

D YOUNG & CO

NET ZERO WEEK

2024 IP UPDATE

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Net Zero Week
Challenges, strategies,
innovations & solutions



NetZeroWeek™
6 – 12 July 2024

Introduction



Net Zero Week 2024, the UK's official national awareness week, ran from 06 to 12 July. Backed by the UK Government, Net Zero Week is aimed at individuals, business and industry, and the energy economy. It offers all stakeholders a dedicated platform to highlight solutions, voice opinions, explore strategy, and share evidence in our shared journey towards net zero.

We all need to radically reduce our carbon emissions to combat the effects of climate change and the UK has legislated to be free of greenhouse gas emissions by 2050. Reaching net zero will require new measures, innovative solutions, and plenty of human effort both at work and at home. D Young & Co has been working to reduce our carbon emissions through a number of targeted initiatives, including moving our London office to a building with a BREEAM certification of "excellent".

Over Net Zero Week we ran a series of net zero and green technology related articles, with an emphasis on innovation and intellectual property rights.

We have collated these articles in this special edition newsletter, in which we cover a wide range of green topics including green trade mark trends, sustainability-related patents, battery tech, solar tech, mobile communications (6G), aviation, green energy and green chemistry.

We hope that you will find our updates thought provoking and that we are able to share our enthusiasm for helping inventors protect their innovations in the sustainability space.

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Patents / aviation

Fly net zero 2050 Sustainable aviation fuel, aircraft technology and other mitigations

At the 77th Annual General Meeting of the International Air Transport Association (IATA) on 04 October 2021, a resolution was passed by the member airlines to commit to achieving net-zero carbon emissions from their operations by 2050.

In 2022, air travel was responsible for 0.8 gigatons of carbon dioxide (CO₂) emissions, approximately 2.1% of global CO₂ emissions¹.

Despite the downfall in passenger numbers as a result of the COVID pandemic, with the 2022 air travel related CO₂ emissions at 85% of pre-pandemic levels, demand for air passenger journeys is expected to return to pre-pandemic levels in 2024 and to exceed 10 billion by 2050². Based on this trajectory, the expected carbon emissions from air travel for the period from when the resolution was passed in 2021 until 2025 is approximately 21.2 gigatons of CO₂³.

The Fly Net Zero resolution passed by the IATA member airlines bring air transport in line with supporting efforts of the Paris Agreement to limit global warming to 1.5°. Fly Net Zero is therefore an ambitious target which will require coordinated efforts across the aviation industry. In the first of a series of articles, this article introduces the key technologies and changes that are being considered.

Energy and new fuels

The conventional kerosene based jet fuel used in aviation has remained substantially unchanged for over 30 years. Changing the type of fuel used in aviation and/or using alternative energy sources presents the largest opportunity for reducing CO₂ emissions.

Indeed, 65% of the contribution to achieving net zero is expected to come from the use of sustainable aviation fuel (SAF) alone. SAF is a term used to describe aviation fuels that are derived by non-fossil carbon resources, such as from biomass, waste feedstocks or carbon capture.

Although SAF is largely compatible with current airport infrastructures, nearly all of the SAF available today is referred to

as "paraffinic SAF" as it has a different chemical composition, and therefore different properties, to conventional aviation fuel. Paraffinic SAF cannot be directly substituted for conventional aviation fuel without changes to the aircraft's fuel lines and metering systems, so only a blend of up to 50% SAF to kerosene based fuel is currently certified for use. Equally the global SAF uptake today is low and focused in a few geographic regions, although some countries such as the UK have started legislating mandates for a minimum SAF content in aviation fuel.

The global upscaling of the sustainable aviation fuel supply chain therefore presents the biggest challenge in order to achieve the expected contribution to achieving net zero from SAF.

Hydrogen presents an opportunity as a carbon-free fuel that could be incorporated either in liquid form as a replacement to conventional kerosene based jet fuel or in fuel cells as an electrical power source.

Liquid hydrogen contains about 2.5 times more energy per kilogram than kerosene and only produces water as a by-product when burnt⁴. Due to its lower volumetric density, however, for a given flight the volume of liquid hydrogen required would be around 4 times larger than that of kerosene, despite having a lower mass⁵. Hydrogen is also only a liquid at atmospheric pressure below -253°C, so would need to be stored in low temperature and/or pressurised tanks. These challenges therefore mean that liquid hydrogen fuelled aircraft are being investigated as part of a longer term solution, complementing the short/medium term gains from SAF.

The use of hydrogen in fuel cells, however, is a more mature technology with many electric vehicles already employing such devices. Like with electric vehicles, the combustion (jet) engines on aircraft are replaced by

Sources & useful links

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propellers electrically powered by the fuel cells. Although conventional batteries can also be used as an energy source instead of hydrogen fuel cells, the currently available energy densities of batteries limit their application to small (<10 seat) aircraft.

Hydrogen fuel cells have a higher energy density than batteries and therefore provide an opportunity for larger fully electric aircraft.

Hydrogen production, on the other hand, is not necessary carbon neutral as current hydrogen production is primarily from burning coal or natural gas. Low-carbon source hydrogen, such as from water using renewable energy, only accounts for around 0.1% of current hydrogen supplies². Potential aviation demand for hydrogen by 2050 could represent 8-15% of future hydrogen production. Although global hydrogen demand was forecast to increase sevenfold in the same timescale⁶, this did not account for direct use of hydrogen in aircraft propulsion, so the global market for hydrogen production may be further augmented in the event of strong aviation uptake. Large-scale clean hydrogen production therefore presents an enormous challenge.

Aircraft technology

Reducing the amount of energy an aircraft requires in flight is being investigated alongside changing an aircraft's energy source and is expected to account for 13% of contribution to achieving Net Zero. This can be achieved by improvements in aircraft and engine design.

Continuous improvements in aerodynamic and propulsive efficiency have been the backbone of the aviation industry since its inception; the latest generation of jet powered aircraft has just 20% of the fuel burn per seat of the first generation of jet aircraft introduced in the 1960s⁷. Whilst developments in areas such as composite materials, additive manufacture and higher bypass-ratio engines are expected to deliver improvements in the short term, the benefits of such evolutionary



technological improvements are gradually diminishing over time. Coupled with the rate of growth of air traffic, emission increases traditionally outpace such efficiency gains.

Revolutionary aircraft architectures are therefore being explored to enable an extra step change in efficiency or more than 10% compared to evolutionary technology levels. These new architectures can complement the requirements of the new energy sources discussed above, but present additional challenges such as meeting certification and evacuation requirements, and avoiding or minimising airport and infrastructure changes. Equally, theoretically optimal aircraft architectures often result in wider aircraft cabins with fewer or no windows, so passenger perception and expectations will need to be carefully managed.

Other issues and mitigations

Although less impactful than changes to the aircraft, operational and air traffic control management changes can provide environmental quick wins, such as allowing aircraft to continuously climb and descend between the ground and their cruising altitudes, reducing the need for holding patterns, trajectory optimisation that allows aircraft to fly optimum flight profiles, and reducing ground engine

running through the use of electric auxiliary engines or electric tow vehicles.

Whilst Fly Net Zero specifically targets CO₂ emissions, other emissions from aircraft such as methane and water vapour also contribute to global warming. An additional factor for the aviation industry is that 90% of aircraft emissions occur above 3000ft⁸. Not only does this mean that low altitude and ground based operational mitigations will have a limited impact, but high altitude emissions have a greater impact on global warming; indeed, CO₂ emissions only account for around a third of aviation's impact on overall climate change. Although methodologies and conclusions differ, studies have found aviation to account for between 3.5-5% of global warming despite only contributing 2-2.5% of annual CO₂ emissions⁹. As a result, there is growing pressure to reduce short haul flying where greener forms of transport such as high speed rail are available.

Nonetheless, Fly Net Zero 2050 is an ambitious target with numerous evolutionary and revolutionary technologies. Future articles in this series will investigate some of these key technologies and challenges in more detail.

Author:
Andrew Cockerell



Net zero Green trade mark trends and tips

Published in February 2024, the UK Intellectual Property Office's report "The race to net zero: tracking the green industrial revolution through IP" divulges trends in green trade marks between 2000 and 2021. The report was commissioned to provide an insight into the progress towards the UK Government's legally binding target for the UK to be net zero by 2050. It is widely accepted that an increase in innovation and investment in green technologies will be essential to deliver the net-zero target.

While the purpose of trade marks is to indicate origin rather than to indicate innovation, a trade mark can nevertheless be used in relation to an innovative product and/or service. There is no legal definition for green trade marks. Within the context of the UKIPO's report a trade mark application was considered to be green if the goods/services specification contained at least one "green term". The list of green terms was taken from the European Intellectual Property Office's "Harmonised Green Terms" inventory. To analyse the distribution of green trade marks, they were then divided up into different product categories and groups, such as pollution control, reusable and waste management".

Trends in green trade marks

Some of the key findings from the UKIPO report regarding trade mark applications filed between 2000 and 2021 are that:

- More than one million trade mark applications were filed, and around 6% of these were considered to be green trade marks.

- The proportion of overall trade mark applications containing at least one green term has generally increased in recent years (and particularly after 2015).
- The energy conservation product group accounted for around 26% of all green trade marks. Energy conservation covers, for example, the storage of electricity (such as batteries). The pollution control product group accounted for 17.4% of all green trade marks and covers, for example, air and water purification. Agriculture was the least popular product group with just 0.9% of green trade mark filings.
- The most popular product groups in which green trade marks have been filed has changed over time. The transportation product group has recently increased in popularity, with more trade mark applications being filed in this product group relative to others. In contrast, the climate change and waste management groups have decreased in popularity relative to other product groups.
- UK green trade mark applicants are mainly from the UK, China, the USA and Germany.
- On the patent side, the largest green technology sectors in the UK were found to be green vehicles and green buildings. This aligns with the finding on the trade mark side that storage of electricity is a key category overall in all the top countries.
- The highest number of green terms can be found in classes 9 (electrical and scientific apparatus), 11 (environmental control apparatus), 40 (material treatment) and 42 (computer scientific).

So what does this tell us?

As with any data analysis there will be assumptions and limitations and these are recognised in the report. For example, on the one hand, the volume of green trade marks could have been overestimated because a specification can include both green and non-green terms, and the mark filed may have been focused on the non-green terms. On the other hand, many of the green terms identify products and/or services that are intrinsically green, and would not identify a product that has been produced in a sustainable way. It would also be difficult to account for the following from the UKIPO's objective dataset:

- Applicants might not be using their green trade marks yet.
- Applicants might be using green trade marks without filing applications.
- Applicants might be claiming to be green when they are not.

There is nevertheless a general inference that green innovation is increasing in some areas.

Practical tips for green trade marks

- The UK and EUIPO will review a specification containing green terms in the usual way: if the specification is not clear and precise then an objection will be raised.
- If a trade mark owner later decides not to use a registration in relation to the green terms, then the registration may become vulnerable to a non-use cancellation action after five years of registration.
- In the UK there is a requirement for an intention to use. In both the UK and EU, if an applicant applies for green terms in their specification but has no intention to use them ("greenwashing"), then this could in theory be attacked on the grounds of bad faith.
- If businesses are using existing trade marks for new green innovations, it is recommended that new trade marks are filed to cover the new goods and/or services and that existing agreements (such as licence agreements) are reviewed to ensure that new goods and/or services are included where appropriate.

The UKIPO net-zero report suggests that green innovation is increasing



Interconnecting the way to net zero

The missing Xlinks?

One of the challenges facing the UK Government's target of achieving net-zero emissions by 2050, and indeed renewable energy generation in general, is the inconsistency of some renewable energy sources, such as solar and wind. Seasonal and daily variation in solar output and wind levels limits the renewable energy generation capabilities of the UK and presents a hurdle in the pursuit of the UK's net-zero target.

Electricity interconnectors

Sub-sea interconnector arrangements, where electricity systems of different countries are connected by sub-sea cabling, are becoming an increasingly attractive option for countries to share and trade energy, and thus supplement their own inconsistent renewable energy supply.

Currently, the UK has 9.8GW of interconnect capacity provided by nine interconnect systems. Of these, the longest interconnects are the 720km North Sea Link, connecting the UK and Norway, and the 765km Viking Link, connecting the UK and Denmark. These interconnects enable the export of surplus wind power from the UK, and the import of power from Norway and Denmark, during periods of low energy generation in the UK. Interconnector systems can provide resilience to a country's inconsistent renewable energy generation capability, and offer an attractive option to offload excess renewable energy to supplement another country's demand. Indeed, interconnectors are seen as an important component to the UK Government's net-zero target, with a planned tripling of interconnector capacity by 2030.

While new interconnector systems have been proposed that will connect the UK with each of France, the Netherlands and Germany in the coming decade, one ambitious proposal, the Xlinks Morocco-UK Power Project, aims to provide the UK with 3.6GW of interconnector capacity by harnessing the more consistent renewable energy generating capability of Morocco.

The Xlinks project has the highest capacity of interconnect projects currently being proposed, and while the project is currently

Xlinks secured a lease from the Moroccan government to build a 10.5GW solar & wind farm



only in preliminary stages, in August 2023 the project was declared by Claire Coutinho, the UK Government's Secretary of State for Energy Security and Net Zero, to be a project of "national significance". The project hopes to be operational within a decade, and promises to supply the UK with up to 8% of the UK's electricity consumption.

Energy generation

The energy will be generated from solar and wind farms located in the Guelmim-Oued Noun region of Morocco, where Xlinks has secured a 50-year lease from the Moroccan Government to build a 10.5GW solar and wind farm. The project intends to harness the high solar intensity of the desert in the region, along with the naturally-occurring trade winds caused by the temperature differential between the Atlantic ocean and African continent, to provide a consistent supply of solar and wind-generated energy.

Crucially, accessing energy generation further afield decreases the seasonal variation experienced by the UK and much of Europe, and also provides access to a region with different weather patterns and daylight hours. For example, Morocco has the third highest global horizontal irradiance (GHI) in North Africa, 20% greater than Spain (the highest GHI in Europe) and more than twice that of the UK. Morocco also provides triple the solar intensity of the UK (34% vs 11%).

Useful links

Ofgem, energy policy and regulation programmes, gas interconnectors:
dycip.com/interconnectors-ofgem

UK Government Department for Energy Security and Net Zero, energy white paper, "Powering our net zero future", 18 December 2020:
dycip.com/energy-white-paper-ukgov

Xlinks, "Morocco-UK Power Project":
dycip.com/morocco-uk-power-project-xlinks

Xlinks, response to the UK Government Environmental Audit Committee's "technical innovations and climate change: onshore solar energy" call for evidence(PDF):
dycip.com/xlinks-evidence-ukgov

Energy storage and transmission

Energy generated from the solar and wind farms will be stored in a 22.5 GWh battery system, which will assist with supporting variations in supply. This battery system, combined with the energy generation capabilities, should allow the project to supply consistent peak energy for 19 hours a day on average .

Once generated in Morocco, the energy will be transmitted through 3,800km of high voltage direct current (HVDC) sub-sea cabling to connection points in England, with the cable passing by Spain, Portugal and France, and following the continental shelf on the sea floor. HVDC systems are more cost effective and result in lower power loss for inter-country power transmission over longer distances compared to alternating current systems, and as such are used for all current interconnector projects.

Summary

The UK Government is considering various technologies to support the move towards net zero, and ambitious interconnector projects such as Xlinks will play an important role in complementing and supplementing the UK's renewable energy generation capabilities going forward.

Author:
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Tackling microplastics pollution

An innovative approach

Plastics have revolutionised essentially every aspect of modern life. However, the ubiquitous use of plastics poses challenges for sustainability and our environment. While the reliance on fossil fuels for the manufacture of plastics has been an ongoing concern for many years, the problem of microplastics pollution has only been recognised much more recently.

What are microplastics and why should we be concerned about them?

Microplastics are defined by the European Chemicals Agency (ECHA) as being small pieces of plastic, typically smaller than 5mm. Microplastics are generally composed of mixtures of polymers and functional additives (for example, plasticisers), and may also comprise residual impurities.

The concern around microplastics stems from the material properties of plastics that makes them desirable for use in the first place, that is, they are organic, insoluble, and resist degradation. Once in the environment microplastics persist for a very long period of time.

Many microplastics are formed incidentally, for example through wear and tear of larger

articles made of plastics such as car tyres. A major source of microplastics (microfibers) is laundry, where washing machines produce synthetic microfibers that are discharged into waste water systems. However, microplastics are also often intentionally included in products. For instance, plastic microbeads have frequently been included in cosmetic products such as exfoliants, and the granular infill used on artificial sport surfaces is stated by the ECHA to be the largest source of intentional microplastics in the environment.

Microplastics pollution

Due to their small particle size microplastics generally escape water treatment and filtration processes and have been found in drinking water. Moreover, microplastics have been found to accumulate in animals, including fish and shellfish, and thereby end up in food for human consumption. Responding to concerns for the environment and human health, governments and regulatory authorities have begun to restrict the intentional use of microplastics and products that are major sources of microplastics. For instance, the Microbead-Free Waters Act of 2015 in the USA banned the use of plastic microbeads in cosmetics and personal care products. Similarly, the European Commission has introduced various restrictions on the use of intentionally added microplastics.

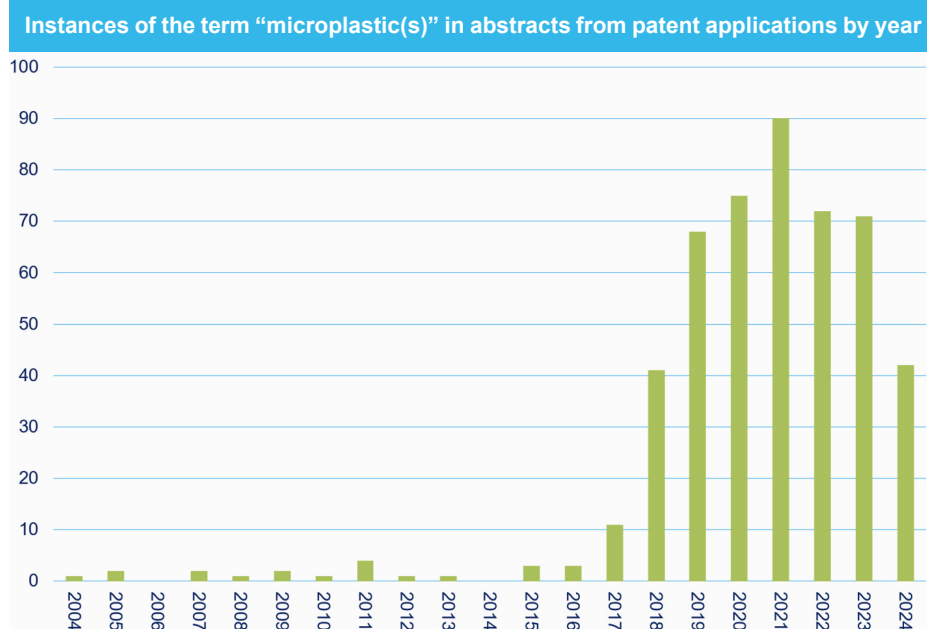
Solutions and innovations

In this light, it is clear that there is significant space for innovation to ameliorate the problem of microplastics pollution. On the one hand, new technologies for removing microplastics already in the environment, such as systems for collecting or filtering microplastics particles from water. Similarly, interceptor systems have been developed that float on the surface of oceans and rivers to collect plastic debris. Intriguing biological solutions include the use of mussels, which can ingest and excrete microplastics in the form of pellets that can then be readily collected. Similarly, there is interest in using microbes to biodegrade plastics.

There is also space for innovation in preventing the release and/or formation of microplastics. For example, accessories for washing machines that prevent the release of microfibers into waste systems. Improved textiles with improved mechanical integrity that are less prone to shed microfibers might also be possible. To this end, there is also space for innovative materials that can replace the use of intentional microplastics such as bio-derived materials that can be used to form microbeads for use in, for example, cosmetic products.

The number of patent application filings in a particular technology area can be a useful indicator of innovation and investment. Interestingly, a search for “microplastic(s)” in the abstracts of patent applications published in the last twenty years reveals a relatively low volume of filings prior to 2017, with a dramatic increase after that time, peaking around 2021 (see the graphic shown left).

Of course, this is only a rough measure and the increase seen may in part be due to the adoption of the particular “microplastics” terminology. Nonetheless, in view of increasing concerns and regulatory restrictions, it is clear that further investment and innovation will be required to develop new products and technologies to avoid microplastics pollution.



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6G Sustainability in mobile communications

To most of us it will feel like 5G has only just arrived. Indeed, 5G coverage is still far from ubiquitous, and a lot of the time we have to make do with connectivity to 4G cellular networks. But 6G has been under development since 2020, and will be progressed and standardised over the next decade or so.

Several generations of mobile communications have been standardised globally up to now, where each generation took approximately a decade from introduction before the subsequent development and deployment of another new generation. For example, generations of mobile communications have moved from the Global System for Mobile Communications (GSM) (2G) to Wideband Code Division Multiple Access (WCDMA) (3G), from WCDMA (3G) to Long Term Evolution (LTE) (4G), and most recently from LTE (4G) to New Radio (NR) (5G). Now 6G is being developed, and is expected to be commercialised sometime in the 2030s.

What is 6G?

But what exactly is 6G? 6G is effectively an umbrella term given to a set of specifications and technical standards which are expected to provide much higher transmission speeds and much smaller delays than 5G. Furthermore, capacity is anticipated to be much greater, as 6G is likely to utilise higher frequency bands for communication. Coverage and reliability are also expected to be improved, while connectivity for faster-moving devices (for example, in planes or drones) is likely to be possible.

Sustainability in mobile communications

Another topic in respect of which 6G is anticipated to have particular focus is that of sustainability. As is the case in many other industries, mobile network operators, network vendors, and mobile phone or other user equipment manufacturers are increasingly focusing on their carbon footprint.

The United Nations has identified seventeen goals for sustainable development, which are shown in the graphic shown above right.

Useful links

6G World, "The Early Days of 6G are Over: Nokia's Volker Ziegler on the Next G": dycip.com/nokia-6gworld

United Nations, 17 Sustainable Development Goals: dycip.com/un-17-sustainable-development

6GWorld, "Guest Blog: Building a More Sustainable Future with 6G": dycip.com/sustainable-future-6gworld

"From Efficiency to Sustainability: Exploring the Potential of 6G for a Greener Future", Rohit Kumar, Saurav Kumar Gupta, Hwang-Cheng Wang et al, *Sustainability*, 2023, 15(23), 16387: dycip.com/potential-6g-greener-future



There are a few use cases of mobile networks which are already known and are helping achieve some of these sustainability goals. For example, mobile networks are addressing the goal of zero hunger through smart agriculture and rural access to wireless communications. The target of industry innovation may be addressed through the deployment of interconnected machines, while mobile networks can aid the transition to clean and renewable energy and enable the utilisation of smart grids, as well as improving the flow of traffic by connecting vehicles and roadside infrastructure.

At present, mobile networks consume a considerable amount of energy in respect of their worldwide deployment, while simultaneously handling greater and greater amounts of data generated by an ever-increasing number of data hungry users. Requirements for new data-intensive use-cases and services expected to be handled by technologies such as 5G and 6G run contrary to the goals shown in the graphic above. This therefore presents a challenge for wireless network operators, network vendors, and mobile phone manufacturers in the overall effort to achieve these sustainability goals. Such a challenge is particularly stark for 6G. How, if 6G technologies will enable a growing world population to burn through more data at faster speeds than ever before, is it possible for 6G and sustainability to go hand-in-hand?

How can 6G help the world meet sustainability targets?

6G technologies can, and are expected to, consider sustainability in their design. At a high level, 6G communications are likely to be much more energy efficient than 5G, both in respect of hardware design and through use of more advanced power-saving techniques. Through increased capacity and ubiquitous connectivity, as well as improved coverage and reliability, and transmission speeds of up to 100 times those of 5G, applications such as smart cities and factories, advanced and autonomous transport, and improvements in healthcare and environmental impact through real-time monitoring, can be supported by 6G technologies.

Development of 6G is well underway, with patent applications relating to techniques and infrastructure which will find application in having 6G already been filed and granted around the world. At the same time the process of standardisation has now begun for 6G, with the first 6G specifications being expected within the next five years. As both the specifications and the technologies themselves take shape, many, both within the telecommunications industry and outside it, will keep a keen eye on the extent to which these focus on, and address, sustainability.

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David Al-Khalili



Climate-neutral claims German Court of Justice sets strict requirements

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“Advertising climate neutrality - German courts establish divergent requirements”:
dycip.com/climate-neutrality-german-courts

[EU Commission Green Claims Directive:](#)
dycip.com/directive-green-claims-proposal

[EU directive to empower consumers for environmental change through better protection against unfair practices and better information:](#)
dycip.com/directive-eu-2024-825

[Case 20-U-72-22 full decision \(German\):](#)
dycip.com/20-U-72-22

In light of conflicting lower court decisions in Germany, the decision of the Federal Court of Justice (BGH) on the advertising of Katjes’ fruit gummies with the claim “climate-neutral” was eagerly awaited.

In its decision (I ZR 98/23) of 27 June 2024 the BGH set out strict requirements companies must meet to promote their products with the term “climate neutral”. Since the term is too vague, it requires specific and clearly visible information in the advert itself, that is, on how the claimed climate neutrality is achieved and what measures have been taken by the advertiser to verify the claim. The BGH decided both that reduction measures take precedence over mere compensation of CO₂ emissions which needs to be made transparent to the consumer and that the risk of consumer deception is particularly high when it comes to so called “green claims”.

Background

In July 2023, the OLG Düsseldorf (Higher Regional Court of Dusseldorf) was asked to define the requirements for advertising with climate-neutrality claims in two proceedings. Whilst the claim by the sweets company Katjes was deemed compliant, a jam manufacturer was found to be in violation of German Unfair Competition Law.

In its decisions, the OLG Düsseldorf explained that climate neutrality is not in itself a false claim and, thus, misleading advertising. However, the advertiser is obliged to provide information on how the climate neutrality of the advertised product is achieved and what compensation measures are in place, whether by the product’s own savings (reduction of greenhouse gas emissions in the production process) or compensation measures (such as purchasing CO₂ certificates or supporting third-party climate projects).

As neither the print advertisement nor the product packaging itself provided any explanatory information, the advertising of the jam manufacturer was deemed insufficient. In contrast, the claim of climate neutrality in both the advertisement and the packaging of Katjes’ fruit gummies was accompanied by a QR code and reference to the website

The German courts crack down on climate-neutral claims in product advertising



of its certification partner, which met the obligation to provide supporting information.

The Wettbewerbszentrale (Centre for Combating Unfair Competition), claimant in both cases, appealed the latter decision.

BGH sets strict requirements

On appeal, the BGH determined Katjes’ advertising to be misleading and overturned the ruling of the OLG Düsseldorf. The BGH is clear that environmental claims are of significant importance in a consumer’s purchasing decision. Therefore, the same strict standards have to be applied to environmental ads as for health-related ads. In both cases, the risk of being misled is particularly high, requiring an increased need to inform and protect the public.

The term “climate neutral” is a vague term (as it can relate to reduction or compensation of CO₂ emissions, which are not equivalent measures) and therefore clarification is required in the advert itself to avoid deception; mere reference to further information being available either via a QR code or a link is inadequate information. The BGH is clear that reduction of CO₂ emissions takes precedence over compensation measures.

Outlook

The BGH’s long awaited decision will significantly impact advertising with the term “climate-neutral” in Germany, but will also affect other environmental friendly claims, which may be deemed to be unclear.

The practice of referring to a website for further information due to spatial restrictions, as the OLG Dusseldorf deemed sufficient, will no longer be possible. Instead, all relevant information must be provided in the advert

or on the product packaging. This judgment is in line with the EU’s increased efforts to impose strict requirements for companies that make environmental claims (green claims) in their adverts to avoid claims that may mislead or deceive EU consumers. One of the instruments is the Green Claims Directive, which was introduced by the EU Commission in March 2023, recently adopted by the EU Council, but is still in the legislative process. Another is the recently adopted “Directive to empower consumers for environmental change through better protection against unfair practices and better information”, which has to be transposed by the EU member states by March 2026. It aims to better protect consumers from misleading advertising with regard to deceptive, unclear, or poorly-substantiated environmental claims (greenwashing).

The prohibition on adverts that claim products are climate neutral, where the product’s neutral CO₂ footprint is achieved by offsetting emissions and not due to reductions in the production process or supply of a product, is of particular significance and will force companies to reconsider their approach. In this regard, the 2026 EU directive appears to impose even stricter requirements on companies that make climate neutral claims in their advertising than the BGH’s recent decision.

While it remains to be seen how the regulations will be transposed and interpreted by the courts, companies will need to carefully consider the basis of their environmental-friendly and in particular climate-neutral claims.

Author:
Gabriele Engels



Battery technology Patent filings and future development areas

🔗 Useful links

EPO Patent Index 2023:

dycip.com/patent-index-2023-statistics

EPO statistics and trends centre, unitary patent:

dycip.com/epo-up-statistics

EPO Espacenet: dycip.com/y02E60-10-1

EPO Espacenet: dycip.com/y02E60-10-2

Batteries have the potential to contribute significantly to a greener and more sustainable future, and so are a critical sector in the drive to net zero.

What do the latest patent statistics reveal about innovation in the battery power sector? What are the key areas suitable for patent protection? In this article we explore the newest patent trends and gain valuable insights into this rapidly evolving field.

Growth in the sector

The European Patent Office's (EPO) Patent Index 2023 highlights that the field of electrical machinery, apparatus and energy, which includes clean energy inventions, was the fastest growing technology field with new European applications. 2023 applications increased by 12.2% in comparison to 2022, including both direct European applications and international (Patent Cooperation Treaty) applications which entered the European phase.

Furthermore, as of 10 June 2024, the percentage of granted patents in the field of electrical machinery, apparatus and energy for which a unitary patent has also been requested has increased to 20.1% in 2024 from 14.0% in 2023, potentially demonstrating the increasing confidence in the Unified Patent Court (UPC) system, as well as the importance of this field.

The Y02E 60/10 international patent classification (IPC) is a specific technology classification indicating climate change mitigation technologies relating to energy storage using batteries. Our analysis of this classification finds that the number of A1

publications (including both new European applications and divisional applications) increased from around 5,000 in 2022 to over 6,000 in 2023. This increase follows a general trend of expansion in the field since 2017.

Areas of patenting activity

There are various aspects of battery technology which can be patented. For example, while the most common additional classifications for patents in the Y02E 60/10 class in 2023 were for secondary batteries (IPC: H01M10), construction details of non-active parts of electrochemical cells (IPC: H01M50), and electrodes (IPC: H01M4), other classifications commonly applied to patent applications included circuit arrangements for charging and discharging (IPC: H02J7), arrangements for testing electric properties (IPC: G10R31), the use of compounds of nickel (IPC: C01G53), and the use of batteries specially adapted for use in electric vehicles (IPC: B60L58).

As demonstrated by these wide ranging classifications, patentable inventions relating to battery technology can vary significantly in terms of scope and form. In some scenarios patentable inventions can be directed towards improving parameters such as energy density and stability, particularly to allow for many hundreds or thousands of charge-discharge cycles. These parameters are important for both consumer devices (such as portable electronics and the like), and also for electrical vehicles. In particular, for portable or mobile applications, there is a push to reduce the weight of battery systems while improving the energy storage capacity. Conversely, for static energy storage solutions, cost or reliability may be more important drivers for new innovations.

Innovations can involve the identification of novel materials for cathodes and anodes, and other related components. For example, particular elements can be replaced with cheaper, more abundant alternatives, such as using sodium ions in place of lithium ions to reduce overall cost. As noted, there were a number of patent applications published in 2023 which were classified as relating to compounds of nickel.

Similarly, new crystallographic structures which are more suitable for intercalation or other ionic movements can provide for more stable and safe systems. For example, Li_xCoO_2 is a crystal structure which has been used as a cathode material for many decades. However, the CoO_2 layers can distort or deform when the amount of lithium within the structure is high (for example, x is close to 1) or low (for example, x is close to 0), leading to a loss in storage capacity. Alternative structures which are more stable at high or low ionic concentrations can lead to longer lasting batteries with improved reliability and safety, which may also be able to handle higher charge rates. Further interesting areas in which developments have occurred include identifying structures which are suitable for use as solid electrolytes in solid-state batteries.

While these examples focus on the battery itself, further patentable innovations can relate to control functionality for battery systems and their application in particular devices or roles (for example, energy management technologies), or the related areas such as innovations relating to manufacturing or recycling and reusing batteries.

Exciting growth for a rapidly developing field

The rapid rise in battery-related patent applications underscores a growing drive towards sustainable power in the race to reach net zero. EPO statistics emphasise the areas in which developments have and may continue to be made. As for future innovation and patenting trends, we expect that the number of patent applications will continue to increase as innovation in this sector remains crucial role in pursuing net zero.

Author:
Toby Willis



Lighting the way

A brief review of developments in solar technology

Useful links

International Energy Agency (IEA), "Renewable power's growth is being turbocharged as countries seek to strengthen energy security", 06 December 2022: [dycip.com/renewable-power-growth-iea50](https://www.dycip.com/renewable-power-growth-iea50)

World Intellectual Property Organization (WIPO), "Patenting trends in renewable energy", March 2020: [dycip.com/patenting-trends-renewables-wipo](https://www.dycip.com/patenting-trends-renewables-wipo)

European Patent Office (EPO) news release, "Printing thin and flexible solar cells to generate solar power: Polish physicist and team selected as finalists for the European Inventor Award 2024", 15 May 2024: [dycip.com/patenting-solar-cells-epo](https://www.dycip.com/patenting-solar-cells-epo)

International Energy Agency (IEA), "Patents and the Energy Transition", April 2021: [dycip.com/patents-energy-transition-iea50](https://www.dycip.com/patents-energy-transition-iea50)

Net Zero Week provides an opportunity for leaders and innovators to come together and discuss the path towards net zero.

In this article we review developments in solar technology and consider how this technology may play a significant role in our path towards net zero.

Harnessing the sun

The International Energy Agency (IEA) has highlighted the rapid growth in renewable energy production as countries seek to strengthen their energy security. Rapid growth in renewable energy production is also being driven by ambitious net-zero commitments.

Solar energy is a key component of renewable energy (alongside other sources, such as wind energy). Indeed, global solar photovoltaic (PV) power production, which is electricity converted from sunlight, is set to triple in the period of 2022 to 2027, surpassing coal and becoming the largest source of power capacity in the world.

Given its rapid growth and increasing contribution to the energy budget, solar energy is poised to become an incredibly important player in the quest for net zero.

Generations of solar cells

Solar PV cells (solar cells) are devices which convert sunlight into electricity.

There are several generations of solar cells; each generation is based on a different underlying technology.

First generation solar cells ("conventional" solar cells) are made of crystalline silicon and account for the largest proportion of commercially available solar cells. While first generation solar cells perform well in certain conditions there are a number of drawbacks associated with their use. One of the key drawbacks is their relatively limited conversion efficiency (the percentage of solar energy which can be converted into electricity). They are also quite bulky, which restricts their use to only specific types of applications.

Second generation solar cells are thin-film solar cells (often manufactured by depositing layers of photovoltaic material onto an underlying substrate). These cells are lighter and more flexible than the first generation solar cells (thus enabling use for a wider range of applications). However, they often have lower conversion efficiency than first generation solar cells.

Third generation solar cells are made from a variety of new materials. They aim to surpass the limited conversion efficiency of the first and second generation solar cells. Examples of third-generation solar cells include perovskite, quantum dot and dye-sensitised solar cells.

Given their potential to overcome drawbacks of the first and second generation solar cells it is likely that third generation solar cells will

hold the key to maximising the potential of solar power as an energy source of the future.

Innovation

As with any technology, patents can be used as an indicator of innovation.

Solar cells, in general, are quite well established technology. The peak of international applications under the Patent Corporation Treaty (PCT), for applications relating to solar power, was reached in 2012. However, new patent filings are still observed for third generation solar cell technology, indicating continued innovation in this area. This marks a shift from the focus on traditional inorganic photovoltaic cells.

As an example, Olga Malinkiewicz and her team have recently been shortlisted for as finalists for the European Inventor Award 2024. They invented a new technology for printing flexible solar cells, which can be used in areas which would be beyond the reach of traditional solar panel cells. For example, these flexible solar cells can be used in the fabric of a building, such as on windows or facades. Moreover, these solar cells can also be used in consumer electronic devices.

Furthermore, there has also been a focus on technology for more cost-effective installation and operation of solar cells. This is an exciting development as it shows the interest in finding new and innovative ways in which solar cells can be applied in the real world.

New patent filings for third generation solar cell tech show innovation in this field



Future solar initiatives

Solar power is set to play a key role in the path to net zero. Maximising its potential will require continued development in emerging technology, including third generation solar cells.

Looking ahead, it will be fascinating to observe how these developments unfold. These developments are likely to shape not only the market for solar technology but also our broader approach to sustainable energy solutions in the quest to reach net zero.

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Trading in Europe Sustainable green trade marks on the rise

According to the European Intellectual Property Office's "Green EU trade marks report" and its 2023 update, the proportion of green EU trade marks (EUTMs) continues to rise. This is due to the result of the growing importance of sustainability for European business and/or its products or services.

Over 14% of all applications in 2022 were for goods or services aimed at environmental protection and sustainable development. This represents an increase of over 1% from the previous year. This increase in interest in green branding and claims corresponds with the EU's increased efforts in the area. Tackling the issue of greenwashing and untrue or non-transparent sustainability statements and labels is high on the EU's list of priorities as part of its European Green Deal.

The EUIPO green EUTM report

The study shows that the number of green EUTMs has increased considerably in recent years, with an average annual growth of 10% between 1996 and 2022, with EU-based firms accounting for more than 60% of all green trade marks.

2021 marked a milestone with the most ever (21,281) green EUTM applications. Although 2022 saw a slight decline in EUTM filings, the share of green trade marks continued to rise.

Until 2014, EU firms registered more green EUTMs as a share of total filings compared with non-EU firms; however, since then, non-EU applicants have shown higher ratios of green EUTMs, reaching more than 14% green EUTM filings in the last three years.

Looking at the origin of the applications, China tops the ranks with 3,720 green EUTMs in 2022, almost half of the filings of green EUTMs from non-EU firms and 40% of all EUTM filings from non-EU countries. Germany leads among EU member states with 3,297 (27.5% from EU firms and 22.5% of all EUTM filings from EU member states), followed by Italy, France and Spain.

In terms of sectors, 25% of all green terms are



classified in the energy conservation category, 18% belong to energy production, 15% to transportation, and 14% to pollution control.

Pitfalls for trade mark registrations

A trade mark must be capable of distinguishing the goods or services of one company from the goods or services of other companies. It is important to remember that green trade marks can be refused registration (Art. 7 EUTMR) or subsequently revoked (Art. 58, 59 EUTMR) if they are:

- descriptive (such as commonly used words like "eco", "green" and "bio") or
- indistinct (such as using green imagery).

For example, the General Court of the EU (decision T-253/22, 01 February 2023) recently refused to register the sign "Sustainability through Quality" as a trade mark since consumers would not perceive it as an indicator of commercial origin, but a promotional phrase.

Likewise the application for registration of the figurative sign, shown right, was denied (T-641/21, 13 July 2022) since it lacks the necessary distinctive character as a consequence of its descriptive indication to a "sales outlet". The graphic was deemed insufficient to turn the attention of the relevant public away from the descriptive message



and give the sign a distinctive character.

Further, a trade mark that is misleading, deceptive or made in bad faith could be denied registration or even revoked later if it misleads the public, for example, regarding environmental friendliness. Though it is a potential ground for refusal, it is rarely invoked in practice for green trade mark applications.

Green claims and greenwashing

This is different, however, when it comes to using green brands and claims in advertising.

In accordance with the EU's mission to combat greenwashing, where products or processes are made to appear more environmentally friendly than they truly are, the EU Commission introduced the proposal for a Green Claims Directive in March 2023.

The Green Claims Directive includes the prohibition of environmental advertising claims (green claims) and labels that may mislead or deceive EU consumers by establishing several minimum criteria for transparency and credibility.

Further, companies will have to obtain approval of their green marketing claims from an independent verifier before they can be used in advertising. The Green Claims Directive also provides for a comprehensive range of deterrent sanctions and penalties in order to sanction violations...

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Sustainable green trade marks on the rise



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...The proposal is still subject to negotiations and it is not yet clear when they will be finally adopted.

That proposal supports the recently adopted "Directive to empower consumers for environmental change through better protection against unfair practices and better information", which entered into force on 26 March 2024, and has to be applied by the EU member states by 27 September 2026. This directive aims to better protect consumers from misleading advertising with regard to misleading, unclear, or poorly-substantiated environmental claims (greenwashing). It contains a non-exhaustive list of banned commercial practices regarding the use of generic environmental claims, which include any message or representation, including labels, brand names, company names or product names.

The Impact Assessment Report accompanying the Green Claims Directive highlights that 53% of examined green claims in the EU give vague, misleading or unfounded information and 40% have no supporting evidence.

Outlook

Environmental policy and a sustainable image are becoming increasingly important for companies and trade mark owners, materially influencing a company's branding and advertising strategy. Already, under current law, particular care must be taken when drafting specifications of goods and services for a trade mark application to ensure that they are not misleading or deceptive to the public. Further, applicants need to consider the distinctive and descriptiveness thresholds. In terms of use, consideration should be given to the context of a mark's use and the ability to substantiate a green claim, with the upcoming laws, companies could even be penalised if they are not able to do so.

However, it should not be forgotten that trade mark law can be useful in protecting against greenwashing and to convey trusted messages with regard to their business and/or characteristics of their goods/services to their customers.

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