What Does Global Land Climate Look Like at 2°C Warming?’ (2022), 11 no. 5 Earth’s Future 1, 5ff. & 13 <<https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2022EF003330>> accessed 14 October 2024.

³ Annika Stechemesser and others, ‘Climate policies that achieved major emission reductions: Global evidence from two decades’ (2024), 385 Science 884, 884f.; Janna Hoppe and others, ‘Three Decades of Climate Mitigation Policy: What Has It Delivered?’ (2023), 48 Annual Review of Environment and Resources 615, 617ff. <<https://www.annualreviews.org/content/journals/10.1146/annurev-environ-112321-103821#right-ref-B69>> accessed 11 October 2024; For a sector-level overview of international policies: Hanna Fekete and others, ‘A review of successful climate change mitigation policies in major emitting economies and the potential of global replication’ (2021), 137 Article 110602 Renewable and Sustainable Energy Reviews 1 <<https://www.sciencedirect.com/science/article/pii/S1364032120308868>> accessed 11 October 2024.

⁴ Paris Agreement [2016] OJ L 282/4; Council Decision (EU) 2016/1841 of 5 October 2016 on the conclusion, on behalf of the European Union, of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change [2016] OJ L282/1; Commission, ‘Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions The European Green Deal’ (2019) 640 final.

⁵ *ibid.*

The EU's high ambitions are also reflected in the above quote from the speech of European Commission President Ursula Van der Leyen addressed at the European Patent Office (EPO) at the 50th anniversary of the European Patent Convention (EPC). In order to achieve the Green Deal and climate neutrality, she identifies a “green” transition to sustainable technologies as a key factor, and stresses the importance of innovation in sustainable technologies and their protection through patenting.⁶ As a positive example of sustainable development, she points out that EU countries are already “world leaders” in patenting sustainable hydrogen technology.⁷

In general, her assessment implies an already optimistic development for the patenting of sustainable and environmental friendly technologies, hereafter referred to as “Green Patents”.⁸ However, the number of Green patent applications does not directly indicate the role of the European Union – as a legal person with a supranational character and the respective political and legislative competences derived from the member states –⁹ and the European countries in promoting such a development, e.g. through patenting by European public bodies themselves. A total of 92% of patent applications to the European Patent Office in 2023 came from private large enterprises (69%) and private small-and-medium-sized enterprises (alias SMEs) and individual inventors (23%), while only 8% of the applications came from universities or public research organisations.¹⁰ Therefore – without taking into account any pre-application funding of research and development through the European Union –¹¹, it is mainly the private sector, consisting of European citizens and enterprises, which predominantly drives the direct process of inventing and applying for patents, rather than European public institutions.

⁶ von der Leyen, ‘Speech by President von der Leyen at the 50th anniversary of the European Patent Convention, via video message’ (n 1).

⁷ *ibid.*

⁸ See chapter C. for the detailed approach of the general understanding of the term.

⁹ Matej Savić, ‘The European Union’s Legal Personality in International Law – Character, Structure, and Scope’ (2023) 2 *Studia Europejskie - Studies in European Affairs* 45, 52-59 <<https://www.researchgate.net/publication/373254853> The European Union's Legal Personality in International Law - Character Structure and Scope> accessed 14 October 2024; Publications Office of the European Union, ‘Summaries of EU legislation – European Union’ (*eur-lex.europa.eu*) <<https://eur-lex.europa.eu/EN/legal-content/glossary/european-union.html>> accessed 14 October 2024.

¹⁰ European Patent Office, ‘Patent Index 2023’ (*epo.org*) <<https://www.epo.org/en/about-us/statistics/patent-index-2023/statistics-and-indicators/applicants/categories>> accessed 11 October 2024.

¹¹ e.g. funding through the European Union’s Framework Programme for Research and Innovation, Horizon Europe: Consolidated Text: Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013 [2021] OJ L 170/1; Council Decision (EU) 2021/764 of 10 May 2021 establishing the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation, and repealing Decision 2013/743/EU [2021] OJ L 167/1.

Consequently, this raises the question to what extent and by which means the European Union and the European Countries as public authorities can actively contribute and incentivise the green transition in respect to Green patent rights in Europe. Henceforth, this shifts the focus to the establishment of legal incentives and a general legal patent framework, which can actively promote the patenting of Green technologies.

As general instruments for influencing the intellectual property system, the EU might introduce political strategies and respective legislative measures on the design of the legal framework for intellectual property rights and the funding of research and development.¹² However, in respect to a European patent law, it is important to consider, that the EU might not be the only public authority shaping the system. The procedural and material granting of national patents are competences of the respective national patent offices in accordance with national law and, in the case of European patents, solely of the European Patent Office (EPO) as the administrative body of the European Patent Organisation (EPOrg) in accordance with the European Patent Convention.¹³ The EPO is also responsible for granting the newly established Unitary Patent, which is based on a European patent.¹⁴ Additionally, several European Union member states, which agreed to participate in an enhanced cooperation, recently established the Unified Patent Court (UPC) as a new centralised enforcement body for European patents and European patents with unitary effect (Unitary Patent).¹⁵ This already

¹² cf Jörg Hoffmann, 'The Role of Patent and Competition Law for Setting the Right Innovation Incentives for Europe's Green Transition' in Florentin Thouvenin and others (eds), *Kreation Innovation Märkte – Creation Innovation Markets* (Springer 2024) 579f.; cf Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, 'Patent protection in the EU' (*single-market-economy.ec.europa.eu*) <https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/patent-protection-eu_en#> accessed 14 October 2024.

¹³ Heinz Goddar and Konstantin Werner, 'The interaction between the UPC, national courts, and the Board of Appeal' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 17ff.

¹⁴ *ibid*; Decision of the Select Committee of the Administrative Council of 15 December 2015 adopting the Rules relating to Unitary Patent Protection (SC/D 1/15) [2016] OJ EPO 2016, A39; Rules relating to Unitary Patent Protection as adopted by decision of the Select Committee of the Administrative Council of the European Patent Organisation of 15 December 2015 and as last amended by decision of the Select Committee of the Administrative Council of 23 March 2022 [2022] OJ EPO 2022, A41; See in more detail: Fernand de Visscher, 'Constitutional aspects of the Unitary Patent Package (UPP) and the Unified Patent Court (UPC) – question marks remain' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 206f.

¹⁵ Agreement on a Unified Patent Court [2013] OJ C 175/1; Council of the EU and the European Council, 'Agreement on a Unified Patent Court (UPC) – Ratification Details', (*consilium.europa.eu*) <<https://www.consilium.europa.eu/en/documents-publications/treaties-agreements/agreement/?id=2013001>> accessed 15 October 2024; Regulation (EU) 1257/2012 of the European Parliament and of the Council of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1; 2011/167/EU: Council Decision of 10 March 2011 authorising enhanced cooperation in the area of the creation of unitary patent protection OJ L 76/53; Consolidated version of the Treaty on the Functioning of the European Union [2016] OJ C 202/47, art 331; Consolidated version of the Treaty on Euro-

indicates the complexity of the European patent system and the existence of multiple key players that may have different areas of legal control as well as potentially significant intersections.

Therefore, the key to effectively pursuing a green transition and promoting climate neutrality across Europe by creating a Green Patent law may lie in a holistic approach and in the cooperation between the EU, the EU member states participating in an enhanced cooperation in the UPC, and the EPOrg. However, while the EU, the EPOrg and the UPC might already show close collaboration – as also emphasised by Ursula Von der Leyen in her abovementioned speech with regard to the Unitary Patent system¹⁶, it appears questionable whether these stakeholders have already established a common specific legal strategy and a legislative framework that directly promotes Green Patents.

II. Research question and structure

This thesis therefore aims to determine whether the European Union, the European Patent Organisation and the EU member states participating in the Unified Patent Court have already established a common strategic and legislative approach towards a promotion of Green Patents. In the absence of such a common legal framework, this thesis intends to develop legislative and strategic measures, which can be introduced by the abovementioned stakeholders in order to incentivise the development of Green Patents. The final objective is to establish and propose common, comprehensive European “Green Patent Strategy”.

In order to analyse and approach the outlined “Green Patent Strategy”, this thesis will, in the first chapter, provide an outline of the European patent system and identify the relevant legal stakeholders and legislative nodes necessary for effectively analysing and introducing measures to promote Green Patents. The second chapter will focus on building a common legal language on what Green Patents actually are and will explore the European classification framework on how to define and categorise Green Patents. It will also briefly highlight the impact that Green Patents can have on a sustainable technological development and on the mitigation of climate change related effects. Furthermore, the chapter aims to provide an

pean Union [2016] OJ C 202/13, art. 20; Esther van Zimmeren, ‘Trusting the Unified Patent Court: the importance of the institutional design of the UPC and its judges’, in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 221.

¹⁶ von der Leyen, ‘Speech by President von der Leyen at the 50th anniversary of the European Patent Convention, via video message’ (n 1).

overview of the current application statistics of Green Patents in the European and international context and address whether the European countries can actually be considered as “world-leaders” in green patenting.

Continuing on this foundation, the third chapter will address the analysis and establishment of a European Green Patent Strategy. In a first step, the thesis will evaluate the European Union’s Green Deal and other European policies in order to determine the existence or non-existence of specific legislative measures that could promote Green Patents. In a second step, it will develop specific legal measures and improvements to the current patent framework of the EU, the EPOrg and the UPC in relation to Green Patents. For this purpose, the chapter will draw comparisons with other international legal approaches and deduce a potential of integration thereof into the European system. The focus will be on creating incentives through specific changes of procedural and material patent law.

In the conclusion the thesis will provide a substantial evaluation of the status quo of the legal Green patent framework of the European Union, the European Patent Organisation and the Unified Patent Court in terms of creating incentives for Green Patents. Finally, a comprehensive common Green Patent Strategy consisting of specific legislative measures that could be established by the relevant stakeholders will be outlined and proposed.

III. Methodology and limitations

Regarding the methodological approach, this thesis will perform – in particular in the main part and in the evaluation of a European legal framework for Green Patents – a positive doctrinal research of the relevant EU and international legislation and evaluate the existing norms and policies, their intention, interaction and practice.¹⁷ In parallel, it will evaluate the relevant legal secondary literature. Where appropriate, it will further analyse respective judicial decisions of the European Legal bodies and also consider any “informal” institutional practice of the written law.¹⁸ Between the analysis of EU legislation, EPOrg legislation and other international legal texts and legal literature, a comparative legal analysis will be added.¹⁹ The

¹⁷ cf Brune De Witte, ‘Legal Methods for the Study of EU Institutional Practice’ (2022) 18 No. 4 European Constitutional Law Review 637, 637 <<https://doi.org/10.1017/S157401962200044X>> accessed 17 October 2024; with a general critical approach to a narrow doctrinal research and the recommendation to introduce further “non-doctrinal” methods to also analyse “law in context”: cf Rob van Gestel and Hans-Wolfgang Micklitz, ‘Why Methods Matter in European Legal Scholarship’ (2014) 20 No. 3 European Law Journal 292, 294 & 311-314 <<https://doi.org/10.1111/eulj.12049>> accessed 21 October 2024.

¹⁸ cf De Witte (n 17) 637, 654.

¹⁹ European intellectual property law has both private law elements for the substantive part of the law and public law elements for the administrative and procedural aspects, in particular for patent law: Laurent Manderieux, ‘The Relationship Between Intellectual Property and Administrative Law’, in Irene Calbolo and Maria Lillà Montagnani (eds), *Handbook of Intellectual Property Research: Lenses, Methods, and Perspectives* (Oxford Academic 2021) 109ff., 116-120; Pedro Alberto and De Miguel Asensio, ‘Intellectual Property in

second chapter will also include an analysis of the respective European patent classification schemes and present statistics of green patent applications from the EPO and other international patent offices. As limitations, the thesis will not examine in detail legislative measures relating to funding projects for research and development of patentable green technologies, nor will it consider utility models as an intellectual property right and measures relating to them.

B. Outline of the European Patent System

Before analysing and creating a legal framework to promote Green Patents in Europe, it is essential to understand the structure of the European patent system in order to identify the legal players and nodes through which a framework could be modified or established.

I. European patent titles and legislative foundation

A patent – as a legal title and exclusionary right that protects an invention in the form of a technological idea –²⁰ can be obtained through different routes and under different legislations in the European territory. Firstly, national patent offices grant patents on a national basis and according to national law, with the scope of protection for the patent covering solely the national territory.²¹ In order to obtain patent protection in more than one European country simultaneously, it is possible either to obtain the national patents individually from the national patent offices or to file a European patent application at the EPO under using the European route.²² At the EPO, the inventor can either file a first direct application or follow the

European Private Law’, in Elise Poillot and Isabelle Rueda (eds), *‘Les frontières du droit privé européen / The Boundaries of European Private Law’* (Iarcier 2012) 195ff.; With an outline for a comparative approach towards the development of the European private law: Andreas Schwartz, ‘Die Rechtsvergleichung’ [Comparative law], in Karl Riesenhuber (ed), *‘Europäische Methodenlehre’* [European Methodology] (4th edn, De Gruyter 2021) 82ff., 92-96; With an adaption of (global) comparative arguments in regards of European public law and scholarly research: Armin von Bogdandy, ‘Comparative Public Law For European Society’ (2022) No. 2022-28 MPIL Research Paper Series 1, 3f., 17f. <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4298016#> accessed 22 October 2024.

²⁰ cf Hanns Ullrich, ‘The unified patent court’ (2023) 42 Yearbook of European Law 135, 144 <<https://doi-org.uaccess.univie.ac.at/10.1093/yel/yead007>> accessed 21 November 2023.

²¹ Heinz Goddar and Konstantin Werner, ‘The interaction between the UPC, national courts, and the Board of Appeal’ in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 18f.

²² *ibid.*, 18f.; Paul England and others, *A Practitioner’s Guide to the Unified Patent Court and Unitary Patent* (Hart Publishing 2022) 19f; Thomas Jaeger and Johannes Lukan, ‘A system fit for innovation? Part I: (Dis-)incentives for potential patentees in the UP legal framework’ in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 357; Convention on the Grant of European Patents of 5 October 1973 as revised by the Act revising Article 63 EPC of 17 December 1991 and the Act revising the EPC of 29 November 2000, adopted by the Administrative Council of the European Patent Organisation by decision of 28 June 2001 [2001] OJ EPO 2001 Special edition No. 4, p. 55 (European Patent Convention) art. 2.

international route and file an application as a derivation from the international application under the Patent Cooperation Treaty (PCT).²³

The legal basis of the European patent is the European Patent Convention – established by the European Patent Organisation in the form of an international treaty between EU-member states and European non-EU members states –²⁴, which sets out the substantive requirements for patentability and is accompanied by the respective secondary implementing regulation and rules.²⁵ Nevertheless, a European patent does not grant a uniform European patent right covering all EPC member states and instead creates a bundle of national patents, which each – as the counterpart of the single European patent application – have to be registered and validated at the respective national patent offices.²⁶ European patents are thus examined and granted solely by the EPO and changes to the legislation are subject to authority of the EPOrg without the EU having a legislative influence.²⁷

As a new third option, it is possible to obtain a Unitary Patent at the EPO for a number of EU member states participating in an enhanced cooperation since 1 June 2023.²⁸ The Unitary Patent is a European patent for which the applicant can request an additional unitary effect at the EPO as the administrative granting authority.²⁹ If the EPO grants the Unitary Patent, it

²³ See in more detail: European Patent Office, *Euro-PCT Guide – PCT procedure at the EPO* (EPO January 2023) <<https://www.epo.org/en/legal/guide-europct>> accessed 15 November 2024; Patent Cooperation Treaty (PCT) done at Washington on June 19, 1970, amended on September 28, 1979, modified on February 3, 1984, and on October 3, 2001 <<https://www.wipo.int/pct/en/texts/articles/atoc.html>> accessed 15 November 2024 (Patent Cooperation Treaty), art. 150; The derivation of an international patent application is also an option for national patent applications: Goddar and Werner, in Matthews and Torremans (eds) (n 21) 18.

²⁴ EPO, ‘Legal Foundations’ (*epo.org*) <<https://www.epo.org/en/about-us/foundation/legal-foundations>> accessed 13 November 2024; cf European Patent Convention.

²⁵ cf European Patent Convention; Implementing Regulations to the Convention on the Grant of European Patents of 5 October 1973 as adopted by decision of the Administrative Council of the European Patent Organisation of 7 December 2006 and as last amended by decision of the Administrative Council of the European Patent Organisation of 10 December 2024 as in force as from 16 December 2024 [2024] OJ EPO 2024, A105, (CA/D 13/24) (Implementing Regulations to the European Patent Convention).

²⁶ *ibid.*

²⁷ cf Nina Ferara, Peter de Lange, Andrew Rudge, in Kaisa Suominen (ed), *Visser’s Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 10ff., 46-48, 425-427; cf Jean-Christophe Galloux, ‘The role of EPO Boards of Appeal in shaping of patent law in Europe’ in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 1; European Patent Convention, art. 10, 33 & 172.

²⁸ European Patent Office, ‘Supporting users in uptake of the Unitary Patent before 1 June 2023’ (*epo.org*) <<https://www.epo.org/en/applying/european/unitary/unitary-patent/transitional-arrangements-for-early-uptake#f1>> accessed 16 November 2024; Regulation (EU) 1257/2012 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, art. 18 (2); Agreement on a Unified Patent Court, art. 89.

²⁹ Regulation (EU) 1257/2012 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, art. 9; Rules relating to Unitary Patent Protection as adopted by decision of the Select Committee of the Administrative Council of the European Patent Organisation of 15 December 2015 and as last amended by decision of the Select Committee of the Administrative Council of 23 March 2022 [2022] OJ EPO 2022, A41; England and others (n 22) 21.

creates a single unitary effect through all participating EU-members.³⁰ The EU has introduced the unitary effect through the respective EU-regulations Regulation (EU) 1257/2012 and Regulation (EU) 1260/2012.³¹ Nevertheless, the legal nature of the Unitary Patent remains that of a European patent granted by the EPO and based on international law, and has merely been given an additional unitary effect by the respective implementing EU legislation.³² The granting of the European (Unitary) patent and the unitary effect are thus still governed by the EPO and the EPC and the EU does not possess legislative power in the field of granting the patent.³³

However, it is important to note that only 25 of the 27 EU member states participate in the enhanced participation and to date only 18 of the participating EU member states have ratified the UPCA yet.³⁴ The unitary effect therefore cannot apply, firstly, in the non-contracting EU member states that do not participate in the enhanced cooperation, secondly, in the participating EU states that have not signed and ratified the UPC, and thirdly, in the non-EU member states, which are part of the EPC, but are not entitled to join the UPCA.³⁵ Thus, the unitary effect still covers only part of the territory of the EU.³⁶ Overall, the European patent law is still fragmented in its patent titles, with the existence of different territorial national, European and Unitary Patents.

³⁰ Ferara, de Lange and Rudge in Suominen (ed) (n 27) preamble 6-9; Regulation (EU) 1257/2012 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, art. 4.

³¹ Ferara, de Lange P and Rudge in Suominen (ed) (n 27) preamble 6-9; Regulation (EU) 1257/2012 (n 28); Council Regulation (EU) 1260/2012 implementing enhanced cooperation in the area of the creation of unitary patent protection with regard to the applicable translation arrangements [2012] OJ L 361/89; European Patent Convention, art. 142.

³² Frantzeska Papadopoulou, 'The novelty and inventive step requirement in Europe and under the UPP' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 97, 104; de Visscher, in Matthews and Torremans (eds) (n 14) 206f.

³³ Ferara, de Lange P and Rudge in Suominen (ed) (n 27) 10f.; cf Galloux, in Matthews and Torremans (eds) (n 27) 1; cf Tamar Khucha, 'The role of the CJEU in European patent law from a procedural perspective', in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 478f; For a certain influence on substantive patent law through primary and secondary legislation: Fernand de Visscher in Matthews and Torremans (eds) (n 14) 219.

³⁴ Council of the European Union, 'Agreement on a Unified Patent Court (UPC) – Ratification Details' (*consilium.europa.eu*) <<https://www.consilium.europa.eu/en/documents-publications/treaties-agreements/agreement/?id=2013001>> accessed 15 November 2025; cf Ferara, de Lange P and Rudge in Suominen (ed) (n 26); Council Decision of 10 March 2011 authorising enhanced cooperation in the area of the creation of unitary patent protection OJ L 76/53; Consolidated version of the Treaty on the Functioning of the European Union [2016] OJ C 202/47, art 331; Consolidated version of the Treaty on European Union [2016] OJ C 202/13, art. 20; Italy joined the enhanced participation in 2015: Commission Decision (EU) 2015/1753 of 30 September 2015 on confirming the participation of Italy in enhanced cooperation in the area of the creation of unitary patent protection [2015] OJ L 256/19.

³⁵ Paul England and others, *A Practitioner's Guide to the Unified Patent Court and Unitary Patent* (Hart Publishing 2022) 32f; Regulation (EU) 1257/2012 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, art. 18.

³⁶ It is possible as a "quasi" fourth route to combine a European patent registered as a Unitary Patent with additional validations of the European patent in the EPC contracting states that are not covered by the Unitary Patent: Ferara, de Lange P and Rudge in Suominen (ed) (n 27) preamble 6-9.

II. Patent litigation – Establishment and competence of the Unified Patent Court

In the past, litigation and enforcement in relation to European patent titles could only be brought before the national authorities in relation to the respective national part of the bundle patent.³⁷ This changed when the Unified Patent Court (UPC) was established by the Agreement on a Unified Patent Court (UPCA) at the same time as the EU and the EPOrg introduced the Unitary Patent.³⁸ The UPC is a centralised court with the respective competences as stated in Article 32 UPCA, including, but not limited to, revocation and infringement claims.³⁹ Its competence covers proceedings relating to Unitary Patents, European patents that have not been opted-out by the proprietor under Art. 83 UPCA and SPCs that were granted for a Unitary Patent or a European patent.⁴⁰

With respect to the relevant international jurisdiction of the UPC to decide on these matters,⁴¹ the jurisdiction of the UPC covers exclusively actions for Unitary Patents and European patents of the UPCA contracting EU member states.⁴² However, the UPC does not have exclusive jurisdiction over the national parts of European patents in relation to the countries of the EU that do not participate in the UPCA, but it can establish jurisdiction in certain cases.⁴³

³⁷ Goddar and Werner, in Matthews and Torremans (eds) (n 21) 19; Hanns Ullrich, 'The unified patent court' (2023) 42 Yearbook of European Law 135, 140 <<https://doi-org.uaccess.univie.ac.at/10.1093/yel/yead007>> accessed 21 November 2023. However the EPO offers the option of a centralised opposition of a European Patent within nine months of the publication of the mention of the grant of the European patent: European Patent Convention, art. 99.

³⁸ cf footnote (n 15).

³⁹ Zimmeren, in Matthews and Torremans (eds) (n 15) 221; Agreement on a Unified Patent Court, art. 32.

⁴⁰ Agreement on a Unified Patent Court, art. 2, art. 32; Within a transition period of seven years after establishment of the UPCA right holders can also option-out their European patents that are covered by the UPCA and bring the respective actions in front of the national courts or competent authorities: Agreement on a Unified Patent Court, art. 83.

⁴¹ cf Paul LC Torremans, 'Regulation 542/2014 on jurisdiction' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 185, 185f.

⁴² Karen Walsh, 'Institutional coexistence: the necessity of judicial dialogue and cooperation in the UPC' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 463, 466; cf Papadopoulou in Matthews and Torremans (eds) (n 32) 105; Agreement on a Unified Patent Court, art. 2 (c), 3, 31; Consolidated Text: Regulation (EU) No 1215/2012 of the European Parliament and of the Council of 12 December 2012 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters [2012] OJ L 351/1, art. 71a, 71b (1), 4; The application of art. 71b (1) Brussels I leads to a transfer of jurisdiction of a court of a UPC member state to the UPC, if the case in front of the national court is covered by the UPC: Torremans (n 41) 188; The UPC Court of Appeal considers only EU member countries as contracting countries, that have signed the UPCA and additionally ratified it: UPC CoA 388/2024, Court of Appeal, order of the Court of Appeal of the Unified Patent Court issued on 19 August 2024 concerning an application pursuant to R.223 RoP (Application for suspensive effect).

⁴³ Consolidated Text: Regulation (EU) No 1215/2012 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters [2012] OJ L 351/1, art. 71a, 71b (1); For Lugano member states: Convention on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters [2007] OJ L 339, 21.12.2007, art. 5, 6; UPC CoA 388/2024, Court of Appeal, order of the Court of Appeal of the Unified Patent Court issued on 19 August 2024 concerning an application pursuant to R.223 RoP (Application for suspensive effect); This is still a highly debated question in secondary literature, cf: Pieter Callens and Sam Granata, *The Unitary Patent and the Unified Patent Court* (2nd edn, Wolters Kluwer 2024) 158; Paul England and Wim Maas, 'The UPC long-arm jurisdiction an the UK' (2023) Vol. 18, No. 6 Journal of Intel-

The UPC may also have very limited jurisdiction with regard to the compensation and damages for an infringement of a European patent in a non-EU member state.⁴⁴ The UPC has thus brought a partial harmonisation of patent litigation for Unitary and European patents⁴⁵ of the (EU) contracting states of the UPCA.⁴⁶ However, there is still a risk of procedural fragmentation in relation to European patents from non-UPCA countries.⁴⁷ Furthermore, the UPCA as the agreement establishing the UPC is – again – an international treaty comprising of the respective EU member states that participate in an enhanced participation.⁴⁸ The EU as a legal person is not included in the UPCA and thus cannot introduce legal changes to it.⁴⁹ Only the establishment of the unitary effect of the Unitary Patent is EU legislation per se.⁵⁰ Nevertheless, all of the countries participating in the UPCA are members of the EU and have declared their participation in the form of European law.⁵¹ In addition, the UPC considers EU, international and national law in its decisions,⁵² and it has jurisdiction over European and Unitary Patents, which are granted by the EPO. The UPC is therefore – although it is governed by the independent international agreement, the UPCA – closely related with both the EU and the EPOrg.⁵³

lectual Property Law & Practice 455, 457 <<https://doi-org.uaccess.univie.ac.at/10.1093/jiplp/jpad042>> accessed 20 November 2024; cf Paul England and others, *A Practitioner's Guide to the Unified Patent Court and Unitary Patent* (Hart Publishing 2022) 32; cf Torremans (n 41) 190f; Marc Miller, 'The co-existence between EPC and patents with unitary effect' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 454f.

⁴⁴ Consolidated Text: Regulation (EU) No 1215/2012 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters [2012] OJ L 351/1, art. 71b (2), (3); The UPC CoA established as criteria for an international jurisdiction that the European patent, relied on in the infringement claim, has effect in at least one UPCA contracting state and that the alleged infringement occurred in that state: UPC CoA 188/2024, Court of Appeal, order of the Court of Appeal of the Unified Patent Court issued on 3 September 2024; Pieter Callens and Sam Granata, *The Unitary Patent and the Unified Patent Court* (2nd edn, Wolters Kluwer 2024) 158f.; Matthias Grob and Rainer Härtle, 'The "long arm" of the Unified Patent Court' (2023) 4 epi Information 28 <<https://information.patentepi.org/issue-4-2023/the-long-arm-of-the-unified-patent-court.html>> accessed 20 November 2024; cf Torremans (n 41) 193f.

⁴⁵ European patents are no longer under the competence of national courts after the end of the transitional period for opting out patents at the UPC, cf footnote (n 40).

⁴⁶ cf Matthias Lamping, Christoph Rademacher, 'Patent litigation strategise in Germany maneuvering the evolving landscape of bifurcation', in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 432.

⁴⁷ cf Miller, in Matthews and Torremans (eds) (n 43) 461f.; cf Walsh in Matthews and Torremans (eds) (n 42) 470; Highlighting the risk of legal fragmentation: cf Douwe de Lange, 'EU patent harmonization policy: reconsidering the consequences of the UPCA' (2021) 16 No. 10 Journal of Intellectual Property Law & Practice 1078, 1081ff. <<https://doi.org/10.1093/jiplp/jpab096>> accessed 19 November 2024.

⁴⁸ cf Agreement on a Unified Patent Court; de Lange D (n 47) 1080ff.

⁴⁹ cf *ibid*; Papadopoulou (n 32) 104; Council of the European Union, 'Agreement on a Unified Patent Court (UPC) – Ratification Details' (consilium.europa.eu) <<https://www.consilium.europa.eu/en/documents-publications/treaties-agreements/agreement/?id=2013001>> accessed 15 November 2025.

⁵⁰ de Lange D (n 47) 1081; Papadopoulou (n 32) 105f.

⁵¹ See footnote (n 34).

⁵² Walsh, in Matthews and Torremans (eds) (n 42) 466f; Papadopoulou, in Matthews and Torremans (eds) (n 32) 105; Agreement on a Unified Patent Court, art. 20 & 24.

⁵³ cf Papadopoulou, in Matthews and Torremans (eds) (n 32) 105; cf Khucha (n 33) 493f; Highlighting the links to the EU law and the CJEU: Klara Polackova Van der Ploeg, 'Unified Patent Court and international

III. Legislative impact of the European Union

In addition to the abovementioned establishment of the unitary effect of the Unitary Patent and funding programs like Horizon Europe,⁵⁴ the EU has enacted a number of directives and regulations addressing patent issues in the EU. For example, the EU introduced Regulation (EC) No 469/2009 concerning Supplementary Protection Certificates for pharmaceutical and plant protection products and Directive 98/44/EC on the limits of patentability in Biotechnology.⁵⁵ The EU Commission has also proposed a new Regulation on Standard Essential Patents (SEPs), as part of the 2020 EU Intellectual Property Plan.⁵⁶ In the absence of a direct legislative influence towards the grant of European and Unitary Patents and the enforcement procedures at the UPC,⁵⁷ the EU legislation therefore focuses on pre-grant funding measures and post-grant harmonisation measures inter alia in relation to the limitations of the patent scope and further in relation to licensing issues.

IV. Interim result

In conclusion, a single uniform patent title, which covers all of Europe and is administered by a single legal entity under one legislative foundation, does not exist. As described above, patent protection runs through different routes, either national, European as a bundle or European with unitary effect. The substantive and procedural patent law is further ratified in a mixture of international treaties such as the EPC and the UPCA, and is complemented by harmonizing EU legislation on post-grant patent issues.⁵⁸ The different routes to obtain patent

law', in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 317.

⁵⁴ See footnote (n 11).

⁵⁵ cf Khucha (n 33) 478f; Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions [1998], OJ L 213/13 (Biotechnology Directive); Consolidated text: Regulation (EC) No 469/2009 of the European Parliament and of the Council of 6 May 2009 concerning the supplementary protection certificate for medicinal products [2009] OJ L 152/1; Consolidated text: Regulation (EC) No 1610/96 of the European Parliament and of the Council of 23 July 1996 concerning the creation of a supplementary protection certificate for plant protection products [1996] OJ L 198/30.

⁵⁶ Adopted by the EU parliament and currently pending for adoption by the EU Council: Proposal for a regulation of the European Parliament and of the Council on standard essential patents and amending Regulation (EU) 2017/1001 [2023] COM(2023) 232 final, 2023/0133 (COD); European Parliament legislative resolution of 28 February 2024 on the proposal for a regulation of the European Parliament and of the Council on standard essential patents and amending Regulation (EU) 2017/1001 (COM(2023)0232 – C9-0147/2023 – 2023/0133(COD)), P9_TA(2024)0100 <https://www.europarl.europa.eu/doceo/document/TA-9-2024-0100_EN.html> accessed 19 November 2024; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions making the most of the EU's innovative potential An intellectual property action plan to support the EU's recovery and resilience [2020] COM/2020/760 final.

⁵⁷ cf chapter B. I & II.

⁵⁸ cf Jean-Christophe Galloux, 'The role of EPO Boards of Appeal in shaping of patent law in Europe' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 1.

protection, the different levels of patent issues (pre-grant granting requirements and procedure and post-grant regulation) and the different legal stakeholders and frameworks for patents, highlight the inherent complexity of European patent law. In relation to the establishment of a common European patent strategy for Green Patents, three main connection points for a legal framework for Green Patents can therefore be identified in the form of legal “key players” and their respective legal frameworks:

- (1) The EPOrg under the EPC with the legislative power on the pre-grant substantive and procedural framework for the granting of European patents and European patents with a unitary effect.⁵⁹
- (2) The EU with the power to regulate, through EU regulations and directives for the EU territory, the pre-grant funding of technology, the establishment of e.g. the unitary effect of the Unitary Patent, as well as post-grant issues of European patents and harmonisation measures of the European Union patent law.
- (3) The UPC, as a centralized court for European patents and European patents with unitary effect for the participating countries, which covers post-grant litigation and revocation actions. The UPC is closely affiliated with both the EU and the EPO.

C. What are Green Patents?

In literature, Green Patents are seen as one of the pillars – along with R&D investments and the actual use and performance of renewable energy – of the dynamic concept of “green innovation”, a process aimed at the development of new technologies that focus, depending on the exact definition, e.g. on energy related issues and the mitigation and prevention of pollution and waste.⁶⁰ Green Patents themselves are understood as patents targeting environmental technologies and the mitigation of environmental risks.⁶¹ However while the term “Green Patents” is becoming a common term and is frequently used in the literature, by international organisations and by institutions of the EU,⁶² it is still a rather broad and dynamic

⁵⁹ cf de Lange D (n 47) 1081.

⁶⁰ Marinella Favot and others, ‘Green patents and codes: How different methodologies lead to different results’ (2023) 18 Article 200132 Resources, Conversation & Recycling Advances 1, 1f. <https://doi.org/10.1016/j.rcradv.2023.200132> accessed 29 October 2024; Mucahit Aydin and others, ‘The role of green innovation in achieving environmental sustainability in European Union countries: Testing the environmental Kuznets curve hypothesis’ (2023) 118 Gondwana Research 105, 105f., <https://doi.org/10.1016/j.gr.2023.01.013> accessed 29 October 2024.

⁶¹ Aydin (n 15) 105, 105; cf Favot (n 15) 1, 2; The terms “green”, “eco-friendly” or “sustainable” are often used as interchangeable pseudonyms but all have the common ground of targeting climate change and a technological development for the benefit of the environment: cf Pablo Cisneros Chavira and others, ‘Defining green innovation, its impact, and cycle – A literature analysis’ (2023) 17 Article 100693 Cleaner Engineering and Technology 1, 3, <https://doi.org/10.1016/j.clet.2023.100693> accessed 29 October 2024.

⁶² e.g.: Aydin (n 15) 105, 105; Favot (n 15) 1, 2; Michela Bello and others, ‘The geography of EU green and digital inventions and their knowledge sources’ (Publications Office of the European Union, 28 June 2023)

concept and does not directly establish precise criteria for determining when a patent can be qualified as “green”. Nowadays, naming subjects “green” also comes with the risk of “greenwashing”, a phenomenon where the relevant stakeholders, e.g. companies, exaggerate or falsely claim positive environmental effects in order to comply with regulations or gain advantages.⁶³ Therefore, if the EU the EPO or UPC have created a legal framework to promote Green Patents, or if such a framework is to be created, the stakeholders would have to ensure a precise clarification of the concept of Green Patents and a prevention of greenwashing. This would require the EU, the EPO and the UPC to create a classification framework capable of identifying and classifying Green Patents as such when dealing with patent applications and issues.

The EPO – as the respective authority responsible for granting European patents and European patents with unitary effect – is the first point of contact of potential Green Patents with the patent system and could therefore be the competent authority to establish a code based Green classification.⁶⁴ The patent examiners and specialists are technically qualified and can apply a pre-set of classification schemes either directly by using their technical knowledge or by creating the technical qualified algorithms.⁶⁵ The EPO would then also be able to cover the classification of Unitary Patents, since a Unitary Patent is in its core a European patent.⁶⁶ Once EPO classifies the patent as green and grants it, the EU and the UPC could adopt the classification for further measures. It thus has to be determined whether the EPO has already established such a Green classification framework.

<<https://publications.jrc.ec.europa.eu/repository/handle/JRC133565>> accessed 30 October 2024; Lorena Rivera León and others, ‘Measuring innovation in energy technologies: green patents as captured by WIPO’s IPC green inventory’ (2018) WIPO Economic Research Working Paper No. 44, 1 <<https://www.wipo.int/publications/en/details.jsp?id=4351>> accessed 30 October 2024.

⁶³ Pascal Berrone, Andrea Fosfuri and Liliana Gelabert, ‘Does Greenwashing Pay Off? Understanding the Relationship Between Environmental Actions and Environmental Legitimacy’ (2017) 144 *Journal of Business Ethics* 363, 363 <<https://doi.org/10.1007/s10551-015-2816-9>> accessed 30 October 2024.

⁶⁴ cf Favot (n 60) 1.

⁶⁵ cf Ivan Hašič and Mauro Migotto, ‘Measuring environmental innovation using patent data’ (2015) 89 *OECD Environment Working Papers* 1, 18 <<https://doi.org/10.1787/19970900>> accessed 8 December 2024; cf Cooperative Patent Classification, ‘Guide to the CPC (Cooperative Patent Classification)’ (February 2017) 10 <<https://www.cooperativepatentclassification.org/publications/Miscellaneous;https://link.epo.org/cpc/Guide+to+the+CPC.pdf>> accessed 30 November 2024.

⁶⁶ As already emphasised before: cf Frantzeska Papadopoulou, ‘The novelty and inventive step requirement in Europe and under the UPP’ in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 97, 104.

I. Green Patent Classification at the EPO

Patent classification at the EPO and in general at the world's patent offices comprises of the categorisation of patent applications based on the technical subject matter claimed.⁶⁷ The classification is an essential part of the patent application process – as part of the patent search phase – and is performed by the patent examiners.⁶⁸ The goal of the classification is to improve the effectiveness of patent searches, which firstly is of importance for the patent office's patent examiners, who have to evaluate the patent application on the criteria of patentability, especially on novelty and the inventive step and compare them with already registered patents.⁶⁹ However, the classification is also of interest for private stakeholders conducting patent searches, to assess whether their own inventions can meet the criteria of novelty and to evaluate the patent portfolios of competitors.⁷⁰

1. Patent classification standards and practice at the EPO

The EPO applies the International Patent Classification (IPC) and the Cooperative Patent Classification (CPC) for the examination of European patent applications.⁷¹ The IPC is the most widely, used patent classification scheme and was established by the Strasbourg Agreement in 1971.⁷² It is a classification system that comprises of language independent symbols

⁶⁷ Eleni Kamateri, Michail Salampasis and Eduardo Perez-Molina, 'Will AI solve the patent classification problem?' (2024) 78 Article 102294 World Patent Information 1, 1 <<https://doi.org/10.1016/j.wpi.2024.102294>> accessed 31 October 2024.

⁶⁸ EPO, *Guidelines for Examination in the European Patent Office* (EPO March 2024) part B chapter V <<https://www.epo.org/en/legal/guidelines-epc>> accessed 10 November 2024; Kamateri, Salampasis and Diamantaras, (n 67) 1; See the patent application process in detail: EPO, *European Patent Guide* (EPO July 2024) chapter 5 <<https://www.epo.org/en/legal/guide-epc>> accessed 11 November 2024.

⁶⁹ World Intellectual Property Organization, 'Guide to the International Patent Classification' (2024) chapter I.6f. <<https://www.wipo.int/publications/en/details.jsp?id=4722&plang=EN>> accessed 31 October 2024; Kamateri, Salampasis and Diamantaras, (n 67) 1; See for the material requirements of applications at the EPO: European Patent Convention, art. 52-59; EPO, *European Patent Guide* (EPO July 2024) chapter 3 <<https://www.epo.org/en/legal/guide-epc>> accessed 11 November 2024.

⁷⁰ WIPO, 'Guide to the International Patent Classification' (2024) chapter I.6f. <<https://www.wipo.int/publications/en/details.jsp?id=4722&plang=EN>> accessed 31 October 2024; cf Kamateri, Salampasis and Diamantaras, (n 67) 1; In respect to the IPC classification: S.R. Arsad and others, 'Patent landscape review of hydrogen production methods: Assessing technological updates and innovations' (2024) 50 Part B International Journal of Hydrogen Energy 447, 456 <<https://doi.org/10.1016/j.ijhydene.2023.09.085>> accessed 31 October 2024.

⁷¹ European Patent Office, *Guidelines for Examination in the European Patent Office* (EPO March 2024) part B chapter V <<https://www.epo.org/en/legal/guidelines-epc>> accessed 10 November 2024; Implementing Regulations to the European Patent Convention, Rule 8; New agreement between the European Patent Organisation and the International Bureau of the World Intellectual Property Organization in relation to the functioning of the European Patent Office as an International Searching Authority and International Preliminary Examining Authority under the Patent Cooperation Treaty [2017] OJ EPO 2017, A115, art. 6; Regulations under the Patent Cooperation Treaty (as in force from July 1, 2024) <<https://www.wipo.int/pct/en/texts/rules/rtoc1.html>> accessed 10 November 2025; Koji Meguro, Yoshiyuki Osabe, 'Lost in Patent Classification' (2019), 57 World Patent Information 70 <<https://doi.org/10.1016/j.wpi.2019.03.008>> accessed 10 November 2024.

⁷² cf. Meguro, Osabe (n 71) 70; WIPO, Strasbourg Agreement Concerning the International Patent Classification of March 24, 1971, as amended on September 28, 1979, 1160 UNTS 483; 65 states have signed the agreement and established a respective IPC Union, but in total the IPC is used by patent offices of more than a

in form of combinations of letters and numbers and classifies patents with respect of their related area of technology.⁷³ The IPC system consists out of hierarchical levels classifying the technology according to a section (A-H), class, subclass, main group and subgroups, which narrows down the scope of the related area of technology with each step.⁷⁴ The system comprises of approximately 80.000 combinations.⁷⁵

The EPO and the United States Patent and Trademark Office (USPTO) established the Cooperative Patent Classification (CPC) as a bilateral classification system and a cooperative approach.⁷⁶ The CPC supersedes the now abolished European Classification (ECLA) scheme of the EPO.⁷⁷ The CPC classification scheme has a similar structure as the IPC. It is hierarchically structured into nine sections A-H and Y, which in turn are further subdivided into classes, subclasses, groups and subgroups.⁷⁸ Compared to the IPC the CPC consists of a more detailed classification framework with approximately over 250.000 combinations.⁷⁹ It is therefore a stand-alone classification system that is compliant with the IPC, but also represents an extension of the IPC.⁸⁰

The EPO differentiates between a first initial and broad preclassification of the incoming patent application, which is then directed to the technical qualified in depth patent examiner

hundred states: World Intellectual Property Organisation, 'Summary of the Strasbourg Agreement Concerning the International Patent Classification (1971)' (*wipo.int*) <https://www.wipo.int/treaties/en/classification/strasbourg/summary_strasbourg.html> accessed 26 November 2024; World Intellectual Property Organisation, 'WIPO-Administered Treaties' (*wipo.int*) <https://www.wipo.int/wipolex/en/treaties/Show-Results?search_what=C&treaty_id=11> accessed 26 November 2024; World Intellectual Property Organisation, 'Use of the simplified IPC by industrial property offices' (*wipo.int*) <https://www.wipo.int/export/sites/www/classifications/ipc/en/reform/table_use_simplified_ipc.pdf> accessed 26 November 2024.

⁷³ WIPO, Strasbourg Agreement Concerning the International Patent Classification of March 24, 1971, as amended on September 28, 1979, 1160 UNTS 483.

⁷⁴ See in detail: World Intellectual Property Organization, 'Guide to the International Patent Classification' (2024) chapter II-IV. <<https://www.wipo.int/publications/en/details.jsp?id=4722&plang=EN>> accessed 31 October 2024; World Intellectual Property Organisation, 'Strasbourg Agreement Concerning the International Patent Classification' (*wipo.int*) <<https://www.wipo.int/treaties/en/classification/strasbourg>> accessed 26 November 2024.

⁷⁵ *ibid.*

⁷⁶ European Patent Register, 'Cooperative Patent Classification (CPC)' (*register.epo.org*) <<https://register.epo.org/help?lng=en&topic=CPC>> accessed 26 November 2024; See the joint statement of 2010 Director of the USPTO David Kappos and President of the EPO Benoît Battistelli: Cooperative Patent Classification, 'About CPC' (*cooperativepatentclassification.org*) <<https://www.cooperativepatentclassification.org/about>> accessed 26 November 2024.

⁷⁷ Cooperative Patent Classification, 'Guide to the CPC (Cooperative Patent Classification)' (February 2017) 4, 6ff. <<https://www.cooperativepatentclassification.org/publications/Miscellaneous;https://link.epo.org/cpc/Guide+to+the+CPC.pdf>> accessed 26 November 2024.

⁷⁸ *ibid.*

⁷⁹ European Patent Office, 'Cooperative Patent Classification' (*epo.org*) <<https://www.epo.org/en/searching-for-patents/helpful-resources/first-time-here/classification/cpc>> accessed 26 November 2024.

⁸⁰ Cooperative Patent Classification, 'Guide to the CPC (Cooperative Patent Classification)' (February 2017) 4, 6ff. <<https://www.cooperativepatentclassification.org/publications/Miscellaneous;https://link.epo.org/cpc/Guide+to+the+CPC.pdf>> accessed 26 November 2024; Nina Ferrara, Peter de Lange, Andrew Rudge, in Kaisa Suominen (ed), *Visser's Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 459.

for the more detailed full classification.⁸¹ The preclassification for file routing and allocating is performed using the IPC classification and/or the CPC classification.⁸² The main classification performed by the respective search division consist of both the IPC and the CPC classification of the relevant patent application. In practice, the patent examiners at the EPO first perform the more detailed CPC classification in relation to the main classification and then translate the CPC classification into the IPC classification using a one-to-one concordance.⁸³ However, while the CPC retains all the elements of the IPC and is even more detailed – as stated above –, the IPC is still of independent importance as a stand-alone international and more widely used classification, in particular because it is the classification that is published in the search report.⁸⁴

Therefore, although there are significant overlaps between the IPC and the CPC, both application schemes are of independent importance for classifying patents at the EPO, due to the additional or alternative application of the schemes in the preclassification and the dual classification in the main classification. Thus, the preclassification using the classification schemes combined or alternatively is the earliest stage at which a potential green patent can potentially be identified and enact promotional measures at the EPO. It thus becomes of specific importance for the effective promotion of Green Patents.

2. Green classification internationally and at the EPO

Having identified the relevant classification schemes of the EPO, this sub-chapter aims to provide an overview of how the EPO deals with the classification of green technologies in patent applications when applying the IPC and the CPC scheme.

a. World Intellectual Property Office – IPC Green Inventory

The World Intellectual Property Office (WIPO) provides the “IPC Green Inventory” list.⁸⁵ The Green Inventory facilitates the organisation and search of patents relating to Environmental Sound Technologies (EST). EST are technologies as promoted by the United Nations

⁸¹ European Patent Office, *Guidelines for Examination in the European Patent Office* (EPO March 2024) part B chapter V <<https://www.epo.org/en/legal/guidelines-epc>> accessed 26 November 2024.

⁸² *ibid.*

⁸³ *ibid*; Cooperative Patent Classification, ‘CPC to IPC Concordance’ (August 2024) <<https://www.cooperativepatentclassification.org/cpcConcordances>> accessed 26 November 2024.

⁸⁴ European Patent Office, ‘Monitoring revisions of the IPC/CPC classification scheme’ (*epo.org*, 9 October 2023) <<https://www.epo.org/en/searching-for-patents/helpful-resources/patent-knowledge-news/monitoring-revisions-ipccpc>> accessed 27 November 2024; European Patent Office, *Guidelines for Examination in the European Patent Office* (EPO March 2024) part B chapter X-5 <<https://www.epo.org/en/legal/guidelines-epc>> accessed 26 November 2024

⁸⁵ World Intellectual Property Organisation, ‘IPC Green Inventory’ (*wipo.int*) <<https://www.wipo.int/classifications/ipc/green-inventory/home>> accessed 27 November 2024.

Framework Convention on Climate Change (UNFCCC), e.g. technologies in relation to the protection of environment, waste management, and recycling.⁸⁶ The list consists of seven topics referring to EST fields and to specific technologies that are considered environmental sound.⁸⁷ It is further divided into sub-topics, which themselves refer to the most relevant IPC codes.⁸⁸ The WIPO updated the list yearly and if a new patent application involves EST, the IPC classification codes of the IPC may qualify for inclusion into the Green Inventory.⁸⁹ Therefore, at the time of filing, green technologies are not directly categorised into a specific class focused on green technologies in relation to the IPC and the IPC code is not tagged as a green technology. Instead, the Green Inventory represents a post-grant selection of classification codes of EST extracted from various scattered classification categories. Furthermore, the Green Inventory is facilitated solely by the WIPO and therefore excludes any direct influence by the EPO.⁹⁰ Thus, when applying the IPC in the preclassification (or main classification) at the EPO, the EPO examiner does not specifically classify green technologies in the IPC as such. However, the examiner could instead theoretically choose – in a reverse conclusion – a classification that is related to a classification that is already included into the Green inventory. In conclusion, the Green Inventory is not a direct method for identifying Green Patents on part of the EPO as the competent authority.

b. CPC Y02/Y04S tagging scheme

Nevertheless, the EPO has introduced its own Y02/YO4S tagging scheme within the CPC scheme.⁹¹ The Y02/YO4S tagging scheme adds an additional complementary tag to the existing CPC qualification; “Y02” if the patent application relates to low-carbon, sustainable and climate change mitigation technologies (CCMTs) e.g. applications relating to energy,

⁸⁶ *ibid*; United Nations Framework Convention on Climate Change (1992) No. 30822, art. 4 para. 5; UNFCCC, ‘Application of environmentally sound technologies for adaptation to climate change – Technical paper’ (10 May 2006) FCCC/TP/2006/2 p. 11 <<https://unfccc.int/documents/4199>> accessed 27 November 2024.

⁸⁷ cf World Intellectual Property Organisation, ‘IPC Green Inventory’ (*wipo.int*) (n 85).

⁸⁸ The corresponding patents granted can be accessed through the search function “Patentscope”: World Intellectual Property Organisation, ‘IPC Green Inventory’ (*wipo.int*) <<https://www.wipo.int/classifications/ipc/green-inventory/home>> accessed 28 November 2024; World Intellectual Property Organisation, ‘The Patentscope User’s Guide’ (June 2024) 62 <https://patentscope.wipo.int/search/help/en/users_guide.pdf> accessed 29 November 2024.

⁸⁹ Jörn Block and others, ‘Green patents and green trademarks as indicators of green innovation’ (2025) Vol 54 Issue 1 Article 105138 Research Policy 6 <<https://doi.org/10.1016/j.respol.2024.105138>> accessed 26 November 2024; Marinella Favot and others, ‘Green patents and codes: How different methodologies lead to different results’ (2023) 18 Article 200132 Resources, Conversation & Recycling Advances 2f. <<https://doi.org/10.1016/j.rcradv.2023.200132>> accessed 29 November 2024

⁹⁰ cf World Intellectual Property Organisation, ‘IPC Green Inventory’ (*wipo.int*) (n 85).

⁹¹ cf also for an overview: Li Xiangning, ‘Green Technology and Patents: in the European Context’ (Master Thesis European Business Law, Lund University 2020) 22f.

greenhouse gases, transport and waste management, as well as technologies that allow adaptation to negative effects of climate change.⁹² The Y02S scheme thus focuses on both “clean” technology classes, but also considers beneficial effects of technology on the environment.⁹³ It adds “Y04” for applications relating to smart grid technologies.⁹⁴ The tagging scheme consists of multiple sub-groups (Y02A-Y02W) and further more specific technology tags, which narrow down the scope of the CCMT.⁹⁵ The tagging is not performed by the EPO classifiers, but by an algorithm provided and updated by an expert task force.⁹⁶ The application of the algorithm is periodically re-run, while the EPO also updates the Y02/Y04S list several times a year.⁹⁷ One of the objectives of the CPC Y-section is, inter alia, to cover technologies that span over several sections within the IPC classification and thus the Y02/Y04S tagging algorithm also considers IPC codes.⁹⁸ However, the Y02/Y04S tagging cannot be applied to the IPC codes themselves and, as far as the concordance sheet is concerned, it is not possible to transpose the Y02/Y04S codes back to the IPC.⁹⁹ The Y02 section of the Y02/Y04S scheme therefore provides the EPO with a periodic automated algorithm tool for identifying patents in relation to CCMTs and thus Green Patents.¹⁰⁰ Nevertheless, the scheme is limited to the CPC classification.

⁹² Favot (n 89) 4; Javier Hurtado-Albir and others, European Patent Office, ‘Finding sustainable technologies in patents’ (2016) <https://link.epo.org/web/finding_sustainable_technologies_in_patents_2016_en.pdf> accessed 29 November 2024; United State Patent and Trademark Office, ‘Classification Resources – Cooperative Patent Classification’ (August 2024) Y02 – notes <<https://www.uspto.gov/web/patents/classification/cpc/html/cpc-Y.html>> accessed 30 November 2024.

⁹³ United State Patent and Trademark Office, ‘Classification Resources – Cooperative Patent Classification’ (August 2024) <<https://www.uspto.gov/web/patents/classification/cpc/html/cpc-Y.html>> accessed 13 January 2025.

⁹⁴ *ibid.*

⁹⁵ Favot (n 89) 4; Stefano Angelucci, F. Javier Hurtado-Albir and Alessia Volpe, ‘Supporting global initiatives on climate change: The EPO’s “Y02-Y04S” tagging scheme’ (2018) 54 World Patent Information S85, S85f. <<https://doi.org/10.1016/j.wpi.2017.04.006>> accessed 29 November 2024.

⁹⁶ *ibid.*; Cooperative Patent Classification, ‘Guide to the CPC (Cooperative Patent Classification)’ (February 2017) 4, 6ff. <<https://link.epo.org/cpc/Guide+to+the+CPC.pdf>> accessed 30 November 2024.

⁹⁷ *ibid.*

⁹⁸ European Patent Office, ‘Updates on Y02 and Y04S’ (*epo.org*) <<https://www.epo.org/en/news-events/in-focus/classification/classification/updatesYO2andY04S>> accessed 30 November 2024; United State Patent and Trademark Office, ‘Classification Resources – Cooperative Patent Classification’ (n93).

⁹⁹ Favot (n 89) 5 & Fig. 6; Cooperative Patent Classification, ‘CPC to IPC Concordance’ (August 2024) <<https://www.cooperativepatentclassification.org/cpcConcordances>> accessed 30 November 2024.

¹⁰⁰ The EU Commission’s Joint Research Centre (JRC) also considered the Y02 tagging category as a qualifier for identifying Green Patents in one of its papers: Udichibarna Bose, Wildmer Daniel Gregori and Maria Martinez Cillero, ‘Does Green Transition promote Green Innovation and Technological Acquisitions?’ (2023) 4 JRC Working Papers in Economics and Finance 4/2023, 14 <<https://publications.jrc.ec.europa.eu/repository/handle/JRC132977>> accessed 30 November 2024; Favot (n 89) 4; The JCR relied in another technical report on the qualification of the OECD ENV-Tech scheme to identify green patents: Michela Bello and others, ‘The geography of EU green and digital inventions and their knowledge sources’ (Publications Office of the European Union, 28 June 2023) 4 <<https://publications.jrc.ec.europa.eu/repository/handle/JRC133565>> accessed 30 November 2024.

3. Shortcomings and possible improvements of the EPO's Y02/Y04S scheme

However, the EPO's Y02/Y04S scheme as a tool for identifying Green Patents may pose shortcomings that may require improvements. First off, separate classification systems such as the WIPO Green Inventory and the EPO's Y02/Y04S have intersections when classifying the same sustainable technologies, but also leave room for gaps and divergent classification.¹⁰¹ As the EPO only relies on its own Y02/Y04S scheme – which is only applied on CPC codes and not directly applicable on IPC codes –, this may result in Green Patents not being classified as such or being classified in a divergent way compared to the other schemes.¹⁰² In order to mitigate this risk of non-identification of green technology or a divergent classification between the schemes, the EPO could integrate a mirrored version of the WIPO Green Inventory directly into its classification system and therefore ensure an additional green classification of IPC codes.¹⁰³ For a practical realisation, the EPO could include an automatic algorithmic verification after each IPC classification, on whether the code is already related to a code included in the WIPO/Green inventory. In a next step, the EPO could then tag the IPC code as a Green Patent and include it in its inventory. However, it is important to note, that the Y02 classification would still be applied and therefore a patent application can receive its Green tagging status either alternatively or cumulatively with respect to the complementing Green tagging schemes. As another complementary measure and in order to guarantee an even broader coverage of green technologies,¹⁰⁴ the EPO could also consider the integration of the OECD ENV-Tech (environmental related technologies) classification scheme. The OECD ENV-Tech scheme enables classification of both IPC and CPC codes into broad categories of environmental technology categories with around 80 different technology fields.¹⁰⁵

¹⁰¹ cf Favot (n 89) 7.

¹⁰² *ibid*; Fig. 1; cf Anne Rainville, Irma Dikker and Magnus Buggenhagen, 'Tracking innovation via green patent classification systems: Are we truly capturing circular economy progress?' (2024) *Journal of Cleaner Production* 1, 4 <<https://doi.org/10.1016/j.jclepro.2024.144385>> accessed 8 December 2024.

¹⁰³ Favot (n 89) 7.

¹⁰⁴ cf Favot (n 89) 3, 7, Fig. 1.

¹⁰⁵ cf Favot (n 89) 3, 7. See in detail: Ivan Haščič and Mauro Migotto, 'Measuring environmental innovation using patent data' (2015) 89 *OECD Environment Working Papers* 1, 18ff. <<https://doi.org/10.1787/19970900>> accessed 8 December 2024; OECD Environment Directorate, 'Patent search strategies for the identification of selected environment-related technologies (ENV-TECH), climate change adaptation technologies, and similar technologies relevant for the ocean economy' (2022) <<https://stats.oecd.org/wbos/fileview2.aspx?IDFile=c5c477c0-d300-42fe-af1f-d4a450c79a39>> accessed 8 December 2024; Bernardo Caldarola and others, 'Economic complexity and the sustainability transition: A review of data, methods, and literature' (2024) 1 *JRC Working Papers on Corporate R&D and Innovation (CoRDI)* 1, 8ff. <<https://publications.jrc.ec.europa.eu/repository/handle/JRC137954>> accessed 8 December 2024.

Furthermore it is important to note, that the EPO allows – in its current practice – a preclassification according to the IPC standard and the CPC standard, as combined or alternatively.¹⁰⁶ This creates the risk that, if only the IPC classification standard is applied in the preclassification, no green classification scheme is applied yet under the current regime.¹⁰⁷ Instead a green patent may only be identified as such by the Y02/Y04S scheme algorithm at a later stage in the application process, e.g. after the main classification, which includes both the IPC and CPC as obligatory classification schemes.¹⁰⁸ This could hinder a potential preferential treatment and promotion of Green Patents at an early stage of the application procedure. On the one hand, this problem could be avoided if the EPO were also to establish a green classification framework for IPC codes, as already suggested above. In addition or as an alternative, the EPO could change its preclassification practice to always require a classification within the CPC scheme – which can be transposed to the IPC codes afterwards anyways – and qualify the CPC code for the periodical examination by the Y02/Y04S scheme already after the preclassification.¹⁰⁹ However, as the preclassification is only a broad classification, the early application of the Y02/Y04S may not be as conclusive in terms of the precise qualification of a Green Patent. The green classification should thus be verified once again, by applying the Y02/Y04S scheme another time after the main classification of the IPC and CPC codes.

Finally, in order to increase the probability of identifying Green Patents at the earliest possible stage of the patent application, the EPO could also consider introducing an option for the applicant to make a specific request for a green patent application. This would create a rebuttable presumption of the existence of a green patent technology, which could treat the application as a green patent application from the beginning. Nevertheless, the presumption could then be verified under application of the different green classification standards during the ongoing application process.

¹⁰⁶ European Patent Office, *Guidelines for Examination in the European Patent Office* (EPO March 2024) part B chapter V <<https://www.epo.org/en/legal/guidelines-epc>> accessed 9 December 2024.

¹⁰⁷ *ibid.*

¹⁰⁸ *cf ibid.*

¹⁰⁹ This would require a change of the EPO Guidelines regarding the Preclassification in: European Patent Office, *Guidelines for Examination in the European Patent Office* (EPO March 2024) part B chapter V no 2 <<https://www.epo.org/en/legal/guidelines-epc>> accessed 26 November 2024.

4. Interim result

In conclusion, the use of classification schemes, which methodically categorise patent applications into certain pre-defined categories and tag them with a patent code, serves as an effective tool for measuring and identifying green technology and patents.¹¹⁰ The EPO already utilises a reliable classification scheme, the Y02/Y04S scheme¹¹¹ and is thus capable of identifying and classifying green patent. Following up, the UPC and EU can adopt these classifications when dealing with the patent in litigation or post-grant issues, in order to ensure harmonised processing of the same patent. However, in order to further improve the identification and coverage of green technologies at the earliest possible stage of the application procedure and to work towards a harmonisation of the different standards, there is still room for improvement of the EPO's Green classification scheme and practice.¹¹² This leads to four main findings:

1. The combination and integration of other green classification systems such as the WIPO Green Inventory or the OECD ENV-Tech scheme into the existing Y02/Y04S scheme could broaden the scope of green technologies identified and facilitate a harmonised qualification of green technologies through the different standards.¹¹³
2. By making the CPC preclassification obligatory alongside the IPC classification in the EPO application process, the EPO would be able to apply its Y02/Y04S scheme in a preliminary broad review in order to identify green technologies as early as possible in the procedure.
3. The EPO could further integrate the option for the applicant to claim a “green patent” in the patent application. This could create a rebuttable presumption and an indication of a green classification even before the broad preclassification, which could then be verified via an automatically triggered application of the green classification systems.
4. However, the EPO must also ensure that the scope of patents classified as green is not too broad and could therefore allow the exploitation and “green-washing”.¹¹⁴ This risk can however be mitigated by establishing

¹¹⁰ cf Favot (n 89) 6.

¹¹¹ cf Angelucci, Hurtado-Albir and Volpe (n 95) 91.

¹¹² *ibid.*

¹¹³ cf Favot (n 89) 7; A combination of the Y02/Y04S and the ENV-Tech scheme was also used to identify green innovation capabilities through green patents, in: cf Andrea Fabrizi, Cristiana Fiorelli and Valentina Meliciani, ‘The Role of Green Networks for Environmental Innovation in European Regions’ (2024) LUISS Institute for European Analysis and Policy Working Paper 14/2024, p. 1, 9ff. <<https://doi.org/10.21203/rs.3.rs-4841609/v1>> accessed 9 December 2024.

¹¹⁴ cf for the identification of the risk described in relation to the sole application of the OECD scheme: Fabrizio Fusillo, ‘Green Technologies and diversity in the knowledge search and output phases: Evidence from European Patents’ (2023) 52 Research policy Article 104727, p. 1, 13 <<https://doi.org/10.1016/j.respol.2023.104727>> accessed 9 December 2024.

clear and strong classification categories, such as through the abovementioned standards in a combined approach.¹¹⁵

II. The impact of Green Patents on a sustainable development

Before evaluating the potential impacts of Green Patents on a sustainable development, it is important to note, that the concept of patent protection as an intellectual property right and as a legal follow-on of innovation is closely related to the green technology and innovation it protects, but also needs to be distinguished from it.¹¹⁶ Green innovation and its latter application promote a sustainable development through the transformation of the industry and can create multiple beneficial effects on the environment like e.g. the reduction of carbon emissions, energy savings and the use of green energy sources.¹¹⁷ With respect to a legal protection of such technologies, patents have in general the effect of granting a legal reward for the inventiveness of a technology.¹¹⁸ The grant of patent creates a balanced “social contract” through the grant of an exclusionary right in exchange for the disclosure of the technology to society.¹¹⁹ As a result, the exclusionary scope of the right creates incentives for research and development of, and investment in, new technologies.¹²⁰ On the other hand, the disclosure of the patent technology to the public can be the basis for further public research in the field of technology, and can promote invention by others (who would then again benefit from an

¹¹⁵ cf *ibid.*

¹¹⁶ Highlighting the complex relationship between patent protection and the protected technology: cf Rafal Sikorski and Żaneta Zemła-Pacud, 'Introduction', in Rafal Sikorski and Zaneta Pacud (eds), *Patents as an Incentive for Innovation* (2021 Kluwer Law International) 1, 1; cf Na Wang and others, 'Can green patents reduce carbon emission intensity?—An empirical analysis based on China's experience' (2022) 10 *Frontiers in Environmental Science* 1, 2 <<https://doi.org/10.3389/fenvs.2022.1084977>> accessed 10 December 2024.

¹¹⁷ With further references and also the highlighting economic and competitive benefits for the companies establishing green innovation: Pablo Cisneros Chavira and others, 'Defining green innovation, its impact, and cycle – A literature analysis' (2023) 17 *Cleaner Engineering and Technology* Art. 100693, 1, 3f., Table 2 <<https://doi.org/10.1016/j.clet.2023.100693>> accessed 10 December 2024; Amir Rahmani, 'Green innovation for a greener future: A meta-analysis of the impact on environmental performance' (2024) 460 *Journal of Cleaner Production* Article 142547, 1 <<https://doi.org/10.1016/j.jclepro.2024.142547>> accessed 10 December 2024; Abdullah Emre Caglar and others, 'Assessing the role of green investments and green innovation in ecological sustainability: From a climate action perspective on European countries' (2024) 928 *Science of the Total Environment* Article 172527, 1, 9 <<https://doi.org/10.1016/j.scitotenv.2024.172527>> accessed 10 December 2024.

¹¹⁸ *ibid*; European Patent Office, 'What to expect' (*epo.org*) <<https://www.epo.org/en/new-to-patents/what-to-expect>> accessed 10 December 2024; Geertrui Van Overwalle, 'Fair use – a workable concept in European patent law' (2014), in Reto M. Hilty, Kung-Chung Liu (eds), *Compulsory Licensing* (2014 Springer) 421, 424f.

¹¹⁹ *ibid.*

¹²⁰ Van Overwalle (n 118) 424f; cf in more detail and with respect to economic effects: Li Xiangning, 'Green Technology and Patents: in the European Context' (Master Thesis European Business Law, Lund University 2020) 17-21; Because the reward – the grant of the patent right – occurs after the innovation was created, it can be considered an ex-post incentive: Susy Frankel, 'Chapter 1: TRIPS and Post-TRIPS Trade Agreements and Their Impact on Innovation' in Rafal Sikorski and Zaneta Pacud (eds), *Patents as an Incentive for Innovation* (Kluwer Law 2021) 9, 18; Anne Rainville, Irma Dikker and Magnus Buggenhagen, 'Tracking innovation via green patent classification systems: Are we truly capturing circular economy progress?' (2024) *Journal of Cleaner Production* 1, 6f. <<https://doi.org/10.1016/j.jclepro.2024.144385>> accessed 8 December 2024.

exclusionary right in a new application).¹²¹ Notably, this process thus creates additional incentives for innovation.¹²²

In conclusion, patent protection promotes the controlled and exclusionary commercialisation of the patented technologies and their diffusion in the market.¹²³ However, the intention behind a patent application is usually also an expectation of a return on an investment, which reduces the incentive effect in less profitable areas of technology, e.g. basis research.¹²⁴ Therefore, in the case of Green Patents, – in particular in areas which are open for commercialisation – patents can provide incentives for research and development of, and investment in, the respective covered green technology. Green Patents are also already widely used as an indicator to measure environmental innovation and a green transition, underlining the importance of Green Patents for a sustainable development.¹²⁵

III. Green Patent applications in the international and European landscape

When evaluating statistics on green patent applications, many different factors can be analysed, e.g. the outward patenting through the geographical origin of the inventor, an inward perspective by looking at the active international patent families (IPF) and / or all active patent families (including also single domestic applications) filed in a region.¹²⁶ The results may also vary depending on the classification scheme for Green Patents used in relation to the respective statistics. Therefore, in order to highlight the general dynamics, the evaluation in this chapter is limited to exemplary comparisons.

¹²¹ Van Overwalle (n 118) 424f; cf Chryssoula Pentheroudakis, ‘Innovation in the European Digital Single Market: The Role of Patents’ in Nikolaus Thumm (ed) *JRC Science and Policy Report* (Joint Research Centre 2015) 5f.

¹²² *ibid.*

¹²³ Jörg Hoffmann, ‘The Role of Patent and Competition Law for Setting the Right Innovation Incentives for Europe’s Green Transition’ in Florentin Thouvenin and others (eds), *Kreation Innovation Märkte – Creation Innovation Markets* (Springer 2024) 578f.

¹²⁴ *ibid.*

¹²⁵ Andrea Fabrizia, Giulio Guarinib and Valentina Meliciani, ‘Green patents, regulatory policies and research network policies’ (2018) 47 Issue 6 Research Policy 1081, 1087 <<https://doi.org/10.1016/j.respol.2018.03.005>> accessed 10 December 2024; Alejandro Lavopa and Maria de las Mercedes Menéndez, ‘Who is at the forefront of the green technology frontier? Again, it’s the manufacturing sector’ (2023) Issue 6 United Nations Industrial Development Organization Policy Brief Series 1, 3 <<https://policycommons.net/artifacts/5043347/issue-no/5808788/>> accessed 10 December 2024; Hoffmann (n 123) 578; Rainville, Dikker and Buggenhagen (n 120) 7.

¹²⁶ cf WIPO, ‘Key findings, The geographical distribution of sustainable innovation and the patent owners driving it’ (*wipo.int*) <<https://www.wipo.int/en/web/patent-analytics/key-findings-the-geographical-distribution-of-sustainable-innovation>> accessed 11 December 2024; cf Project Group for Statistical Analysis of Green and Low-Carbon Technology Patents, ‘Report on Statistical Analysis of Green and Low-carbon Technology Patents Worldwide’ (July 2024) 14f., Figure 2-7 <https://english.cnipa.gov.cn/art/2024/8/6/art_3262_194103.html> accessed 11 December 2024; In regards to the different concepts of international patent families and transnational patents: Ulrich Schmoch and Birgit Gehrke, ‘China’s technological performance as reflected in patents’ (2021) 127 Scientometrics 299, 300ff. <<https://doi.org/10.1007/s11192-021-04193-6>> accessed 15 December 2024.

Since the beginning of the 21st century, patent applications and active patent families related to sustainable technologies have shown a globally general rising trend at the respective patent offices, in parallel with a general increase in patent applications.¹²⁷ This has led to a multiplication of the total number of related international green patent families and further to an increase of the share percentage of sustainable patent technologies in relation to the total number of patent families.¹²⁸ The general trend of the green technology growth was also evident in Europe, as measured by the number of green patent applications, which increased sharply from the 2000 onwards, with a reduced acceleration and short decline around the European debt crisis in 2011.¹²⁹

To return to Ursula van der Leyen's speech and her emphasis on EU countries being world leaders in Hydrogen patents, the EU was and is indeed the leading territory for hydrogen patents, measured by the number of international patent families originating from EU inventors and applicants.¹³⁰ In terms of the numbers and share of transnational patents on green technologies filed at the EPO as the competent patent office, compared to the number and share of Green Patents filed at other patent offices, the European Union was even the market leader from 2008 up to 2020, closely followed by the US.¹³¹ Europe in general also has a

¹²⁷ The green patent data is based on different classification and identification standards, but which all cover green patents in the broad sense, as emphasised in the introduction: Determination by the UN Sustainable Development Goals and by the geographical area where the active international patent family is originating from: cf World Intellectual Property Organisation, 'Mapping Innovations Patents and the Sustainable Development Goals' (2024) 10, 22f. Figure 2 & 11 <<https://www.wipo.int/publications/en/details.jsp?id=4716>> accessed 11 December 2024; Global amount of environmental patents measured via the CPC classification: cf Mahdi Ghodsi and Zahra Mousavi, 'Patents as green technology barometers: trends and disparities' (*wiiw The Vienna Institute for International Economic Studies*, 27 November 2023) Figure 1 <<https://wiiw.ac.at/patents-as-green-technology-barometers-trends-and-disparities-n-615.html>> accessed 11 December 2024; Based on the Y02 scheme: cf Lavopa and de las Mercedes Menéndez (n 125) Figure 1; OECD ENV-Tech qualification: cf Anelia Stoikova, 'Green patents data analysis and trends review, 2005-2020' (2024) Sofia University "St. Koment Ohridski" Faculty of Economics and Business Administration Figure 1 <<http://dx.doi.org/10.13140/RG.2.2.13783.89764>> accessed 11 December 2024. Under application of the WIPO Green Inventory and measuring via PCT applications and emphasising a slow decline and period of deceleration around 2012 onwards: Lorena Rivera León and others, 'Measuring innovation in energy technologies: green patents as captured by WIPO's IPC green inventory' (2018) 44 Economic Research Working Paper 1, 6f., Figure 1 and 2 <<https://www.wipo.int/publications/en/details.jsp?id=4351>> accessed 11 December 2024.

¹²⁸ cf WIPO, 'Mapping Innovations Patents and the Sustainable Development Goals' (2024) (n 127) p. 22f. Figure 11; However with the rise of green patent application the percentage of the respective patent applications denied also grew: cf Ghodsi M and Mousavi Z (n 127) Figure 1.

¹²⁹ Under application of the OECD ENV-Tech standard: Michela Bello and others, 'The geography of EU green and digital inventions and their knowledge sources' (Publications Office of the European Union, 28 June 2023) 4f., Figure 1 <<https://publications.jrc.ec.europa.eu/repository/handle/JRC133565>> accessed 11 December 2024.

¹³⁰ International Energy Agency, 'Hydrogen patents for a clean energy future' (2023) IEA Report 1, 27ff. Fig. 2.1 <<https://www.iea.org/reports/hydrogen-patents-for-a-clean-energy-future>> accessed 11 December 2024.

¹³¹ cf Commission Staff Working Document, 'First annual report on key findings from the European Monitor of Industrial Ecosystems (EMI)' (February 2024) SWD/2024/77 final, p. 20ff. Figure 11; cf Communication from the Commission to the European Parliament, the Council, the European Economic and Social Commit-

strong position in the technological field of e.g. offshore wind energy,¹³² and more generally in relation to the amount of active international green patent families and the shares within all patent families.¹³³ However, while Japan is not far behind in terms of Hydrogen technology patents and other countries such as China and South Korea are also picking up speed in the growth of hydrogen related patents, the EU and Europe are also not the patent market leaders in other green technology sectors, e.g. in the overall energy sector.¹³⁴ Europe also falls behind countries such as Japan, the US and Israel in terms of the number of Green Patents filed in Europe per capita.¹³⁵ Moreover, China e.g. has a significantly higher number of published green patent applications in relation to the country of origin overall.¹³⁶

In conclusion, it depends on the exact data evaluated,¹³⁷ whether Europe (or the EU) can really be considered as the world leader in Green Patents.¹³⁸ Henceforth, while Europe has established a solid position in terms of Green Patents in general – taking into account the reviewed reports – there is still room for growth and improvement of the overall green patent performance in order to maintain and further improve its position. This applies in particular to responding to the patenting growth in other countries, especially with respect to China,¹³⁹ and to re-accelerate the own growth process again.

tee and the Committee of the Regions, ‘The 2024 Annual Single Market and Competitiveness Report’ (February 2024) COM(2024) 77 final, p. 12; See also in relation to green patent numbers at the patent offices and measured by green patents as qualified by the OECD standard: cf European Investment Bank, *EIB Investment Report 2023/2024* (European Investment Bank, 2024) 148ff., Figure 5 & 6; Evaluating transnational patents: cf Schmoch and Gehrke (n 126) 300ff; Share of PCT patent applications in Climate & Environment: cf European Commission: Directorate-General for Research and Innovation, *Science, research and innovation performance of the EU, 2020 – A fair, green and digital Europe* (Publications Office, 2020) 424 Figure 6.3-7.

¹³² Measured by the share of international patent families: European Patent Office, ‘Offshore wind energy’ (2023) EPO Patent insight report 1, 34, Figure 3.2. <<https://www.epo.org/en/news-events/news/epo-publishes-new-patent-insight-report-offshore-wind-energy>> accessed 11 December 2024.

¹³³ cf World Intellectual Property Organisation, ‘Mapping Innovations Patents and the Sustainable Development Goals’ (2024) (n 127) 22f. Figure 11.

¹³⁴ *ibid.*, cf footnote (n 130), Under usage of the Y02/Y04S covering the time span of 2000-2016 and evaluating the inventors country of residence: cf Carine Swartenbroekx, ‘Technological innovation and green transition : where does Belgium stand ?’ (June 2021) NBB Economic Review 1, 8, Chart 3 <<https://www.nbb.be/en/articles/technological-innovation-and-green-transition-where-does-belgium-stand-0>> accessed 11 December 2024; Indicating a stronger share of the US in relation to transnational patents in energy-saving technologies: Commission Staff Working Document, ‘First annual report on key findings from the European Monitor of Industrial Ecosystems (EMI)’ (February 2024) SWD/2024/77 final, p. 21.

¹³⁵ Under application of the Y02Y04S-Scheme: cf Philippe Aghion, ‘Financial Markets and Green Innovation’ (2022) No. 2022/16 ECB Working Paper 1, 16 Figure 1 <<http://dx.doi.org/10.2139/ssrn.4590501>> accessed 11 December 2024; Green patents determined via the Chinese CNIPA Green Patent Classification Scheme: Project Group for Statistical Analysis of Green and Low-Carbon Technology Patents, ‘Report on Statistical Analysis of Green and Low-carbon Technology Patents Worldwide’ (July 2024) 2, 15f., Figure 2-8 <https://english.cnipa.gov.cn/art/2024/8/6/art_3262_194103.html> accessed 11 December 2024.

¹³⁶ *ibid.*

¹³⁷ e.g. the number/share of green patent applications at the EPO or the number/share of active international green patent families or the green patent filed per capita.

¹³⁸ cf Schmoch and Gehrke (n 126) 300ff.

¹³⁹ cf footnotes (n 130 & 131).

D. Approaching a European Green Patent Strategy

After having identified the potential to further promote Green Patents in Europe, this chapter will examine the existence of specific Green Patent strategies of the EU, the EPOrg and the UPC. In the event of the non-existence or shortcomings of such approaches, this chapter will review in a second step specific procedural and material legal incentives that may be introduced by the aforementioned actors. For this purpose, this chapter will also consider international approaches for comparison and examine them in terms of their efficiency and their potential for integration into the European system.

I. (Non-)existence of a Green Patent Strategy in Europe

It is questionable whether the EU, the EPOrg and the UPC have adopted specific or common Green Patent strategies. In order to focus on the existence of a common Green Patent Strategy, this part will not focus individual national strategies and policies and will thus focus only on strategies with an immediate relation to patents, excluding other means of promoting innovation in general, e.g. the funding of R & D.¹⁴⁰

1. Establishing Green patent strategies through international agreements?

First, as already briefly mentioned in the introduction, the EU and all European countries have signed the Paris Agreement.¹⁴¹ The Paris Agreement is a binding legal agreement that consists out of climate goals and partially binding obligations to achieve them.¹⁴² As a result, the countries have the procedural obligation to establish Nationally Determined Contributions (NDCs) and review them under the Paris Agreement.¹⁴³ However, the NDCs themselves are not binding.¹⁴⁴ Notably, the Agreement also does not set out any specific measures

¹⁴⁰ e.g. through programmes like the EU's Horizon Europe or the EU's Innovation Fund: See footnote 11 for details on Horizon Europe; With an overview on the legal framework for the EU Innovation fund: Directorate-General for Climate Action, 'Legal Framework' (*climate.ec.europa.eu*) <https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/innovation-fund/legal-framework_en> accessed 20 December 2024; Directorate-General for Climate Action, 'What is the Innovation Fund' (*climate.ec.europa.eu*) <https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/innovation-fund/what-innovation-fund_en> accessed 20 December 2024.

¹⁴¹ Paris Agreement [2016] OJ L 282/4; Council Decision (EU) 2016/1841 on the conclusion, on behalf of the European Union, of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change [2016] OJ L282/1; cf United Nations Treaty Collection (*treaties.un.org*, Status 19 December 2024) <https://treaties.un.org/pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-7-d&chapter=27&clang=_en> accessed 19 December 2024; United Nations Framework Convention on Climate Change (UNFCCC) (1992) United Nations FCCC/INFORMAL/84 GE.05-62220 (E) 200705.

¹⁴² *ibid*; Daniel Bodansky, 'The Legal Character of the Paris Agreement' (2016) 25 (2) Review of European Community & international environmental law 142, 144ff. <<https://doi.org/10.1111/reel.12154>> accessed 19 December 2024.

¹⁴³ Maria Jernnäs, 'Governing through the nationally determined contribution (NDC): five functions to steer states' climate conduct' (2024) 33 (3) Environmental politics 530, 533f. <<https://doi.org/10.1080/09644016.2023.2192146>> accessed 19 December 2024.

¹⁴⁴ *ibid*.

in relation to intellectual property itself and instead facilitates a broad economic, social and technological transformation to reach the climate goals.¹⁴⁵ With regard to intellectual property, the Agreement only highlights the importance of promoting innovation and maintaining an effective intellectual property protection system.¹⁴⁶ This leaves the contracting states to establish specific NDCs.¹⁴⁷ The Paris Agreement also includes the UNFCCC Technology Mechanism, consisting of the Technology Executive Committee and the Climate Technology Centre and Network, which aim to provide guidance through policies, information and technical support as complementary measures to national technology development.¹⁴⁸ However, the Technology Mechanism also does not establish specific proactive legal measures in relation to Green Patent rights.¹⁴⁹ The same applies to the UN Sustainable Development Goals, which all members agreed on, but which are not legally binding and also only create abstract goals instead of specific legislative ventures.¹⁵⁰

2. EU green legislative measures and policies

For the EU, the European Commission established a general Green strategy through the Green Deal, which comprises of firstly the goal to reduce CO₂ emissions and achieve climate neutrality by 2050, and secondly the respective measures to pursue that goal.¹⁵¹ These emission borders were ratified in the legally binding European Climate Law and are supposed to

¹⁴⁵ cf Lavanya Rajamani, 'Interpreting the Paris Agreement in its Normative Environment' (2024) 77 Issue 1 Current Legal Problems 167, 169-180 <<https://doi.org/10.1093/clp/cuae011>> accessed 19 December 2024; cf Paris Agreement (n 141) art. 4.2; cf United Nations Climate Change, 'Key aspects of the Paris Agreement' (*unfccc.int*) <<https://unfccc.int/most-requested/key-aspects-of-the-paris-agreement>> accessed 19 December 2024.

¹⁴⁶ cf Paris Agreement (n 141) art. 10.

¹⁴⁷ cf footnote (n 145).

¹⁴⁸ Paris Agreement (n 141) art. 10; United Nations Framework Convention on Climate Change, 'Technology Mechanism' (2015) <https://unfccc.int/ttclear/misc/_StaticFiles/gnwoerk_static/TEM/0e7cc25f3f9843ccb98399df4d47e219/174ad939936746b6bfad76e30a324e78.pdf> accessed 19 December 2024; UNFCCC Decision 15/CMA.1, Technology framework under Article 10, paragraph 4, of the Paris Agreement FCCC/PA/CMA/2018/3/Add.2 (19 March 201) 4-11; Katherine Owens and Hannah James, 'Embedding technology at the grassroots: Strategies for localising technology transfer under the UNFCCC technology mechanism' (2024) 33 (2) Review of European Community & international environmental law 159, 164ff <<https://doi.org/10.1111/reel.12548>> accessed 19 December 2024.

¹⁴⁹ cf *ibid*.

¹⁵⁰ United Nations Resolution adopted by the General Assembly on 25 September 2015, 'Transforming our world: the 2030 Agenda for Sustainable Development' [2015] A/RES/70/1, p. 14-26; Ilias Bantekas and Katerina Akestoridi, 'Sustainable Development Goals: Their Political and Legal Nature under International Law' in Ilias Bantekas and Francesco Seatzu (eds), *The UN Sustainable Development Goals: A Commentary* (Oxford University Press 2023) 32ff.

¹⁵¹ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions 'The European Green Deal' [2019] COM/2019/640 final; The Commission also introduced a proposal to set intermediate climate goals for 2040 and the new Commission of 2024 will make a legislative proposal to be included in the European Climate Law: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society' [2024] COM/2024/63 final.

be achieved, inter alia, through a comprehensive set of legislative proposals in the “fit for 2055” package, which was launched to support the Green Deal strategy and in order to achieve a 55% reduction in emissions by 2030.¹⁵² The latter package consist of a multitude of legislative proposals, with the key legislative proposals already finalised, including e.g. the revised Renewable Energy Directive, the ReFuelEU Aviation Regulation and the Carbon Border Adjustment Mechanism (CBAM).¹⁵³ However, while the EU Green Deal, the European Climate Law and the “fit for 55” package highlight the importance of innovation and set further binding climate targets for key industries, they did not introduce specific measures in relation to Patent Law.¹⁵⁴ The EU has also launched an Intellectual Property Action Plan in 2020 as part of the general EU’s “new Industrial Strategy”, both aimed at providing further momentum for the realization of the Green Deal.¹⁵⁵ Key elements of the Action Plan in relation to patent law include the reduction of fragmentation, e.g. through the establishment of the Unitary Patent system and an introduction of unitary Supplementary Protection Certificates (SPCs).¹⁵⁶ However, while the measures in generally also aim to promote the green

¹⁵² With a reduction to below 1990s levels: Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (‘European Climate Law’) [2021] OJ L 242/1; General Secretariat of the Council, ‘Fit for 55’ (*consilium.europa.eu*) <<https://www.consilium.europa.eu/en/policies/fit-for-55/>> accessed 19 December 2024; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Empty ‘Fit for 55’: delivering the EU’s 2030 Climate Target on the way to climate neutrality [2021] COM/2021/550 final.

¹⁵³ Directorate-General for Communication, ‘Legal documents on Delivering the European Green Deal’ (*commission.europa.eu*, European Commission, 9 October 2023) <https://commission.europa.eu/publications/legal-documents-delivering-european-green-deal_en> accessed 20 December 2024; General Secretariat of the Council, ‘Fit for 55: Delivering on the proposals’ (*consilium.europa.eu*, European Commission) <https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal/fit-55-delivering-proposals_en> accessed 20 December 2024; Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 [2023] OJ L 2023/2413; Consolidated Text: Regulation (EU) 2023/2405 of the European Parliament and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport (ReFuelEU Aviation) [2023] OJ L 2023/2405; Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism [2023] OJ L 130/52.

¹⁵⁴ cf: Ibid; The European Green Deal (n 151) [2019] COM/2019/640 final; European Climate Law (n 152) [2021] OJ L 242/1, no 11, 18; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Empty ‘Fit for 55’: delivering the EU’s 2030 Climate Target on the way to climate neutrality [2021] COM/2021/550 final, chapter 2.

¹⁵⁵ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Making the most of the EU’s innovative potential, An intellectual property action plan to support the EU’s recovery and resilience [2020] COM/2020/760 final; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A New Industrial Strategy for Europe [2020] COM/2020/102 final.

¹⁵⁶ Ibid; With an overview on the IP Action Plan: Directorate-General for Internal Market, ‘Intellectual property action plan implementation’ (*single-market-economy.ec.europa.eu*, March 2022) <https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/intellectual-property-action-plan-implementation_en> accessed 20 December 2024; Industry, Entrepreneurship and SMEs, Proposals for SPC regulation

transition and innovation by improving the attractiveness of the EU patent system, the Intellectual Property Plan does not include specific incentives for Green Patents.¹⁵⁷ Thus, the EU provides a general strategy for a green transition and improving the intellectual property and patent system, but has not yet established specific strategies to incentivise Green Patents actively.

3. Green strategies of the EPOrg and the UPC and interim result

As discussed before, the EPO, as the executive arm of the EPOrg, has established a green classification scheme and is thus able to identify Green Patents.¹⁵⁸ The EPO has further established a “Clean Energy Platform”, which enables scientists and engineers to easily access patent information on clean energy, further ensuring the dissemination of patent information to encourage further innovation.¹⁵⁹ Additionally, the EPO worked together with the United Nations Environment Programme (UNEP), the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA) to publish joint reports on innovation in climate change mitigation to foster the dissemination of green knowledge.¹⁶⁰ However on the first view, the EPO does not seem to offer specific – e.g. procedural – measures to incen-

adopted by Parliament, but still pending before the Council: Proposal for a Regulation of the European Parliament and of the Council on the unitary supplementary protection certificate for plant protection products [2023] COM/2023/221 final; Proposal for a Regulation of the European Parliament and of the Council on the supplementary protection certificate for plant protection products (recast) [2023] COM/2023/223 final; European Parliamentary Research Service, ‘Unitary supplementary protection certificate for plant protection products’ (April 2024) European Parliament Briefing EU Legislation in Progress <[https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2024\)762281](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2024)762281)> accessed 20 December 2024.

¹⁵⁷ cf Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, An intellectual property action plan to support the EU’s recovery and resilience [2020] COM/2020/760 final; Directorate-General for Internal Market, ‘Intellectual property action plan implementation’ (n 156); cf Directorate-General for Internal Market, ‘Intellectual property: Final step taken to launch the Unitary Patent system’ (*single-market-economy.ec.europa.eu*, February 2023) <https://single-market-economy.ec.europa.eu/news/intellectual-property-final-step-taken-launch-unitary-patent-system-2023-02-20_en> accessed 20 December 2024; Directorate-General for Communication, ‘Commission adopts Action Plan on Intellectual Property to strengthen EU’s economic resilience and recovery’ (*ec.europa.eu*, November 2020) <https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2187> accessed 20 December 2024.

¹⁵⁸ cf chapter C. I.

¹⁵⁹ European Patent Organisation, ‘Clean energy technologies’ (*epo.org*) <<https://www.epo.org/en/searching-for-patents/technology-platforms/clean-energy>> accessed 20 December 2024; Johanna Rahnasto, ‘Exploring the Role of Patent Offices in Climate Change Mitigation’ (2023) 23 Issue 1 Article 3 Chicago-Kent Journal of Intellectual Property 56, 59f. <<https://scholarship.kentlaw.iit.edu/ckjip/vol23/iss1/6>> accessed 20 December 2024.

¹⁶⁰ FPS Economie, ‘The European Green Deal’ (*econmoie.fgov.be*, July 2024) <<https://economie.fgov.be/en/themes/intellectual-property/innovation-and-intellectual/european-green-deal>> accessed 20 December 2024; European Patent Office, ‘EPO and IRENA enhance cooperation on patent information about renewable energy technologies’ (*epo.org*) <<https://www.epo.org/en/news-events/press-centre/press-release/2017/451489>> accessed 20 December 2024; European Patent Office, ‘EPO and IEA team up to shed light on trends in sustainable energy technologies’ (*epo.org*) <<https://www.epo.org/en/news-events/news/epo-and-iea-team-shed-light-trends-sustainable-energy-technologies>> accessed 20 December 2024.

tivise Green Patents, e.g. through a specific fast-track mechanism for Green Patent applications.¹⁶¹ Therefore, the EPO's strategies tend to focus on fostering the dissemination of information in order to promote innovation indirectly and not on specific measures to promote Green Patent applications directly.

As for the UPC, the establishment of the Court is expected to improve the attractiveness and efficiency of the European patent system and thus to indirectly encourage innovation by providing cheaper and centralised enforcement of patent rights.¹⁶² However, it appears that the UPC operates under equal procedural rules for all types of technologies protected in European patents and thus has not established specific incentives for Green Patents.¹⁶³

In conclusion, the EU, the EPOrg and the UPC are generally promoting (green) innovation. In the case of the EU, through legislative measures to improve the patent system and pursue a green transition, or in case of the EPO through the dissemination of information on Green Patents and lastly in the case of the UPC by improving the efficiency of the overall patent enforcement system. However, the parties have not yet established specific measures to incentivise Green Patents and have not yet developed a common approach, besides the general interaction in the establishment of the UPC. Therefore, to return to the introduction, an "EU Green Patent Deal" or a common European Green Patent Strategy involving the respective stakeholders does not exist.

II. Procedural incentives

As the granting authority, patent offices manage the first phases of a patent's life cycle, including the course of the granting procedure, its length and costs, and determine whether the application meets the material requirements for grant.¹⁶⁴ They thus play a crucial role in the pre-granting process of the patent and in the granting process itself. The UPC, on the other hand, deals with post-grant enforcement and invalidity actions and administers the respective procedural law.¹⁶⁵ Thus, the EPO may introduce procedural measures to promote Green Patents in the pre-grant patenting procedure and the UPC may promote Green Patents through a favourable treatment in post-grant enforcement actions.

¹⁶¹ Rahnasto (n 159) 60; See more detailed in chapter D. II. 1.

¹⁶² Directorate-General for Communication, 'New Unitary Patent system: pioneering a new era of patent protection and enforcement in the EU' (*ec.europa.eu*, June 2023) <https://ec.europa.eu/commis-sion/presscorner/detail/en/ip_23_3004> accessed 20 December 2024.

¹⁶³ cf Agreement on a Unified Patent Court; Rules of Procedure of the Unified Patent Court as adopted by decision of the Administrative Committee on 8 July 2022 entry into force: 1 September 2022 <<https://www.unified-patent-court.org/en/court/legal-documents?page=0>> accessed 20 December 2024.

¹⁶⁴ See also chapter B. I.; cf Rahnasto (n 159) 69f.

¹⁶⁵ See chapter B. II.; Agreement on a Unified Patent Court, art. 2, art. 31.

1. A Fast-track programme for Green Patent applications at the EPO

Patent applications at the EPO take on average three to five years from the date of filing to the date of grant at the EPO.¹⁶⁶ This can raise the question, whether the EPO already offers general fast-track programs that could also specifically promote Green Patents. In the case that these fast-track programs do not directly promote Green Patents, the establishment of a fast-tracking programme specifically for Green Patent applications may pose a valid incentive for Green Patents at the EPO.

a. Benefits and disadvantages of fast-tracking patents

In terms of advantages and disadvantages of a faster European patent grant,¹⁶⁷ it first must be considered that the general term of patent protection is 20 years and starts in the case of a grant from the day of filing, not the day of grant.¹⁶⁸ However, the rights conferred by a patent apply only fully after the publication of the grant.¹⁶⁹ Before that, a preliminary interim protection is enacted from the day of the publication of the application, but it is not of the same extent as the full protection.¹⁷⁰ Therefore, the longer the patent grant procedure takes, the more of the 20-year term is used up already without having full-secured patent protection.¹⁷¹ Fast track programs can therefore lengthen the time in which the patent is granted under full protection. Furthermore, if the time between the first filing and the first publication of the patent application by the EPO is also shortened, the applicant can enjoy the abovementioned preliminary protection earlier. Especially in cases where it is likely that the respective patent will be infringed, the applicants can have an interest in receiving patent protection as fast as possible.¹⁷² The same applies in cases where receiving financial aid is bound to the patent grant.¹⁷³ An accelerated patent grant procedure can also prepone the possibility of commercialisation of the patented technology and can create “first mover” advantages for the

¹⁶⁶ EPO, ‘How long does the grant procedure take?’ (*epo.org*) <<https://www.epo.org/en/service-support/faq/applying-patent/procedure/how-long-does-grant-procedure-take>> accessed 21 December 2024.

¹⁶⁷ cf for a separate overview of advantages and disadvantages also under consideration of patent-backlogs: Li Xiangning, ‘Green Technology and Patents: in the European Context’ (Master Thesis European Business Law, Lund University 2020) 30-38.

¹⁶⁸ European Patent Convention, art. 63.

¹⁶⁹ *ibid*, art. 64.

¹⁷⁰ *ibid*, art. 67.; cf Reto M. Hilty and Pedro Henrique D. Batista, ‘Potential and Limits of Patent Law to Address Climate Change’ (2023) 72 Issue 9 GRUR International 821, 828 <<https://doi.org/10.1093/grur-int/ikad066>> accessed 1 January 2025.

¹⁷¹ cf European Patent Office, ‘Speeding up the patent granting process’ (*epo.org*) <<https://www.epo.org/en/searching-for-patents/helpful-resources/patent-knowledge-news/speeding-patent-granting-process>> accessed 21 December 2024.

¹⁷² cf Hilty and Batista (n 170) 829.

¹⁷³ , e.g. for institutes or universities and in general for raising private capital: cf EPO, ‘Speeding up the patent granting process’ (n 171); Rahnasto (n 159) 72; Hilty and Batista (n 170) 829.

holder.¹⁷⁴ It also leads to an earlier dissemination of information on innovation, e.g. through an earlier publication of the patent application or through an earlier availability of the technology on the market.¹⁷⁵

As for disadvantages, it is important to note, that applicants can also have an interest in not accelerating the application process. In cases of certain technologies, it can be a more effective strategy to hold back the patenting of an innovation, to improve the ability of commercialisation.¹⁷⁶ Furthermore, a longer application process gives more time to perfect the claims in order to ensure a patent grant, while still maintaining a priority date.¹⁷⁷ An accelerated patent grant can also lead to higher costs for the applicant at the EPO, because the longer patent term also comes with a longer period in which the holder must pay patent fees.¹⁷⁸ Moreover, an earlier patent publication also discloses the technology earlier to competitors, which can lead to the development of competing technology before the own product can be commercialised.¹⁷⁹ Another aspect to consider is that an accelerated programme strongly depends on the capacity of the patent offices. It requires a prioritisation of the respective patents by the patent examiners, which may have the downside of prolonging the granting procedures of patents not participating in the programme.¹⁸⁰ Further, in cases of high demand to the programme, it may also again lead to capacity issues and a decrease of the speed of the accelerated process.¹⁸¹

However, these disadvantages might be mitigated. Firstly, the programme can be designed as only optionally, thus leaving it open to the applicant to decide on whether they think they would benefit from a shorter or longer procedure.¹⁸² Furthermore, the accelerated programme might also be combined with reduced renewal fees, thus potentially canceling out the risk of bearing higher costs through a fast-track.¹⁸³ In relation to a deceleration of other patents and the danger of breaking the capacity of the fast-track, the patent offices might also introduce

¹⁷⁴ Rahnasto (n 159) 72; cf Hilty and Batista (n 170) 829.

¹⁷⁵ Rahnasto (n 159) 74f.

¹⁷⁶ Rahnasto (n 159) 77; Hilty and Batista (n 170) 829.

¹⁷⁷ *ibid.*

¹⁷⁸ cf Hilty and Batista (n 170) 829; cf Antoine Dechezleprêtre, 'Fast-Tracking 'Green' Patent Applications: An Empirical Analysis' (2013) Issue 37 ICTSD Global Platform on Climate Change, Trade and Sustainable Energy 1, 8 <https://www.researchgate.net/publication/256050795_Fast-Tracking_'Green'_Patent_Applications_An_Empirical_Analysis> accessed 1 January 2025.

¹⁷⁹ Dechezleprêtre (n 178) 8.

¹⁸⁰ cf Dechezleprêtre (n 178) 8.

¹⁸¹ cf Eric L. Lane, 'Building the Global Green Patent Highway: A Proposal for International Harmonization of Green Technology Fast Track Programs' (2012) 27 No. 2 Bekeley Technology Law Journal 1119, 1162 <<https://www.jstor.org/stable/24119483>> accessed 1 January 2025.

¹⁸² Rahnasto (n 159) 77; cf Dechezleprêtre (n 178) 19.

¹⁸³ cf Hilty and Batista (n 170) 829f., 836.

contingents for the fast-track or set certain material requirements to control the amount of parallel requests.¹⁸⁴ In conclusion, the abovementioned benefits of fast-tracking programs of patents prevail and potential disadvantages can be minimised through counter measures and the specific design of the programme.¹⁸⁵

b. Fast-Track programs at the EPO

This subchapter aims to analyse the general fast-track programs at the EPO. These existing legal structures might provide the foundation for a specific Green fast-track program.

aa. PACE

The EPO facilitates its programme for accelerated prosecution of European patent applications ("PACE"-programme), which also includes PCT applications entering the European regional phase.¹⁸⁶ The expedited patent procedure generally intends to ensure a faster receipt of the European search report by the applicant in the search phase and of the first examination report in the examination phase.¹⁸⁷ Applicants can optionally apply for the programme free of charge via a written request, but must limit their request to the respective phase (search or examination) of the procedure and to one patent at a time.¹⁸⁸ Thereby, a request for the examination phase cannot be enacted in the search phase.¹⁸⁹ Notably, the programme is open to all fields of technology and does not set material requirements to grant the access.¹⁹⁰ Nevertheless, the EPO retains the right to limit the access to the programme according to its own

¹⁸⁴ cf Lane (n 181) 1162.

¹⁸⁵ However, these programs must also still ensure that the accelerated granting procedure does not come with a decreased quality in terms of the quality of the examination report. Highlighting the quality of the search report and the speed of delivery of such as independent indicators of patent quality: WIPO, 'Expedited Examination Programs of IP Offices' (*wipo.int*) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>> accessed 1 January 2025.

¹⁸⁶ European Patent Convention, footnote to art. 91, 94; Notice from the European Patent Office dated 30 November 2015 concerning the programme for accelerated prosecution of European patent applications ("PACE") [2015] OJ EPO 2015, A93.

¹⁸⁷ *ibid* p. 1; The acceleration also includes the receipt of the written opinion under Rule 62(1) and 71(1); Implementing Regulations to the European Patent Convention, rule 61, 62, 71.

¹⁸⁸ Notice from the European Patent Office dated 30 November 2015 concerning the programme for accelerated prosecution of European patent applications ("PACE") [2015] OJ EPO 2015, A93, p. 2; European Patent Office, 'Forms' (*epo.org*) <<https://www.epo.org/en/applying/forms>> accessed 2 January 2025; Nina Ferara, Peter de Lange, Andrew Rudge in Kaisa Suominen (ed), *Visser's Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 237; Implementing Regulations to the European Patent Convention, rule 10, 70.

¹⁸⁹ The examination division must become responsible for the application first: cf Implementing Regulations to the European Patent Convention, rule 10(4), 70(2); Nina Ferara, Peter de Lange, Andrew Rudge, in Kaisa Suominen (ed), *Visser's Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 235f.; European Patent Convention, art. 94; Notice from the European Patent Office dated 30 November 2015 concerning the programme for accelerated prosecution of European patent applications ("PACE") [2015] OJ EPO 2015, A93, p. 2.

¹⁹⁰ cf *ibid*; World Intellectual Property Organisation, 'Expedited Examination Programs of IP Offices', national/regional programs European Patent Office (*wipo.int*) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>> accessed 2 January 2025.

merits and thus consider its working capacity and the practicability of the individual acceleration.¹⁹¹ In cases where applicants apply for an acceleration in multiple applications, the EPO can also limit the requests and oblige the applicant to select only certain applications for a participation in PACE.¹⁹²

In the event that the EPO grants the PACE request, the EPO aims to issue its next procedural action in relation to the examination phase within three month after receiving the latest of the following options: (1) The receipt of the application by the examining division, (2) the response of the applicant under Art. 70a or Art. 161(1) EPC or (3) the PACE request.¹⁹³ However, it is important to note, that the EPO introduced – in relation to the search phase – the scheme “Early Certainty from Search” in 2014.¹⁹⁴ This scheme accelerates the search phase of all applications filed on or after 1 July 2014.¹⁹⁵ The EPO thus already aims to produce a search report for all applications within six months of filing or from the expiry of the amendment period.¹⁹⁶ Consequently, an application for the PACE programme has become practically obsolete in the search phase, although there remains – in theory – a scope of application if e.g. the EPO exceeds the six-month limit.¹⁹⁷ The PACE programme thus focuses on the examination phase, whose average duration was e.g. 24.9 months in 2022, and reduces its duration significantly.¹⁹⁸

Nevertheless, the maximum acceleration might be limited under certain circumstances. In general, while the the examination (and request) can also occur already before the publication of the examination,¹⁹⁹ the EPO generally requires the termination of 18 months, measured from the day of filing or the earliest priority date, until it publishes the application.²⁰⁰ After

¹⁹¹ Notice from the European Patent Office dated 30 November 2015 concerning the programme for accelerated prosecution of European patent applications (“PACE”) [2015] OJ EPO 2015, A93, p. 3.

¹⁹² *ibid* p. 3.

¹⁹³ *ibid* p. 5.

¹⁹⁴ *ibid* p. 3.

¹⁹⁵ *ibid* p. 3.

¹⁹⁶ *ibid* p. 3; Implementing Regulations to the European Patent Convention, rule 161(2).

¹⁹⁷ cf European Patent Office, *Euro-PCT Guide – PCT procedure at the EPO* (EPO January 2023) 105 <<https://www.epo.org/en/legal/guide-europct>> accessed 2 January 2024; Nina Ferara, Peter de Lange, Andrew Rudge in Kaisa Suominen (ed), *Visser’s Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 237; Also stating that an expedition is still possible for European patent applications filed before 1 July 2014 and claiming priority: cf Notice from the European Patent Office dated 30 November 2015 concerning the programme for accelerated prosecution of European patent applications (“PACE”) [2015] OJ EPO 2015, A93, p. 3.

¹⁹⁸ European Patent Office, ‘Statistics – Examination’ (*epo.org*) <<https://www.epo.org/en/about-us/services-and-activities/quality/statistics/examination>> accessed 8 January 2024.

¹⁹⁹ cf Proving the possibility of the publication of the application at the same time as the publication of the patent specifications after the grant of a patent, which necessarily requires the success of the examination phase: European Patent Convention, art. 93(2); cf Nina Ferara, Peter de Lange, Andrew Rudge, in Kaisa Suominen (ed), *Visser’s Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 234f.

²⁰⁰ European Patent Convention, art. 93(1)(a), For the option of a request for early publication to earlier enjoy the provisional right protection: art. 93(1)(b).

these 18 months, even when a potential expedited patent examination occurred, the examiner carries out a top-up search for prior rights.²⁰¹ This is necessary to cover the whole state of the art and to consider also potential European patents as prior art, which were filed before the application in question and were published later within the 18-month period.²⁰² In practice, the EPO thus only grants a patent after the top-up search could have been processed.²⁰³ As a result, the EPO grants the patent only after the termination of period of 18 months after filing if a PACE applications is a first filing and does not have a priority date.²⁰⁴ A quicker reception period of a grant at the EPO is thus only available for patent applications on the PACE track that can use a priority right.

bb. Patent Prosecution Highways and further options for acceleration

Another path to accelerate the patent application at the EPO is a participation in the Patent Prosecution Highway programs (PPHs).²⁰⁵ The PPHs consist of bilateral and multilateral agreements with other Intellectual Property Offices.²⁰⁶ It enables an accelerated patent procedure at the EPO for patent applications that have been deemed patentable at a PPH partner office and it further aims for an acceleration through the use and exploitation of other PPH partner office's work results by the EPO.²⁰⁷ The application for the PPH can in general be based on (1) either the latest PCT work product by a PPH partner office acting as the International Search Authority or the International Preliminary Search Authority or (2) on a national work product of one of the PPH partner offices, created in the processing of a national application or the regional phase of a PCT application.²⁰⁸ Consequently, the PPHs programs can only be accessed for international applications and if the patent application has been filed at another PPH partner office previously. First applications at the EPO are thus excluded for

²⁰¹ cf Ferara, Lange, Rudge, in Suominen (n 199) 234f; European Patent Office, *Guidelines for Examination in the European Patent Office* (EPO March 2024) Part C chapter IV-3 no 7.1 <<https://www.epo.org/en/legal/guidelines-epc>> accessed 7 January 2025.

²⁰² *ibid*; European Patent Convention, art. 54(3), 93(1)(a); EPO, *European Patent Guide* (EPO July 2024) chapter 3.3. <<https://www.epo.org/en/legal/guide-epc>> accessed 7 January 2025.

²⁰³ EPO, *Guidelines for Examination in the European Patent Office* (EPO March 2024) (n 201) Part C chapter chapter IV-3 no 7.1; cf Ferara, Lange, Rudge, in Suominen (n 199) 234f.

²⁰⁴ *ibid*.

²⁰⁵ Highlighting the co-existence of PACE and the PPH: European Patent Office, *Euro-PCT Guide – PCT procedure at the EPO* (EPO January 2023) 71 <<https://www.epo.org/en/legal/guide-europct>> accessed 2 January 2024.

²⁰⁶ The EPO has entered into multiple bilateral and multilateral PPH agreements, see for an overview: European Patent Office, 'Patent Prosecution Highway (PPH)' (*epo.org*) <<https://www.epo.org/en/applying/international/patent-prosecution-highway>> accessed 2 January 2025; These agreement follow the same regulatory principles, therefore the IP5 agreement can be used as an exemplary agreement: European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115, p. 1;

²⁰⁷ *ibid*.

²⁰⁸ cf European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115.

an access. With respect to the grant of access to the programs, the PPH-regimes impose not only formal but also material requirements.²⁰⁹ However, PPHs are open for patent applications related to all areas of technology.²¹⁰ In the event that the EPO grants a PPH request, the EPO applies the same acceleration as for the PACE programme in an analogy, as well as the same limitations.²¹¹ Additionally, participation in the PPH also encompasses the reusability of work products from PPH partner offices, which can thus lead to an additional acceleration depending on the usability of the work products for the EPO.²¹²

As further options to expedite the patent applications, the EPO also offers the option to request an early publication under Art. 93 (1) (b) EPC,²¹³ as well as the option to waive certain procedural rights with respect to all applications and in particular with respect to PCT applications.²¹⁴ An effective waiver can reduce the procedural steps taken by the EPO and its examiners and thus expedite the whole application. Nevertheless, waivers of rights do merely “trade” certain procedural rights in exchange for a faster processing and can thus not represent a direct acceleration and prioritisation.

²⁰⁹ cf. in detail: European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products, OJ EPO 2022, A115, p. 3ff; European Patent Office, ‘Forms’ (*epo.org*) <<https://www.epo.org/en/applying/forms>> accessed 2 January 2025; European Patent Office, ‘Patent Prosecution Highway (PPH)’ (*epo.org*) <<https://www.epo.org/en/applying/international/patent-prosecution-highway>> accessed 2 January 2025; Ferara, Lange, Rudge, in Suominen (n 199) p. 239.

²¹⁰ cf European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115.

²¹¹ Including “Early Certainty from Search” and accelerated examination: cf chapter D. II. b. aa; EPO, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115, p. 8; Ferara, Lange, Rudge, in Suominen (n 199) 239.; EPO, ‘Is there a different degree of acceleration between PACE and PPH?’ (*epo.org*) <<https://www.epo.org/en/service-support/faq/applying-patent/patent-prosecution-highway-pph/pph-and-other-acceleration-1>> accessed 2 January 2025.

²¹² Ferara, Lange, Rudge, in Suominen (n 199) 238f; cf EPO, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115, p. 5; However, the EPO examiner also applies a “discretionary approach” with respect to the work products of other offices: cf European Patent Office, ‘What is the difference between the PPH programme and the PACE programme?’ (*epo.org*) <<https://www.epo.org/en/service-support/faq/applying-patent/patent-prosecution-highway-pph/pph-and-other-acceleration-0>> accessed 2 January 2025; Michael Schmid, ‘Optimizing patent applications at the European Patent Office (EPO)’ (*Richardt.eu news*, 5 May 2023) <<https://www.richardt.eu/en/news/detail/optimizing-patent-applications-at-the-european-patent-office-epo/>> accessed 2 December 2025.

²¹³ European Patent Convention, art. 93(1)(b).

²¹⁴ See in full detail: European Patent Office, Notice from the European Patent Office dated 30 November 2015 concerning ways to expedite the European grant procedure [2015] OJ EPO 2015, A94, p. 1; Implementing Regulations to the European Patent Convention, rule 70, 161(1) & (2), 162; Further with respect to waiver in the context of PCT applications: European Patent Office, *Euro-PCT Guide – PCT procedure at the EPO* (EPO January 2023) 105, 115f. <<https://www.epo.org/en/legal/guide-europct>> accessed 3 January 2024; cf Patent Cooperation Treaty, art. 22(3); 23(2), 39(2); 40(2).

cc. Interim result

In conclusion, the EPO provides two general positive acceleration programs:²¹⁵ First the PACE-programme and second the PPHs-programs, which both focus mainly on an acceleration of the examination phase in an analogous manner.²¹⁶ The PPHs programs require an international application under the PCT, but also enable the reutilisation of work products from PPH partner offices, leading to a potential additional acceleration. The EPO introduced both of these options as internal guidelines and the legal acts fall within the respective competence of the EPO to manage the search and examination of patent applications.²¹⁷ Respectively, the fastest path to a patent grant lies in the combination of one of these programs with the declaration of waivers.²¹⁸ In relation to Green Patents, the PPH enables – in theory – to benefit from Green Patent fast-track programs in PPH partner offices indirectly through the reuse of the work products of PPH partner offices, which were already received in an accelerated manner.²¹⁹ However, in general, all acceleration schemes at the EPO treat all kinds of patent applications equally and do not favour any technology classes.²²⁰ Consequently, the fast-track can also be accessed by Green Patent applications. An equal treatment of pollution technology applications and Green patent applications, however, does therefore not specifically promote Green Patents and does not create a direct incentive.²²¹

As a result, while the EPO generally offers a solid range of optional fast-track programs, it does not provide a specific fast-track program for Green Patents. Under consideration of the limitations and shortcoming of the general programs, this creates a notable gap for the introduction of a Green Patent fast-track as an incentive for Green Patents.

²¹⁵ Alongside the “Early Certainty from Search”-scheme and excluding “negative” acceleration by waivers.

²¹⁶ cf chapter D. II. 1. b. aa. & bb.

²¹⁷ cf Notice from the European Patent Office dated 30 November 2015 concerning the programme for accelerated prosecution of European patent applications (“PACE”) [2015] OJ EPO 2015, A93; European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115; cf European Patent Office, Notice from the European Patent Office dated 30 November 2015 concerning ways to expedite the European grant procedure [2015] OJ EPO 2015, A94; cf European Patent Office, *Euro-PCT Guide – PCT procedure at the EPO* (EPO January 2023). <<https://www.epo.org/en/legal/guide-europct>> accessed 3 January 2024; cf Nina Ferrara, Peter de Lange, Andrew Rudge, in Kaisa Suominen (ed), *Visser’s Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 17f., 228ff., 235ff.; European Patent Convention, art. 10(2)(a), 92, 94.

²¹⁸ Considering the limitation of an acceleration, cf footnotes (n 202 & 204).

²¹⁹ cf European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115, p. 1.

²²⁰ cf Footnote 190 and: European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115.

²²¹ cf Hilty and Pedro Henrique D. Batista, ‘Potential and Limits of Patent Law to Address Climate Change’ (2023) 72 Issue 9 GRUR International 821, 828 <<https://doi.org/10.1093/grurint/ikad066>> accessed 3 January 2025.

c. Green Patent fast-tracks in the international context

In order to establish an effective Green Patent fast-track at the EPO, this chapter aims to embrace international experiences and analyse, compare and categorise selected specific national Green Patent fast-track programs and review them for integration into the EPO system. For that purpose, it is important to consider first the specific outline of the individual programme – inter alia, the nature of the acceleration, the costs, a potential prioritisation – second the qualification requirements for Green Patents and third the relevant burden of proof for an grant of access to the programme.

aa. National programs for accelerated Green Patent prosecution

Several national intellectual property offices have established national acceleration fast-track programs for Green Patents, such as the intellectual property offices of the US, the United Kingdom (UK), Australia, Canada, China, Israel, Japan, the Republic of Korea and Brazil, as well as Taiwan and newly Peru.²²² According to the WIPO, of the EU countries, Finland and Spain have established such programs.²²³ This thesis reviews an exemplary selection of national approaches.²²⁴

²²² WIPO, 'Expedited Examination Programs of IP Offices' (*wipo.int*, National/regional programs – Summary table) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-summary.pdf>> accessed 4 January 2025; With further references: European Innovation Council and SMEs Executive Agency, 'INDECOPi Peru launches an accelerated program for green patents' (*intellectual-property-helpdesk.ec.europa.eu*, 3 May 2024) <https://intellectual-property-helpdesk.ec.europa.eu/news-events/news/indecopi-peru-launches-accelerated-program-green-patents-2024-05-03_en> accessed 4 January 2024; TIPO Intellectual Property Office – Ministry of Economic Affairs, R.O.C., 'TIPO Introduces Green Patent Revisions to Accelerated Examination Program on January 1, 2022' (*tipo.gov.tw* 25 February 2022) <<https://www.tipo.gov.tw/en/cp-896-902715-1ad81-2.html>> accessed 4 January 2024; Peter A. Jackman, 'Options for Accelerating Examination of Renewable Technology Patent Applications' (*Pratt's Energy Law Report*, 24 March 2023) <<https://www.sternekessler.com/news-insights/publications/options-accelerating-examination-renewable-technology-patent/>> accessed 4 January 2024; For the option of international programs and green PPH cf: WIPO, 'IPO Green' (*wipo.int*, Green Patent Prosecution Highways', IPO Green Policy Note 8) <<https://www3.wipo.int/wipogreen/en/ipo-green/>; <https://www3.wipo.int/wipogreen/en/docs/ipo-green-policy-note-8.pdf>> accessed 4 January 2025.

²²³ cf WIPO 'Expedited Examination Programs of IP Offices' (*wipo.int*, National/regional programs – Summary table) (n 222); cf WIPO, 'Expedited Examination Programs of IP Offices' (*wipo.int*, National/regional programs – Spain) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-spain.pdf>> accessed 5 January 2025; WIPO, 'Expedited Examination Programs of IP Offices' (*wipo.int*, National/regional programs – Finland) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-finland.pdf>> accessed 6 January 2025; Finnish Patent and Registration Office, 'Fast-track processing of patent applications' (*prh.fi*) <<https://www.prh.fi/en/patentit/applyforanationalpatentinfinland/processingofapplicationsatprh/fast-trackprocessing.html>> accessed 6 January 2025.

²²⁴ cf for a separate analysis of international programs for an European accelerated channel also under consideration of the UK, Brazil, China and Japan as well as the now outdated programs of the US and the Republic of Korea: Li Xiangning, 'Green Technology and Patents: in the European Context' (Master Thesis European Business Law, Lund University 2020) 28, 39-46. The respective evaluation also focuses inter alia on the usage of the programs, the analysis of market effects and patent-backlogs.

(a) United States of America

As a strong global player in green patenting,²²⁵ the United States Patent and Trademark Office (USPTO) supplies several optional programs to accelerate the patent procedure.²²⁶

(aa) Climate Change Mitigation Pilot Program

(i) Programme outline

The USPTO facilitates the Climate Change Mitigation Pilot Program (CCMPP) as a Green Patent fast-track and successor of the previous Green Technology Pilot Program for acceleration, which terminated in 2012.²²⁷ The CCMPP is open for both national and international utility patent applications, the latter entering the national phase.²²⁸ The USPTO established the CCMPP as a legal notice and thus as administrative guidance to support the Executive Order 14008 of 2021 on climate change mitigation.²²⁹ For participation in the programme, the applicant is required to apply for their application receiving “special status” under the use of form PTO/SB/457 within 30 days for a national application and for an international application with the application or entry into the national stage.²³⁰ There is no fee connected to

²²⁵ cf chapter C. III:

²²⁶ World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, National/regional programs – United States of America) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-usa.pdf>> accessed 8 January 2025.

²²⁷ United States Patent and Trademark Office, ‘Climate Change Mitigation Pilot Program’, (*uspto.gov*) <<https://www.uspto.gov/patents/laws/patent-related-notices/climate-change-mitigation-pilot-program>> accessed 8 January 2025; Ari Rollason, ‘Green IPOs: Accelerating Prosecution of Green Tech Patent Applications Part I’ (*hlk-ip.com, News & insights*, 30 August 2023) <<https://www.hlk-ip.com/news-and-insights/green-ipos-accelerating-prosecution-of-green-tech-patent-applications-part-i/>> accessed 9 January 2025.

²²⁸ *ibid.*

²²⁹ United States Patent and Trademark Office, Notice, ‘Climate Change Mitigation Pilot Program’ (June 3, 2022) 87 FR 33750 <<https://www.federalregister.gov/documents/2022/06/03/2022-11930/climate-change-mitigation-pilot-program>> accessed 9 January 2025; United States Patent and Trademark Office, Notice, ‘Expansion and Extension of the Climate Change Mitigation Pilot Program’ (June 1, 2023) 88 FR 35841 <<https://www.federalregister.gov/documents/2023/06/01/2023-11660/expansion-and-extension-of-the-climate-change-mitigation-pilot-program>> accessed 9 January 2025; Presidential Documents (United States), Executive Order 14008, ‘Tackling the Climate Crisis at Home and Abroad’ (January 27, 2021) 86 FR 19 <<https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad>> accessed 9 January 2025; See for the administrative freedom of the USPTO to create expedited programs: Code of Federal Regulations Title 37 Part 1 Subpart B - Examination of Applications (United States) para. 1.102 (c) (2) (ii) <<https://www.ecfr.gov/current/title-37/part-1/subject-group-ECFR4f6faa3f96af06d>> accessed 9 January 2025; United States Code, title 35 para. 2 <<https://us-code.house.gov/view.xhtml?req=granuleid:USC-prelim-title35-section2&num=0&edition=prelim>> accessed 9 January 2025.

²³⁰ United States Patent and Trademark Office, ‘Climate Change Mitigation Pilot Program’, (*uspto.gov*) <<https://www.uspto.gov/patents/laws/patent-related-notices/climate-change-mitigation-pilot-program>> accessed 8 January 2025; United States Patent and Trademark Office, ‘Certification and Petition to Make Special under the Climate Change Mitigation Pilot Program’ (*uspto.gov*) <<https://www.uspto.gov/patents/apply/forms>>; <https://www.uspto.gov/sites/default/files/documents/sb0457.pdf>> accessed 9 January 2025.

such petition.²³¹ As a material requirement in relation to the subject of the application, the applicant must inter alia certify that:

- (1) the claims of their application cover a product / process, which mitigates climate change;*
- (2) “the product or process is designed to:*
 - (a) remove greenhouse gases already present in the atmosphere;*
 - (b) reduce and/or prevent additional greenhouse gas emissions; and/or*
 - (c) monitor, track, and/or verify greenhouse gas emission reductions;*
- 3. The applicant has a good faith belief that expediting patent examination will likely have a positive impact on the climate.*²³²

In the case of an access grant to the programme, the patent’s status is elevated to “special” and can thus be processed out of turn in relation to the first office action, which is the examiners first written notice of findings in search and examination to the applicant.²³³ Notably, the first available data indicates a reduced pendency resulting in a first action within six months in contrast to an average 16 months in regular processing.²³⁴ However, after the first expedited office action, the status of the patent application is returned to normal and processed as such in respect to further office actions and publication.²³⁵ Furthermore, after an extension in 2023, the overall program will run either until 7 June 2027 or until the date where the USPTO has accepted 4000 grantable petitions.²³⁶ Additionally, applicants are only eligible for access if they have not filed more than twelve other valid CCMPP applications before.²³⁷ The programme is thus limited in its duration and has a cap for the overall number of applications and applications per applicant.

²³¹ *ibid.*

²³² See also all of the extensive material requirements in detail: *ibid.*

²³³ United States Patent and Trademark Office, ‘Climate Change Mitigation Pilot Program’, (*uspto.gov*) <<https://www.uspto.gov/patents/laws/patent-related-notice/climate-change-mitigation-pilot-program>> accessed 8 January 2025; See for an overview of the whole patent procedure at the USPTO: United States Patent and Trademark Office, *Manual of Patent Examining Procedure (MPEP)*, 9th Edition, Revision January 2025, Chapter 700 <<https://www.uspto.gov/web/offices/pac/mpep/index.html>> accessed 9 January 2025.

²³⁴ C. Erik Haws, Sujohn Das and Melissa Story, ‘Early Results of USPTO’s New Climate Change Mitigation Pilot Program’ (*morganlewis lawflash*, 23 February 2023) <<https://www.morganlewis.com/pubs/2023/02/early-results-of-usptos-new-climate-change-mitigation-pilot-program>> accessed 9 January 2025.

²³⁵ United States Patent and Trademark Office, Notice, ‘Climate Change Mitigation Pilot Program’ (June 3, 2022) 87 FR 33750 (n 229); World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, National/regional programs – United States of America) (n 226).

²³⁶ United States Patent and Trademark Office, Notice, ‘Expansion and Extension of the Climate Change Mitigation Pilot Program’ (June 1, 2023) 88 FR 35841 (n 229);

²³⁷ *Ibid*; United States Patent and Trademark Office, ‘Certification and Petition to Make Special under the Climate Change Mitigation Pilot Program’ (*uspto.gov*) (n 230).

Nevertheless, in comparison to other acceleration programs at the USPTO, it is important to note, that the CCMPP might not be the “fastest” fast-track programme at the USPTO.²³⁸ Applicants can also make use of the Track-One programme or the Accelerated Examination programme, the latter however raising higher material requirements, inter alia the provision of a pre-examination by the applicant.²³⁹ Both programs are available for all technology classes and absent of the requirement to raise substantial reasons for an acceleration, and also strive to issue a final disposition within 12 months after the access to the programme was granted.²⁴⁰ The USPTO maintain the prioritisation throughout the whole application process and e.g. the average pendency for the first office action after was only 1.9 months in 2023 in the Track One.²⁴¹ This level of acceleration is on the downside connected with special fees for the acceleration, with up to 4200 US Dollars for large enterprises.²⁴²

The USPTO, therefore, facilitates multiple parallel fast-tracks, with different material requirements, levels of acceleration and costs. The CCMPP represents the special Green Patent fast-track of the USPTO. While it only grants a partly prioritisation within the grant procedure and is thus not the fastest option for an acceleration, it is also free of charge and does not need to fulfil all of the general requirements for acceleration.²⁴³ The CCMPP therefore distinguishes itself from the other acceleration programs through the free of cost access and the relaxed requirements.

²³⁸ cf also: Benjamin Vaughan and Lucas Watkins, ‘US Patent Trademark Office Expands Climate Change Mitigation Pilot Program’ (*foleyhoag – Energy and Climate Counsel*, 12 June 2023) <<https://foleyhoag.com/news-and-insights/blogs/energy-and-climate-counsel/2023/june/us-patent-trademark-office-expands-climate-change-mitigation-pilot-program>> accessed 9 January 2025.

²³⁹ World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, National/regional programs – United States of America) (n 226); See in more detail and with further references for Track-One: United States Patent and Trademark Office, ‘USPTO’s Prioritized Patent Examination Program’ (*uspto.gov*) <<https://www.uspto.gov/patents/initiatives/usptos-prioritized-patent-examination-program>> accessed 9 January 2025; United States Patent and Trademark Office, ‘Certification and request for prioritized examination under 37 CFR 1.102(e) (*uspto.gov*)’ <<https://www.uspto.gov/patents/apply/forms;https://www.uspto.gov/sites/default/files/documents/aia0424.pdf>> accessed 9 January 2025; Code of Federal Regulations Title 37 Part 1 Subpart B - Examination of Applications (United States) para. 1.102 (e); See for the general Accelerated Examination with further references: United States Patent and Trademark Office, ‘Accelerated Examination’ (*uspto.gov*) <<https://www.uspto.gov/patents/initiatives/accelerated-examination>> accessed 9 January 2025.

²⁴⁰ cf *ibid*.

²⁴¹ cf *ibid*; Gene Quinn, ‘Prioritized Examination: Why Filing a Track One Application Makes Sense’ (*ip-watchdog*, 12 June 2023) <<https://ipwatchdog.com/2023/06/12/prioritized-examination-filing-track-one-application-makes-sense/id=162212/>> accessed 9 January 2025.

²⁴² For Track-One applications: *ibid*.

²⁴³ Under § 708.02(a) Manual of Patent Examination Procedure: United States Patent and Trademark Office, Notice, ‘Climate Change Mitigation Pilot Program’ (June 3, 2022) 87 FR 33750 (n 229); United States Patent and Trademark Office, *Manual of Patent Examining Procedure (MPEP)* (n 233) 708.02.

(ii) National qualification standard and burden of proof

With respect to the determination of access to the programme in relation to the technology of the application, the UPSTO requires, inter alia, the certification of three cumulative elements by the applicant, as outlined above. First, the product or process must have the effect to mitigate climate change.²⁴⁴ The USPTO specifies that the claims must correspond to one or more of the technical concepts of the Y02A-Y02W classes of the CPC classification.²⁴⁵ The technical concepts of the Y02 classes relate to technologies that either indirectly mitigate climate change through their “clean” nature or through their direct beneficial effect on environment.²⁴⁶ Nevertheless the second requirement of the CCMPP further narrows down the “climate change mitigation effects”, to a removal, reduction or managing of greenhouse gas emission reductions, thus excluding other technology effects that can also be beneficial for the environment but do not revolve directly or indirectly around greenhouse gas emissions, e.g. like protection of water resources.²⁴⁷ Lastly, the third requirement also adds a requirement for the applicant to certify that the acceleration of the application will result in particular in benefits for the climate.²⁴⁸ With regard to the burden of proof, the applicant is relieved of the need to provide material evidence for the access to the Green fast-track programme, and instead only has to certify the fulfilment of the abovementioned requirements.²⁴⁹ However, the access to the programme is still up to the discretion and material review of the USPTOs

²⁴⁴ United States Patent and Trademark Office, Notice, ‘Expansion and Extension of the Climate Change Mitigation Pilot Program’ (June 1, 2023) 88 FR 35841 (n 229); United States Patent and Trademark Office, ‘Certification and Petition to Make Special under the Climate Change Mitigation Pilot Program’ (*uspto.gov*) (n 230).

²⁴⁵ The CPC is facilitated by the UPSTO and the EPO: United States Patent and Trademark Office, Notice, ‘Climate Change Mitigation Pilot Program’ (June 3, 2022) 87 FR 33750 (n 229); United States Patent and Trademark Office, ‘Certification and Petition to Make Special under the Climate Change Mitigation Pilot Program’ (*uspto.gov*) (n 230); cf chapter C. I. 2. b.

²⁴⁶ cf Ibid; United State Patent and Trademark Office, ‘Classification Resources – Cooperative Patent Classification’ (August 2024) <<https://www.uspto.gov/web/patents/classification/cpc/html/cpc-Y.html>> accessed 10 January 2024.

²⁴⁷ cf United States Patent and Trademark Office, Notice, ‘Expansion and Extension of the Climate Change Mitigation Pilot Program’ (June 1, 2023) 88 FR 35841 (n 229); United States Patent and Trademark Office, ‘Certification and Petition to Make Special under the Climate Change Mitigation Pilot Program’ (*uspto.gov*) (n 230); An exemplary CPC class for water protection, Y02A 20/40: United State Patent and Trademark Office, ‘Classification Resources – Cooperative Patent Classification’ (August 2024) (n 246); However, under consideration of recent applications processed under the CCMPP, it seems that the USPTO interprets the effects of the technology on greenhouse gas emissions broadly: Jordan P. Glassman, Zachary S. Kelton and Jennifer Giordano-Coltart, ‘USPTO Acts to Spur Innovation in Climate Mitigation Technologies with Expedited Review Pilot Program’ (*Kilpatrick Insights: Publications*, 15 November 2022) <<https://ktslaw.com/en/Insights/Alert/2022/11/USPTO-Acts-to-Spur-Innovation-in-Climate-Mitigation-Technologies-with-Expedited-Review-Pilot-Program>> accessed 10 January 2025.

²⁴⁸ *ibid*.

²⁴⁹ United States Patent and Trademark Office, Notice, ‘Climate Change Mitigation Pilot Program’ (June 3, 2022) 87 FR 33750 (n 229); In particular in relation to the provisions in the Manual of Patent Examination Practice: United States Patent and Trademark Office, *Manual of Patent Examining Procedure (MPEP)* (n 233) 708.02.(a).

patent examiners, who can dismiss the application if it does not meet the certified requirements.²⁵⁰

In conclusion, the USPTO facilitates a multileveled “effect” approach in relation to the material access to the CCMPP, focusing on the effect of the technology on climate change mitigation and a correspondence with the technology classes of the Y02 CPC scheme. This scope however is, further narrowed down through the requirement, that the climate change mitigation effect of the technology must be aimed at greenhouse gas emission and through the requirement that the applicant must believe that the expedition has a positive climate impact. The burden of proof is low for the applicants in terms of only having to certify the respective statements, but the examiner review the requirements materially before the grant of the petition and thus the applicants can influence their access to the programme indirectly through the outline of their application.²⁵¹

(bb) Patents for Humanity Award: Green Energy

The USPTO also facilitates its award programme “Patents for Humanity” and featured a specific category for Green Energy in its last award cycle.²⁵² The initiative awarded a selection of granted or pending US utility patents for green energy, with technology in relation to wind, solar, green hydrogen, hydropower, geothermal and biofuels being exemplary categories, but the award not being limited to them.²⁵³ The USPTO grants an acceleration certificate to the winner, which the winner can “trade” for an acceleration and a special status at the USPTO.²⁵⁴ It is important to note, that the certificates are also transferable and sellable to other parties.²⁵⁵

²⁵⁰ United States Patent and Trademark Office, Notice, ‘Climate Change Mitigation Pilot Program’ (June 3, 2022) 87 FR 33750 (n 229); cf Jordan P. Glassman, Zachary S. Kelton and Jennifer Giordano-Coltart, ‘USPTO Acts to Spur Innovation in Climate Mitigation Technologies with Expedited Review Pilot Program’ (n 247).

²⁵¹ cf Jordan P. Glassman, Zachary S. Kelton and Jennifer Giordano-Coltart, ‘USPTO Acts to Spur Innovation in Climate Mitigation Technologies with Expedited Review Pilot Program’ (n 247).

²⁵² United States Patent and Trademark Office, ‘Patents for Humanity: Green Energy’ (*uspto.gov*) <<https://www.uspto.gov/ip-policy/patents-humanity-green-energy>> accessed 10 January 2025; United States Patent and Trademark Office, ‘Patents for Humanity’ (*uspto.gov*) <<https://www.uspto.gov/ip-policy/patent-policy/patents-humanity>> accessed 10 January 2025; Legal foundation: United States Code, title 35 para. 28 <<https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title35-section2&num=0&edition=prelim>> accessed 9 January 2025; See for the extensive participation requirements in detail: United States Patent and Trademark Office, ‘USPTO Patents for Humanity Program: Green Energy – Terms and Conditions 2023’ (*uspto.gov*) 4 ff. <<https://www.uspto.gov/ip-policy/patent-policy/patents-humanity; Patents for Humanity Terms and Conditions>> accessed 10 January 2025.

²⁵³ United States Patent and Trademark Office, ‘Patents for Humanity: Green Energy’ (n 252); See for the extensive participation requirements in detail: United States Patent and Trademark Office, ‘USPTO Patents for Humanity Program: Green Energy – Terms and Conditions 2023’ (*uspto.gov*) 4ff. <<https://www.uspto.gov/ip-policy/patent-policy/patents-humanity; Patents for Humanity Terms and Conditions>> accessed 10 January 2025.

²⁵⁴ See the acceleration options in full detail: United States Patent and Trademark Office, ‘USPTO Patents for Humanity Program: Green Energy – Terms and Conditions 2023’ (*uspto.gov*) (n 253) 6.

²⁵⁵ *ibid.*

However, as a limitation, the certificate is only valid within 12 months of the date of issuance.²⁵⁶

Ultimately, the USPTO's award system for Green Energy Patents provides the winner with a valuable certificate, which can accelerate the overall patent procedure at the USPTO free of charge, thus providing an attractive incentive for patents in Green technology. Nevertheless, the overall programme is inter alia limited by the relatively small number of awards granted,²⁵⁷ and the "lifetime" of the acceleration certificate of only one year. Latter aspect decreases the value of the award, in the case that the winner does not pursue a patent procedure within the 12 months. Furthermore, the possibility of selling and transferring the certificate opens the possibility to sell the certificate to applicants of pollution technologies, which could undermine the overall "green" idea of the award.

(b) United Kingdom

As a European and former EU country, the Intellectual Property Office of the United Kingdom (UK IPO) introduced the option for applicants to request an accelerated patent procedure of national applications free of cost under the Green Channel.²⁵⁸

(aa) Programme outline

A Qualification for the green channel requires a written request – not bound to any specific form – that,

- (1) states how the application is "green" and environmentally friendly,*
*and (2) which actions of the UK IPO the applicant seeks to accelerate.*²⁵⁹

²⁵⁶ Ibid; H.R. 7259 — 116th Congress: Patents for Humanity Program Improvement Act." [2020] (GovTrack.us) <<https://www.govtrack.us/congress/bills/116/hr7259>> accessed 10 January 2025.

²⁵⁷ Eight winners in the Green category in 2024: United States Patent and Trademark Office, '2024 Patents for Humanity: Green Energy category award recipients' (uspto.gov) <<https://www.uspto.gov/ip-policy/patent-policy/patents-humanity/2024-recipients>> accessed 10 January 2025; The whole Patents for Humanity Award programme is also currently being reviewed for continuity: United States Patent and Trademark Office, Notice of information collection; request for comment, 'Agency Information Collection Activities; Submission to the Office of Management and Budget (OMB) for Review and Approval; Comment Request; Patents for Humanity Program and Trademarks for Humanity Program' (October 25, 2024) 89 FR 8571 <<https://www.federalregister.gov/documents/2024/10/25/2024-24920/agency-information-collection-activities-submission-to-the-office-of-management-and-budget-omb-for>> accessed 10 January 2025

²⁵⁸ Established since 2009: Intellectual Property Office of the United Kingdom, 'Patents: accelerated processing' (gov.uk) <<https://www.gov.uk/guidance/patents-accelerated-processing#full-publication-update-history>> accessed 8 January 2025.

²⁵⁹ Ibid; Intellectual Property Office of the United Kingdom, 'Guidance – Get your patent granted more quickly' (gov.uk, updated 12 August 2016) chapter 3ff. <<https://www.gov.uk/government/publications/patents-fast-grant/patents-fast-grant-guidance>> accessed 8 January 2025.

Additional material reasons for an access are not required.²⁶⁰ Acceleration is open alternatively or combined for the search-, examination- and publication-phase of the application.²⁶¹ Under the use of acceleration for all phases, it is thus possible to receive a national patent grant in under a year at the UK IPO.²⁶² The UK IPO established the Green Channel as an administrative guideline of the office.²⁶³

Besides the Green Channel, the UK IPO also provides the general option to request acceleration at the UK IPO and the option of an acceleration of a PCT application.²⁶⁴ The first mentioned general acceleration usually requires the applicant to state important reasons on why an accelerated procedure is needed, e.g. in cases of a looming infringement or to secure a potential investor.²⁶⁵ The Green Channel, however, is lifted from the requirement to prove special reasons for an acceleration and only requires that the application relates to a green technology or green benefits.²⁶⁶ It is important to note, that the general track and the Green channel enjoy the same standard of acceleration for the respective phases.²⁶⁷ Therefore, the UK IPO features several parallel acceleration tracks with different eligibility criteria. Out of these, the Green Channel is a special track that is exempt from the requirement to prove urgent or important reasons for an acceleration.

(bb) National qualification standard and burden of proof

In relation to the access criteria, it is questionable what the UK IPO considers as environmental friendly technology and which burden of proof applies to the applicant. As for the

²⁶⁰ cf *ibid.*

²⁶¹ The application can also already be processed as a combined search and examination: cf *ibid.*

²⁶² cf Intellectual Property Office of the United Kingdom, ‘Guidance – Get your patent granted more quickly’ (n 259) chapter 4.

²⁶³ cf Intellectual Property Office of the United Kingdom, ‘UK ‘Green’ inventions to get fast-tracked through patent system’ (*webarchive.nationalarchives.gov.uk*) <<https://webarchive.nationalarchives.gov.uk/ukgwa/20140603121549/http://www.ipo.gov.uk/about/press/press-release/press-release-2009/press-release-20090512.htm>> accessed 8 January 2025; cf for the administrative discretion of the UK IPO in relation to the timelines: United Kingdom, Patents Act 1977, 1977 c. 37, amended up to 24.05.2024, section 17f. <<https://www.legislation.gov.uk/ukpga/1977/37>> accessed 8 January 2025; United Kingdom, The Patents Rules 2007, 2007 no. 3291, amended up to 01.01.2021, rule 108f. <<https://www.legislation.gov.uk/uksi/2007/3291>> accessed 8 January 2025.

²⁶⁴ cf Intellectual Property Office of the United Kingdom, ‘Guidance – Get your patent granted more quickly’ (n 259) chapter 4; For the PCT national phase: Intellectual Property Office of the United Kingdom, Practice Notice, Statutory guidance, ‘Relaxation of requirements for PCT(UK) Fast Track’ (*gov.uk*, 8 June 2012) <<https://www.gov.uk/government/publications/practice-notice-pctuk-fast-track/relaxation-of-requirements-for-pctuk-fast-track>> accessed 19 January 2025.

²⁶⁵ IPO UK, ‘Guidance – Get your patent granted more quickly’ (n 259) chapter 6.2.

²⁶⁶ IPO UK, ‘Guidance – Get your patent granted more quickly’ (n 259) chapter 3; Intellectual Property Office of the United Kingdom, ‘Patents: accelerated processing’ (n 258).

²⁶⁷ cf *ibid.*

technical nature of the application, the UK IPO requires the applicant to provide a “reasonable assertion that the invention has some environmental benefit”²⁶⁸ or to assert, “how their application is environmentally-friendly”²⁶⁹ or “how their application relates to a “green” or environmentally friendly technology”²⁷⁰. However, the UK IPO does not provide certain fixed categories and criteria.²⁷¹ This implies rather open categories for the determination of green technology, not necessarily connected to specific technology classes or classification systems.²⁷² However, as guidance, the UK IPO lists solar power and wind energy as examples for green technology and provides a database of applications processed through the Green Channel.²⁷³ Notably, under the abovementioned standards, the required “green” element of the application can thus relate to either the nature of the technology in the sense that the technology (and its application) is “clean” for the environment or to a potential environmental benefit through its application.²⁷⁴ Therefore, the UK IPO also considers a broad effect-based evaluation of “green” technology.

In respect to the burden of proof, the UK IPO requires the beforementioned “assertion” or an “appropriate explanation” of the existence of a green technology or the environmental benefit.²⁷⁵ However, the UK IPO will not perform an in-depth investigation of such claim and intends to rather sort out evidently unfounded requests.²⁷⁶ The UK IPO further differentiates its qualification and also provides certain exemplary classes of technology that indicate an access to the green channel and do not need further assertion beyond the statement of the

²⁶⁸ Intellectual Property Office of the United Kingdom, ‘Patens: accelerated processing’ (n 258) chapter ‘Green Channel’.

²⁶⁹ *ibid.*

²⁷⁰ Intellectual Property Office of the United Kingdom, ‘Manual of Patent Practice’ (*gov.uk*, updated October 2024) Section 17.05.1 <<https://www.gov.uk/guidance/manual-of-patent-practice-mopp/section-17-search>> accessed 8 January 2025; Intellectual Property Office of the United Kingdom, ‘Formalities manual (online version)’ (*gov.uk*, updated 29 June 2022) Section 7.41 <<https://www.gov.uk/guidance/formalities-manual-online-version/chapter-7-preliminary-examination-and-reports>> accessed 8 January 2025.

²⁷¹ Intellectual Property Office of the United Kingdom, ‘Patens: accelerated processing’ (n 258) chapter ‘Green Channel’.

²⁷² Intellectual Property Office of the United Kingdom, ‘Patens: accelerated processing’ (n 258) chapter ‘Green Channel’; cf Peter A. Jackman, ‘Options for Accelerating Examination of Renewable Technology Patent Applications’ (*Pratt’s Energy Law Report*, 24 March 2023) <<https://www.sternekessler.com/news-insights/publications/options-accelerating-examination-renewable-technology-patent/>> accessed 8 January 2024; Ankit Singh and Yogendra Kumar Srivastava, *Patent Law, Green Technology and Innovation* (Routledge 2023) 95.

²⁷³ *Ibid.*, UK IPO, ‘Published Green Channel Applications’ (*ipo.gov.uk*, updated 8 January 2025) <<https://www.ipo.gov.uk/p-gcp.htm>> accessed 8 January 2025.

²⁷⁴ cf Nathan Zhang, ‘Reasons for request under the Green Channel’ (2023) Mewburn Ellis Special Report p. 8 <<https://view.publitas.com/mewburn-ellis/green-channel-report/page/1>> accessed 8 January 2025.

²⁷⁵ *ibid.*; Intellectual Property Office of the United Kingdom, ‘Manual of Patent Practice’ (n 270) section 17.05.1; Intellectual Property Office of the United Kingdom, ‘Formalities manual (online version)’ (n 270) section 7.41.

²⁷⁶ *ibid.*

existence of such a technology, such as for application related to solar power and wind energy.²⁷⁷ However, in more complex or ambiguous applications this has to be determined on a case-to-case basis requiring more arguments for an assertion.²⁷⁸ This implies that in these more ambiguous cases, the statement needs to go further than just claiming the green nature of the application and just requesting the Green Channel, but it also does not require a full evidence standard.²⁷⁹ The decision however is up to the discretionary of the patent examiners at the UK IPO.²⁸⁰

(c) Republic of Korea

As an example of an acceleration programme in the Asian hemisphere, the Korean Intellectual Property Office (KIPO) supplies an “Accelerated examination” programme codified in the Korean Patent Act and the Korean Enforcement Decree of the Patent Act.²⁸¹

(aa) Programme outline

The programme comprises of several different requirements for eligibility with respect to special characteristics of applicants and applications as well to certain types of technologies, one of them also enabling an acceleration of national applications and international applications (entering the national phase) relating to green technology:²⁸²

*2. A patent application directly related to green technology under the Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis.*²⁸³

²⁷⁷ Intellectual Property Office of the United Kingdom, ‘Patens: accelerated processing’ (n 258) chapter ‘Green Channel’.

²⁷⁸ *ibid.*

²⁷⁹ *cf ibid.*

²⁸⁰ *cf ibid*; *cf* Intellectual Property Office of the United Kingdom, ‘Manual of Patent Practice’ (n 270) 17.05.1.

²⁸¹ Korean Intellectual Property Office, ‘Patent Examination System – Accelerated Examination’ (*kipo.go.kr*) <https://www.kipo.go.kr/en/HtmlApp?c=92102&catmenu=ek03_01_01_03> accessed 11 January 2025; Legal foundation in: Patent Act, Republic of Korea amended up to Act No. 19714, 14 February 2023 [2023] article 61 <https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=64605&type=sogan&key=35> accessed 11 January 2025; The newest amendment of 2024, is only available in Korean: Patent Act, Republic of Korea, amended up to Act No. 20322, 20 February 2024 [2024] article 61 <<https://www.wipo.int/wipolex/en/legislation/details/22666>> accessed 11 January 2025; However the amendments do not concern article 61: *cf* Min Son, ‘Korea increases punitive damages cap and introduces new unfair competition measures’ (*managingip*, 6 March 2024) <<https://www.managingip.com/article/2cxssros2fw981tfun4e9/sponsored-content/korea-increases-punitive-damages-cap-and-introduces-new-unfair-competition-measures#>> accessed 25 January; *cf* Enforcement Decree of the Patent Act, Republic of Korea, Presidential Decree amended up to No. 32590, 19 April 2022 [2022] article 9f. <https://elaw.klri.re.kr/eng_service/lawView.do?hseq=60677&lang=ENG> accessed 11 January 2025.

²⁸² *cf ibid.*

²⁸³ Enforcement Decree of the Patent Act, Republic of Korea, Presidential Decree amended up to No. 32590, 19 April 2022 [2022] (n 281) article 9f.

As formal requirements, applicants can request access to the programme by submitting a written request.²⁸⁴ Nevertheless, the application for acceleration requires the payment of extra fees by the applicant.²⁸⁵

Upon the access grant, the KIPO accelerates the application in comparison to the regular examination and reduces the pendency until the first office action – legal experts indicate a reduction of the pendency to around two to four months –²⁸⁶. This also reduces the overall pendency, which was on average 16.1 months in 2023.²⁸⁷ As a result, the KIPO facilitates a fast-track system with several parallel fast-tracks that prioritise applications in relation to the general examination procedure. One of them is the fast-track for Green Patents, which, however – in general – does not enjoy a preferential treatment in relation to the other fast-track programs.²⁸⁸

Introduced in 2009 the KIPO also provided a fast-track with a “super-acceleration” for Green technologies, enabling a first action within around one month.²⁸⁹ The aim was to create a

²⁸⁴ Korean Intellectual Property Office, ‘Patent Examination System – Accelerated Examination’ (*kipo.go.kr*) (n 281).

²⁸⁵ cf Korean Intellectual Property Office, ‘Fees and Payments’ (*kipo.go.kr*) <https://www.kipo.go.kr/en/HtmlApp?c=92004&catmenu=ek03_04_01> accessed 11 January 2025; cf Pine IP, ‘About Patent Applications in Korea: What They Are, Costs, and Procedures’ (*Insights*, 30 November 2024) <<https://www.pinepat.com/en/insights/columns/teugheo-culweonyi-modeun-geos-teugheo-culweoniran-biyong-geurigo-jeolca>> accessed 11 January 2025; Jongsun Kim, ‘Decreasing of Subjects for Expedited Examination and Delay in Examination for Patent Applications in Korea’ (2024) APAA e-Newsletter No. 39 <<https://apaaonline.org/article/decreasing-of-subjects-for-expedited-examination-and-delay-in-examination-for-patent-applications-in-korea/>> accessed 11 January 2025.

²⁸⁶ Kyoo Yeon LEE and CY Chooyoun KIM, ‘Managing the Pace of Patent Examinations for Patent Applications in Korea’ (*Kim & Chang Newsletters*, 3 December 2020) <https://www.ip.kimchang.com/en/insights/detail.kc?sch_section=4&idx=22321> accessed 11 January 2025; Peter A. Jackman, ‘Options for Accelerating Examination of Renewable Technology Patent Applications’ (*Pratt’s Energy Law Report*, 24 March 2023) <<https://www.sterneckessler.com/news-insights/publications/options-accelerating-examination-renewable-technology-patent/>> accessed 11 January 2024.

²⁸⁷ The KIPO states in a presentation that the examination is “initiated” within two months after access grant to the accelerated program: Korean Intellectual Property Office, ‘KIPO’s IP Policies for Carbon Neutrality’, presentation 10th TRIPO User Synopsium, (*jpo.go.jp*) <https://www.jpo.go.jp/news/kokusai/nityukan/document/10th_nityukan_symposium/siryo07.pdf> accessed 11 January 2025; The accelerated examination under a fast-track for Covid-19 vaccines also had a pendency between two and three months until the first office action: cf European Patent Office, ‘IP 5 Statistics Report 2021 Edition’ (November 2022) <<https://www.fiveipoffices.org/statistics/statisticsreports/2021edition>> accessed 12 January 2025; See for the average pendency at the KIPO: Korean Intellectual Property Office, ‘Annual Report 2023’ (June 2024) 7, 78. <https://www.kipo.go.kr/en/HtmlApp?c=60114&catmenu=ek07_01_01_23> accessed 12 January 2025.

²⁸⁸ cf footnote (n 281).

²⁸⁹ Korean Intellectual Property Office, ‘IP Policies’ (*kipo.go.kr*, last updated 24 May 2016) <https://www.kipo.go.kr/en/HtmlApp?c=100000&catmenu=ek02_01_02_01> accessed 12 January 2025. Peter A. Jackman, ‘Options for Accelerating Examination of Renewable Technology Patent Applications’ (n 286); See for an overview of the material requirements: Antoine Dechezleprêtre, ‘Fast-Tracking ‘Green’ Patent Applications: An Empirical Analysis’ (2013) Issue 37 ICTSD Global Platform on Climate Change, Trade and Sustainable Energy 1, 3 <https://www.researchgate.net/publication/256050795_Fast-Tracking_'Green'_Patent_Applications_An_Empirical_Analysis> accessed 12 January 2025

preferential acceleration that specifically exceeds the one of the general acceleration programs.²⁹⁰ Nevertheless, the programme was abolished and continued only by the general acceleration programme, which, as of now, also covers Green technologies.²⁹¹

(bb) National qualification standard and burden of proof

In respect of the content of the patent application, the KIPO requires that the application relates to green technology, which must be determined according to the Korean Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis.²⁹² Green technology is thus defined as following under the Act:

*The term "green technology" means a technology to achieve carbon neutrality and promote green growth by replacing the use of fossil fuels and using energy and resources more efficiently throughout the entire process of social and economic activities (...)*²⁹³

The definitions further include technology for coping with climate change, facilitating clean energy usage and efficiency as well as circular resource management and eco-friendly technology.²⁹⁴ Notably, the qualification requirements do not focus on certain fixed specific technology classes, and instead broadly encompass – in an “effect approach” – all technologies that have beneficial effects on the environment, on climate change mitigation and / or on the promotion of clean energy. In terms of the burden of proof, the applicant must explain the

²⁹⁰ Korean Intellectual Property Office, ‘IP Policies’ (n 289).

²⁹¹ cf footnote (n 281); See for the abolishment: Peter A. Jackman, ‘Options for Accelerating Examination of Renewable Technology Patent Applications’ (n 286); See the systematic change also indicated in the differences in the yearly reports of 2013 and 2014 in relation to the mentioning of the super acceleration: Korean Intellectual Property Office, ‘Annual Report 2013 (April 2015) 26

<https://www.kipo.go.kr/en/HtmlApp?c=60114&catmenu=ek07_01_01_13> accessed 12 January 2025; Korean Intellectual Property Office, ‘Annual Report 2014’ (June 2015) 26

<https://www.kipo.go.kr/en/HtmlApp?c=60114&catmenu=ek07_01_01_14> accessed 12 January 2025.

²⁹² Enforcement Decree of the Patent Act, Republic of Korea, Presidential Decree amended up to No. 32590, 19 April 2022 [2022] (n 281) article 9f.; In the past the KIPO required more strict conditions, e.g. that the applicants had to receive already state support for green technology or that the technology was certified as “green”: cf Joonyoung KWAK, ‘KIPO Reforms the Patent Application Preferential Examination System’ (February 2024) in: Young Mo KWON, Hyeon Gil RYOO, Seong Tahk AHN (eds), *Recent IP Developments in Korea*, Lee & Ko Newsletter p. 16 <https://www.leeko.com/news/leeko_ip/202402/lkip2402.pdf> accessed 12 January 2025.

²⁹³ See for the full definition: Framework Act on Carbon Neutrality and Green Growth for coping with Climate Crisis, Republic of Korea, amended up to Act No. 18469, 24 September 2021 [2021] art. 1 para. 16. <https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=59958&type=part&key=39> accessed 12 January 2025.

²⁹⁴ ibid; See further: Act on Promotion of Technology Development for coping with Climate Change, Republic of Korea, amended up to Act No. 18865, 10 June [2022] art. 2 para. 6 <https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=63949&type=sogan&key=54> accessed 12 January 2025; Framework Act on Resources Circulation, Republic of Korea, amended up to Act No. 16172, 31 December 2018 [2018] art. 2 para. 1 <https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=51210&type=part&key=39> accessed 12 January 2025.

need for an acceleration in detail in the written request and provide evidence to support the existence of a green technology application.²⁹⁵

(d) Peru

In brief, the last and most recent example for green acceleration programs is the “Programa Acelerado para Patentes Verdes” (Accelerated Green Patents Program) of the Peruvian National Institute for the Defense of Free Competition and the Protection of Intellectual Property (INDECOPI) which was launched in 2024.²⁹⁶

(aa) Programme outline

The participation in the Green acceleration programme is free of charge and open for all national patent applications and international patent applications entering the national phase, both of which must have been filed after 2 January 2023.²⁹⁷ Furthermore, the application, raised through a written application form of the INDECOPI,²⁹⁸ must (1) *relate to a Green patent technology* and (2) *the patent applications must have been published already and the opposition period must have terminated*.²⁹⁹ In the case of grant, the office accelerates the examination phase of the application in comparison to applications under the general procedure.³⁰⁰ Notably, the INDECOPI also facilitates PPH with selected Patent Offices, but does

²⁹⁵ Korean Intellectual Property Office, ‘Patent Examination System – Accelerated Examination’ (*kipo.go.kr*) (n 281); Min Son, ‘Korea increases punitive damages cap and introduces new unfair competition measures’ (n 281).

²⁹⁶ With further referrals to the official publications of the INDECOPI in Spanish: European Innovation Council and SMEs Executive Agency, ‘INDECOPI Peru launches an accelerated program for green patents’ (*intellectual-property-helpdesk.ec.europa.eu*, 3 May 2024) <https://intellectual-property-helpdesk.ec.europa.eu/news-events/news/indecopi-peru-launches-accelerated-program-green-patents-2024-05-03_en> accessed 12 January 2024; See the legal administrative resolution of the INDECOPI: Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (National Institute for the Defense of Free Competition and the Protection of Intellectual Property) Resolución N.º 001160-2024/DIN-INDECOPI, 24 April 2024 [2024] <<https://www.gob.pe/institucion/indecopi/normas-legales/5494153-001160-2024-din-indecopi>> accessed 12 December 2025.

²⁹⁷ Jesús González Ahijado, ‘Fostering sustainable innovation: INDECOPI’s Accelerated Green Patents Program in Peru’ (*hyaip.com News*, 15 May 2024) <<https://hyaip.com/en/fostering-sustainable-innovation-indecopis-accelerated-green-patents-program-in-peru/>> accessed 12 January 2024.

²⁹⁸ Ibid; Only available in Spanish: National Institute for the Defense of Free Competition and the Protection of Intellectual Property, ‘Solicitud de participación en el Programa Acelerado de Patentes Verdes’ (Application for participation in the accelerated green patent programme) (*gob.pe*, 24 April 2024) <<https://www.gob.pe/institucion/indecopi/informes-publicaciones/5494133-solicitud-de-participacion-en-el-programa-acelerado-de-patentes-verdes>> accessed 12 January 2025.

²⁹⁹ For further requirements: cf *ibid*.

³⁰⁰ See also for an expected reduced pendency of the examination of 6 months Katja Armejo, ‘Peruvian Fast-track Green Patent Program’ (*barredamoller.com – Articles*, 21 May 2024) <<https://www.barredamoller.com/en/noticia/peruvian-fast-track-green-patent-program>> accessed 12 January 2024; See for an expected reduced pendency of the overall patent application procedure to below a year: Song on Mon, ‘Peru launches fast-track examination program for green patent applications’ (*yezshimaip.com*, 13 May 2024) <<https://yezshimaip.com/en/node/5346?page=1>> accessed 12 January 2024.

currently not provide other general national fast-tracks.³⁰¹ The Green fast-track at the INDECOPI thus stands out as a single national acceleration programme.

(bb) National qualification standard and burden of proof

To meet the material requirement for successfully requesting an acceleration, the subject matter of the application must refer to a Green technology, which is eligible to qualify as a code under the IPC classification that is included as an environmental sound technology in the WIPO Green inventory.³⁰² Additionally, the applicant must materially prove the eligibility through a statement within the written application.³⁰³

bb. Interim result - Categorising the different approaches

Before analysing a potential improvement of the EPOs system, the outlined exemplary national programs will be categorised according to – but overall not limited to – their most significant aspects, into different “Tracks”, different Green Patent qualification standards and “levels” of the burden of proof.³⁰⁴

(a) Green Patent Tracks

In the international context, Intellectual Property Offices have facilitated different national fast-track schemes for Green Patents, which can be categorised as following:

1. Single Green Patent fast-track: IPOs can establish a Green Patent Fast-Track as an exclusive single national acceleration programme – not considering any PPH programs – like at the INDECOPI in Peru,³⁰⁵ and thus

³⁰¹ cf. World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, National/regional programs) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>> accessed 12 January 2025; World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, Patent Prosecution Highway (PPH) and Other Bilateral and Multilateral Initiatives) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-pph.pdf>> accessed 12 January 2025; cf Maria del Carmen Arana Courrejolles, ‘In brief: patent prosecution in Peru’ (*lexology.com*, 18 March 2019) <<https://www.lexology.com/library/detail.aspx?g=f0b8c0b8-03c9-4770-8dcb-a9f8cb16dbcb>> accessed 13 January 2025.

³⁰² See the translation: “Las solicitudes de patentes que podrán beneficiarse del Programa Acelerado para Patentes Verdes deberán tener como clasificación principal (primer orden) alguno de los grupos de la Clasificación Internacional de Patentes (CIP) mencionados en el Inventario Verde de la Clasificación Internacional de Patentes (CIP), IPC GREEN INVENTORY (*wipo.int*)” (Patent applications eligible for the Green Patent Fast-Track Program must have as their main classification (first order) one of the International Patent Classification (IPC) groups mentioned in the Green Inventory of the International Patent Classification (IPC) (IPC Green Inventory (*wipo.int*)): National Institute for the Defense of Free Competition and the Protection of Intellectual Property, ‘Solicitud de participación en el Programa Acelerado de Patentes Verdes’ (Application for participation in the accelerated green patent programme) (n 298) 3; Jesús González Ahijado, ‘Fostering sustainable innovation: INDECOPI’s Accelerated Green Patents Program in Peru’ (n 297).

³⁰³ World Intellectual Property Organisation, ‘IPC Green Inventory’ (*wipo.int*) <<https://www.wipo.int/classifications/ipc/green-inventory/home>> accessed 27 November 2024; Song on Mon, ‘Peru launches fast-track examination program for green patent applications’ (n 300).

³⁰⁴ cf for a separate categorisation approach into different “modes”: Li Xiangning, ‘Green Technology and Patents: in the European Context’ (Master Thesis European Business Law, Lund University 2020) 44-46.

³⁰⁵ cf chapter D. II. 1. c. aa. (d).

provide an incentive for Green Patent applications through the exclusionary character of the fast-track with respect to non-Green technology applications.

2. Parallel tracks – general acceleration and Green Patent track: IPOs may also introduce a Green Patent Fast-Track as one special option for acceleration in a Fast-Track programme with several parallel tracks, like in the UK, the Republic of Korea and the US. These programmes can be differentiated further:

a. Uniform acceleration for all tracks. All parallel tracks receive a uniform acceleration and only differ through the access requirements, as in the UK and the Republic of Korea. However, the Green Patent fast-track may provide easier access requirements and a lighter burden of proof.³⁰⁶ The Green Patent track creates an additional option to accelerate the application.³⁰⁷

b. Different levels of acceleration and procedural benefits. Represented in the approach of the USPTO, it is also an option to provide a parallel Fast-Track programme, where the Green-Fast Track is not the fastest option, but it incentivises by being free of cost (USPTO). In the case of the USPTO, this programme however comes with a limited contingent.³⁰⁸

c. Super-Acceleration. Lastly – outlined in the now abolished programme of the KIPO –, it is possible to introduce a fast-track programme with parallel acceleration tracks and one super-accelerated Green track, which creates an special incentivisation not only through the acceleration in relation to general application but also in relation to other (non-green) accelerated applications.³⁰⁹

3. Acceleration certificate: The USPTO also introduced the possibility to create additional acceleration incentives, by awarding an acceleration certificate in the context of a “Green Patent Award”.³¹⁰

(b) Green Patent qualification standards

Following up, the different qualification standards for green technology and Green Patents can be outlined as such:³¹¹

1. Open and broad qualification terminology: IPOs can work with a broad understanding of Green technology eligible for access, by using open

³⁰⁶ e.g. through the absence of an obligation to raise substantial reasons for an acceleration and through the low burden of only having to claim or assert the “Green nature” of the application (UK): cf. chapter D. II. 1. c. aa. (b) & (c).

³⁰⁷ cf chapter D. II. 1. c. aa. (c).

³⁰⁸ cf chapter D. II. 1. c. aa. (a).

³⁰⁹ cf chapter D. II. 1. c. aa. (c).

³¹⁰ cf chapter D. II. 1. c. aa. (a).

³¹¹ cf for consideration of either a broad concept of green inventions or a clear range of eligible technologies within one of the “modes”: Li Xiangning, (n 304) 44-46.

terms and definitions. These can be facilitated in a way that they encompass “clean” technologies in general, which are neutral or beneficial for environment in their nature, and by also comprising an additional or alternative effect-/ benefit-based approach, which targets technologies that mitigate climate change or provide benefits for the environment (UK, Republic of Korea).³¹²

2. Application of broad classification standards: For a more controlled qualification approach of Green technology, IPOs can also rely on international patent classification standards for Green technology, such as the WIPO IPC Green Inventory (Peru) or the CPC Y02 class (US). An access to the program may be granted if the technology qualifies in one of the classification categories.³¹³ While the WIPO IPC Green Inventory considers specific “environmental sound” technology classes, the slightly more open CPC Y02 class also encompasses beneficial climate effects or climate change mitigation effects.³¹⁴

3. Restricted classification standards. Lastly, IPOs can decide to limit the scope of access and the classification standards to only certain types of technology or green effects. Exemplary, in the Green Patent fast-track of the USPTO the CPC Y02 scheme is applied, but out of the categories, only applications relating to several aspects of greenhouse gas emissions are admissible for the fast-track.³¹⁵

(c) Burden of proof levels

Finally, the IPOs may introduce different levels for the burden of proof for the applicant with respect to the green nature of the application and the underlying technology:

1. No-evidence certification: For a low barrier, IPOs may deem it sufficient that the applicants merely certify or claim the green nature of their patent application (US). Nevertheless, it is up to the material decision of the patent examiner whether to grant access to the fast-track. The applicants thus influence the access through the outline and content of their patent application.³¹⁶

2. Low-evidence assertion: IPOs can require a low burden of proof, which obliges the applicant to assert the green nature of its application in writing. Certain evident green technology classes can already indicate the green nature and do not require additional assertion, while more ambiguous cases need to be supported by evidence (UK).³¹⁷

³¹² cf chapters D. II. 1. c. aa. (b) and (c).

³¹³ cf chapters D. II. 1. c. aa. (c), (d) and (e).

³¹⁴ cf chapter C. I. 2.

³¹⁵ cf chapter D. II. 1. c. aa. (a).

³¹⁶ cf chapters D. II. 1. c. aa. (a).

³¹⁷ cf chapter D. II. 1. c. aa. (b).

3. Material evidence: To create a higher barrier, IPOs may also require the provision of written statements (Peru) and additional material evidence (Republic of Korea).³¹⁸

d. Integration of a Green Patent fast-track into the system of the EPO

Taking into account the various international approaches to Green Patent fast-tracks, the EPO could integrate a Green fast-track into its current patent application system.

aa. Suitable track

First off, it is important to consider that the EPO's PACE programme is already an optional, free of cost programme, which does not require material reasons (e.g. urgency, risk of infringement) for access.³¹⁹ Therefore, the most efficient way to create an incentivising distinction for the Green Patent fast-track, without abolishing the general PACE programme, would be through the establishment of a "super-accelerated"-track exclusively open for Green Patent applications.³²⁰ The super-acceleration could e.g. aim for a further reduction of the three month examination phase period of the general PACE track or could also focus on further reducing the six months search phase in comparison to the "Early certainty from Search" scheme.³²¹ To prevent an overuse and capacity blockade, the EPO could – similar to the USPTO – introduce a contingent for a first pilot programme, which could be adapted yearly and potentially lifted if the EPO proves to manage the numbers of applications.³²² However, in relation to the maximum acceleration reached, the Green Patent fast-track might be limited and reasonably be delayed for first applications, which cannot make use of a priority date, because all the potential prior art must be considered in the top-up search to maintain patent quality.³²³

bb. Access requirements and burden of proof level

In order to streamline and harmonise the overall patent procedure, the EPO could connect the access to the fast-track to the qualification of the subject matter within the broad "Green" Y02 subclass of CPC classification.³²⁴ As already suggested above as a potential improvement of the classification practice, the applicants should be able to claim and certify, in the

³¹⁸ cf chapters D. II. 1. c. aa. (c) & (d).

³¹⁹ cf chapter D. II. 1. b. aa.

³²⁰ Also considered as an option for the EPO, but ultimately not chosen as the best suitable option: cf Li Xiangning, 'Green Technology and Patents: in the European Context' (Master Thesis European Business Law, Lund University 2020) 45, 51.

³²¹ *ibid.*

³²² cf chapter D. II. 1. c. aa. (a) (aa).

³²³ cf chapter D. II. 1. b. aa.

³²⁴ cf chapter C. I. 2. b.

sense of a rebuttable presumption, the green nature of their application, which the EPO then would review automatically.³²⁵ Nevertheless, to not exclude patent applications that cannot be qualified within the CPC Y02S scheme, but might still be beneficial for the environment, the EPO could also introduce a supplementary default clause, which would enable an access to the fast-track for Green Patent applications that *(1) mitigate the effects of climate change and/or (2) create effects beneficial for the environment*. However, this clause would require a higher burden of proof for the applicant and the provision of further material arguments and evidence.³²⁶ Notably, a grant of access would still be up to the discretion of the examiner, but this approach would facilitate a higher level of flexibility, in particular in relation to the dynamic field of green technology.

cc. Legal integration of the programme at the EPO

Finally, the EPO would have to introduce such a Green Patent fast-track legally. In general, the EPO can establish administrative guidelines for the search and examination phase by notices of the President of the.³²⁷ However, a Green Patent fast-track might have to be evaluated differently due to a potential conflict with material provisions of the EPC. According to Art. 52 EPC, “any” patent applications may – in general – be patentable, and the article does not differentiate between different kinds of technology, like between “green” and “pollution”-technology.³²⁸ This is further supported by Art. 94 EPC, which also provides a universal equal examination of all patent applications.³²⁹ Moreover, under Art. 125 EPC, the EPO considers general principles of procedural law, which encompass the principle of equal procedural rights for the applicants,³³⁰ and might also cover an equal access to accelerated examination. On the other hand, the EPC also provides the consideration of general public interests like public security, rights of individuals, morality and environment protection, that might limit the scope of the applicants rights again.³³¹ Environmental interests may thus be considered as a public interest outweighing the preferential treatment of Green applications. Thereby, in order to avoid a potential internal conflict of law, the EPOrg could introduce the Green fast-track as a “Green PACE” programme by an administrative notice and a parallel

³²⁵ cf chapter C. I. 3. & 4.

³²⁶ cf chapters D. II. 1. c. aa. (c) & (d).

³²⁷ As an example, see the legal establishment of the PACE programme: footnote (n 217).

³²⁸ cf Nina Ferara, Peter de Lange, Andrew Rudge in Kaisa Suominen (ed), *Visser’s Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 60; European Patent Convention, art. 52.

³²⁹ cf European Patent Convention, art. 94.

³³⁰ Ferara, Lange, Rudge, in Suominen (n 328) 363; European Patent Convention, art. 125.

³³¹ Ferara, Lange, Rudge, in Suominen (n 328) 70; European Patent Convention, art. 53.

legislative change of the EPC through a revision conference.³³² As a result, the the provision of the programme would also become legally binding for the EPO by creating new competences and obligations in relation of the grant of patents for the EPO and it could also emit strong signal in the legal landscape to commit to the mitigation of climate change.³³³ This thesis exemplary proposes the introduction of the new Art. 94a EPC:

Art. 94a EPC Acceleration of Green European patent applications: The European Patent Office shall facilitate a programme accelerating the search and examination phase of a European patent application. The programme shall be exclusively reserved for European patent applications that (1) can be classified according to the CPC Y02 subclasses or (2) substantially prove that the technology comprised in the application mitigates the effects of climate change or creates beneficial effects for the environment. The European Patent Office shall, in accordance with the Implementing Regulations, examine the application to the fast-track on request and free of charge.

As a potential area for further research, the thereby established Green PACE could also be supplement by the introduction of new and Green PPHs that enable the EPO to additionally re-use the work products of other IPOs and also further streamline European and other international Green acceleration programs.³³⁴ Finally, in order to also reduce potential disadvantages for the applicants of a Green fast-track in respect to higher renewal cost resulting out of a longer patent lifetime, the fast-track could also be accompanied by an automatic supplementary reduction of renewal fees upon accessing the programme.³³⁵

2. Fast-tracking of the application for the Unitary Patent effect at the EPO

The Fast tracking of a Green Patent application might also pose a procedural incentive in the context of the Unitary Patent and the UPC. This would require an interest in acceleration with relation to the duration of the granting procedure of the Unitary Patent, the overall term of unitary protection or an otherwise delayed entry infringement proceedings.

³³² European Patent Convention, art. 172.

³³³ cf European Patent Convention, art. 4(3); cf Ferara, Lange, Rudge, in Suominen (n 328) 162.

³³⁴ cf World Intellectual Property Organisation, 'IPO Green' (*wipo.int*, Green Patent Prosecution Highways', IPO Green Policy Note 8) <<https://www3.wipo.int/wipogreen/en/ipo-green/>; <https://www3.wipo.int/wipogreen/en/docs/ipo-green-policy-note-8.pdf>> accessed 14 January 2025; cf European Patent Office, Patent Prosecution Highway programme between the IP5 Offices based on PCT and national work products [2022] OJ EPO 2022, A115, p. 1; cf chapters D. II. 1. b. bb. & cc.

³³⁵ cf chapter D. II. 1. a.; cf Hilty and Batista (n 221) 829f., 836.

a. Duration of grant and date of effect

Generally, while the EU governs the legal effect of the Unitary Patent under its law, the EPO is the relevant body for granting and administering the unitary effect.³³⁶ Not later than a month after the EPO grants the European patent, applicants may request the issuance of the unitary effect at the EPO, which the EPO reviews formally and materially and grants in the case of compliance with the law.³³⁷ Afterwards the unitary effect is registered in the register for Unitary Patents.³³⁸ This might indicate – without considering a necessity for national validation of European patents – that the granting of a Unitary Patent takes longer than the granting of a “classic” European patent.³³⁹ The EPO does not supply specific statistics on the procedural duration for the request for unitary effect until grant. Nevertheless, the statistics of registered unitary effects in 2023 – the year of introduction – present that the EPO granted nearly all requests for unitary effect that year, also requests of December, thus indicating a rapid processing of the request.³⁴⁰ This also aligns with the systematic intention behind the Unitary Patent to provide a simple and straightforward procedure for obtaining the right.³⁴¹ Therefore, the unitary effect is usually already granted within a shorter time (weeks) and this reduces the potential additional incentive effect of an extra “Green Acceleration” already.

Moreover, upon grant, the unitary effect is enacted from the day of the publication of the mention of the grant of European patent application, which underlies the Unitary Patent application.³⁴² Therefore, the date of effect for the Unitary Patent dates back and provides a retroactively unitary protection within the territory of the UPC contracting states.³⁴³ The overall duration of unitary protection is therefore independent from the speed of the unitary

³³⁶ Regulation (EU) 1257/2012 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, art. 4 & 9; Rules relating to Unitary Patent Protection as adopted by decision of the Select Committee of the Administrative Council of the European Patent Organisation of 15 December 2015 and as last amended by decision of the Select Committee of the Administrative Council of 23 March 2022 [2022] OJ EPO 2022, A41, rule 1; See also chapter: B. II.

³³⁷ See the requirements in detail: Rules relating to Unitary Patent Protection [2022] OJ EPO 2022, A41 (n 336) rule 5ff; Regulation (EU) 1257/2012 [2012] OJ L 361/1 (n 336) art. 3.

³³⁸ *ibid.* rule 7 (1).

³³⁹ Thomas Jaeger and Johannes Lukan, ‘Asystem fit for innovation? Part I: (Dis-)incentives for potential patentees in the UP legal framework’ in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 363.

³⁴⁰ European Patent Office, ‘Statistics & Trend Centre – Requests for unitary effect 2023’ ([epo.org](https://www.epo.org/en/about-us/statistics/statistics-centre#/unitary-patent)) <<https://www.epo.org/en/about-us/statistics/statistics-centre#/unitary-patent>> accessed 14 January 2025;

³⁴¹ European Patent Office, ‘Unitary Patent Guide’ (2024) 3rd edition November 2024 ([epo.org](https://www.epo.org/en/legal/guide-up/2024/index.html)) chapter A. V. no. 40f. <<https://www.epo.org/en/legal/guide-up/2024/index.html>> accessed 14 January 2025.

³⁴² Regulation (EU) 1257/2012 [2012] OJ L 361/1 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, art. 4 (1).

³⁴³ See also: Regulation (EU) 1257/2012 [2012] OJ L 361/1 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, preamble no. 8; Pieter Callens and Sam Granata, *The Unitary Patent and the Unified Patent Court* (2nd edn, Wolters Kluwer 2024) 44.

effect granting procedure at the EPO and is streamlined with the lapse of the European patent.³⁴⁴ Thereby, the pendency of the granting of the unitary effect does not reduce the overall duration of the unitary protection and thus reduces an interest for acceleration.

b. Patent enforcement within the granting period

However, it is important to note, that after the request and before the grant of the Unitary Patent, the applicant does not have a fully enforceable Unitary Patent yet, which could be the basis of an infringement proceeding and a claim for damages or cease and desist at the UPC.³⁴⁵ While the UPC might also be competent to grant provisional injunctions before a patent grant, the scope of protection and granting practice bears higher risks for the applicant.³⁴⁶ Therefore, if the applicant would also be limited in the ability to start proceedings under the already granted European patent (as the basis of the Unitary Patent) at the UPC, then there still might be room left for an interest in an accelerated grant of the unitary effect in order to enable infringement proceedings as soon as possible.

After the grant of the European patent, the national validation is essential in most of the EPC contracting states to create enforceable national European patent parts in front of the UPC or the national courts.³⁴⁷ Only several states under the London Agreement enable an automatic validation on grant of the European patent and thus an immediate enforceability.³⁴⁸ Thereby,

³⁴⁴ cf Rules relating to Unitary Patent Protection [2022] OJ EPO 2022, A41 (n 336) rule 14; European Patent Convention, art. 63.

³⁴⁵ Agreement on a Unified Patent Court, art. 3(a), 32(1)(a), 63, 64; cf Alexander Harguth, Konstantin Schallmoser and Steven C. Carlson, *Patent Litigation Through the Unified Patent Court and German Courts*, (1st edn. Kluwer Law International B.V. 2023) 197 ff; However it is possible to claim compensation for pre-grant and post-publication infringements after the grant of the patent: cf Callens and Granata, *The Unitary Patent and the Unified Patent Court* (n 343) 164; Agreement on a Unified Patent Court, art. 32(1)(f); European Patent Convention, art. 67.

³⁴⁶ Agreement on a Unified Patent Court, art. 32(1)(g); cf Katharine Stephens (ed), *A Guide to the UPC and the UP* (Bird & Bird LLP 2023) chapter 10, no 85f. <<https://www.twobirds.com/en/insights/2023/global/a-guide-to-the-unified-patent-court-and-the-unitary-patent>> accessed 16 January 2025.

³⁴⁷ cf Harguth, Schallmoser and Carlson, *Patent Litigation Through the Unified Patent Court and German Courts* (n 345) 35, 323 & 327; Even though the European patent takes legal effect after the grant, if the validation is not completed, the states might consider the patent invalid from the beginning thus rendering a potential enforcement impossible: European Patent Convention, art. 65(3); cf Nina Ferara, Peter de Lange, Andrew Rudge in Kaisa Suominen (ed), *Visser's Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 147; cf Paul England and others, *A Practitioner's Guide to the Unified Patent Court and Unitary Patent* (Hart Publishing 2022) 5.

³⁴⁸ cf Ibid; European Patent Office, London Agreement Agreement dated 17 October 2000 on the application of Article 65 EPC OJ EPO 2001, 549 Supplementary publication 4, OJ EPO 2016, 506; European Patent Office, 'Agreement on the application of Article 65 EPC – London Agreement' (*epo.org*) <<https://www.epo.org/en/legal/london-agreement>> accessed 16 January 2025; cf European Patent Office, 'Translation requirements after grant' (*epo.org*) <<https://www.epo.org/en/legal/national-law/2024/iv/index.html>> accessed 16 January 2025; With respect to the jurisdiction of the UPC: cf Marc Miller, 'The co-existence between EPC and patents with unitary effect' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 457; cf Nina Ferara, Peter de Lange, Andrew Rudge in Kaisa Suominen (ed), *Visser's Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 150.

the applicant must generally decide – after the grant of the European patent – whether to request a unitary effect or to enact a validation of the national parts of the European patent.³⁴⁹ A combination of both patents is only possible in relation to European patents in contracting states not covered by the UPCA and thus a double patenting of both unitary and European patents in their national parts for the UPCA contracting states is not possible.³⁵⁰ Notably, if the applicant requests a unitary effect, an additional validation of the national parts for European patents in UPCA contracting states is rendered practically obsolete,³⁵¹ because the national parts cease to exist upon registration of the unitary effect.³⁵² It would also require additional effort and costs for the validation processes, thus undermining the benefits of the Unitary Patent, which are inter alia the saving of costs for validation.³⁵³ Even though, in theory, the (non-automatic) validation of a European patent is possible before the grant of the Unitary Patent, the abovementioned arguments make it in general not practically feasible.³⁵⁴ This leads to the problem, that without a Unitary Patent and without national (non-automatic) validations of the underlying European patent, the applicant would not be able to enforce both of the patent rights fully before national courts or the UPC in the period between filing for unitary effect and grant.³⁵⁵ Therefore, a gap for a full procedural patent protection can be identified.

c. Interim result

Henceforth, the applicant can have an interest in receiving the Unitary Patent protection as quickly as possible in order to litigate potential infringers quickly under full material protection. It is important to note that the retroactive effect of the Unitary Patent grants full (retroactive) unitary protection from the day of publication of the European patent and thus enables

³⁴⁹ See also for the respective timelines: Rules relating to Unitary Patent Protection [2022] OJ EPO 2022, A41 (n 336) rule 5ff; cf Harguth, Schallmoser and Carlson, *Patent Litigation Through the Unified Patent Court and German Courts* (n 345) 35.

³⁵⁰ Regulation (EU) 1257/2012 [2012] OJ L 361/1 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, art. 4 (2); Callens and Granata, *The Unitary Patent and the Unified Patent Court* (n 343) 37; Nina Ferara, Peter de Lange, Andrew Rudge in Kaisa Suominen (ed), *Visser's Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 151.

³⁵¹ Not considering contracting states with an automatic validation, cf footnote (n 348).

³⁵² cf *ibid.*; cf European Patent Office, 'Unitary Patent Guide' (2024) 3rd edition November 2024 (*epo.org*) chapter A.V no. 37ff. <<https://www.epo.org/en/legal/guide-up/2024/index.html>> accessed 15 January 2025.

³⁵³ European Patent Office, 'Unitary Patent Guide' (2024) (n 352) chapter A. V no. 37ff.

³⁵⁴ cf footnotes (n 349 & 352) Under consideration of the already rather swift proceedings in granting the unitary effect, it is also questionable whether a national validation could in practice be received before the unitary effect: EPO, 'Unitary Patent Guide' (2024) (n 352) chapter A. IV n 36.

³⁵⁵ cf Agreement on a Unified Patent Court, art. 5(a) & (c), art. 32(1)(a); cf Nina Ferara, Peter de Lange, Andrew Rudge in Kaisa Suominen (ed), *Visser's Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 150f.; cf footnote (n 347); Not considering a potential provisional protection as discussed in: cf footnote (n 345).

an enforcement immediately from the day of grant of the unitary effect.³⁵⁶ An acceleration thereby enables the patent holder to make use of this retroactive effect as fast as possible with respect to an enforcement. Further aspects for consideration with respect to an acceleration can be the applicant's interest in a quick commercialisation and an early licensing of the Unitary Patent as a whole.³⁵⁷

In conclusion, while the potential of an acceleration of the unitary effect granting procedure at the EPO is limited, it can still provide a (minor) incentive for Green patent applicants wishing to enter into unitary litigation, commercialisation or licensing as quickly as possible. This thesis thereby proposes to expand the already suggested Green-PACE fast-track at the EPO to also include a Green Unitary Patent fast-track. In order to do so the EPO could integrate an option for European patent applications, which are processed under the Green Patent Fast-track and request a unitary effect, to also request an accelerated processing of the unitary effect. This would then be granted automatically. By this approach, the Green PACE would also further streamline the overall efficiency of the Green Patent fast-track and could also consider measures for Green technologies in the context of the Unitary Patent.³⁵⁸

3. Accelerated “Green” litigation proceedings at the Unified Patent Court

Continuing, Green patent holders might also have an interest in receiving quick post-grant infringement proceedings at the UPC. Therefore, an exclusive expedited Green patent litigation procedure or an additional “Green” acceleration in comparison to general acceleration options at the UPC, might pose another incentive for Green Patents. This chapter thus aims to review the general procedural speed of the UPC, existing procedural options to pursue a swift protection of patents and to analyse whether an accelerated litigation for Green patent at the UPC can be an effective incentive for Green Patents.

a. General procedural speed at the UPC

Patent infringement cases can come in general with complex and lengthy proceedings at the admissible national courts in Europe spanning from an average of 12 months to up an average up to 42 months.³⁵⁹ The newly established UPC aims in principle to provide the final oral

³⁵⁶ cf footnotes (n 342 & 343).

³⁵⁷ cf Regulation (EU) 1257/2012 [2012] OJ L 361/1 implementing enhanced cooperation in the area of the creation of unitary patent protection [2012] OJ L 361/1, art. 3 (2), 8.

³⁵⁸ cf footnote (n 162).

³⁵⁹ Covering patent statistics from 2000-2010: Stuart J.H. Graham and Nicolas Van Zeebroeck, ‘Comparing Patent Litigation Across Europe: A First Look’ (2014) 17 Stanford Technology Law Review 655, 667 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1924124> accessed 17 January 2025; Spanning 2000-2008: Katrin Cremers and others, ‘Patent litigation in Europe’ (2017) 44 European Journal of Law and Economics 1, 26 <<https://link.springer.com/article/10.1007/s10657-016-9529-0>> accessed 17 January 2025.

hearing of a first instance infringement proceeding within 12 months of filing the action.³⁶⁰ Notably, the UPC also considers the specifications of the exact case and can enable a quicker or longer processing when required and possible.³⁶¹ The UPC ensures this general fast procedural pace through tightened time limits for procedural actions of the parties in the written procedure, as well as by a self-set benchmark to provide a decision within six weeks after the oral hearing, thus ensuring timely proceedings.³⁶² While the statistics on the UPC, which is now more than 18 months old, are just consecutively accumulating, first numbers indicate that the UPC can meet the one-year line and can thus keep up with the goal of swift infringement proceedings.³⁶³

b. Expedited procedural options and conflict with procedural principles

In relation to procedural measures to expedite the proceeding, Rule 9(3)(b) of the Rules of Procedure enables the court to shorten the procedural time periods for the infringement action by its discretion.³⁶⁴ This could enable e.g. a shortening of in particular the written procedure, which requires most of the time of the overall procedure.³⁶⁵ As a requirement, one party must explicitly requests such shortening and provide a substantial reason.³⁶⁶ However, the UPC appears to be already hesitant to grant an extension of the time periods to maintain the speed of the procedure.³⁶⁷ Thus, it remain to be seen on what grounds the UPC will actually consider the opposite shortening of the periods. As for another already existing option for acceleration,

³⁶⁰ Rules of Procedure of the Unified Patent Court as adopted by decision of the Administrative Committee on 8 July 2022, preamble no. 7 <<https://www.unified-patent-court.org/en/court/legal-documents?page=0>> accessed 17 January 2025.

³⁶¹ *ibid.*

³⁶² Rules of Procedure of the Unified Patent Court (n 361) rule 19, 23, 25, 29, 30, 32, 118(6.); For an overview of the procedure and usual timetable: Heuking, ‘Procedure and deadlines of a UPC infringement procedure’ (*heuking.de*) <<https://www.heuking.de/en/expertise/patent-law/unitary-patent/procedure-and-deadlines-of-a-upc-infringement-procedure.html>> accessed 17 January 2025; See the course of the process in more detail: Harguth, Schallmoser and Carlson, *Patent Litigation Through the Unified Patent Court and German Courts* (n 345) 191ff.

³⁶³ cf Juliet Hibbert and Chris De Mauny, ‘The UPC in 2024: Statistics, Trends and Substantive Law’ (*ip-watchdog.com*, 17 December 2024) <<https://ipwatchdog.com/2024/12/17/upc-2024-statistics-trends-substantive-law/id=183996/>> accessed 17 January 2025; Colin Devinant, ‘The Unified Patent Court: Also an Attractive Jurisdiction for SMEs’ (*jonesday insights*, 25 November 2024) <<https://www.jonesday.com/en/insights/2024/11/the-unified-patent-court-also-an-attractive-jurisdiction-for-smes>> accessed 17 January 2025; Bao Tran, ‘Unified Patent Court Statistics: Trends and Insights’ (*PatentPC Blog*, 16 January 2025) <<https://patentpc.com/blog/unified-patent-court-statistics-trends-and-insights>> accessed 17 January 2025; Heike Röder-Hitschke, ‘One year Unitary Patent and Unified Patent Court in facts and figures’ (*maiwald.eu*, 17 June 2024) <<https://www.maiwald.eu/cn/maiwald-blog/one-year-unitary-patent-and-unified-patent-court-in-facts-and-figures-draft/>> accessed 17 January 2025.

³⁶⁴ Rules of Procedure of the Unified Patent Court (n 361) rule 9(3)(b); Callens and Granata, *The Unitary Patent and the Unified Patent Court* (n 343) 260f.

³⁶⁵ cf footnote (n 362).

³⁶⁶ See footnote (n 364).

³⁶⁷ UPC CFI 363/2023 Local Division Duesseldorf, order of the Court of First Instance of the Unified Patent Court of 20 January 2024; UPC CFI 412/2023 Central Division Paris, order of the Court of First Instance of the Unified Patent Court of 9 February 2024.

Rule 343(2)(a) Rules of Procedure allows the parties to apply for a prioritisation and general acceleration of the legal action.³⁶⁸ This diverges from the general practice of the court that the UPC processes the actions in the order in which they become ready for hearing.³⁶⁹ As there are no explicit guidelines for determination yet, the parties must provide substantial reasons for such prioritisation.³⁷⁰

The grant of these expeditions is, however, under the discretion of the presiding judges and the UPC.³⁷¹ As a general principle, the UPC must ensure a fair and equal proceeding, when applying the UPCA and the Rules of Procedure by its discretion and balance the procedural rights of both parties.³⁷² These principles apply in particular to the interest of both parties to be heard in front of the court and to have sufficient time to prepare the respective required written and oral actions within the provided timelines.³⁷³ In this context and in respect of a potential expedition of the written procedure and a shortening of the parties timelines, it is important to note, that the deadlines for the parties within infringement proceedings are in practice already considered tight, in particular under consideration of the often technical and complicated questions of violation of the patent.³⁷⁴ The room for an acceleration is therefore already limited. Consequently, a further shortening, without unfairly restricting the right to be heard by a party, is therefore only possible in atypical urgent cases or in cases where both parties agree on such changes of the timeline.³⁷⁵

³⁶⁸ Rules of Procedure of the Unified Patent Court (n 361) rule 343(1) & (2)(a); cf Katharine Stephens (ed), *A Guide to the UPC and the UP* (n 345) chapter 14 no. 11f.

³⁶⁹ *ibid.*

³⁷⁰ *ibid.*

³⁷¹ cf footnote (n 368).

³⁷² Also considering the efficiency of the proceedings and the individual complexity of the case: Agreement on a Unified Patent Court, preamble no 6, art 41(3), 42, 52, 76(2); Rules of Procedure of the Unified Patent Court (n 361) preamble no. 2 & 5, rule 101 (2), 111, & 262a(6); Harguth, Schallmoser and Carlson, *Patent Litigation Through the Unified Patent Court and German Courts* (n 345) 212; Callens and Granata, *The Unitary Patent and the Unified Patent Court* (n 343) 182f.

³⁷³ Agreement on a Unified Patent Court, art. 76(2).

³⁷⁴ cf *Ibid*; cf Tobias Baus, Amanda Ebbut and Charlotte Garnitsch, ‘The challenging timeline of patent infringement proceedings before the Unified Patent Court’ (*taylorwessing Briefing*, 23 September 2022) <<https://www.taylorwessing.com/de/insights-and-events/insights/2022/09/the-challenging-timeline-of-patent-infringement-proceedings-before-the-unified-patent-court>> accessed 17 January 2025; Niclas Gajeck, ‘Flexible Case Management, Strict Deadlines? The Procedure Before the UPC’ (n 375); Heuking, ‘Procedure and deadlines of a UPC infringement procedure’ (n 362).

³⁷⁵ See in respect to the shortening of time periods under Rule 9(3)(b): cf Niclas Gajeck, ‘Flexible Case Management, Strict Deadlines? The Procedure Before the UPC’ (*noerr.com Insights*, 28 April 2023) <<https://www.noerr.com/en/insights/flexible-case-management-strict-deadlines-the-procedure-before-the-upc>> accessed 17 January 2025; cf Callens and Granata, *The Unitary Patent and the Unified Patent Court* (n 343) 261; See for an agreement on an extension by the parties, which was considered “reasonable” by the court: UPC CFI 395/2023 Local Division Paris, procedural Order of the Court of First Instance of the Unified Patent Court of 12 February 2024.

The same applies to the timetables on side of the UPC, which could also be considered as a connecting point for an expedition, such as the goal of issuing the decision after an hearing within six weeks.³⁷⁶ Generally, the UPC thrives to maintain a high quality of judgements.³⁷⁷ Decisions in complex technical cases necessarily need time to prepare and the benchmark of six weeks aims already for fast decisions.³⁷⁸ Therefore, justifying a shortening of the UPC periods or a prioritisation and thus an acceleration only on the basis of the nature of a (Green) patent without considering the complexity of the case and the lack of atypical circumstances or agreement of the parties, could thus impede the procedural rights of the other party or the quality of the UPC decisions.

Another key point is, that the parties also always have the option to apply for provisional measures and have an action issued within a short time, sometimes within a number of days.³⁷⁹ For that, they have to prove inter alia a threatened infringement and a special necessity of the immediate provisional measures.³⁸⁰ This again broadens the general options for acceleration and reduces the necessity to provide further exclusive acceleration for Green Patents. Furthermore, it highlights again that a restriction of the parties procedural rights through a shortening or exclusion of the right to be heard, may only apply in specific urgent cases and requires a balancing of an interest.³⁸¹

c. Interim result

To sum it up, the UPC offers options for provisional measures or accelerated proceedings for all parties. Nevertheless, in order to maintain the general principles of the UPC of a fair and equal trial, the right to be heard and the quality of the process, these expedited options require urgency, atypical circumstances or agreements of the parties. Green Patents can in general

³⁷⁶ cf *ibid*; cf footnote (n 362).

³⁷⁷ Agreement on a Unified Patent Court, art 41(3); Katharine Stephens (ed), *A Guide to the UPC and the UP* (n 345) chapter 5 no. 1.

³⁷⁸ cf Henrik Holzapfel, Charles Larsen and Diana Pisani, 'Legal Lens on the Unified Patent Court' (*mwe.com Insights*, January 2024) <<https://www.mwe.com/insights/legal-lens-on-the-unified-patent-court-january-2024/>> accessed 18 January 2025; The UPC must also generally issue the decision as soon as possible, thus also before the six week benchmark if the individual case allows it: Rules of Procedure of the Unified Patent Court (n 361) rule 118(6.)

³⁷⁹ Agreement on a Unified Patent Court, art. 32(c), 62; Rules of Procedure of the Unified Patent Court (n 361) rules 205ff; Harguth, Schallmoser and Carlson, *Patent Litigation Through the Unified Patent Court and German Courts* (n 345) 283; cf Holzapfel, Larsen and Pisani, 'Legal Lens on the Unified Patent Court' (n 378); With a provisional decision ex-parte on the same day: UPC CFI 177/2023 Local Division Duesseldorf, order of the Court of First Instance of the Unified Patent Court of 22 June 2023.

³⁸⁰ *ibid*.

³⁸¹ Agreement on a Unified Patent Court, art. 62(2).

access these expedition options, but must also prove these substantial reasons. The introduction of an acceleration for Green Patents without the requirement to present substantial reasons could endanger these procedural rights and principles.

These standards also align with the general practice in the international exemplary comparison. As two exemplary approaches, both the UK Patents courts and the General Division of the Singapore High Court offer general expedited procedure programs for patent proceedings of all technology classes.³⁸² For an expedition at the UK Patent court, it considers under their discretion multiple factors such as good reasons for an expedition, compliance with principles of good administration and justice, as well as prejudice to the other party.³⁸³ The Singapore High Court requires – with respect to an access to the simplified process framework – a monetary limit for the claim and a suitability for the process under consideration of the complexity of the case.³⁸⁴ A participation in the Express track requires a consent of the parties.³⁸⁵ Thereby, both jurisdiction's expedited procedures require substantial reasons (like urgency, consent of the parties, simple cases) and further consider the individual complexity of the case, as well as the procedural rights and interests of the other party, in order to justify the expeditions impact on the procedural rights of the other party and to take into account the capacity of the court.³⁸⁶ As a result, an additional exclusive acceleration of Green Patents without having to provide substantial reasons is – for the time being – not feasible. Moreover, the UPC – as already emphasised – processes quickly and the timelines for the parties are calculated tight already. Thereby, with regard to a potential second outline of a procedural acceleration for Green Patents, even the introduction of an exclusive additional acceleration for Green Patents that also requires the provision of substantial reasons is limited in terms of room for acceleration. Thus, latter option is also not a practical incentive.

³⁸² In respect to Singapore: Pin-Ping Oh and Christine Saw, 'Patent Litigation in Practice Series: Spotlight on Singapore: The Simplified Process vs Express Track in Singapore' (*Bird & Bird Patenthub Insights*, 12 November 2024) <<https://www.twobirds.com/en/patenthub/shared/insights/2024/singapore/patent-litigation-in-practice-series-spotlight-on-singapore#page=1>> accessed 18 January 2025; Singapore Rules of Court 2021 [2021] No. S 914/2021, order 46A & 65 <<https://sso.agc.gov.sg/SL/SCJA1969-S914-2021?DocDate=20240610&WholeDoc=1>> accessed 18 January 2025; In respect to the UK: *WL Gore & Associates GmbH v Geox SPA* [2008] England and Wales Court of Appeal Civ 622; *Nicoventures Trading Ltd v Philip Morris Products, SA (A Company Formed Under the Laws of Switzerland) & Anor* [2020]] England and Wales High Court 1594; cf in detail: Ashley Allen, 'What's the Rush? Lessons from applications for an expedited trial' (*gatehouselaw.co.uk Articles*, 13 January 2021) <<https://gatehouselaw.co.uk/whats-the-rush-lessons-from-applications-for-an-expedited-trial/>> accessed 18 January 2025.

³⁸³ Notably, a mere commercial certainty is not sufficient, cf *ibid*.

³⁸⁴ *ibid*.

³⁸⁵ *ibid*.

³⁸⁶ *ibid*.

Nevertheless, the option of a green accelerated infringement proceeding might become a more relevant procedural incentive in the future again, if the UPC were not able to meet its self set timelines and the proceedings would significantly exceed one year benchmark, or if the UPC would prove a very restricted application of the general acceleration provisions.³⁸⁷ Since its launch, however, the UPC can ensure a quick procedural processing of Green Patents through its already existing scheme and can facilitate technology incentives indirectly through the overall pan-European outline and efficiency of the Unitary Patent system.³⁸⁸ The UPC thus has to prove, if it can maintain these expectations or if an adaption will be necessary in the future, in order to improve the incentive effect.

III. Material law incentives

Another way to set incentives for Green Patents can be by changes of the material law, influencing the scope of protection for patents. With the EPO focusing on the grant-procedure³⁸⁹ and the UPC dealing with post-grant litigation questions, this shifts the focus to the EU creating post-grant material law for its member states.

1. “Negative” regulation of the European Union

As a general principle, a granted patent law grants its holder a negative exclusionary right to prohibit violations by others.³⁹⁰ However, it explicitly does not provide an absolute positive right to – inter alia – use, sell and import the respective patented technology without limits.³⁹¹ The actual potential scope of application of the patented technology is thus shaped significantly by the boundaries set within material law.³⁹² This opens the possibility for the law-

³⁸⁷ The length of the proceedings (exceeding the desired timeframes) is seen as a factor influencing the incentive effect of expedited programmes in the case of the UK patent court: David Wilson and Selina Badiani, ‘No time to wait in line: Expedition in the UK Patents Court’ (*carpmaels.com* 25 March 2022) <<https://www.carpmaels.com/no-time-to-wait-in-line-trends-in-recent-cases-on-expedition-before-the-uk-patents-court/%3C>> accessed 18 January 2025.

³⁸⁸ cf footnote (n 162); Sarah Taylor, ‘The UPC: lessons learned from the first 18 months’ (*Pinsent Masons Out-Law Analysis*, 17 December 2024) <<https://www.pinsentmasons.com/out-law/analysis/upc-lessons-learned-first-18-months>> accessed 25 January 2025; Bao Tran, ‘Unified Patent Court Statistics: Trends and Insights’ (n 363).

³⁸⁹ Also consisting of material law in respect of inter alia the material grant requirements: footnote (n 69).

³⁹⁰ cf Hanns Ullrich, ‘The unified patent court’ (2023) 42 Yearbook of European Law 135, 144 <<https://doi-org.uaccess.univie.ac.at/10.1093/yel/yead007>> accessed 21 November 2023; European Patent Convention, art. 64.

³⁹¹ EPO Board of Appeals, *Euthanasia Compositions/MICHIGAN STATE UNIV.*, Decision of 11 May 2005 [2005] T 0866/01, p. 9.7; Biotechnology Directive, preamble no. 14; cf European Patent Convention, art. 64.

³⁹² cf Ibid; The EPC also comprises already inherent exceptions to patentability already inherent, which prohibit the grant of a patent: European Patent Convention, art. 53.

maker to limit the material scope of application and commercialisation of non-green, pollution technologies in practice in a “negative” approach.³⁹³ As a result, if pollution technologies are banned or restricted, investment in Green Patents and technologies becomes more attractive and Green Patents are indirectly incentivised.³⁹⁴

The EU already introduced multiple “negative” legislative ventures, which regulate or prohibit the commercialisation of certain specific “non-green” technology applications, with exemplary regulations limiting the commercialisation of fluorescent energy inefficient lighting bulbs, ozone layer depleting substances and single-use plastic products as well as products that fall under the newly established Carbon Border Adjustment Mechanism (CBAM)-Regulation.³⁹⁵ The introduction of even further new regulations that restrict pollution technologies is therefore a valid measure to target climate change and incentivise green technology. However, a negative prohibiting regulation can also always come with the downside of potentially hindering technological improvements of the relevant technology class, which could still improve towards a “greener” nature.³⁹⁶ Furthermore, this negative approach creates only indirect Green patent incentives and requires an individual evaluation of the exact effects of the individual “negative” legal measure.³⁹⁷ This thesis therefore generally acknowledges the indirect incentivising effect of “negative” EU regulation on Green Patents. However, in order to streamline the material incentives with the procedural incentives for the development of the common European Green Patent Strategy, this thesis will not evaluate specific negative measures of the EU in detail and instead focus on potential positive material incentives.

³⁹³ cf Reto M. Hilty and Pedro Henrique D. Batista, ‘Potential and Limits of Patent Law to Address Climate Change’ (2023) 72 Issue 9 GRUR International 821, 828 <<https://doi.org/10.1093/grurint/ikad066>> accessed 19 January 2025.

³⁹⁴ Ibid; cf Qiyang He and Buhui Qiu, ‘Environmental enforcement actions and corporate green innovation’ (2025) 91 (in progress) Article 102711 Journal of Corporate Finance 1, 27 <<https://doi.org/10.1016/j.jcorpfin.2024.102711>> accessed 19 January 2025; cf Nicola Benatti and others, ‘The impact of environmental regulation on clean innovation: are there crowding out effects?’ (2024) No. 2024/2946 ECB Working Paper 1, 32f. <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4868748> accessed 19 January 2025.

³⁹⁵ With an overview over the multiple regulations in relation to fluorescent lightning: European Commission Directorate-General for Environment, ‘Clean and circular electronics: Commission ends use of mercury in lamps as mercury-free alternatives prevail’ (*environment.ec.europa.eu*, 16 December 2021) <https://environment.ec.europa.eu/news/clean-and-circular-electronics-commission-ends-use-mercury-lamps-mercury-free-alternatives-prevail-2021-12-16_en> accessed 19 January 2025; Regulation (EU) 2024/590 of the European Parliament and of the Council of 7 February 2024 on substances that deplete the ozone layer, and repealing Regulation (EC) No 1005/2009 [2024] OJ L 2024/590; Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment [2019] OJ L 155/1; CBAM covers products and products classes, which directly or indirectly contribute to carbon leakage, like e.g. cement, steel and certain chemicals cf Regulation (EU) 2023/956 establishing a carbon border adjustment mechanism [2023] OJ L 130/52, preamble.

³⁹⁶ cf Hilty and Batista, ‘Potential and Limits of Patent Law to Address Climate Change’ (n 393) 826.

³⁹⁷ *ibid*.

2. Green Supplementary Protection Certificates

Commercialisation of Green Energy patents in large-scale applications, e.g. in on- and off-shore wind-energy, solar-power and hydrogen energy production, commonly requires national public permissions to set up the respective infrastructure.³⁹⁸ The individual permission procedures, however, can take several (in some cases up to 10) years in the EU.³⁹⁹ This might pose the risk to, in fact, reduce the effective exclusive market period for a patented technology.⁴⁰⁰ In order to counter this effect in cases where the commercialisation of a patented product is bound to administrative authorisation, the EPC enables the contracting states to introduce legislation in relation to Supplementary Protection Certificates (SPCs), which can grant an additional protection.⁴⁰¹ It thus has to be determined, whether the introduction of Green SPCs for energy product patents can generally pose a realistic and legally valid incentive for Green Patents. This depends upon the legal purpose of SPCs and a comparison of the existing SPC regimes in Europe with the commercialisation practice for Green energy patents.

a. Outline of SPCs in the legal framework of the EU

SPCs are an extension right linked to a patent after the expiry of such and are considered a sui generis right on itself.⁴⁰² The EU has introduced SPCs in respect to pharmaceutical products and plant protection products (PPP).⁴⁰³ In relation to the conditions for granting, the EU Regulations require inter alia that *(1) the product is protected by a basic patent, that (2) the product has received a market authorisation, which is governed by harmonising EU Directives and national law, and that (3) the SPC is based on the first market authorisation on the*

³⁹⁸ The permission requirements target multiple varying factors, such as inter alia grit-connection, technical specification and tender selection: cf European Commission, Commission Staff Working Document, ‘Guidance to Member States on good practices to speed up permit-granting procedures for renewable energy projects and on facilitating Power Purchase Agreements’ SWD(2022) 149 final [2022] 4ff. <<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022SC0149&qid=1723654491360#footnote11>> accessed 20 January 2025.

³⁹⁹ *ibid.*

⁴⁰⁰ cf Nina Ferrara, Peter de Lange, Andrew Rudge in Kaisa Suominen (ed), *Visser’s Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024) 146f.

⁴⁰¹ *Ibid*; European Patent Convention, art. 63(2)(b).

⁴⁰² Paul England and others, *A Practitioner’s Guide to European Patent Law: For National Practice and the Unified Patent Court* (Hart Publishing 2019) 275, 296; Justyna Ożegalska-Trybalska, ‘Supplementary Protection Certificates (Article 30)’, in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 153.

⁴⁰³ As the regulations are similar for pharma products and PPP, this thesis will focus mainly on pharma products for comparison; See for the extensive granting requirements: Consolidated text: Regulation (EC) No 469/2009 concerning the supplementary protection certificate for medicinal products [2009] OJ L 152/1; Consolidated text: Regulation (EC) No 1610/96 of the European Parliament and of the Council of 23 July 1996 concerning the creation of a supplementary protection certificate for plant protection products [1996] OJ L 198/30; See for the currently pending change and recast proposals for the EU SPC regimes: footnote (n 156); European Patent Convention, art. 63(2)(b).

common market and has not received a certificate before.⁴⁰⁴ Notably, SPCs can be connected to national patents or to the national parts of European patents and are thus currently national rights, which have to be requested at the national IPOs.⁴⁰⁵ SPCs can grant protection for up to five years under consideration of a five-year grace.⁴⁰⁶ The limit of the overall exclusivity term is 15 years from the date of first market authorisation or 25 years from the filing date of the basic patent.⁴⁰⁷ A protection term of 15 years and more is still considered a sufficient period of exclusivity and as a result an authorisation within 5 years of patent filing cannot enable the grant of an SPC under the respective calculation scheme.⁴⁰⁸

As a complementary measure to the Unitary Patent, the EU has currently proposals pending to introduce a Unitary SPC as a pan-European right for pharma products and PPP.⁴⁰⁹ Notably, the EU could – in theory – be competent to introduce SPCs for certain Green technology products for national and European patents as well as the Unitary Patent.⁴¹⁰

b. General legislative purpose of SPCs

As already briefly emphasised, SPCs recognise in respect to a patented technology, whose market entry is bound to an administrative authorisation, the thus created commercialisation

⁴⁰⁴ With further referrals to the respective Directives for market authorisation: Consolidated text: Regulation (EC) No 469/2009 concerning the supplementary protection certificate for medicinal products [2009] OJ L 152/1, art. 3; Consolidated text: Regulation (EC) No 1610/96 concerning the creation of a supplementary protection certificate for plant protection products [1996] OJ L 198/30, art. 3.

⁴⁰⁵ cf England and others, *Practitioner's Guide to European Patent Law: For National Practice and the Unified Patent Court* (n 402); Oswin Ridderbusch and Alexa von Uexküll, 'European Union: General Considerations and Case Law of the CJEU and the EFTA Court', in Oswin Ridderbusch and Alexa von Uexküll (eds), *European SPCs Unravelling* (2nd ed. Wolters Kluwer 2021) 23, 122.

⁴⁰⁶ See the calculation in detail: Ridderbusch and von Uexküll, 'European Union' in Oswin Ridderbusch and Alexa von Uexküll (eds) (n 405) 129ff, 600.; Consolidated text: Regulation (EC) No 469/2009 concerning the supplementary protection certificate for medicinal products [2009] OJ L 152/1 (n 403) art. 13; Consolidated text: Regulation (EC) No 1610/96 concerning the creation of a supplementary protection certificate for plant protection products [1996] OJ L 198/30, art. 13.

⁴⁰⁷ *ibid.*

⁴⁰⁸ cf *ibid.*

⁴⁰⁹ Governance by the EUIPO under a centralised application process: with further references to the proposals: European Commission, 'Proposals for regulations on supplementary protection certificates' (*single-market-economy.ec.europa.eu*, 27 April 2023) <https://single-market-economy.ec.europa.eu/publications/proposals-regulations-supplementary-protection-certificates_en> accessed 20 January 2025; See for an overview of the current state of the procedure: European Parliament, 'Unitary supplementary protection certificate for plant protection products' (*europaparl.europa.eu*, 15 December 2024) <<https://www.europarl.europa.eu/legislative-train/spotlight-JD22/file-patent-licensing-package-2-1>, [https://www.europarl.europa.eu/Reg-Data/etudes/BRIE/2024/762281/EPRS_BRI\(2024\)762281_EN.pdf](https://www.europarl.europa.eu/Reg-Data/etudes/BRIE/2024/762281/EPRS_BRI(2024)762281_EN.pdf)> accessed 20 January 2025; Agreement on a Unified Patent Court, art. 30.

⁴¹⁰ cf Consolidated version of the Treaty on the Functioning of the European Union [2016] OJ C 202/47, art 114, 118; cf European Parliament, 'Unitary supplementary protection certificate for plant protection products' (*europaparl.europa.eu*, 15 December 2024) <<https://www.europarl.europa.eu/legislative-train/spotlight-JD22/file-patent-licensing-package-2-1>, [https://www.europarl.europa.eu/Reg-Data/etudes/BRIE/2024/762281/EPRS_BRI\(2024\)762281_EN.pdf](https://www.europarl.europa.eu/Reg-Data/etudes/BRIE/2024/762281/EPRS_BRI(2024)762281_EN.pdf)> accessed 20 January 2025;

gap between the grant of the patent and the grant of the authorisation.⁴¹¹ The grant of an SPC, therefore aims to compensate the patent holder for the length of the authorisation process by granting an additional exclusive protection term for the innovation.⁴¹² The SPC regime further considers, in particular in respect to pharma and chemical products, the high research and development costs for innovation that might be off-balanced, if the active commercialisation phase is too short.⁴¹³ Therefore, the overall purpose of SPCs is to protect inventions and further promote innovation in specific technical areas, which are of high relevance for society (like healthcare and food production) and come with high R & D costs and long harmonised market authorisation times.⁴¹⁴

c. Conformance of the current SPCs regimes with Green Energy Patents

Following up, this raises the questions on whether the regulation and market practice for Green Energy products aligns with the legal purposes and the structure of existing SPCs.

aa. Practical and regulatory similarities of green energy products with pharmaceutical products

First off, in respect to granting delays, large scale renewable energy applications like on-shore and off-shore windparks, hydroelectricity and hydrogen generation facilities as well as solar-parks, require extensive public (national) permits in respect to inter alia land-use, environment, grid-connection, local impact and consultations.⁴¹⁵ These permits can take several years for grant and also depend on EU regulations in respect to inter alia environment impact assessments and other environmental factors.⁴¹⁶ As a reaction to the long permit times, the

⁴¹¹ Ferara, de Lange, Rudge in Kaisa Suominen (ed), *Visser's Annotated European Patent Convention 2024 Edition* (n 400) 146f; Oswin Ridderbusch and Alexa von Uexküll, 'Introduction', in Oswin Ridderbusch and Alexa von Uexküll (eds), *European SPCs Unravelling* (2nd ed. Wolters Kluwer 2021) 1.

⁴¹² *ibid.*

⁴¹³ Ridderbusch and von Uexküll, 'Introduction', in Oswin Ridderbusch and Alexa von Uexküll (eds), *European SPCs Unravelling* (n 411) 1; Roberto Romandini and others, 'Study on the legal aspects of supplementary protection certificates in the EU – Final report' (2018) 13f <<https://op.europa.eu/en/publication-detail/-/publication/6845fac2-6547-11e8-ab9c-01aa75ed71a1/language-en>> accessed 20 January 2025.

⁴¹⁴ Consolidated text: Regulation (EC) No 469/2009 concerning the supplementary protection certificate for medicinal products [2009] OJ L 152/1 (n 403) preamble; Consolidated text: Regulation (EC) No 1610/96 concerning the creation of a supplementary protection certificate for plant protection products [1996] OJ L 198/30, preamble; Romandini and others (n 413) 12ff, 25.

⁴¹⁵ cf Catherine Banet and Filippo Donati, 'Speeding Up Renewable Energy Permitting in Europe: Overcoming Implementation Challenges' (October 2024) 18ff. <<https://cerre.eu/publications/speeding-up-renewable-energy-permitting-in-europe-overcoming-implementation-challenges/>> accessed 21 January 2025; Consolidated text: Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) (Renewable Energy Directive III) [2018] OJ L 328/82, art. 15, 16f.

⁴¹⁶ *Ibid.*; Consolidated text: Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment [2011] OJ L 026/1; Consolidated text: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy [2000] OJ L 327/1.

EU introduced the Renewable Energy Directive in 2018 to require the member states to grant the respective permissions within a limit of two years.⁴¹⁷ Moreover, the EU introduced other new Regulations and actions plans to accelerate permission granting and deployment of renewable energy.⁴¹⁸ In reality, however, while some member states can show improvement, this benchmark is still often exceeded several times, with on-shore windparks taking up to ten years for grant, off-shore wind parks up to eleven years and solar parks up to five years.⁴¹⁹ Furthermore, hydroelectricity plants have had in single cases a permission delay from four to seven years and hydrogen plants have an average lead-time from concept to operation of six to eight years.⁴²⁰ In comparison with the average twelve-year length between patent application and market authorisation for pharmaceutical products,⁴²¹ these authorisation times represent significant delays for an application of Green technology. In respect to the effects of these delays on the commercial potential of the invention, it is important to note that patent commercialisation has multiple dimensions, not only in relation to enabling to license the invention and exclude others from using the invention, but also to pursue a patent-protected self-exploitation of the technology by the patent holder.⁴²² Within the described authorisation- and permit-delays, pharmaceutical products are generally prohibited to enter the market

⁴¹⁷ Renewable Energy Directive III [2018] OJ L 328/82, art. 16a.

⁴¹⁸ Consolidated text: Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure [2022] OJ L 152/45; See the temporary measure: Consolidated text: Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy [2022] OJ L 335/36; European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions ‘European Wind Power Action Plan’ [2023] COM/2023/669 final; European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions ‘A hydrogen strategy for a climate neutral Europe’ COM/2020/301 final.

⁴¹⁹ cf Directorate-General for Energy (European Commission) and others, *Technical support for RES policy development and implementation – simplification of permission and administrative procedures for RES installations (RES Simplify)* (Publications Office of the European Union, April 2023) 37f., 98-104; See for on-shore wind and Solar-plants: Harriet Fox, Paweł Czyżak and Sarah Brown, ‘Ready, Set, Go: Europe’s Race for Wind and Solar’ (*ember-energy.org insights*, 27 July 2022) <<https://ember-energy.org/latest-insights/europes-race-for-wind-and-solar/>> accessed 21 January 2025; With further references to Off-shore wind: cf European Court of Auditors, *Offshore renewable energy in the EU – Ambitious plans for growth but sustainability remains a challenge* (European Court of Auditors, Special report 22/2023) 29f.; For hydrogen the average lead time is influenced by length permission procedures: cf European Court of Auditors, *The EU’s industrial policy on renewable hydrogen* (European Court of Auditors, Special report 11/2024) 40f., 86.

⁴²⁰ See for exemplary hydroelectricity projects: cf Eurelectric, ‘RES Permitting – Eurelectric Statement’ (*eurelectric.org publications*, 1 October 2020) <<https://www.eurelectric.org/publications/statement-on-res-permitting/>> accessed 21 January 2025; See hydrogen applications: cf European Court of Auditors, *The EU’s industrial policy on renewable hydrogen* (European Court of Auditors, Special report 11/2024) 40f., 86.

⁴²¹ European Federation of Pharmaceutical Industries and Associations, ‘The Pharmaceutical Industry in Figures 2024’ (*efpia.eu*, 24 June 2024) <<https://www.efpia.eu/media/2rxdkn43/the-pharmaceutical-industry-in-figures-2024.pdf>> accessed 21 January 2025.

⁴²² cf Yu-Li Zhou, Shuo-Min Lee, and Jen-Shyang Chen, ‘A Strategic Analysis of Patents for Healthcare Management’ (2023) 8 Issue 2 *European Journal of Business Management and Research* 262, 263 <<http://dx.doi.org/10.24018/ejbmr.2023.8.2.1802>> accessed 24 January 2025; cf Robert Gross and others, ‘How long does innovation and commercialisation in the energy sectors take? Historical case studies of the timescale from invention to widespread commercialisation in energy supply and end use technology’ (2018)

and for green-energy products the application and use in the context of the specific project is prohibited.⁴²³ This means, that a pharma company is prohibited to sell their product to consumers or wholesalers and an energy operator and patent owner is prohibited to apply the technology for generating sellable energy.⁴²⁴ The commercialisation by self-exploitation is thus limited for both patent classes within the delay. Under consideration of this, the above-mentioned green energy technologies carry a significant level of permitting delays and a limitation of patent exploitation, which are generally comparable to pharmaceutical products and thus indicate a justification of the introduction of Green SPCs.

Furthermore, the European green energy sector facilitates significant Research and Development investment (R & D), both private and public.⁴²⁵ While the overall amount invested does not yet meet the capacity of pharmaceutical R & D, the steadily, significant investment and the overall growth over the last decades highlight the importance of green energy R & D for public and private investors.⁴²⁶ It is thus important to note, that these investments also indicate that the investors have a particular interest that the green technology application should return the investment.⁴²⁷ SPCs for Green energy technologies would expand the exclusive market period and thus improve the expectation of a return of investments in green innovation by creating additional protective value.⁴²⁸ As a result, green energy investment can further

123 Energy Policy 682, 688 <<https://doi.org/10.1016/j.enpol.2018.08.061>> accessed 24 January 2025; cf Philip W Grubb and others, *Patents for Chemicals, Pharmaceuticals, and Biotechnology* (Sixth ed Oxford University Press 2016) 441f.; 450f.; cf Agreement on a Unified Patent Court, art. 25(a).

⁴²³ cf Consolidated text: Directive 2001/83/EC of the European Parliament and of the Council of 6 November 2001 on the Community code relating to medicinal products for human use [2001] OJ L 311/67, preamble no. 2, art. 6, 76; For centralised authorisations: Consolidated text: Regulation (EC) No 726/2004 of the European Parliament and of the Council of 31 March 2004 laying down Union procedures for the authorisation and supervision of medicinal products for human use and establishing a European Medicines Agency [2004] OJ L 136/1 art. 3; cf footnote (n 415).

⁴²⁴ And also in order to improve its market position by applying the technology: cf *ibid*.

⁴²⁵ See the overall volume and growth of public and private R&D in the EU for 2023: Eurostat, 'EU spent €381.4 billion on R&D in 2023' (*ec.europa.eu news articles*, 11 December 2024) <<https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20241211-2a>> accessed 22 January 2025; Public R & D budget overview for the IEA Europe states: International Energy Agency, 'Energy Technology RD&D Budgets Data Explorer' (*iea.org*, last updated 23 October 2024) figure 1 <<https://www.iea.org/data-and-statistics/data-tools/energy-technology-rdd-budgets-data-explorer>> accessed 22 January 2025; In respect to public funding, with further references: cf Maximilian Gasser and others, 'Public Research and Development Funding for Renewable Energy Technologies in Europe: A Cross-Country Analysis' (2022) 14 Issue 9 MDPI Sustainability 1, 1ff., footnotes 15-19 <<https://doi.org/10.3390/su14095557>> accessed 22 January 2025; To highlight one reference: cf Raphael Bointner and others, 'Financing Innovations for the Renewable Energy Transition in Europe' (2016) 9 Issue 12 MDPI Energies 1, 1ff., 6f, <<https://doi.org/10.3390/en9120990>> accessed 22 January 2025; Private R & D investment in wind energy: European Commission JRC, *Wind Energy in the European Union* (JCR Status Report 2023) 18f.

⁴²⁶ cf *Ibid*; European Federation of Pharmaceutical Industries and Associations, 'Economic footprint of the pharmaceutical industry in Europe' (*efpia.eu*, November 2024) 17 <<https://efpia.eu/news-events/the-efpia-view/statements-press-releases/despite-a-decade-of-gradual-growth-rd-spending-in-europe-outpaced-by-the-us-with-increasing-competition-from-china-new-data-shows/#>> accessed 22 January 2025.

⁴²⁷ cf Hilty and Batista, 'Potential and Limits of Patent Law to Address Climate Change' (n 393) 823f.

⁴²⁸ cf Hilty and Batista, 'Potential and Limits of Patent Law to Address Climate Change' (n 393) 823f.

be promoted in Europe and the innovation of Green technologies can promote the EU's climate goals.⁴²⁹ Therefore, SPCs for Green technologies also facilitate the general public interest to promote climate change mitigation and are a comparable interest to protecting healthcare with respect to pharmaceutical SPCs.⁴³⁰

bb. Key differences

Nevertheless, "classic" SPC-technology and green energy technology might be subject to legally different regulatory permission procedures, which might have a different connection point for the permit. In the case of a permission delay, this might affect the potential for commercialisation of the patent classes and thus the need for SPCs differently. Firstly – as already briefly emphasised – pharmaceutical products and PPP are subject to harmonised national or centralised market authorisation procedures, which are required for the commercialisation of the exact patented pharmaceutical product.⁴³¹ The products are explicitly only allowed to be placed on the market after the product was evaluated and authorised, in order to prevent potential health and safety risks when the consumer is exposed to the patented technology.⁴³² Thereby, regulation excludes all commercialisation actions (including sales, wholesales) by self-exploitation of the patented technology.⁴³³

On the other hand, the national permits required for Green energy technology applications mostly do not focus on the patented green energy product itself (e.g. the wind turbine).⁴³⁴ Instead they target the sectoral application of such technology in a large scale, e.g. with respect to the sector planning, environment, and grid-connection issues.⁴³⁵ These relevant permits – which are responsible for the commercialisation delays – also do not directly pursue the safety of the singled out patented green energy technology, but rather potential effects of the overall application of the technology in a specific project.⁴³⁶ Nevertheless, it is important

⁴²⁹ cf Ibid.; cf Commission, 'The European Green Deal' [2019] COM/2019/640 final, 6, 18f.

⁴³⁰ cf footnote (n 414).

⁴³¹ cf Consolidated text: Directive 2001/83/EC on the Community code relating to medicinal products for human use [2001] OJ L 311/67, preamble no. 2, art. 6, art. 76; For centralised authorisations: Consolidated text: Regulation (EC) No 726/2004 laying down Union procedures for the authorisation and supervision of medicinal products for human use and establishing a European Medicines Agency [2004] OJ L 136/1 art. 3.

⁴³² cf *ibid.*

⁴³³ Not considering the option to license: *ibid.*; cf footnote (n 422).

⁴³⁴ cf footnote (n 415).

⁴³⁵ cf footnote (n 415); cf for an exemplary overview of Off-shore permitting procedures in the EU: Jack Truce Major, 'Offshore Wind Energy Permitting Processes in the European Union: An examination of Danish, German, Scottish and Swedish offshore permitting processes and case study of acoustic impact on marine mammals' (thesis Advanced level Master, Stockholm University 2022) 8-15 <<https://su.diva-portal.org/smash/record.jsf?pid=diva2%3A1709093&dsid=-1381>> accessed 23 January 2025.

⁴³⁶ cf *Ibid.*; cf exemplary EU harmonising measures: Consolidated text: Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment [2011] OJ L 026/1, preamble;

to note that green energy technology products can also generally be subject to specific product-safety compliance requirements, which in cases of non-compliance can lead to a market prohibition.⁴³⁷ However, these provisions do not represent a general market prohibition and are also not considered as one of the lengthy permit factors that must be accelerated.⁴³⁸ As a result, the commercialisation of the green energy products is not generally prohibited by the sector-specific permits responsible for the application delays. Instead, only the respective application of the specific green technology is limited, but the products themselves can already be sold and enter the market.⁴³⁹ The protection dimension of self-exploitation of the patented technology is thus only partly limited.⁴⁴⁰

Furthermore, as emphasised, the relevant lengthy permit procedures for green technology patents focus on the sectoral application of the energy generating technology. Green energy patents however do not have to exist only in respect to the paramount energy production device – e.g. the overall wind wheel or electrolysis generator –⁴⁴¹ but can also encompass smaller components, which contribute to an improved green energy production, e.g. in respect to the turbine blades, the generator or improved materials.⁴⁴² Thus, if a secondary market without lengthy permits already exists for the patented components, it can make the commercialisation of the components even less depended from a permit of the overall application (which also does not limit the general sale, as highlighted above). Market authorisations for pharmaceutical products and PPP on the other hand correspond directly with the patented product,⁴⁴³ thereby creating an immediate connection point for SPCs. A delay of the permit,

Consolidated Text: Directive 2000/60/EC establishing a framework for Community action in the field of water policy [2000] OJ L 327/1; Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning [2014] OJ L 257/135.

⁴³⁷ cf Consolidated text: Regulation (EU) 2023/1230 of the European Parliament and of the Council of 14 June 2023 on machinery and repealing Directive 2006/42/EC of the European Parliament and of the Council and Council Directive 73/361/EEC [2023] OJ L 165/1; cf Consolidated text: Regulation (EU) 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011 [2019] OJ L 169/1 art. 14(4)(h), 16(5), 19(1), 28.

⁴³⁸ cf footnotes (n 415, 417, 418).

⁴³⁹ Required that they are also compliant with product specific regulation, cf footnote (n 437).

⁴⁴⁰ cf footnote (n 422).

⁴⁴¹ cf EP4484270A1 Floating Wind Energy Installation (2023) <<https://worldwide.espacenet.com/patent/search/family/087059965/publication/EP4484270A1?q=pn%3DEP4484270A1>> accessed 23 January 2025; EP12151580A Electrolysis device (2012) <<https://worldwide.espacenet.com/patent/search/family/047520945/publication/EP2617873A1?q=pn%3DEP2617873A1>> accessed 23 January 2025.

⁴⁴² cf EP3548733A1 Wind turbine blade (2017) <<https://worldwide.espacenet.com/patent/search/family/058159531/publication/US11306696B2?q=pn%3DUS11306696B2>> accessed 23 January 2025; EP2329937A1 Fibre-reinforced plastic material (2009) <<https://worldwide.espacenet.com/patent/search/family/042308363/publication/EP2329937A1?q=pn%3DUS2011129349A1>> accessed 23 January 2025.

⁴⁴³ cf Directive 2001/83/EC on the Community code relating to medicinal products for human use [2001] OJ L 311/67, art. 6; Consolidated text: Regulation (EC) No 1610/96 concerning the creation of a supplementary protection certificate for plant protection products [1996] OJ L 198/30, art. 6,

always results in a delayed commercialisation, as the product can only enter the market after authorisation and thus there cannot be a secondary market.⁴⁴⁴ Therefore, green energy products pose key differences to the established SPCs regimes.

d. Interim result

In conclusion, it is important to note, that the EU introduced SPCs for pharmaceutical products, because the market authorisation process results in an overall regulatory prohibition of the marketisation of the products. Thus, a commercialisation of the patent by self-exploitation is completely excluded for the holder in that authorisation delay. However, in respect to green energy patents, while the permit requirements for large-scale projects hinder the commercial application, the general production and sales of the green energy technology (or components) is not prohibited during that time. The legal framework thus limits the self-exploitation of the patented technology in respect to an application in specific projects, but leaves the general commercialisation by sales open.⁴⁴⁵ If delays of one specific project would still enable the grant of an SPC, it could create an unjustified market advantage for the patent holder in respect to competitors and also create unbalance for the dissemination of the technology to the public.⁴⁴⁶ Thereby, the presented evidence suggests that the current SPCs regimes do not fully correspond with the commercialisation- and permit-practice of green energy patents and a green SPC cannot be established in the exact same manner. Furthermore, the EU aims to accelerate the permission procedures already and introduced respective Directives to create significantly lower timelines. An effective realisation of these legal ventures would already reduce project delays to a level that would ensure a quick commercialisation of the patented technology and thus act already as an effective incentive for the application of green technology patents.⁴⁴⁷

Nevertheless, it must also be considered the commercial value of green energy inventions (in particular considering paramount inventions and not smaller components) can be closely related to the success of an application in specific energy generation projects and they can thus

⁴⁴⁴ cf Ridderbusch and von Uexküll, 'Introduction', in Oswin Ridderbusch and Alexa von Uexküll (eds), *European SPCs Unravelling* (n 411) 72; Consolidated text: Directive 2001/83/EC on the Community code relating to medicinal products for human use [2001] OJ L 311/67, art. 6.

⁴⁴⁵ The option to license the technology is not considered in this context in respect to pharmaceutical, PPP and Green energy products, cf footnote (n 422).

⁴⁴⁶ cf European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, *Study on the economic impact of supplementary protection certificates, pharmaceutical incentives and rewards in Europe* (Publications Office of the European Union 2018) 199.

⁴⁴⁷ cf footnotes (n 417, 418).

be specific inventions without a flexible market.⁴⁴⁸ Even though the EU tries to accelerate the permit schemes through EU regulation, not all countries can meet the timelines yet and thus the commercial self-exploitation of a patented technology through its application can still be significantly delayed in practice.⁴⁴⁹ Furthermore, even if the patent holder sells the products to energy operators or to other buyers that want to apply the technology, in the timeframe before the permit grant of a project, the buyers might be hesitant to invest in the product until relevant permits are secured.⁴⁵⁰ This can lower the actual potential of commercialisation of the patented technology again. Therefore, while the EU should further pursue the acceleration of permission procedures as an incentive of green patent applications, green SPCs might still be introduced as an interim incentive until the member states meet the respective EU permit standards. However, such interim Green SPCs cannot be introduced simply in an analogous manner to the existing SPCs regimes, but need to be tailored specifically in order to consider the regulatory and commercialisation differences between green energy and pharmaceutical products.

e. Outline of a Green Patent SPCs regime

As a result, this thesis proposes the following conceptual draft for an article of interim EU regulation, which would introduce national Green SPCs and outline the conditions to obtain such a certificate. It is important to note, that this general concept could also be introduced in respect to Green unitary SPCs.⁴⁵¹ For a general alignment with the existing regulation, the proposed draft will pursue – in relation to the conditions for obtaining a certificate – a similar normative structure to the existing SPCs regimes.⁴⁵²

First off, the regime would have to establish which green energy basic patent can qualify for an SPC.⁴⁵³ In order to only consider patents related to green energy technologies that can be

⁴⁴⁸ cf Manita Kaur Dosanjh and others, ‘Speeding up renewable energy – bottlenecks and how you resolve them’ (*World Economic Forum*, 5 January 2023, updated 10 September 2024) <<https://www.weforum.org/stories/2023/01/speeding-up-sustainable-energy-bottlenecks-and-how-you-resolve-them-davos2023/>> accessed 24 January 2025; cf Banet C and Donati F, ‘Speeding Up Renewable Energy Permitting in Europe: Overcoming Implementation Challenges’ (n 415) 15.

⁴⁴⁹ See footnotes (n 418, 419, 420)

⁴⁵⁰ cf European Commission, ‘Accelerating permitting for renewable energy’ (*reform-support.ec.europa.eu*) <https://reform-support.ec.europa.eu/accelerating-permitting-renewable-energy_en> accessed 24 January 2025; Robert Addison and others, ‘Towards the green transition: Stimulating investment and accelerating permits for low emissions infrastructure’ (2024) 68 OECD Working Papers on Public Governance 1, 14 <<https://dx.doi.org/10.1787/fc97f64e-en>> accessed 24 January 2025.

⁴⁵¹ cf chapter: D. III. 2. a

⁴⁵² See in chapter: D. III. 2. a.; Consolidated text: Regulation (EC) No 469/2009 concerning the supplementary protection certificate for medicinal products [2009] OJ L 152/1 (n 403) art. 3; Consolidated text: Regulation (EC) No 1610/96 concerning the creation of a supplementary protection certificate for plant protection products [1996] OJ L 198/30 art. 3.

⁴⁵³ cf *ibid*.

subject to permission delays, the SPC regime could require that the basic patent must have been classified according to the EPOs CPC classification scheme in the Y02E 10/00 subclass for renewable energy generation – such as inter alia wind-energy and hydroelectricity – and the Y02E 60/30 subclass class for hydrogen technology.⁴⁵⁴ This approach can facilitate a broad understanding of green energy patents, encompassing paramount energy production technologies as well as components of such, which still contribute to an improved sustainable development.⁴⁵⁵ This aligns with the overall importance of green energy deployment for reaching the EUs climate goals,⁴⁵⁶ and the scope of protection can be narrowed down further by the other requirements.

Second, the granting conditions would have to require the grant of a permit, from which the commercialisation of the green energy product was dependent.⁴⁵⁷ In order to consider the bundle of permits necessary for one energy project and clarify the connection point, the conditions could require that the applicant has received all “final” permits relevant to start the application of the green technology for energy generation in a sectoral project.⁴⁵⁸ Furthermore, the relevant patented product would have to prove that it has not received a certificate for the product in the member state of application before, in order to avoid the grant of unjustified multiple consecutive SPCs for the same product.⁴⁵⁹ Notably, in respect to one of the key point for the commercial practice of green energy applications, namely that the permit and commercialisation delays are project depended, this adds the difficulty that a patent holder can commercialise their patent in multiple independent projects.⁴⁶⁰ The patent holder could thus tactically delay the application of the SPC in order to apply for the “latest possible” project and thus maximise the exclusive protection term. This would then lack a justification with respect of the legal purpose to enable a fair compensation for commercialisation delays, because the patent holder was in these cases already able to commercialise the invention in the other (earlier) projects.⁴⁶¹ Therefore, the applicants for the SPCs would also have to prove

⁴⁵⁴ cf EPO, ‘Classification search’ (*worldwide.espacenet.com*) <<https://worldwide.espacenet.com/patent/cpc-browser#!/CPC=Y02>> accessed 24 January 2025.

⁴⁵⁵ cf footnotes (n 441, 442).

⁴⁵⁶ cf chapter D. I. 1. & 2.

⁴⁵⁷ cf footnone (n 452); cf Ridderbusch and von Uexküll, ‘Introduction’, in Oswin Ridderbusch and Alexa von Uexküll (eds), *European SPCs Unravalled* (n 411) 81.

⁴⁵⁸ cf chapter D. III. 2. c. aa.

⁴⁵⁹ cf footnone (n 452); Also known as the “One SPC per Product per Patent holder”-rule: Ridderbusch and von Uexküll, ‘Introduction’, in Oswin Ridderbusch and Alexa von Uexküll (eds), *European SPCs Unravalled* (n 411) 93ff; Ric Brinkmann, ‘SPC Blog – Part 4: One SPC per product (Article 3(c))’ (*brantsandpatents.com SPC Blog*) <<https://brantsandpatents.com/fr/nouvelles/spc-blog-part-4-the-crucial-role-in-patent-protection>> accessed 25 January 2025.

⁴⁶⁰ cf chapter D. III. 2. c. bb.

⁴⁶¹ cf Footnote (n 411).

that they have not received a “final” permit for another project previously to the project for which they claim their application.

Lastly, in order to comply with the protective scope of SPCs, the applicant would also have to prove that an actual delay in the commercialisation of the energy patent occurred in the specific project.⁴⁶² This would require that no other stream of commercialisation of the patented technology outside the specific project had been accessed at the date of the final permit. Notably, this condition could consider both the exclusion of a commercialisation by self-exploitation and application of the patented energy technology to produce energy as well as a delayed sale or wholesale of the patented products.⁴⁶³ However, sales of the product on a secondary market within the delay would thereby exclude a grant.

Therefore, this thesis proposes the following conceptual article in respect to the granting conditions for national Green-SPCs:

Conditions for obtaining a certificate

A certificate shall be granted if, in the Member State in which the application is submitted and at the date of that application:

- (a) the product is protected by a basic patent in force, which is classified according to the EPO’s CPC scheme within the Y02E 10/00 or the Y02E 60/30 sub-classes;
- (b) all valid permits to allow the technical application of the product in a sectoral energy production project as a product to generate renewable energy or as part of such a product have been granted in accordance with European and national regulation, as appropriate;
- (c) the product has not already been the subject of a certificate
- (d) the permits referred to in point (b) are the first bundle of permits which allows the application of the product in a sectoral energy production project;
- (e) upon the time of application the product has not been commercialised outside of the project referred to in point (d).

Finally, to consider significant delays only and to not extend the exclusive character of the technology unjustified, the suggested approach could apply the same calculation scheme as for pharmaceutical product SPCs, which would also consider and deduct a five-year grace period for the green energy patent.⁴⁶⁴ Moreover, in order to streamline the interim Green SPC

⁴⁶² cf *ibid*; chapter D. III. 2. c. bb.

⁴⁶³ cf chapter D. III. 2. c. bb.

⁴⁶⁴ cf chapter D. III. 2. a; footnote (n 407).

regime with the already introduced EU Directives for accelerating the permit procedures, the Green SPCs regime could provide an automatic termination of the system for new applications as soon as all EU member states have fully implemented the Directives and have met the required goals.

D. Conclusion and outline of a common Green Patent Strategy

The European countries have accepted the climate reality and are taking up the challenge to achieve climate neutrality in Europe and mitigate the negative effects of climate change. In order to pursue these “green” goals, self-binding national and international legislation and regulation were introduced in Europe. These approaches all have in common that they consider the importance of a technological transition to green technologies and the promotion of such by innovation and an effective intellectual property system. This opens up the potential to introduce a Green Patent Strategy and tailor the patent system in Europe specifically to incentivise climate-change mitigation patents.

However, this puts Europe up to a complex challenge; Europe does not have a uniform patent law and has only introduced limited harmonisation approaches. Notably, the current European patent system is facilitated by three legal key players: First of, the European patent Organisation with the European Patent Office as the administrative entity governing the (pre) grant procedure and the substantive granting requirements of European and European patents with unitary effect, secondly the newly established Unified Patent Court as the post-grant enforcement and litigation authority for these patents in respect to its contracting states and thirdly the European Union establishing material post-grant regulations influencing the scope of patent protection within the EU member states. While these authorities have all been established separately under independent international agreements, they nevertheless prove an interdependence to each other. Therefore, in order to consider a holistic perspective that creates value in all areas of the existing patent system, these legal key players must introduce a Green Patent Strategy in a common approach.

In order to define what shall be considered as a Green patent clearly, these stakeholders can rely on the classification practice of the EPO, which has the first point of contact with a patented technology within its lifecycle and is the technically qualified body for reviewing. The EPO has established a specific green classification category with the Y02 subclasses of the CPC classification scheme and thus broadly covers categories of climate change technology. A classification within the Y02 class can ensure that the respective patent is “Green” and can therefore enable a potential preferential processing also by the other key players, the

EU and the UPC. Under consideration of statistics on Green Patents in Europe, the European economic area has already a solid position in green patent performance, but also still potential to improve and strengthen its standing.

However, while the EU, the EPOrg and the UPC already promote green innovation and a green transition – either directly through legislative regulation or indirectly through the outline and effects of the institutional structures – they have not yet established specific individual measures to directly incentivise Green Patents let alone a common strategy to promote Green Patents. Therefore, under consideration of international Green patent incentives and the particularities and legal nodes of the key players to introduce regulatory measures, this thesis proposes a concept for a common Green Patent Strategy for Europe. The relevant stakeholder could establish such an approach through an international agreement. To sum up the extensive evaluations and interim results in the chapters above, the proposal consists out of three main pillars:

I. Optimisation of the Green classification system at the EPO

1. The EPO should extend its Green Y02/Y04S CPC-classification scheme and also integrate the WIPO Green Inventory and/or the OECD ENV-Tech classification schemes into the existing system.
2. Additionally, the EPO could introduce an obligatory CPC classification, for the preclassification and could include an automatic application of the Y02/Y04S scheme right afterwards.
3. Furthermore, the EPO could integrate an option for the applicant to claim the existence of a “green patent” in the application. This can create a rebuttable presumption of the existence of such a patent and can be reviewed and verified by the EPO under consideration of that presumption.

II. Introduction of procedural legal incentives

1. This thesis suggest the introduction of an optional super-accelerated Green patent fast-track programme at the EPO, which extends the currently applied PACE programme. The proposed “Green PACE” accelerates Green European patent applications as well as an application for a Green unitary effect and is further accompanied by a reduction of renewal fees for the patent.
2. The UPC does currently not require the introduction of a litigation acceleration programme. However, this option could become a more relevant incentive again if the UPC’s procedural practice were to slow down significantly in the future. Therefore, the UPC should focus on maintaining and further improving its procedural capacities.

III. Introduction of material legal incentives

1. The EU can always rely on indirectly incentivising Green Patents, by introducing negative material regulation that limits the scope of protection of pollution

patents. Nevertheless, each of these “negative” regulatory ventures requires an extensive evaluation of its incentivising effects on Green Patents.

2. As a positive incentive on the other hand, the EU should introduce a specifically tailored “Green” Supplementary Protection Certificates regime for renewable energy patents. In parallel, the EU should further promote the implementation of the acceleration directives for energy permit granting and finally terminate the Green-energy SPCs programme upon the time when the standards of the directives are met by all member states.

With the introduction of this outlined common Green Patent Strategy between the EU, the EPO and the UPC, these stakeholders can create holistic incentives for Green Patents that create value on all stages of the patent’s lifecycle in Europe. Nevertheless, it is important to note that the overall role of the UPC within a common Green Patent Strategy is less focused on providing immediate incentives for Green Patents, but to contribute to an impartial enforcement system and thus indirectly incentives (green) patents through its efficient outline and procedural speed. Altogether, by establishing the proposed Green Patent Strategy, Europe can represent itself as united with respect to an active incentivisation of the green transition on the level of the European patent system.

Finally, the opening quote of this thesis of Ursula Van der Leyen can be seen in different dimensions: The establishment of the proposed Green Patent Strategy can positively influence the attractiveness of the European patent system and might actually further elevate Europe to becoming and staying the “world leader” in all aspects of Green patenting. However, in times where international industrial forerunners back down from their climate commitments, such as the US with the withdrawal from the Paris Agreement,⁴⁶⁵ it is important to note that economic positioning in the context of patent rights should not be of sole importance. Fighting climate requires a common effort by the whole world and to build bridges between industry, citizens and authorities. Therefore, by establishing a common Green patent Strategy for Europe, it is not only about becoming the international “world leader” in patent rights, but also to set a strong example for a green development and contribute to leading the world into a greener future.

⁴⁶⁵ The White House, Presidential Action Executive Order, ‘Putting America first in International Environmental Agreements’ (*whitehouse.gov*, 20 January 2025) <<https://www.whitehouse.gov/presidential-actions/2025/01/putting-america-first-in-international-environmental-agreements/>> accessed 25 January 2025.

BIBLIOGRAPHY

Academic literature:

Alberto P and Asensio D, ‘Intellectual Property in European Private Law’, in Poillot E and Rueda I (eds), *‘Les frontières du droit privé européen / The Boundaries of European Private Law’* (Iarcier 2012)

Bantekas I and Akestoridi K, ‘Sustainable Development Goals: Their Political and Legal Nature under International Law’, in Ilias Bantekas and Francesco Seatzu (eds), *The UN Sustainable Development Goals: A Commentary* (Oxford University Press 2023)

Callens P and Granata S, *The Unitary Patent and the Unified Patent Court* (2nd edn Wolters Kluwer 2024)

de Visscher F, ‘Constitutional aspects of the Unitary Patent Package (UPP) and the Unified Patent Court (UPC)—question marks remain’ in Matthews D and Torremans P (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

England P. and others, *A Practitioner’s Guide to the Unified Patent Court and Unitary Patent* (Hart Publishing 2022)

Ferara N, de Lange P, Rudge A in Suominen K (ed), *Visser’s Annotated European Patent Convention 2024 Edition* (Wolters Kluwer 2024)

Frankel S, ‘Chapter 1: TRIPS and Post-TRIPS Trade Agreements and Their Impact on Innovation’, in Rafał Sikorski and Zaneta Pacud (eds), *Patents as an Incentive for Innovation* (Kluwer Law 2021)

Galloux J, ‘The role of EPO Boards of Appeal in shaping of patent law in Europe’ in Matthews D and Torremans P (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Goddard H and Werner K, ‘The interaction between the UPC, national courts, and the Board of Appeal’, in Matthews D and Torremans P (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Harguth A, Schallmoser K and Carlson S, *Patent Litigation Through the Unified Patent Court and German Courts*, (Kluwer Law International B.V. 2023)

Hoffmann J, ‘The Role of Patent and Competition Law for Setting the Right Innovation Incentives for Europe’s Green Transition’ in F Thouvenin and others (eds), *Kreation Innovation Märkte – Creation Innovation Markets* (Springer 2024)

Jaeger T and Lukan J, ‘A system fit for innovation? Part I: (Dis-)incentives for potential patentees in the UP legal framework’ in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Khucha T, ‘The role of the CJEU in European patent law from a procedural perspective’, in Matthews D and Torremans P (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Lamping M, Rademacher C, 'Patent litigation strategise in Germany maneuvering the evolving landscape of bifurcation', in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Li X, 'Green Technology and Patents: in the European Context' (Master Thesis European Business Law, Lund University 2020)

Manderieux L, 'The Relationship Between Intellectual Property and Administrative Law', in Calbolo I and Montagnani M (eds), *Handbook of Intellectual Property Research: Lenses, Methods, and Perspectives* (Oxford Academic 2021)

Miller M, 'The co-existence between EPC and patents with unitary effect' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Oswin Ridderbusch and Alexa von Uexküll, 'Introduction', in Oswin Ridderbusch and Alexa von Uexküll (eds), *European SPCs Unravalled* (2nd edn Wolters Kluwer 2021) 1

Ożegalska-Trybalska J, 'Supplementary Protection Certificates (Article 30)', in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023) 153

Papadopoulou F, 'The novelty and inventive step requirement in Europe and under the UPP' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Philip W Grubb and others, *Patents for Chemicals, Pharmaceuticals, and Biotechnology* (6th edn Oxford University Press 2016)

Ridderbusch O and Uexküll A, 'European Union: General Considerations and Case Law of the CJEU and the EFTA Court', in Oswin Ridderbusch and Alexa von Uexküll (eds), *European SPCs Unravalled* (2nd edn Wolters Kluwer 2021) 23

Schwartz A, 'Die Rechtsvergleichung' [Comparative law], in Riesenhuber K (ed), *Euro-päische Methodenlehre* [European Methodology] (4th edn, De Gruyter 2021)

Sikorski R and Zemła-Pacud Ż, 'Introduction', in Rafal Sikorski and Zaneta Pacud (eds), *Patents as an Incentive for Innovation* (2021 Kluwer Law International)

Singh A and Srivastava Y, *Patent Law, Green Technology and Innovation* (Routledge 2023)

Torremans P, 'Regulation 542/2014 on jurisdiction' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Truce Major J, 'Offshore Wind Energy Permitting Processes in the European Union: An examination of Danish, German, Scottish and Swedish offshore permitting processes and case study of acoustic impact on marine mammals' (Independent thesis Advanced level Master, Stockholm University 2022) 8-15 <<https://su.diva-portal.org/smash/rec-ord.jsf?pid=diva2%3A1709093&dswid=-1381>> accessed 23 January 2025

Van der Ploeg K, 'Unified Patent Court and international law', in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Van Overwalle G, 'Fair use – a workable concept in European patent law' (2014), in Reto M. Hilty and Kung-Chung Liu (eds), *Compulsory Licensing* (2014 Springer)

van Zimmeren E, 'Trusting the Unified Patent Court: the importance of the institutional design of the UPC and its judges', in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Walsh K, 'Institutional coexistence: the necessity of judicial dialogue and cooperation in the UPC' in Duncan Matthews and Paul Torremans (eds), *The Unified Patent Court and The European Patent Convention* (De Gruyter 2023)

Journal Articles:

Arsad S. and others, 'Patent landscape review of hydrogen production methods: Assessing technological updates and innovations' (2024) 50 Part B International Journal of Hydrogen Energy 447 <<https://doi.org/10.1016/j.ijhydene.2023.09.085>> accessed 31 October 2024

Aydin M and others, 'The role of green innovation in achieving environmental sustainability in European Union countries: Testing the environmental Kuznets curve hypothesis' (2023) 118 Gondwana Research 105, <<https://doi.org/10.1016/j.gr.2023.01.013>> accessed 29 October 2024

Berrone P, Fosfuri A and Gelabert L, 'Does Greenwashing Pay Off? Understanding the Relationship Between Environmental Actions and Environmental Legitimacy' (2017) 144 Journal of Business Ethics 363 <<https://doi.org/10.1007/s10551-015-2816-9>> accessed 30 October 2024

Block J and others, 'Green patents and green trademarks as indicators of green innovation' (2025) Vol 54 Issue 1 Article 105138 Research Policy 6 <<https://doi.org/10.1016/j.respol.2024.105138>> accessed 26 November 2024

Bodansky D, 'The Legal Character of the Paris Agreement' (2016) 25 (2) Review of European Community & international environmental law 142 <<https://doi.org/10.1111/reel.12154>> accessed 19 December 2024

Bointner R and others, 'Financing Innovations for the Renewable Energy Transition in Europe' (2016) 9 Issue 12 MDPI Energies 1 <<https://doi.org/10.3390/en9120990>> accessed 22 January 2025

Chavira P and others, 'Defining green innovation, its impact, and cycle – A literature analysis' (2023) 17 Article 100693 Cleaner Engineering and Technology 1, <<https://doi.org/10.1016/j.clet.2023.100693>> accessed 29 October 2024

Chavira P and others, 'Defining green innovation, its impact, and cycle – A literature analysis' (2023) 17 Cleaner Engineering and Technology Art. 100693, 1 <<https://doi.org/10.1016/j.clet.2023.100693>> accessed 10 December 2024

Cremers K and others, 'Patent litigation in Europe' (2017) 44 European Journal of Law and Economics 1 <<https://link.springer.com/article/10.1007/s10657-016-9529-0>> accessed 17 January 2025

de Lange D, 'EU patent harmonization policy: reconsidering the consequences of the UPCA' (2021) 16 No. 10 Journal of Intellectual Property Law & Practice 1078 <<https://doi.org/10.1093/jiplp/jpab096>> accessed 16 November 2024

De Witte B, 'Legal Methods for the Study of EU Institutional Practice' (2022) 18 No. 4 European Constitutional Law Review 637 <<https://doi.org/10.1017/S157401962200044X>> accessed 17 October 2024

Dechezleprêtre A, 'Fast-Tracking 'Green' Patent Applications: An Empirical Analysis' (2013) Issue 37 ICTSD Global Platform on Climate Change, Trade and Sustainable Energy <https://www.researchgate.net/publication/256050795_Fast-Tracking_'Green'_Patent_Applications_An_Empirical_Analysis> accessed 1 January 2025

England P and Maas W, 'The UPC long-arm jurisdiction an the UK' (2023) Vol. 18, No. 6 Journal of Intellectual Property Law & Practice 455 <<https://doi-org.uaccess.univie.ac.at/10.1093/jiplp/jpad042>> accessed 20 November 2024

Fabrizia A, Guarinib G and Meliciani V, 'Green patents, regulatory policies and research network policies' (2018) 47 Issue 6 Research Policy 1081 <<https://doi.org/10.1016/j.respol.2018.03.005>> accessed 10 December 2024

Favot M and others, 'Green patents and codes: How different methodologies lead to different results' (2023) 18 Article 200132 Resources, Conversation & Recycling Advances 1 <<https://doi.org/10.1016/j.rcradv.2023.200132>> accessed 29 October 2024

Fekete H and others, 'A review of successful climate change mitigation policies in major emitting economies and the potential of global replication' (2021), 137 Article 110602 Renewable and Sustainable Energy Reviews 1 <<https://www.sciencedirect.com/science/article/pii/S1364032120308868>> accessed 11 October 2024

Fusillo F, 'Green Technologies and diversity in the knowledge search and output phases: Evidence from European Patents' (2023) 52 Research policy Article 104727, p. 1 <<https://doi.org/10.1016/j.respol.2023.104727>> accessed 9 December 2024

Gasser M and others, 'Public Research and Development Funding for Renewable Energy Technologies in Europe: A Cross-Country Analysis' (2022) 14 Issue 9 MDPI Sustainability 1 <<https://doi.org/10.3390/su14095557>> accessed 22 January 2025

Graham S and Van Zeebroeck N, 'Comparing Patent Litigation Across Europe: A First Look' (2014) 17 Stanford Technology Law Review 655 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1924124> accessed 17 January 2025

Gross R and others, 'How long does innovation and commercialisation in the energy sectors take? Historical case studies of the timescale from invention to widespread commercialisation in energy supply and end use technology' (2018) 123 Energy Policy 682 <<https://doi.org/10.1016/j.enpol.2018.08.061>> accessed 24 January 2025

Hansen J and others, 'Global warming in the pipeline' (2023), 3 no. 1 kgad008 Oxford Open Climate Change 1 <<https://academic.oup.com/oocc/article/3/1/kgad008/7335889>> accessed 10 October 2024

He Q and Qiu B, 'Environmental enforcement actions and corporate green innovation' (2025) 91 (in progress) Article 102711 Journal of Corporate Finance 1 <<https://doi.org/10.1016/j.jcorpfin.2024.102711>> accessed 19 January 2025

Hilty R and Batista P, 'Potential and Limits of Patent Law to Address Climate Change' (2023) 72 Issue 9 GRUR International 821 <<https://doi.org/10.1093/grurint/ikad066>> accessed 1 January 2025

Hoppe J and others, 'Three Decades of Climate Mitigation Policy: What Has It Delivered?' (2023), 48 Annual Review of Environment and Resources 615 <<https://www.annualreviews.org/content/journals/10.1146/annurev-environ-112321-103821#right-ref-B69>> accessed 11 October 2024

International Energy Agency, 'Hydrogen patents for a clean energy future' (2023) IEA Report 1 <<https://www.iea.org/reports/hydrogen-patents-for-a-clean-energy-future>> accessed 11 December 2024

Jernnäs M, 'Governing through the nationally determined contribution (NDC): five functions to steer states' climate conduct' (2024) 33 (3) Environmental politics 530, 533f. <<https://doi.org/10.1080/09644016.2023.2192146>> accessed 19 December 2024

Kamateri E, Salampasis M and Diamantaras K, 'An ensemble framework for patent classification' (2023) 75 Article 102233 World Patent Information 1 <<https://doi.org/10.1016/j.wpi.2023.102233>> accessed 31 October 2024

Kamateri E, Salampasis M and Perez-Molina E, 'Will AI solve the patent classification problem?' (2024) 78 Article 102294 World Patent Information 1 <<https://doi.org/10.1016/j.wpi.2024.102294>> accessed 31 October 2024

Kim J, 'Decreasing of Subjects for Expedited Examination and Delay in Examination for Patent Applications in Korea' (2024) APAA e-Newsletter No. 39 <<https://apaaonline.org/article/decreasing-of-subjects-for-expedited-examination-and-delay-in-examination-for-patent-applications-in-korea/>> accessed 11 January 2025

Lane E, 'Building the Global Green Patent Highway: A Proposal for International Harmonization of Green Technology Fast Track Programs' (2012) 27 No. 2 Bekeley Technology Law Journal 1119 <<https://www.jstor.org/stable/24119483>> accessed 1 January 2025

Lavopa A and de las Mercedes Menéndez M, 'Who is at the forefront of the green technology frontier? Again, it's the manufacturing sector' (2023) Issue 6 United Nations Industrial Development Organization Policy Brief Series 1 <<https://policycommons.net/artifacts/5043347/issue-no/5808788/>> accessed 10 December 2024

Meguro K, Osabe Y, 'Lost in Patent Classificaiton' (2019), 57 World Patent Information 70 <<https://doi.org/10.1016/j.wpi.2019.03.008>> accessed 10 November 2024

Owens K and James H, 'Embedding technology at the grassroots: Strategies for localising technology transfer under the UNFCCC technology mechanism' (2024) 33 (2) Review of

European Community & international environmental law 159
<<https://doi.org/10.1111/reel.12548>> accessed 19 December 2024

Park T and others, 'What Does Global Land Climate Look Like at 2°C Warming?' (2022), 11 no. 5 Earth's Future 1 <<https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2022EF003330>> accessed 14 October 2024

Rahmani A., 'Green innovation for a greener future: A meta-analysis of the impact on environmental performance' (2024) 460 Journal of Cleaner Production Article 142547, 1
<<https://doi.org/10.1016/j.jclepro.2024.142547>> accessed 10 December 2024

Rahnasto J, 'Exploring the Role of Patent Offices in Climate Change Mitigation' (2023) 23 Issue 1 Article 3 Chicago-Kent Journal of Intellectual Property 56 <<https://scholarship.kentlaw.iit.edu/ckjip/vol23/iss1/6>> accessed 20 December 2024

Rainville A, Dikker I and Buggenhagen M, 'Tracking innovation via green patent classification systems: Are we truly capturing circular economy progress?' (2024) Journal of Cleaner Production 1 <<https://doi.org/10.1016/j.jclepro.2024.144385>> accessed 8 December 2024

Rajamani L, 'Interpreting the Paris Agreement in its Normative Environment' (2024) 77 Issue 1 Current Legal Problems 167 <<https://doi.org/10.1093/clp/cuae011>> accessed 19 December 2024

Savić M, 'The European Union's Legal Personality in International Law – Character, Structure, and Scope' (2023) 2 Studia Europejskie - Studies in European Affairs 45
<https://www.researchgate.net/publication/373254853_The_European_Union's_Legal_Personality_in_International_Law_-_Character_Structure_and_Scope> accessed 14 October 2024

Schmoch U and Gehrke B, 'China's technological performance as reflected in patents' (2021) 127 Scientometrics 299 <<https://doi.org/10.1007/s11192-021-04193-6>> accessed 15 December 2024

Stechemesser A and others, 'Climate policies that achieved major emission reductions: Global evidence from two decades' (2024), 385 Science 884

Stefano A, Hurtado-Albir F and Volpe A, 'Supporting global initiatives on climate change: The EPO's "Y02-Y04S" tagging scheme' (2018) 54 World Patent Information S85
<<https://doi.org/10.1016/j.wpi.2017.04.006>> accessed 29 November 2024

Stoikova A, 'Green patents data analysis and trends review, 2005-2020' (2024) Sofia University "St. Koment Ohridski" Faculty of Economics and Business Administration Figure 1
<<http://dx.doi.org/10.13140/RG.2.2.13783.89764>> accessed 11 December 2024

Swartenbroekx C, 'Technological innovation and green transition : where does Belgium stand ?' (June 2021) NBB Economic Review 1 <<https://www.nbb.be/en/articles/technological-innovation-and-green-transition-where-does-belgium-stand-0>> accessed 11 December 2024

Ullrich H, 'The unified patent court' (2023) 42 Yearbook of European Law 135, 140
<<https://doi-org.uaccess.univie.ac.at/10.1093/yel/yead007>> accessed 21 November 2023

van Gestel R and Micklitz H, 'Why Methods Matter in European Legal Scholarship' (2014) 20 No. 3 European Law Journal 292 <<https://doi.org/10.1111/eulj.12049>> accessed 21 October 2024

von Bogdandy A, 'Comparative Public Law For European Society' (2022) No. 2022-28 MPIL Research Paper Series 1 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4298016#> accessed 22 October 2024

Wang N and others, 'Can green patents reduce carbon emission intensity?—An empirical analysis based on China's experience' (2022) 10 Frontiers in Environmental Science 1 <<https://doi.org/10.3389/fenvs.2022.1084977>> accessed 10 December 2024

Zhang N, 'Reasons for request under the Green Channel' (2023) Mewburn Ellis Special Report <<https://view.publitas.com/mewburn-ellis/green-channel-report/page/1>> accessed 8 January 2025

Zhou Y, Lee S, and Chen J, 'A Strategic Analysis of Patents for Healthcare Management' (2023) 8 Issue 2 European Journal of Business Management and Research 262 <<http://dx.doi.org/10.24018/ejbmr.2023.8.2.1802>> accessed 24 January 2025

Working Papers:

Addison R and others, 'Towards the green transition: Stimulating investment and accelerating permits for low emissions infrastructure' (2024) 68 OECD Working Papers on Public Governance 1, 14 <<https://dx.doi.org/10.1787/fc97f64e-en>> accessed 24 January 2025.

Aghion P, 'Financial Markets and Green Innovation' (2022) No. 2022/16 ECB Working Paper 1, 16 Figure 1 <<http://dx.doi.org/10.2139/ssrn.4590501>> accessed 11 December 2024

Benatti N and others, 'The impact of environmental regulation on clean innovation: are there crowding out effects?' (2024) No. 2024/2946 ECB Working Paper 1 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4868748> accessed 19 January 2025

Bose U, Gregori W and Cillero M, 'Does Green Transition promote Green Innovation and Technological Acquisitions?' (2023) 4 JRC Working Papers in Economics and Finance 4/2023 <<https://publications.jrc.ec.europa.eu/repository/handle/JRC132977>> accessed 30 November 2024

Caglar A and others, 'Assessing the role of green investments and green innovation in ecological sustainability: From a climate action perspective on European countries' (2024) 928 Science of the Total Environment Article 172527, 1 <<https://doi.org/10.1016/j.scitotenv.2024.172527>> accessed 10 December 2024

Caldarola B and others, 'Economic complexity and the sustainability transition: A review of data, methods, and literature' (2024) 1 JRC Working Papers on Corporate R&D and Innovation (CoRDI) 1, 8ff. <<https://publications.jrc.ec.europa.eu/repository/handle/JRC137954>> accessed 8 December 2024

Fabrizi A, Fiorelli C and Meliciani V, 'The Role of Green Networks for Environmental Innovation in European Regions' (2024) LUISS Institute for European Analysis and Policy Working Paper 14/2024, 1 <<https://doi.org/10.21203/rs.3.rs-4841609/v1>> accessed 9 December 2024

León L and others, ‘Measuring innovation in energy technologies: green patents as captured by WIPO's IPC green inventory’ (2018) WIPO Economic Research Working Paper No. 44, 1 <<https://www.wipo.int/publications/en/details.jsp?id=4351>> accessed 30 October 2024

Rivera León L and others, ‘Measuring innovation in energy technologies: green patents as captured by WIPO's IPC green inventory’ (2018) 44 Economic Research Working Paper 1, 6f., Figure 1 and 2 <<https://www.wipo.int/publications/en/details.jsp?id=4351>> accessed 11 December 2024

Scientific and legal reports:

Banet C and Donati F, ‘Speeding Up Renewable Energy Permitting in Europe: Overcoming Implementation Challenges’ (October 2024) <<https://cerre.eu/publications/speeding-up-renewable-energy-permitting-in-europe-overcoming-implementation-challenges/>> accessed 21 January 2025

Project Group for Statistical Analysis of Green and Low-Carbon Technology Patents, ‘Report on Statistical Analysis of Green and Low-carbon Technology Patents Worldwide’ (July 2024) 2, 15f., Figure 2-8 <https://english.cnipa.gov.cn/art/2024/8/6/art_3262_194103.html> accessed 11 December 2024

Stephens K (ed), *A Guide to the UPC and the UP* (Bird & Bird LLP 2023) chapter 10, no 85f. <<https://www.twobirds.com/en/insights/2023/global/a-guide-to-the-unified-patent-court-and-the-unitary-patent>> accessed 16 January 2025

European Union publication sources:

Bello M and others, ‘The geography of EU green and digital inventions and their knowledge sources’ (Publications Office of the European Union, 28 June 2023) <<https://publications.jrc.ec.europa.eu/repository/handle/JRC133565>> accessed 30 October 2024

Council of the EU and the European Council, ‘Agreement on a Unified Patent Court (UPC) – Ratification Details’, (*consilium.europa.eu*) <<https://www.consilium.europa.eu/en/documents-publications/treaties-agreements/agreement/?id=2013001>> accessed 15 October 2024

Directorate-General for Climate Action, ‘Legal Framework’ (*climate.ec.europa.eu*) <https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/innovation-fund/legal-framework_en> accessed 20 December 2024

Directorate-General for Climate Action, ‘What is the Innovation Fund’ (*climate.ec.europa.eu*) <https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/innovation-fund/what-innovation-fund_en> accessed 20 December 2024

Directorate-General for Communication, ‘Commission adopts Action Plan on Intellectual Property to strengthen EU's economic resilience and recovery’ (*ec.europa.eu*, November 2020) <https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2187> accessed 20 December 2024

Directorate-General for Communication, ‘New Unitary Patent system: pioneering a new era of patent protection and enforcement in the EU’ (*ec.europa.eu*, June 2023) <https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3004> accessed 20 December 2024

Directorate-General for Communication, ‘Fit for 55: Delivering on the proposals’ (*consilium.europa.eu*, European Commission) <https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal/fit-55-delivering-proposals_en> accessed 20 December 2024

Directorate-General for Communication, ‘Legal documents on Delivering the European Green Deal’ (*commission.europa.eu*, European Commission, 9 October 2023) <https://commission.europa.eu/publications/legal-documents-delivering-european-green-deal_en> accessed 20 December 2024

Directorate-General for Energy (European Commission) and others, *Technical support for RES policy development and implementation – simplification of permission and administrative procedures for RES installations (RES Simplify)* (Publications Office of the European Union, April 2023)

Directorate-General for Internal Market, ‘Intellectual property action plan implementation’ (*single-market-economy.ec.europa.eu*, March 2022) <https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/intellectual-property-action-plan-implementation_en> accessed 20 December 2024

Directorate-General for Internal Market, ‘Intellectual property: Final step taken to launch the Unitary Patent system’ (*single-market-economy.ec.europa.eu*, February 2023) <https://single-market-economy.ec.europa.eu/news/intellectual-property-final-step-taken-launch-unitary-patent-system-2023-02-20_en> accessed 20 December 2024

Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, ‘Patent protection in the EU’ (*single-market-economy.ec.europa.eu*) <https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/patent-protection-eu_en#> accessed 14 October 2024

European Commission JRC, *Wind Energy in the European Union* (JCR Status Report 2023)

European Commission, ‘Proposals for regulations on supplementary protection certificates’ (*single-market-economy.ec.europa.eu*, 27 April 2023) <https://single-market-economy.ec.europa.eu/publications/proposals-regulations-supplementary-protection-certificates_en> accessed 20 January 2025

European Commission, Commission Staff Working Document, ‘Guidance to Member States on good practices to speed up permit-granting procedures for renewable energy projects and on facilitating Power Purchase Agreements’ SWD(2022) 149 final [2022] 4ff. <<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022SC0149&qid=1723654491360#footnote11>> accessed 20 January 2025

European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, *Study on the economic impact of supplementary protection certificates, pharmaceutical incentives and rewards in Europe* (Publications Office of the European Union 2018) 199

European Commission: Directorate-General for Research and Innovation, *Science, research and innovation performance of the EU, 2020 – A fair, green and digital Europe* (Publications Office, 2020)

European Commission Directorate-General for Environment, ‘Clean and circular electronics: Commission ends use of mercury in lamps as mercury-free alternatives prevail’ (*environment.ec.europa.eu*, 16 December 2021) <https://environment.ec.europa.eu/news/clean-and-circular-electronics-commission-ends-use-mercury-lamps-mercury-free-alternatives-prevail-2021-12-16_en> accessed 19 January 2025

European Court of Auditors, *Offshore renewable energy in the EU – Ambitious plans for growth but sustainability remains a challenge* (European Court of Auditors, Special report 22/2023)

European Court of Auditors, *The EU’s industrial policy on renewable hydrogen* (European Court of Auditors, Special report 11/2024)

European Federation of Pharmaceutical Industries and Associations, ‘Economic footprint of the pharmaceutical industry in Europe’ (*efpia.eu report*, November 2024) <<https://efpia.eu/news-events/the-efpia-view/statements-press-releases/despite-a-decade-of-gradual-growth-rd-spending-in-europe-outpaced-by-the-us-with-increasing-competition-from-china-new-data-shows/#>> accessed 22 January 2025

European Innovation Council and SMEs Executive Agency, ‘INDECOPi Peru launches an accelerated program for green patents’ (*intellectual-property-helpdesk.ec.europa.eu*, 3 May 2024) <https://intellectual-property-helpdesk.ec.europa.eu/news-events/news/indecopi-peru-launches-accelerated-program-green-patents-2024-05-03_en> accessed 4 January 2024

European Investment Bank, *EIB Investment Report 2023/2024* (European Investment Bank, 2024)

European Parliament, ‘Unitary supplementary protection certificate for plant protection products’ (*europaparl.europa.eu*, 15 December 2024) <<https://www.europarl.europa.eu/legislative-train/spotlight-JD22/file-patent-licensing-package-2-1>> accessed 20 January 2025

European Parliamentary Research Service, ‘Unitary supplementary protection certificate for plant protection products’ (April 2024) European Parliament Briefing EU Legislation in Progress <<https://www.europarl.europa.eu/legislative-train/spotlight-JD22/file-patent-licensing-package-2-1>, [https://www.europarl.europa.eu/Reg-Data/etudes/BRIE/2024/762281/EPRS_BRI\(2024\)762281_EN.pdf](https://www.europarl.europa.eu/Reg-Data/etudes/BRIE/2024/762281/EPRS_BRI(2024)762281_EN.pdf)> accessed 20 December 2024

Eurostat, ‘EU spent €381.4 billion on R&D in 2023’ (*ec.europa.eu news articles*, 11 December 2024) <<https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20241211-2a>> accessed 22 January 2025

General Secretariat of the Council, ‘Fit for 55’ (*consilium.europa.eu*) <<https://www.consilium.europa.eu/en/policies/fit-for-55/>> accessed 19 December 2024

Hurtado-Albir J and others, European Patent Office, ‘Finding sustainable technologies in patents’ (2016) <https://link.epo.org/web/finding_sustainable_technologies_in_patents_2016_en.pdf> accessed 29 November 2024

Pentheroudakis C, ‘Innovation in the European Digital Single Market: The Role of Patents’ in Nikolaus Thumm (ed) *JRC Science and Policy Report JRC96728*, (Joint Research Centre 2015)

Publications Office of the European Union, ‘Summaries of EU legislation – European Union’ (*eur-lex.europa.eu*) <<https://eur-lex.europa.eu/EN/legal-content/glossary/european-union.html>> accessed 14 October 2024

Romandini R and others, ‘Study on the legal aspects of supplementary protection certificates in the EU – Final report’ (2018) <<https://op.europa.eu/en/publication-detail/-/publication/6845fac2-6547-11e8-ab9c-01aa75ed71a1/language-en>> accessed 20 January 2025

Von der Leyen U, ‘Speech by President von der Leyen at the 50th anniversary of the European Patent Convention, via video message’ (European Commission Press Corner, 5 October 2023) <https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_23_4785> accessed 1 October 2024

Publications of the European Patent Organisation and the European Patent Office:

European Patent Office, *Euro-PCT Guide – PCT procedure at the EPO* (EPO January 2023) <<https://www.epo.org/en/legal/guide-europct>> accessed 15 November 2024

European Patent Office, *Guidelines for Examination in the European Patent Office* (EPO March 2024) chapter V <<https://www.epo.org/en/legal/guidelines-epc>> accessed 10 November 2024

European Patent Office, *European Patent Guide* (EPO July 2024) chapter III, V <<https://www.epo.org/en/legal/guide-epc>> accessed 11 November 2024

European Patent Office, ‘Patent Index 2023’ (*epo.org*) <<https://www.epo.org/en/about-us/statistics/patent-index-2023/statistics-and-indicators/applicants/categories>> accessed 11 October 2024

European Patent Office, ‘Supporting users in uptake of the Unitary Patent before 1 June 2023’ (*epo.org*) <<https://www.epo.org/en/applying/european/unitary/unitary-patent/transitional-arrangements-for-early-uptake#f1>> accessed 16 November 2024

European Patent Office, ‘Monitoring revisions of the IPC/CPC classification scheme’ (*epo.org*, 9 October 2023) <<https://www.epo.org/en/searching-for-patents/helpful-resources/patent-knowledge-news/monitoring-revisions-ipccpc>> accessed 27 November 2024

European Patent Office, ‘Agreement on the application of Article 65 EPC – London Agreement’ (*epo.org*) <<https://www.epo.org/en/legal/london-agreement>> accessed 16 January 2025

European Patent Office, 'Translation requirements after grant' (*epo.org*)
<<https://www.epo.org/en/legal/national-law/2024/iv/index.html>> accessed 16 January 2025

European Patent Office, 'Offshore wind energy' (2023) EPO Patent insight report 1
<<https://www.epo.org/en/news-events/news/epo-publishes-new-patent-insight-report-off-shore-wind-energy>> accessed 11 December 2024

European Patent Office, 'European Patent Convention' (*epo.org*)
<<https://www.epo.org/en/legal/epc/2020/index.html>> accessed 18 November 2024

European Patent Office, 'What to expect' (*epo.org*) <<https://www.epo.org/en/new-to-patents/what-to-expect>> accessed 10 December 2024

European Patent Register, 'Cooperative Patent Classification (CPC)' (*register.epo.org*)
<<https://register.epo.org/help?lng=en&topic=CPC>> accessed 26 November 2024

European Patent Office, 'Cooperative Patent Classification' (*epo.org*)
<<https://www.epo.org/en/searching-for-patents/helpful-resources/first-time-here/classification/cpc>> accessed 26 November 2024

European Patent Office, 'Is there a different degree of acceleration between PACE and PPH?' (*epo.org*) <<https://www.epo.org/en/service-support/faq/applying-patent/patent-prosecution-highway-pph/pph-and-other-acceleration-1>> accessed 2 January 2025

European Patent Office, 'IP 5 Statistics Report 2021 Edition' (November 2022)
<<https://www.fiveipoffices.org/statistics/statisticsreports/2021edition>> accessed 12 January 2025

European Patent Office, 'Clean energy technologies' (*epo.org*)
<<https://www.epo.org/en/searching-for-patents/technology-platforms/clean-energy>> accessed 20 December 2024

European Patent Office, 'EPO and IRENA enhance cooperation on patent information about renewable energy technologies' (*epo.org*) <<https://www.epo.org/en/news-events/press-centre/press-release/2017/451489>> accessed 20 December 2024

European Patent Office, 'EPO and IEA team up to shed light on trends in sustainable energy technologies' (*epo.org*) <<https://www.epo.org/en/news-events/news/epo-and-iea-team-shed-light-trends-sustainable-energy-technologies>> accessed 20 December 2024

European Patent Office, 'Forms' (*epo.org*) <<https://www.epo.org/en/applying/forms>> accessed 2 January 2025

European Patent Office, 'Patent Prosecution Highway (PPH)' (*epo.org*)
<<https://www.epo.org/en/applying/international/patent-prosecution-highway>> accessed 2 January 2025

European Patent Office, 'Speeding up the patent granting process' (*epo.org*)
<<https://www.epo.org/en/searching-for-patents/helpful-resources/patent-knowledge-news/speeding-patent-granting-process>> accessed 21 December 2024

European Patent Office, 'Statistics – Examination' (*epo.org*)
<<https://www.epo.org/en/about-us/services-and-activities/quality/statistics/examination>> accessed 8 January 2024

European Patent Office, ‘What is the difference between the PPH programme and the PACE programme?’ (*epo.org*) <<https://www.epo.org/en/service-support/faq/applying-patent/patent-prosecution-highway-pph/pph-and-other-acceleration-0>> accessed 2 January 2025

European Patent Office, ‘Statistics & Trend Centre – Requests for unitary effect 2023’ (*epo.org*) <<https://www.epo.org/en/about-us/statistics/statistics-centre#/unitary-patent>> accessed 14 January 2025

European Patent Office, ‘Unitary Patent Guide’ (2024) 3rd edition November 2024 (*epo.org*) chapter A. V. <<https://www.epo.org/en/legal/guide-up/2024/index.html>> accessed 15 January 2025

Publications of other international organisations and intellectual property offices:

Cooperative Patent Classification, ‘About CPC’ (*cooperativepatentclassification.org*) <<https://www.cooperativepatentclassification.org/about>> accessed 26 November 2024

Cooperative Patent Classification, ‘CPC to IPC Concordance’ (August 2024) <<https://www.cooperativepatentclassification.org/cpcConcordances>> accessed 26 November 2024

Cooperative Patent Classification, ‘Guide to the CPC (Cooperative Patent Classification)’ (February 2017) <<https://www.cooperativepatentclassification.org/publications/Miscellaneous; https://link.epo.org/cpc/Guide+to+the+CPC.pdf>> accessed 26 November 2024

Finnish Patent and Registration Office, ‘Fast-track processing of patent applications’ (*prh.fi*) <<https://www.prh.fi/en/patentit/applyforanationalpatentinfinland/processingofapplicationsatprh/fast-trackprocessing.html>> accessed 6 January 2025

Intellectual Property Office of the United Kingdom, ‘Formalities manual (online version)’ (*gov.uk*, updated 29 June 2022) Section 7.41 <<https://www.gov.uk/guidance/formalities-manual-online-version/chapter-7-preliminary-examination-and-reports>> accessed 8 January 2025

Intellectual Property Office of the United Kingdom, ‘Guidance – Get your patent granted more quickly’ (*gov.uk*, updated 12 August 2016) <<https://www.gov.uk/government/publications/patents-fast-grant/patents-fast-grant-guidance>> accessed 8 January 2025

Intellectual Property Office of the United Kingdom, ‘Patents: accelerated processing’ (*gov.uk*) <<https://www.gov.uk/guidance/patents-accelerated-processing#full-publication-update-history>> accessed 8 January 2025

Intellectual Property Office of the United Kingdom, ‘Published Green Channel Applications’ (*ipo.gov.uk*, updated 8 January 2025) <<https://www.ipo.gov.uk/p-gcp.htm>> accessed 8 January 2025

Intellectual Property Office of the United Kingdom, ‘UK ‘Green’ inventions to get fast-tracked through patent system’ (*webarchive.nationalarchives.gov.uk*) <<https://webarchive.nationalarchives.gov.uk/ukgwa/20140603121549/http://www.ipo.gov.uk/about/press/press-release/press-release-2009/press-release-20090512.htm>> accessed 8 January 2025

Intellectual Property Office of the United Kingdom, Practice Notice, Statutory guidance, ‘Relaxation of requirements for PCT(UK) Fast Track’ (*gov.uk*, 8 June 2012) <<https://www.gov.uk/government/publications/practice-notice-pctuk-fast-track/relaxation-of-requirements-for-pctuk-fast-track>> accessed 19 January 2025

International Energy Agency, ‘Energy Technology RD&D Budgets Data Explorer’ (*iea.org*, last updated 23 October 2024) figure 1 <<https://www.iea.org/data-and-statistics/data-tools/energy-technology-rdd-budgets-data-explorer>> accessed 22 January 2025

Korean Intellectual Property Office, ‘Annual Report 2013 (April 2015)’ <https://www.kipo.go.kr/en/HtmlApp?c=60114&catmenu=ek07_01_01_13> accessed 12 January 2025

Korean Intellectual Property Office, ‘Annual Report 2014’ (June 2015) <https://www.kipo.go.kr/en/HtmlApp?c=60114&catmenu=ek07_01_01_14> accessed 12 January 2025.

Korean Intellectual Property Office, ‘Annual Report 2023’ (June 2024) <https://www.kipo.go.kr/en/HtmlApp?c=60114&catmenu=ek07_01_01_23> accessed 12 January 2025

Korean Intellectual Property Office, ‘Fees and Payments’ (*kipo.go.kr*) <https://www.kipo.go.kr/en/HtmlApp?c=92004&catmenu=ek03_04_01> accessed 11 January 2025

Korean Intellectual Property Office, ‘IP Policies’ (*kipo.go.kr*, last updated 24 May 2016) <https://www.kipo.go.kr/en/HtmlApp?c=100000&catmenu=ek02_01_02_01> accessed 12 January 2025

Korean Intellectual Property Office, ‘KIPO’s IP Policies for Carbon Neutrality’, presentation 10th TRIPO User Synopsium, (*jpo.go.jp*) <https://www.jpo.go.jp/news/kokusai/nityukan/document/10th_nityukan_symposium/siryo07.pdf> accessed 11 January 2025

Korean Intellectual Property Office, ‘Patent Examination System – Accelerated Examination’ (*kipo.go.kr*) <https://www.kipo.go.kr/en/HtmlApp?c=92102&catmenu=ek03_01_01_03> accessed 11 January 2025

National Institute for the Defense of Free Competition and the Protection of Intellectual Property, ‘Solicitud de participación en el Programa Acelerado de Patentes Verdes’ (Application for participation in the accelerated green patent programme) (*gob.pe*, 24 April 2024) <<https://www.gob.pe/institucion/indecopi/informes-publicaciones/5494133-solicitud-de-participacion-en-el-programa-acelerado-de-patentes-verdes>> accessed 12 January 2025

OECD Environment Directorate, ‘Patent search strategies for the identification of selected environment-related technologies (ENV-TECH), climate change adaptation technologies, and similar technologies relevant for the ocean economy’ (2022) <<https://stats.oecd.org/wbos/fileview2.aspx?IDFile=c5c477c0-d300-42fe-af1f-d4a450c79a39>> accessed 8 December 2024

PRH Finish Patent and Registration Office, ‘Fast-track processing of patent applications’ (*prh.fi*) <<https://www.prh.fi/en/patentit/applyforanationalpatentinfinland/processingofapplicationsatprh/fast-trackprocessing.html>> accessed 4 January 2025

TIPO Intellectual Property Office – Ministry of Economic Affairs, R.O.C., ‘TIPO Introduces Green Patent Revisions to Accelerated Examination Program on January 1, 2022’ (*tipo.gov.tw* 25 February 2022) <<https://www.tipo.gov.tw/en/cp-896-902715-1ad81-2.html>> accessed 4 January 2024

UNFCCC, ‘Application of environmentally sound technologies for adaptation to climate change – Technical paper’ (10 May 2006) FCCC/TP/2006/2 <<https://unfccc.int/documents/4199>> accessed 27 November 2024

United Nations Climate Change, ‘Key aspects of the Paris Agreement’ (*unfccc.int*) <<https://unfccc.int/most-requested/key-aspects-of-the-paris-agreement>> accessed 19 December 2024

United Nations Framework Convention on Climate Change, ‘Technology Mechanism’ (2015) <https://unfccc.int/ttclear/misc/_StaticFiles/gnwoerk_static/TEM/0e7cc25f3f9843ccb98399df4d47e219/174ad939936746b6bfd76e30a324e78.pdf> accessed 19 December 2024

United Nations Treaty Collection (*treaties.un.org*, Status 19 December 2024) <https://treaties.un.org/pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-7-d&chapter=27&clang=en> accessed 19 December 2024

United State Patent and Trademark Office, ‘Classification Resources – Cooperative Patent Classification’ (August 2024) <<https://www.uspto.gov/web/patents/classification/cpc/html/cpc-Y.html>> accessed 30 November 2024

United States Patent and Trademark Office, ‘2024 Patents for Humanity: Green Energy category award recipients’ (*uspto.gov*) <<https://www.uspto.gov/ip-policy/patent-policy/patents-humanity/2024-recipients>> accessed 10 January 2025

United States Patent and Trademark Office, ‘Accelerated Examination’ (*uspto.gov*) <<https://www.uspto.gov/patents/initiatives/accelerated-examination>> accessed 9 January 2025

United States Patent and Trademark Office, ‘Certification and request for prioritized examination under 37 CFR 1.102(e)’ (*uspto.gov*) <<https://www.uspto.gov/patents/apply/forms>; <https://www.uspto.gov/sites/default/files/documents/aia0424.pdf>> accessed 9 January 2025

United States Patent and Trademark Office, ‘Climate Change Mitigation Pilot Program’, (*uspto.gov*) <<https://www.uspto.gov/patents/laws/patent-related-notices/climate-change-mitigation-pilot-program>> accessed 8 January 2025

United States Patent and Trademark Office, ‘Patents for Humanity: Green Energy’ (*uspto.gov*) <<https://www.uspto.gov/ip-policy/patents-humanity-green-energy>> accessed 10 January 2025

United States Patent and Trademark Office, ‘Patents for Humanity’ (*uspto.gov*) <<https://www.uspto.gov/ip-policy/patent-policy/patents-humanity>> accessed 10 January 2025

United States Patent and Trademark Office, ‘USPTO Patents for Humanity Program: Green Energy – Terms and Conditions 2023’ (*uspto.gov*) <<https://www.uspto.gov/ip-policy/patent-policy/patents-humanity>; [Patents for Humanity Terms and Conditions](#)> accessed 10 January 2025

United States Patent and Trademark Office, ‘USPTO’s Prioritized Patent Examination Program’ (*uspto.gov*) <<https://www.uspto.gov/patents/initiatives/usptos-prioritized-patent-examination-program>> accessed 9 January 2025

United States Patent and Trademark Office, *Manual of Patent Examining Procedure (MPEP)*, 9th Edition, Revision January 2025, Chapter 700 <<https://www.uspto.gov/web/offices/pac/mpep/index.html>> accessed 9 January 2025

WIPO, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>> accessed 1 January 2025

World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’, national/regional programs European Patent Office (*wipo.int*) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>> accessed 2 January 2025

World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, National/regional programs – Summary table) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-summary.pdf>> accessed 4 January 2025

World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, National/regional programs – Spain) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-spain.pdf>> accessed 5 January 2025

World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, National/regional programs – Finland) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-finland.pdf>> accessed 6 January 2025

World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, National/regional programs – United State of America) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-usa.pdf>> accessed 8 January 2025

World Intellectual Property Organisation, ‘Expedited Examination Programs of IP Offices’ (*wipo.int*, Patent Prosecution Highway (PPH) and Other Bilateral and Multilateral Initiatives) <<https://www.wipo.int/scp/en/expedited-examination-programs.html>; <https://www.wipo.int/export/sites/www/scp/docs/expedited-examination-pph.pdf>> accessed 12 January 2025

World Intellectual Property Organisation, ‘IPO Green’ (*wipo.int*, Green Patent Prosecution Highways’, IPO Green Policy Note 8) <<https://www3.wipo.int/wipogreen/en/ipo-green/> ;

<https://www3.wipo.int/wipogreen/en/docs/ipo-green-policy-note-8.pdf> > accessed 4 January 2025

World Intellectual Property Organisation, 'Mapping Innovations Patents and the Sustainable Development Goals' (2024) <<https://www.wipo.int/publications/en/details.jsp?id=4716>> accessed 11 December 2024

World Intellectual Property Organisation, 'Strasbourg Agreement Concerning the International Patent Classification' (*wipo.int*) <<https://www.wipo.int/treaties/en/classification/strasbourg>> accessed 26 November 2024

World Intellectual Property Organisation, 'Summary of the Strasbourg Agreement Concerning the International Patent Classification (1971)' (*wipo.int*) <https://www.wipo.int/treaties/en/classification/strasbourg/summary_strasbourg.html> accessed 26 November 2024

World Intellectual Property Organisation, 'The Patentscope User's Guide' (June 2024) 62 <https://patentscope.wipo.int/search/help/en/users_guide.pdf> accessed 29 November 2024

World Intellectual Property Organisation, 'Use of the simplified IPC by industrial property offices' (*wipo.int*) <https://www.wipo.int/export/sites/www/classifications/ipc/en/reform/table_use_simplified_ipc.pdf> accessed 26 November 2024

World Intellectual Property Organisation, 'WIPO-Administered Treaties' (*wipo.int*) <https://www.wipo.int/wipolex/en/treaties/ShowResults?search_what=C&treaty_id=11> accessed 26 November 2024

World Intellectual Property Organization, 'Guide to the International Patent Classification' (2024) chapter I.6f., <<https://www.wipo.int/publications/en/details.jsp?id=4722&plang=EN>> accessed 31 October 2024

Online Blogs and further web-sources:

Ahijado J, 'Fostering sustainable innovation: INDECOPI's Accelerated Green Patents Program in Peru' (*hyaip.com News*, 15 May 2024) <<https://hyaip.com/en/fostering-sustainable-innovation-indecopis-accelerated-green-patents-program-in-peru/>> accessed 12 January 2024

Aldridge H, 'Controlling the Speed of Prosecution at the EPO' (*Venner Shipley – Insights & Events*, 16 May 2022) <<https://www.vennershipley.com/insights-events/controlling-the-speed-of-prosecution-at-the-epo/>> accessed 3 January 2025

Allen A, 'What's the Rush? Lessons from applications for an expedited trial' (*gatehouse-law.co.uk Articles*, 13 January 2021) <<https://gatehouselaw.co.uk/whats-the-rush-lessons-from-applications-for-an-expedited-trial/>> accessed 18 January 2025

Armejo K, 'Peruvian Fast-track Green Patent Program' (*barredamoller.com – Articles*, 21 May 2024) <<https://www.barredamoller.com/en/noticia/peruvian-fast-track-green-patent-program>> accessed 12 January 2024

Brinkmann R, ‘SPC Blog – Part 4: One SPC per product (Article 3(c))’ (*brantsandpatents.com SPC Blog*) <<https://brantsandpatents.com/fr/nouvelles/spc-blog-part-4-the-crucial-role-in-patent-protection>> accessed 25 January 2025

del Carmen Arana Courrejolles M, ‘In brief: patent prosecution in Peru’ (*lexology.com*, 18 March 2019) <<https://www.lexology.com/library/detail.aspx?g=f0b8c0b8-03c9-4770-8dcb-a9f8cb16dbcb>> accessed 13 January 2025

Devinant C, ‘The Unified Patent Court: Also an Attractive Jurisdiction for SMEs’ (*jonesday insights*, 25 November 2024) <<https://www.jonesday.com/en/insights/2024/11/the-unified-patent-court-also-an-attractive-jurisdiction-for-smes>> accessed 17 January 2025

Dosanjh M and others, ‘Speeding up renewable energy – bottlenecks and how you resolve them’ (*World Economic Forum*, 5 January 2023, updated 10 September 2024) <<https://www.weforum.org/stories/2023/01/speeding-up-sustainable-energy-bottlenecks-and-how-you-resolve-them-davos2023/>> accessed 24 January 2025

Eurelectric, ‘RES Permitting – Eurelectric Statement’ (*eurelectric.org publications*, 1 October 2020) <<https://www.eurelectric.org/publications/statement-on-res-permitting/>> accessed 21 January 2025

European Federation of Pharmaceutical Industries and Associations, ‘The Pharmaceutical Industry in Figures 2024’ (*efpia.eu*, 24 June 2024) <<https://www.efpia.eu/media/2rxdkn43/the-pharmaceutical-industry-in-figures-2024.pdf>> accessed 21 January 2025

Fox H, Czyżak P and Brown S, ‘Ready, Set, Go: Europe’s Race for Wind and Solar’ (*ember-energy.org insights*, 27 July 2022) <<https://ember-energy.org/latest-insights/europes-race-for-wind-and-solar/>> accessed 21 January 2025

FPS Economie, ‘The European Green Deal’ (*econmoie.fgov.be*, July 2024) <<https://economie.fgov.be/en/themes/intellectual-property/innovation-and-intellectual/european-green-deal>> accessed 20 December 2024

Gajeck N, ‘Flexible Case Management, Strict Deadlines? The Procedure Before the UPC’ (*noerr.com Insights*, 28 April 2023) <<https://www.noerr.com/en/insights/flexible-case-management-strict-deadlines-the-procedure-before-the-upc>> accessed 17 January 2025

Ghods M and Mousavi Z, ‘Patents as green technology barometers: trends and disparities’ (*wiiw The Vienna Institute for International Economic Studies*, 27 November 2023) Figure 1 <<https://wiiw.ac.at/patents-as-green-technology-barometers-trends-and-disparities-n-615.html>> accessed 11 December 2024

Glassman J, Kelton Z and Giordano-Coltart J, ‘USPTO Acts to Spur Innovation in Climate Mitigation Technologies with Expedited Review Pilot Program’ (*Kilpatrick Insights: Publications*, 15 November 2022) <<https://ktslaw.com/en/Insights/Alert/2022/11/USPTO-Acts-to-Spur-Innovation-in-Climate-Mitigation-Technologies-with-Expedited-Review-Pilot-Program>> accessed 10 January 2025

Hawks C, Das S and Story M, ‘Early Results of USPTO’s New Climate Change Mitigation Pilot Program’ (*morganlewis lawflash*, 23 February 2023) <<https://www.morganlewis.com/pubs/2023/02/early-results-of-usptos-new-climate-change-mitigation-pilot-program>> accessed 9 January 2025

Heuking, 'Procedure and deadlines of a UPC infringement procedure' (*heuking.de*) <<https://www.heuking.de/en/expertise/patent-law/unitary-patent/procedure-and-deadlines-of-a-upc-infringement-procedure.html>> accessed 17 January 2025

Hibbert J and De Mauny C, 'The UPC in 2024: Statistics, Trends and Substantive Law' (*ip-watchdog.com*, 17 December 2024) <<https://ipwatchdog.com/2024/12/17/upc-2024-statistics-trends-substantive-law/id=183996/>> accessed 17 January 2025

Holzapfel H, Larsen C and Pisani D, 'Legal Lens on the Unified Patent Court' (*mwe.com Insights*, January 2024) <<https://www.mwe.com/insights/legal-lens-on-the-unified-patent-court-january-2024/>> accessed 18 January 2025

Jackman P, 'Options for Accelerating Examination of Renewable Technology Patent Applications' (*Pratt's Energy Law Report*, 24 March 2023) <<https://www.sternekeessler.com/news-insights/publications/options-accelerating-examination-renewable-technology-patent/>> accessed 4 January 2024

KWAK J, 'KIPO Reforms the Patent Application Preferential Examination System' (February 2024) in: Young Mo KWON, Hyeon Gil RYOO, Seong Tahk AHN (eds), Recent IP Developments in Korea, (*Lee & Ko Newsletter*) 16 <https://www.leeko.com/news/leeko_ip/202402/lkip2402.pdf> accessed 12 January 2025

LEE K and KIM C, 'Managing the Pace of Patent Examinations for Patent Applications in Korea' (*Kim & Chang Newsletters*, 3 December 2020) <https://www.ip.kim-chang.com/en/insights/detail.kc?sch_section=4&idx=22321> accessed 11 January 2025

Mattei F, 'The New EU Green Deal: Greening IP Rights' (*rouse.com insights*, 18 July 2020) <<https://rouse.com/insights/news/2020/the-new-eu-green-deal-greening-ip-rights>> accessed 19 January 2025

Oh P and Saw C, 'Patent Litigation in Practice Series: Spotlight on Singapore: The Simplified Process vs Express Track in Singapore' (*Bird & Bird Patenthub Insights*, 12 November 2024) <<https://www.twobirds.com/en/patenthub/shared/insights/2024/singapore/patent-litigation-in-practice-series-spotlight-on-singapore#page=1>> accessed 18 January 2025

on Mon S, 'Peru launches fast-track examination program for green patent applications' (*yezshimaip.com*, 13 May 2024) <<https://yezshimaip.com/en/node/5346?page=1>> accessed 12 January 2024

Pine IP, 'About Patent Applications in Korea: What They Are, Costs, and Procedures' (*Insights*, 30 November 2024) <<https://www.pinepat.com/en/insights/columns/teugheo-culweon-yi-modeun-geos-teugheo-culweoniran-biyong-geurigo-jeolca>> accessed 11 January 2025

Quinn G, 'Prioritized Examination: Why Filing a Track One Application Makes Sense' (*ip-watchdog*, 12 June 2023) <<https://ipwatchdog.com/2023/06/12/prioritized-examination-filing-track-one-application-makes-sense/id=162212/>> accessed 9 January 2025

Röder-Hitschke H, 'One year Unitary Patent and Unified Patent Court in facts and figures' (*maiwald.eu*, 17 June 2024) <<https://www.maiwald.eu/cn/maiwald-blog/one-year-unitary-patent-and-unified-patent-court-in-facts-and-figures-draft/>> accessed 17 January 2025

Rollason A, 'Green IPOs: Accelerating Prosecution of Green Tech Patent Applications Part I' (*hlk-ip.com, News & insights*, 30 August 2023) <<https://www.hlk-ip.com/news-and-insights/green-ipos-accelerating-prosecution-of-green-tech-patent-applications-part-i/>> accessed 9 January 2025

Schmid M, 'Optimizing patent applications at the European Patent Office (EPO)' (*Richardt.eu news*, 5 May 2023) <<https://www.richardt.eu/en/news/detail/optimizing-patent-applications-at-the-european-patent-office-epo/>> accessed 2 December 2025

Schröder V and Metwally J, 'Administrative Patent Disputes' (*Hannes Snellman Blog – Intellectual Property*, 28 June 2024) <<https://www.hannessnellman.com/news-views/blog/administrative-patent-disputes/>> accessed 7 January 2025

Son M, 'Korea increases punitive damages cap and introduces new unfair competition measures' (*managingip*, 6 March 2024) <<https://www.managingip.com/article/2cxss-ros2fw981tfun4e9/sponsored-content/korea-increases-punitive-damages-cap-and-introduces-new-unfair-competition-measures#:>> accessed 25 January

Taylor S, 'The UPC: lessons learned from the first 18 months' (*Pinsent Masons Out-Law Analysis*, 17 December 2024) <<https://www.pinsentmasons.com/out-law/analysis/upc-lessons-learned-first-18-months>> accessed 25 January 2025

Tran B, 'Unified Patent Court Statistics: Trends and Insights' (*PatentPC Blog*, 16 January 2025) <<https://patentpc.com/blog/unified-patent-court-statistics-trends-and-insights>> accessed 17 January 2025

Vaughan B and Watkins L, 'US Patent Trademark Office Expands Climate Change Mitigation Pilot Program' (*foleyhoag – Energy and Climate Counsel*, 12 June 2023) <<https://foleyhoag.com/news-and-insights/blogs/energy-and-climate-counsel/2023/june/us-patent-trademark-office-expands-climate-change-mitigation-pilot-program>> accessed 9 January 2025

Wilson D and Badiani S, 'No time to wait in line: Expedition in the UK Patents Court' (*carpmaels.com* 25 March 2022) <<https://www.carpmaels.com/no-time-to-wait-in-line-trends-in-recent-cases-on-expedition-before-the-uk-patents-court/%3C>> accessed 18 January 2025

Patents:

EP4484270A1 Floating Wind Energy Installation (2023) <<https://worldwide.espacenet.com/patent/search/family/087059965/publication/EP4484270A1?q=pn%3DEP4484270A1>> accessed 23 January 2025

EP12151580A Electrolysis device (2012) <<https://worldwide.espacenet.com/patent/search/family/047520945/publication/EP2617873A1?q=pn%3DEP2617873A1>> accessed 23 January 2025

EP3548733A1 Wind turbine blade (2017) <<https://worldwide.espacenet.com/patent/search/family/058159531/publication/US11306696B2?q=pn%3DUS11306696B2>> accessed 23 January 2025

EP2329937A1 Fibre-reinforced plastic material (2009) <<https://world-wide.espacenet.com/patent/search/family/042308363/publication/EP2329937A1?q=pn%3DUS2011129349A1>> accessed 23 January 2025

ABSTRACT

Green innovation and its legal protection through “Green Patents” is one of the key elements in mitigating the effects of climate change and promoting a green transition of Europe’s industry. This thesis argues that European patent system currently lacks a common legal Green Patent strategy and therefore seeks to outline a specific legal proposal.

The present thesis identifies the European Union (EU), the European Patent Organisation (EPOrg) and the Unified Patent Court (UPC) as the relevant European legal key players and builds a common language for Green Patents by using and optimising the Green Patent classification practice at the European Patent Office (EPO). By also considering European and global statistics on Green Patents, a potential for further Green Patent incentives can be identified. This thesis then evaluates several procedural and material legal incentives for Green Patents, taking into account the existing legislation of the relevant stakeholders and comparing them with international legal approaches.

As a result, it suggests inter alia the integration of a Green-Patent fast-track into the existing schemes of the European Patent Office as well as the introduction of Green Supplementary Protection Certificates through an interim EU regulation. Furthermore, the extension of the Green fast-track to the newly established Unitary Patent is proposed and the efficient procedural practice of the UPC is identified as an indirect incentive for Green Patents.

Grüne Innovation und ihr rechtlicher Schutz durch „Grüne Patente“ ist eines der Schlüsselemente zur Bekämpfung der Folgen des Klimawandels und zur Förderung einer „grünen“ Transformation der europäischen Industrie. Diese Arbeit argumentiert, dass das europäische Patentrechtssystem noch keine einheitliche grüne Patentstrategie verfolgt und schlägt daher ein konkretes legislatives Konzept vor.

Die vorliegende Arbeit identifiziert die Europäische Union (EU), die Europäische Patent Organisation (EPOrg) und das einheitliche Patentgericht (EPG) als die relevanten europäischen Schlüsselakteure und schafft ein gemeinsames Verständnis von Grünen Patenten durch die Anwendung und Optimierung der Klassifikationspraxis des Europäischen Patentamtes (EPA) für Grüne Patente. Unter Berücksichtigung europäischer und globaler Statistiken zu Grünen Patenten wird ein Potenzial für weitere Förderimpulse identifiziert. Anschließend bewertet die Arbeit verfahrensrechtliche und materiell-rechtliche Förderimpulse für Grüne Patente unter Berücksichtigung der Rechtsvorschriften der relevanten Interessenträger und eines Vergleiches mit internationalen Rechtsansätzen.

Vor diesem Hintergrund wird vorgeschlagen ein beschleunigtes Patenterteilungsverfahren für Grüne Patente in die bestehenden Strukturen des Europäischen Patentamtes zu integrieren und erweiterte Schutzzertifikate für Grüne Patente durch eine gesetzliche EU-Interimsregelung einzuführen. Des Weiteren wird eine Erweiterung des beschleunigten „Grünen“ Patenterteilungsverfahrens auf das neu eingeführte Einheitspatent empfohlen und die effiziente Verfahrenspraxis des EPG als indirekte Fördermaßnahme für Grüne Patente identifiziert.