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Can Standard Essential Patents Accelerate Ecological Transition?

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The potential of Standard Essential Patents (SEPs) in driving the ecological transition poses a compelling question. Could these patents be instrumental in fostering innovative technologies and ensuring interoperability of products that are key to the ecological transition? Indeed, within the framework of the European Green Deal, which aims for a climate-neutral Europe by 2050, the role of SEPs may be significant, especially in light of the EU's acknowledgment of the critical role of environmental protection standards.

Considering the European Green Deal's ambitious objective of a climate-neutral continent by 2050, one might ponder the extent to which a dual green and digital transformation is dependent on SEPs. The question is therefore: can SEPs facilitate the integration of cutting-edge technologies into mainstream industrial practices and catalyze sustainable development?

The following instances provide a glimpse into how SEPs are not just theoretical constructs but can be active contributors to environmental sustainability. Each example sheds light on different aspects of the ecological transition, from the development of smart and connected technologies to the implementation of renewable energy solutions and advanced agricultural practices. These case studies offer evidence supporting the proposition that SEPs, through their position at the intersection of innovation, technology, and regulation, may contribute to advancing the global agenda for a sustainable future.

Automotive Sector

In the automotive sector, SEPs are notoriously fundamental for developing connected and electric vehicles. Indeed, the underlying technologies can play a role in emission reduction and sustainable transportation. For instance, electric vehicle technologies, heavily reliant on SEPs for battery management systems and charging protocols, have significantly reduced carbon emissions. The story of Tesla, integrating SEPs in its vehicle designs, exemplifies how these technologies can accelerate ecological transition in transportation. In the evolution of Electric Vehicles (EVs), the development of charging standards has progressed in tandem. While standardization of AC charging protocols became more established across a majority of EVs, a notable addition was the introduction of the DC-capable protocol, CHAdeMO, designed to facilitate faster charging.

Two key standards governing the system and method for electric vehicle charging and billing using a wireless vehicle communication device are IEC 61851-1:2017 and ISO 15118-1:2013. Patents remain essential to the EV charging standard. Patents related to these standards (fast charging station, connectors, wireless charging technology and smart grid integration) are essential to make EVs more convenient to consumers, with companies like General Electric, Bosch, Siemens, and LG Innotek being recognised as major licensors in this sector.

The economic advantages of electric fleet operations are particularly compelling, especially for high-utilization vehicles such as fleet-based cars, buses, delivery vans, and various trucks and semis. The allure lies in lower energy costs, decreased maintenance requirements, and an extended lifetime of the electric drivetrain. Additionally, the reduced noise and greenhouse gas emissions contribute to a compelling case for the electrification of every fleet. A method specifically addressing the testing of electrical components in the main supply is outlined in ISO 15118-2:2014.

It is also worthwhile to mention the IEEE P2872 Standard for Interoperable and Secure Wireless Local Area Network (WLAN) Infrastructure and Architecture, which describes a protocol that enables interoperable, semantically compatible connections between connected hardware (e.g. autonomous drones, sensors, smart devices, robots) and software (e.g. services, platforms, applications, AIS) – features which can be instrumental for creating the smart energy transition in the technology sector.

Energy Sector

As mentioned, SEPs are important for integrating renewable energy sources into power grids, enhancing energy efficiency, and reducing reliance on fossil fuels. They also contribute facilitating the development of smart grid technologies, by enabling efficient energy distribution and consumption. An example is the European Smart Grid project, where SEPs have standardized communication protocols between renewable energy sources and the grid, optimizing energy flow and reducing wastage.

Also, new technologies such as automated eco driving, eco navigation, and truck fuel efficiency can significantly help cut CO2 emissions. Toyota Motor, VW Group, Honda Motor, Kia and suppliers like Bosch and Denso have an impactful patent portfolio in automotive sustainability. The connectivity standards implemented in vehicles are categorised as: IEEE 802.11p, IEEE 1609.x, IEEE 802.11ah, DVB. DVB-T2, ISDB-T, AVC, HEVC, VVC, Qi, Bluetooth, IEEE 8-2.11a/b/g/n, IEEE 820.16 3G, 4G, 5G, NFC. The interconnectivity across the multiple vehicle parts and units relies on the specification of these technology standards.

Connected vehicles can also help cities to improve traffic congestion management by sharing data with Intelligent Transportation Systems (ITS) supported by 5G. Supra national organisations such as ETRI, CEN, IEEE, DIN, BSI, NEN, SAE, IEEE and ASTM are setting connectivity standards for the vehicular application. Improving the environmental footprint of the transport sector will require the application of 5G technology, to be made widely available to implementers through FRAND licensing.

For instance, in 2016, Ericsson and the Italian Interuniversity Consortium for Telecommunication initiated a collaborative effort aimed at enhancing the efficiency and sustainability of the Port of Livorno (Italy). This strategic partnership sought to optimize the operations of the port, which, with an annual traffic capacity of 36 million tons of cargo and a workforce of 15,000 employees, held the potential for significant economic, social, financial, and sustainable benefits. The collaboration yielded innovative processes and technologies, propelling the Port of Livorno to the forefront of advancements in the Mediterranean.

The integration of 5G technology as a collaboration between the Port of Livorno, Ericsson, FEEM and CNIT played a role in this transformation, enabling the real-time collection and analysis of data to optimize systems and enhance intelligent automation across the port area. The 5G standardization is supported by the patent and licensing process. Ericsson worked with the Port of Livorno to build the 5G private network from an interconnected network of smart sensors, 3D LIDARS and Wide Dynamic Range (WDR) cameras. Ericsson has been leading on 5G technology patent declarations (6000).

Agricultural practices

Likewise, advancements in smart agriculture, crucial for environmental sustainability and global nutritional needs, owe much to SEPs. Indeed, agricultural innovation is increasingly important given the need to feed a growing global population. These technologies optimize resource use and minimize environmental impact, essential for efficient and sufficient food production. SEPs in sensor technology and data analysis tools have revolutionized precision farming, leading to less resource wastage and higher crop yields.

The rise of smart farms globally is a testament to the integration of advanced technologies like artificial intelligence, Internet of Things, and big data analytics in agriculture. These technologies, often protected by SEPs, are revolutionizing precision farming. The use of drones and self-driving vehicles in fields for monitoring and cultivation purposes is a practical example of how SEPs contribute to optimizing agricultural processes and sustainability. Additionally, manufacturers of farming machinery, seed producers, and agricultural service providers are increasingly focusing on digital development tailored for agriculture.

This shift is expected to significantly influence production methods in the coming years, with SEPs likely playing a role in protecting these digital innovations. For instance, development of renewable sources of energy is also essential to tackle climate crisis. And Chinese companies are setting the record in solar cell photoelectric conversion efficiency 56 times, having filed 126,400 patent applications in this field. Because one of the application of solar cells is local energy storage and off-grid and hybrid systems, it is likely that solar development will be used in smart farming, which will allow to reshape rural landscape and farm economies for achieving decarbonisation goals.

Conclusion

In the quest for ecological transition, SEPs seem to emerge as a significant but complex instrument. While the examples from the automotive, energy, and agricultural sectors underscore their potential in aiding the green and digital transformation, the path is not without challenges, particularly as far as licensing is concerned. The challenges in SEP licensing, especially in the smart energy industry, revolve around ensuring fairness and accessibility. The need for FRAND licensing practices is thus paramount. These practices are not only vital to guarantee fair access to essential technologies, but also crucial in fostering a climate of innovation.

The European Union's approach, which aims to strike a balance in SEP licensing, serves as a precedent in navigating these complexities (see eg the 2015 seminal decision of the Court of

Justice of the European Union in Huawei). The European Commission's efforts in achieving equitable SEPs licensing agreements, including the recent proposal for a regulation on these patents, could contribute giving a boost to the ecological transition, aligning with Europe's ambition for a climate-neutral future. A balanced approach is indeed necessary to maintain a healthy equilibrium between incentivizing innovation and ensuring broad access to essential environmentally friendly technologies.

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This entry was posted on Thursday, January 25th, 2024 at 1:37 pm and is filed under European Union, FRAND, SEP
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