POWERING UP:

INNOVATION TRENDS IN ENERGY DIGITALISATION

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AT A GLANCE

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FROM THE EDITOR

Bruce Torrance,
Senior Associate

Welcome to the Digitalisation edition of Reddie & Grose's Energy & Renewables newsletter.

Last year saw the UK take a significant step forwards on its path towards net-zero: in September 2024, after 142 years, the last coal-fired power station was extinguished. This world-first was nothing short of remarkable for the country that sparked the industrial revolution and generated 40% of its electricity from burning coal as recently as 2012. The decline of coal power has coincided with, and been offset by, the large scale deployment of renewables. Wind energy alone now provides around 30% of the UK's electricity production, and successive governments have pledged to significantly increase the capacity of renewable energy sources into the future to try and meet ambitious and legally binding carbon emissions targets.

However, increasing our reliance on renewables is not straightforward. Wind and solar are infamously unreliable sources of energy in the UK, and a more diverse blend of energy sources that provide fluctuating capacity to the grid results in a very complex balancing act between supply and demand. To illustrate this point, recent studies have found that the UK is at risk of wasting enough wind energy by the end of this decade to power more than 5 million homes. These challenges that we face are significant but not insurmountable. For example, excessive energy supply provided in times of plenty can be captured and used to create "green" hydrogen which can then be used to generate electricity in times of need.

Our analysis of recent patent applications, a bellwether for innovation, has revealed an increasing focus in the energy sector towards innovation that facilitates the transition from fossil fuels to low-carbon alternatives (such as smart grids, batteries, and fuel cells), marking a pivot away from developing technologies underpinning how renewable energy can be generated effectively.

In this edition, we explore how digitalisation – and particularly AI – is playing an important role in facilitating the energy transition.

We've taken a deep dive into how AI is shaping innovation right now in solar power, by predicting equipment failure to reduce maintenance costs, and modernising our century-old grid system with Smart Grids. We have also investigated two areas that seem poised to be shaped by digitalisation into the future: cybersecurity and the use of generative AI. Energy security has been brought into sharp relief by the recent war in Ukraine, and as we move towards a digital energy infrastructure it is clear that the use of AI, blockchain and quantum cryptography will be critically important to enhancing cyberthreat detection and mitigating the impact of cyberattacks into the future. It is hard to overstate the potential impact that generative AI could have on the energy sector, including the challenge of accurately balancing the supply provided by variable renewable energy sources like wind farms against our fluctuating energy demand.

It is important to acknowledge that AI itself is not a silver bullet. A recent report by the International Energy Agency indicated that the annual electricity consumption from data centres, AI and cryptocurrency is set to double in the next 2 years, equalling Japan's annual consumption. Curbing this growth will require technological advancements or drastic actions: large US tech companies are already looking to commission their own nuclear power plants to fulfil their energy requirements at low carbon cost.

However, patent publications for quantum computing, which could make AI far more efficient, have increased ten-fold in the last decade, and there is increasing confidence that nuclear fusion will provide plentiful clean energy to the grid before the end of the next decade.

Patents are an important tool for innovators seeking a commercial return on their investment in innovation. Securing a patent allows the owner to exclude others from using their invention without permission and a patent covering an attractive invention gives the owner a commercial edge in the market or allows them to gain revenue from licencing. Patents and patent applications also act as important business tools, enabling startups to secure funding at a nascent stage and allowing collaboration between parties where each party's intellectual contribution is well protected.

Although winning an effective monopoly for useful implementations of AI in the energy sector could potentially be extremely lucrative, unfortunately obtaining patent protection for AI is not a straightforward matter as we explore in this series of articles. However, patent protection can nevertheless be awarded so long as certain legal thresholds are satisfied. We have found that, despite the legal challenges, the number of patent applications filed in the last 5 years for the use of generative AI in energy management has outstripped the use of AI in all other established fields, including transportation and agriculture.

Happy reading.
Bruce

MEET THE TEAM...

ALEX COPE

PARTNER, ELECTRONICS & SOFTWARE

Alex mainly works within the electrical, electronics & telecoms and software & business methods fields. His practice involves prosecuting and drafting patent applications in the UK and in Europe for a wide range of clients. Alex's areas of expertise include audio and video signal processing, data encryption, telecommunications and semiconductor devices, as well as handling registered designs in Europe and further afield. In addition, Alex has an interest in the renewable energy sector and has experience handling patent applications relating to solar cell power conversion and control units for wind turbines.

Alex.Cope@reddie.co.uk

DUNCAN NEVETT

PARTNER, ENGINEERING, MATERIALS AND CONSUMER PRODUCTS

Duncan specialises in protecting inventions in the general mechanical, electrical and software fields, and has extensive experience supporting innovators in the renewables space. His clients range from Fortune 500 multinationals to disruptive UK-based start-ups, with his main practice involving invention capturing, and the drafting and prosecution patent applications around the world. He also advises on complex commercial issues, such as due diligence and Infringement Risk Analysis (Freedom to Operate), and has a particular interest in helping clients devise IP strategies suited to their key business objectives.

Duncan.Nevett@reddie.co.uk

GEORGINA AINSCOW

PARTNER, ELECTRONICS & SOFTWARE

Georgina specialises in prosecuting high-tech patent applications at the European Patent Office and internationally, with particular expertise in electronics, computing, and software. She works with clients to protect innovations in advanced technologies across physics, engineering, and digital systems, often in areas that intersect with the energy and renewables sector. Her practice is well suited to supporting innovators in fields such as smart grid control, AI-enabled energy optimisation, sensor systems, and digital infrastructure for low-carbon technologies. Georgina has extensive experience drafting and prosecuting patent applications, representing clients at EPO oral proceedings, and advising on invention harvesting, IP strategy, and the management of global patent portfolios.

Georgina.Ainscow@reddie.co.uk

JULIE RICHARDSON

PARTNER, ELECTRONICS & SOFTWARE

Julie specialises in patents in the electronic engineering sector with a particular focus on signal processing and electronics. She has extensive experience of image and data processing systems, communication systems, radar systems, semiconductor fabrication, computer implemented inventions including those at the business method/softrware interface and knowledge of the UK power transmission grid.

Julie.Richardson@reddie.co.uk

BRUCE TORRANCE

EDITOR, SENIOR ASSOCIATE, ELECTRONICS & SOFTWARE

Bruce is a dual-qualified patent attorney who specialises in the fields of electronics and computing and leads our Renewables group. Bruce advises a colourful spectrum of green-tech clients that range from individual inventors to large multinational corporations.

Bruce has a decade of experience in spotting important opportunities for IP protection, drafting bespoke applications to protect the IP as broadly as possible, navigating these applications through patent offices in the UK, Europe and further afield, and advising on the potential impact of third party IP rights.

Bruce.Torrance@reddie.co.uk

DR XIAOXI ZHU

ASSOCIATE, ELECTRONICS & SOFTWARE

Dr Xiaoxi Zhu is a qualified European patent attorney handling patents in the fields of electronic, electrical engineering and software. Xiaoxi has an interest in the renewable energy sector, focusing on global technology trends in wind energy and smart grids. Xiaoxi completed a PhD and Master degrees in Electrical Engineering at University of Cambridge. She also achieved a Bachelor degree in Materials Science and Engineering at Imperial College London. Xiaoxi's PhD research focused on investigation of functional inks employing graphene and related two-dimensional (2D) materials and their applications in printable and flexible electronic devices.

Xiaoxi.Zhu@reddie.co.uk

DR DONGYOUNG KIM

TECHNICAL ASSISTANT, ELECTRONICS & SOFTWARE

Dongyoung handles patents in the fields of semiconductors, photonics, electronics and electrical engineering, with a particular expertise in energy technologies. He holds a PhD in Semiconductor Photonics and an MEng degree in Electronic and Electrical Engineering, both from University College London (UCL). His PhD research focused on III-V semiconductor nanostructures for solar energy applications, and he subsequently held a post-doctoral position at UCL working on III-V quantum dot laser devices on silicon for integration in photonic integrated circuits (PICs). His research work led to publications in high-impact scientific journals and at internationally recognised conferences, and he remains a regular contributor to journals in the energy sector, with a particular focus on photovoltaics, now bringing a patent perspective to the field.

Dongyoung also gained industrial experience in high voltage (HV) power distribution and control systems at Veolia Environmental Services' material and energy recovery facilities (MRFs and ERFs), and undertook a placement at IBM Hursley Laboratory as a test engineer.

Dongyoung.Kim@reddie.co.uk

HANNAH NAGLE

TECHNICAL ASSISTANT, ELECTRONICS & SOFTWARE

Hannah joined Reddie and Grose in September 2023 after graduating from the University of Exeter with a Masters degree in Physics. Her final year research project entitled 'High Permeability Ferrite Antennas for Microwave Band Communications', involved a computational investigation of the microstrip (or patch) antenna device.

Hannah.Nagle@reddie.co.uk

SAFEGUARDING THE FUTURE: THE CRITICAL ROLE OF CYBERSECURITY IN THE ENERGY TRANSITION

Driven by the urgent need to mitigate climate change, the European Commission has set ambitious targets to reduce net greenhouse gas emissions by 90% by 2040, aiming for climate neutrality by 2050. With this shift towards sustainable energy systems employing renewable sources, and away from traditional coal, oil and gas, the UK's renewable energy capacity has increased almost tenfold between 2007 and 2022.

DIGITALISATION OF ENERGY SYSTEMS

Matching this trend is an increasing reliance on digital technologies as energy infrastructure becomes more digitally focussed and interconnected. Innovations in energy storage, smart grids, the Internet of Things (IoT), and Artificial Intelligence (AI) are key drivers of this transformation. These advancements allow for more efficient energy management, improved integration of renewable sources, and more reliable electricity distribution. For example, AI-powered smart grids facilitate the intelligent flow of energy and data between providers and consumers, and the dynamic balance of supply and demand, enhancing grid stability and proactive maintenance of infrastructure.

However, as energy systems become more interconnected and reliant on digital infrastructure, the potential attack surface of these digital environments expands significantly. Such increased connectivity introduces new vulnerabilities. The various technologies that make the energy transition possible are also the ones that expose it to unprecedented risk of cyberattack.

CYBER THREATS TO THE ENERGY SECTOR

The critical nature of the energy sector makes it a prime target for cyberattacks. These threats are varied and can have potentially devastating consequences. From ransomware attacks that lock down systems and demand payments, to phishing schemes that exploit human error, the methods employed by cybercriminals are evolving in both complexity and frequency.

Moreover, the interconnected nature of modern energy systems means that an attack on one part of the system can have cascading effects. A cyberattack on a single component, such as a power plant or a distribution network, can potentially disrupt entire regions.

INNOVATIVE SOLUTIONS

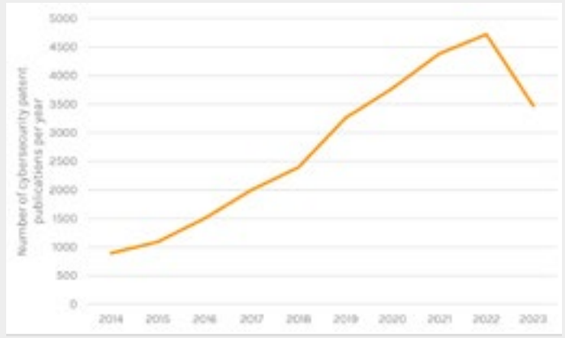
Innovation in cybersecurity is critical to the success of the energy transition addressing the evolving threats and mitigating potential attacks that come with the increasing digitalization of energy systems. A steady increase in number of cybersecurity patent publications over the past 10 years reflects the growing importance and complexity of protecting digital systems, in view of the proliferation of cyberthreats. Taking the number of patent publications as a proxy for commercially important innovation, Figure 1 below shows a sharp increase in patent publications in the cybersecurity field over the past decade, while Figure 2 shows how various technology subfields contribute to the bigger picture.

Noting that the reduction in 2023 publications is directly attributable to the global impact of Covid 19, the accelerated innovation in this area remains clear and critical. Perhaps unsurprisingly, applications relating to AI or machine appear as a key contributor.

AI is key to smart grid security, enhancing threat detection by analysing data from smart grids to identify cyber threats. Alongside this, AI-driven analytics predict equipment failures, minimizing disruptions and reducing the impact of cyberattacks on infrastructure.

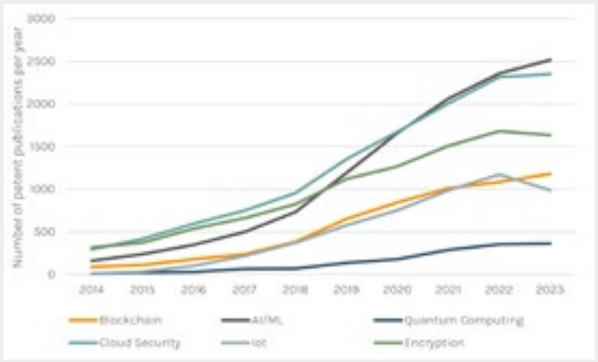
A similarly large number of filings relate to cloud security, as energy companies consider the technical innovations needed to protect data and applications they move operations to the cloud.

Blockchain also stands out as a significant technology area. By creating immutable records, blockchain technology ensures that energy components remain secure throughout the entire supply chain, from generation to distribution.



Although the numbers are smaller, patent filing statistics reveal the emerging importance of innovations related to quantum computing. As quantum computers mature, they may be capable of breaking many of the cryptographic algorithms currently used to secure communications. These classical algorithms rely on mathematical problems that are difficult for classical computers to solve but could be efficiently tackled by a powerful quantum computer. Post-Quantum Cryptography (PQC) is an important emerging field, focused on developing quantum-resistant algorithms that can withstand the potential threats posed by quantum computing.

The patent system plays a key role in incentivizing all of this innovation. In providing the potential for commercial reward, patents encourage investors and innovators to invest in research and development, knowing that they can protect and potentially profit from their technological advancements. Cybersecurity innovations, such as advanced threat detection algorithms, encryption technologies, and anomaly detection systems, can all be protected by patents, ensuring that creators maintain exclusive rights to their inventions.



CONCLUSION

As the energy sector continues to evolve toward a more sustainable and interconnected future, the importance of robust cybersecurity cannot be overstated. Protecting digital infrastructure from evolving cyber threats is essential to ensuring the success of the energy transition. Innovation in this area is critical, and securing these advancements through intellectual property rights is an important consideration for innovators.

If you have questions about how to protect your innovations in this field, we encourage you to reach out to the skilled team of patent attorneys at Reddie & Grose. Our attorneys understand the intricacies of these technologies and are well-equipped to help you navigate the complexities of patent protection.

HANNAH NAGLE AND GEORGINA AINSCOW

GENERATIVE AI AND RENEWABLE ENERGY

WHAT IS GENERATIVE AI?

Interest in generative artificial intelligence, or generative AI, has skyrocketed in recent years. Much of this can be attributed to the launch of ChatGPT – an AI chatbot powered by large language models - towards the end of 2022. Generative AI is disruptive in its ability to produce new content in a range of formats, including text and image, distinguishing it from 'traditional' AI whose functionality lies in the analysis of, as opposed to the creation of, data. Naturally, the attention that generative AI has commanded in recent years has led to consideration of to what extent it can help address challenges in a variety of sectors, one being the renewable energy sector.

GENERATIVE AI IN RENEWABLE ENERGY

One of the significant challenges faced in renewables is the unpredictability of sources such as wind and solar. Such unpredictability is a problem when it is critical that grid supply and demand correspond, forming a barrier to renewable energy grid integration. Much of the discussion surrounding generative AI in renewables looks to overcome this by exploiting its affinity for highly accurate forecasting that takes many relevant factors into account. In terms of actual implementation of generative AI in renewables, the National Renewable Energy Laboratory, based in the US, launched a model Sup3rCC which is able to output high-resolution future climate simulations which can be used to forecast renewable energy generation. At the intersection between generative AI and simulation, however, one should be mindful of the European Patent Office's (EPO) approach to subject-matter that is excluded from patentability.

PATENTABILITY IN EUROPE

The European Patent Convention (EPC) excludes mathematical methods from patentability. Fortunately, this only excludes inventions that are 'purely abstract mathematical method[s]'. Although inventions based on simulation and modelling will, more often than not, include features that, alone, would fall under such an exclusion, the computer-implemented nature of such inventions adds a technical character that prevents them from falling foul to the exclusion as long as the claim-language reflects this. Whether such claims are 'inventive' , however, is determined based on features that 'contribute to the technical character of the invention' (the so-called 'COMVIK' approach).

Enlarged Board of Appeal decision G1/19 is relevant here, which centred on a patent application concerning simulating the movement of a crowd. This decision confirmed that the COMVIK approach is applicable to inventions related to computer-implemented simulations and further determined that:

- 'A computer-implemented simulation of a technical system or process that is claimed as such can, for the purpose of assessing inventive step, solve a technical problem by producing a technical effect going beyond the simulation's implementation on a computer'; and

- 'For that assessment it is not a sufficient condition that the simulation is based, in whole or in part, on technical principles underlying the simulated system or process'.

Consideration should also be had for the EPO's guidance on artificial intelligence inventions. In particular, the Guidelines for Examination outline that although there is no general requirement to 'disclose the specific training dataset itself', 'if the technical effect is dependent on particular characteristics of the training dataset used, those characteristics that are required to reproduce the technical effect must be disclosed unless the skilled person can determine them without undue burden using common general knowledge'.

> "THE NUMBER OF PATENT FAMILIES RELATED TO GENERATIVE AI IN ENERGY MANAGEMENT HAS EXPERIENCED THE MOST GROWTH SINCE 2018"

Beyond the EPO, the patentability of AI-based inventions remains topical. Following a recent UK Court of Appeal ruling, the UK Intellectual Property Office issued updated guidance on examining patent applications involving artificial neural networks (ANNs). Notably, the guidance sets out that 'patent examiners should treat ANN-implemented inventions like any other computer implemented invention' within the context of subject-matter excluded from patentability.

While it may be too early to predict what the patent landscape will look like for generative AI in renewable energy over the coming years, a 2024 WIPO report looks at historical filing trends in different sectors. Promisingly, the number of patent families related to generative AI in energy management has experienced the most growth since 2018, beating applications such as transportation and agriculture.

HOW WE CAN HELP

If you are an innovator working at the intersection between generative AI and renewable energy, our team of attorneys at Reddie & Grose have technical knowledge and expertise that can help you navigate the particulars of seeking patent protection for your inventions.

OLIVIA BUCKINGHAM, AUTHOR

ILLUMINATING WHERE FUTURE INNOVATION MAY LIE IN SOLAR POWER GENERATION

The solar energy industry has seen rapid development over the past three decades. In particular, the solar industry witnessed dramatic advances in the efficiency of solar cells and modules in the first two decades of the 21st century, making large-scale photovoltaic (PV) power generation genuinely technically and economically feasible. This, in turn, brought about further cost reductions through economies of scale, and as a result, solar energy is now cheaper than many fossil fuels, with costs ranging between $0.90 and $1.50 per watt.

Patent filing trends in the PV sector have traditionally reflected the industry's focus on advancements in efficiency. For instance, between 2002 and 2019, there was a dramatic 678% increase in the number of Patent Cooperation Treaty (PCT) applications related to solar power, and by 2019, over half of all renewable energy-related PCT applications were linked to solar technologies, compared to just over a quarter in 2002. [1] However, as silicon-based panels approach their theoretical maximum efficiency limits and the margin for improvement becomes increasingly narrow, there are recent signs that indicate the focus of innovation within the industry has shifted.

Recent patent filing trends reflect a growing emphasis on non-power generating technologies. For example, as shown in Figure 1, the number of patent filings directed to structural details of PV modules other than those related to light conversion have nearly doubled in the past 5 years.

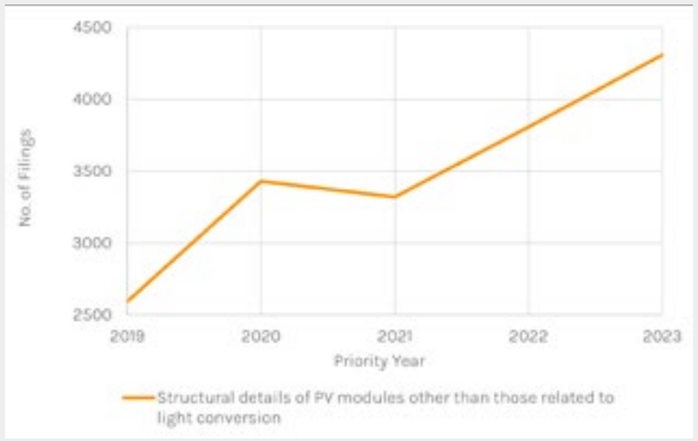


Figure 1 Patent filings directed to structural details of PV modules other than those related to light conversion (IPC: H02S30/00+). Search covers: "Major authorities" (CA CN DE EP FR GB JP KR RU US WO). Plateau in growth in 2021 likely attributable to global slow-down during Covid-19 epidemic.

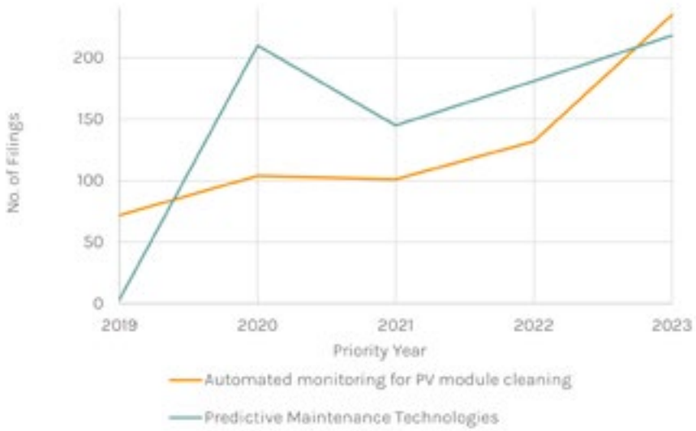
One of the key advancements in such non-power generation aspects of the solar power sector can be found in the digitalisation of automated monitoring and maintenance systems.

These are important technologies, as they enhance the efficiency and prolong the working lifespan of existing equipment. Predicting the maintenance needs of large-scale solar farms using automated systems, such as SCADA-based systems, drones, and IoT-enabled devices, not only enhances the performance of the solar farms but also significantly reduces operational costs by preventing issues from escalating into costly problems.

In particular, the use of automated monitoring for PV module cleaning has gained considerable attention in recent years. This is evidenced by a steady rise in patent filings in this area, as shown in Figure 2, reflecting growing commercial interest in the efficient long term maintenance and cleaning of solar panels.

Predictive maintenance using advanced algorithms and AI to forecast equipment failures can also minimise downtime and reduce maintenance costs. As shown in Figure 2, patent filings relating to predictive maintenance technologies in the solar sector have also surged dramatically in the current decade, reflecting the industry's shift toward integrating AI and IoT into large-scale solar power generation.

Figure 2 Patent filings directed to (i) Automated monitoring for PV module cleaning (IPC: H02S 40/10 - Cleaning arrangements; AND H02S 50/00 - Monitoring or testing of PV systems; (ii) Predictive PV Maintenance Technologies (IPC: G01R31/00 - Arrangements for testing electric properties, Arrangements for locating electric faults, and Arrangements for electrical testing; AND H02S50/00+ - Monitoring or testing of PV systems). Searches cover: "Major authorities" (CA CN DE EP FR GB JP KR RU US WO).



However, despite this surge in innovation, securing patents for digitalisation-related technologies in the solar sector, which can serve as useful tools for protecting commercial interests, presents unique challenges. In particular, in Europe, the patentability of AI, software, and algorithm-based inventions is examined based on their ability to solve a "technical problem". This requirement means that patent applications directed to such inventions need to clearly convey a technical effect beyond the software or algorithm itself. This may explain the considerably lower grant rate for patent applications directed to automated monitoring for PV module cleaning and predictive PV maintenance technologies (i.e. the same group of applications discussed in Figure 2) compared to other IP5 jurisdictions, as depicted in Figure 3.

Therefore, building a successful patent portfolio in the field of solar digitalisation requires not only innovative technologies but also careful legal considerations regarding how these innovations are presented in patent applications.

Figure 3 Grant rate* by jurisdiction for patent applications directed to (i) Automated monitoring for PV module cleaning AND/OR (ii) Predictive PV Maintenance Technologies (IPC: H02S 40/10 - Cleaning arrangements; H02S 50/00 - Monitoring or testing of PV systems; G01R31/00 - Arrangements for testing electric properties, Arrangements for locating electric faults, and Arrangements for electrical testing; AND H02S50/00+ - Monitoring or testing of PV systems). Search covers applications having priority date from 2019 to the date of search (21.08.2024). (*Grant rate as of the date of search).

Whilst the era of rapid efficiency improvements in Si-based PV modules and cells may be nearing its limit, the solar industry remains far from reaching a plateau in innovation. In particular, innovations utilising AI, IoT, and automation are expected to continue growing, as these technologies become increasingly vital for the efficient and reliable operation of large-scale solar plants. Digital innovations in automated monitoring, predictive maintenance, and grid management, are good examples of new frontiers in solar energy, and it is becoming clear that the future of solar power will be shaped not only by advances in power generation but also by the digital technologies that support and enhance the solar power industry.

[1] WIPO, "Patenting trends in renewable energy", WIPO Magazine 1/2020, March 2020.

DONGYOUNG KIM

SMART GRID - A BLIND SPOT?

WHAT ARE SMART GRIDS?

Smart grids are an electricity network that use digital communication and other technologies to monitor and manage the distribution of electricity from all generation sources to meet the varying demands of end users.

To realise this, a smart grid includes various operation and energy measures such as metering infrastructure, smart distribution boards integrated with home control, renewable energy resources, etc.

WHY USE SMART GRIDS?

As the clean energy transition fuels electricity demand, and power from more transient energy sources such as wind and solar is added to the national grid, increased stress is placed on the national grid.

Significantly, there is a huge demand on power grids in recent years. Electricity is the fastest-growing source of final energy demand, and will continue to outpace growth in total energy consumption over the next 25 years. According to IEA's statistics, electricity demand in emerging and developing economies (excluding China) will grow by around an additional 2500 TWh by 2030, roughly equivalent to five times the current demand of Germany.

In particular, as AI demands soar the world's data centres are using ever more electricity. In 2022, they consumed 460 terawatt hours of electricity and are expected to double this consumption in just four years to roughly equal the electricity consumption of Japan.

IEA stats reveal that digital technologies could save $1.8 trillion of grid investment globally through 2050 by extending the lifetime of grids, while also helping to integrate renewables and minimise supply interruptions. On the other hand, failure to smarten the grid with digital technologies could cost nearly three-quarters of the projected savings.

Providing a more sophisticated energy distribution network therefore enables the energy transition to be managed more efficiently, reduces the need for costly new infrastructure, and improves grid resilience and reliability.

INNOVATIONS IN SMART GRIDS

Patent statistics provide a useful proxy for quantifying innovation. According to a recent patent study conducted by the European Patent Office, patenting activity for smart grids in the previous decade falls some way behind other technologies enabling the energy transition, such as batteries or the use of hydrogen. As shown in figure 1, patent filings in the most recent ten years (2014 to 2023) indicate that there was a rapid increase since 2014. This may be mainly due to the unrelenting and disruptive introduction of new digital platforms, including the Internet of Things, 5G communication networks, cloud computing and artificial intelligence.

However, it is evident that the growth rate of patent filings in the most recent three years is decreasing, although the total filing numbers each year is increasing.

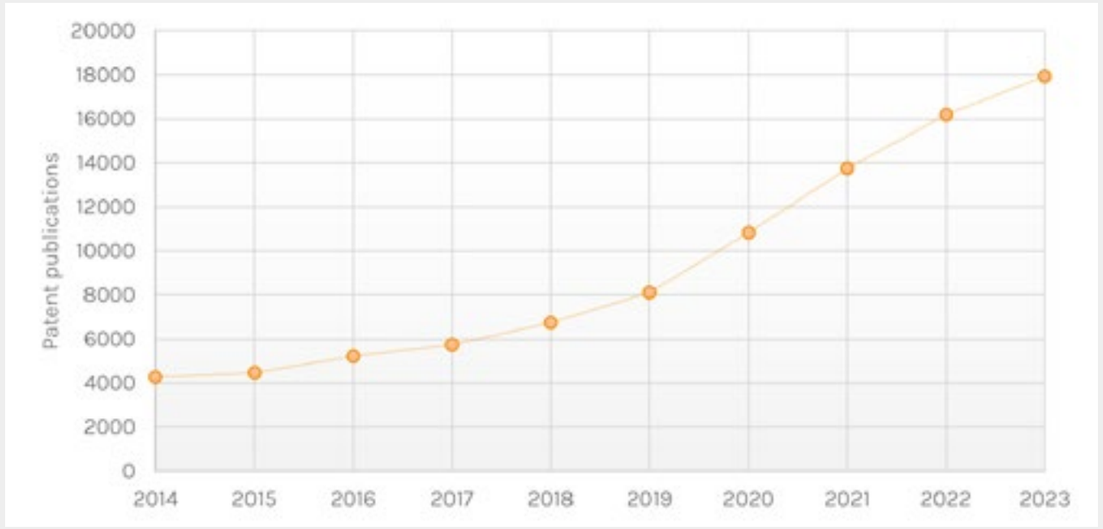


Figure 1 - patent filings of smart grid technologies in the most recent five years

According to the "A Global Review of Patent Data for Smart Grid Technologies" report published by IEA, this is largely due to the lack of stability in grid investment, especially in developing economies. The report highlights that overall investment in smart grids needs to more than double through to 2030 – from around USD 300 billion/year currently to almost USD 600 billion/year – to get on track with the Net Zero by 2050 Scenario.

While solar, wind and other renewables receive a lot of attention in emerging markets and developing economies, a blind spot regarding the role of grids is increasingly evident. Without adequate and timely investment in electricity transmission and distribution networks, developing and deploying new generation capacity may fail to deliver on both climate action goals and purely economic terms. However, there is room for optimism as it is evident that big players in the field such as E.ON and Siemens are continuing to develop innovative solutions to address these problems.

It will be interesting to see how this crucial area of technology develops in the coming years, as our insatiable appetite for energy shows no sign of abating.

XIAOXI ZHU

HERE TO HELP

At Reddie & Grose, our multi-disciplinary team of UK & European patent attorneys aims to help you maximise the value of your innovations.

In a rapidly-developing sector that encompasses an array of technologies, our Cleantech & Energy team has expertise across advanced engineering, electronics, software, materials and life sciences. Whatever you've developed, we have the expertise to protect it.

Our track record is as diverse as it is impressive. From wind, solar, and hydroelectric power to advances in fuel cells, biofuel production, carbon capture, and energy-efficient heating and cooling systems, we bring comprehensive expertise to every project.

HOW WE CAN HELP

Our goal is to provide practical, customised support to ensure your innovations are protected and your IP strategy aligns with your business objectives.

This can involve a range of measures tailored to your needs, including: spotting important opportunities for patent, design and trade mark protection; collaborating with you to draft and file bespoke applications that fully capture your IP; navigating these applications through IP systems at home and around the world to build strong portfolios; conducting due diligence on third-party IP rights, including advising on measures to mitigate risk; and helping resolve IP disputes by working closely with a global network of leading litigation firms.

Whether you are a multinational seeking a global IP strategy, a start-up company launching a new product or brand, or an institution seeking protection for research results, our Cleantech and Energy team have the skills and expertise to help with your IP needs.

CONTACT US

The contact details for the Renewables and Cleantech & Energy team leads are as follows:

BRUCE TORRANCE
bruce.torrance@reddie.co.uk

DUNCAN NEVETT
duncan.nevett@reddie.co.uk

LONDON
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
T + 44 (0)20 7242 0901

CAMBRIDGE
Reddie & Grose LLP
Brooklands B2
Cambridge
CB2 8EE
T + 44 (0)1223 360 350

MUNICH
Hopfenstrasse 8
80335 München
Germany
T + 49 (0)89 206054 267

THE HAGUE
Schenkkade 50
The Hague
Netherlands
2595 AR
T +(00)31 70 800 2162

GENERAL ENQUIRIES
enquiries@reddie.co.uk

REDDIE & GROSE LLP
www.reddie.co.uk