



cycLED Policy Brief

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Supporting LED Eco-innovation and Diffusion: What can Policy Makers Do?

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This Policy Brief aims to inform policy-makers and other interested parties about the obstacles faced by European LED firms when developing innovations, notably the ones seeking to reduce environmental impacts (eco-innovations). It also suggests solutions that could help these firms to overcome those obstacles, and eventually support the diffusion of eco-innovative LED products and services.

According to the IEA, the amount of electricity used by lighting sources corresponds to the quantity of electricity produced by nuclear power plants in the whole world (about 20% of global electricity consumption). Lighting represents the greatest share of electricity expenses of many municipalities, and this electricity is mostly produced with hydrocarbon energy sources. We are currently witnessing a switch to LED technologies, whose ecological impacts are significantly lower than the ones of former lighting technologies.¹ This could help reduce the costs and environmental impacts of lighting, but LEDs also have economic and environmental costs since they generate hazardous waste and consume precious metals. Therefore, should LED technologies replace other lighting technologies, Europe would be faced with important problems of e-waste management and of dependency from non-European precious metals suppliers. Substantial efforts have thus to be made to support the diffusion of highly environmentally efficient LED technologies.

To do so, important obstacles have to be lifted. For example, many LED drivers are not robust enough to enable LED products to last as long as they should. Also, to adopt LED lighting systems many firms lack financial resources to cover the upfront costs of LED panels. There are also problems of unfair competition coming from non-European firms, and threats of IPR litigations by large firms holding large patent pools.

These obstacles deter eco-innovation in the European LED sector. For example, when non-European firms manage to put on European markets cheap LED products which when tested do not meet the displayed specifications such as the amount of lumen per watt, European LED producers are discouraged to develop high quality eco-innovative LED products. Also, when large firms use their patent pools to threaten smaller eco-innovating firms into suing them for patent infringement, LED eco-innovation is also deterred. It is therefore essential to analyse the obstacles hampering eco-innovation in the European LED sector, and to develop policies to support the transition to more ecological and economical lighting systems.

To help policy makers guide the sustainable transition of the lighting industry, we identified barriers to LED eco-innovation and suggested solutions to overcome them. This has been achieved by means of in-depth interviews with cycLED SMEs and with an online survey of European LED firms. In this policy brief, we first present the major barriers identified by these firms that should be circumvented to help the European lighting industry become more eco-innovative and less dependent on foreign natural resources. Second, we suggest measures that policy makers could develop to support the sustainable transition of the European lighting industry.

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¹ See Aman, M. M., G. B. Jasmon, et al. (2013). Analysis of the performance of domestic lighting lamps. *Energy Policy* 52(0), pp. 482-500.

Barriers to eco-innovation in the LED sector

Our interviews with cycLED SMEs have enabled us to identify the following major barriers to eco-innovation:

- B1. Lack of certification mechanisms to check out the technical specifications of LED products.
- B2. Inadequate support from national policies to support eco-innovation and emerging LED technologies.
- B3. Increasing and unfair competition from non-European firms.
- B4. Early failure of LED drivers.
- B5. Lack of funding to support SMEs' eco-innovation.
- B6. Lack of well-trained and educated staff on eco-innovations.
- B7. Existence of litigations between firms.

Besides, our online survey of European LED firms has brought forward three major market-related barriers:

- B8. Consumers lack knowledge about eco-innovative products.
- B9. Consumers are not willing to spend on eco-innovations.
- B10. Established firms prevent others from entering eco-innovation markets.

It also brought to the fore five other major barriers to eco-innovation by European LED firms:

- B11. Lack of EU policies to support eco-innovation.
- B12. Lack of standardisation in the LED sector.
- B13. Future standards in the sector are uncertain.
- B14. Lack of cooperation between firms of the sector on eco-innovation.
- B15. Difficulties to access EU instruments supporting eco-innovations.

Policy recommendations

1. Provide a safe-operating space for European LED firms

Four major barriers relate to certification and standards issues (B1, B4, B12, B13), and four to IPR and market regulations (B3, B7, B10, B14).

The lack of certification mechanisms (B1) calls for policy action that has not yet been fully addressed in Europe. To support the adoption of an EU mechanism aiming to certify the specifications of LED products, the cycLED consortium has sent in June 2014 an official letter to the professional association Lighting Europe. On 7th January 2015, the latter has released "A Joint Industry Call for Action" to strengthen the pan-EU cooperation in market surveillance and

thereby to avoid market distortions.² By means of ad hoc instruments and resources, European policy makers should take action to ensure the effective implementation of the suggested measures. Certification mechanisms could also be put in place to avoid the early failure of LED drivers (B4). A minimum legal warranty of at least 7 years for any LED driver entering the European market could also be put in place. Modular design should also be supported to help extend the longevity of LED products. This could benefit from improved standards in the LED sector (B12, B13), which could be favoured by enabling a more collaborative business climate (B14), e.g. by encouraging inter-firm R&D projects.

But established firms prevent others from entering eco-innovation markets (B10), especially SMEs, notably by engaging in litigations activities with them (B7). Indeed, large lighting firms or patent trolls deter smaller LED firms from eco-innovating by deploying "comprehensive patent strategies",³ and use their large patent portfolios to generate royalty revenues. Therefore, when small LED firms attempt to patent an LED invention, they risk being accused of patent infringement by incumbent firms. To overcome this obstacle to eco-innovation, policy makers should adopt instruments that facilitate the access to IPR advice and training by European LED SMEs. Also, the IPR regime in place should be more favourable to eco-innovation, for example by granting Fair Reasonable and Non-Discriminatory (FRAND) licensing regimes to LED products and services.

The increasing and unfair competition facing European LED firms (B3) could be dealt with by creating strong EU LED certification mechanisms. Policy makers should take measures to strengthen European standards related to LED products and services, including by placing barriers on the imports of LED products that do not meet high environmental and quality standards. Because it aims to protect health and the environment, these barriers could be deemed acceptable by the WTO. Finally, selling light at a service based on high quality and total cost of ownership could enable local European companies to outperform non-European firms producing far from EU markets. By taking policy measures to protect European LED firms from unfair competition, policy makers would reward the quality of European LED products and provide incentives to eco-innovation.

² See

http://www.lightingeurope.org/uploads/files/Market_Surveillance_in_Europe_-_Industry_Call_for_Action_-_January_2015.pdf.

³ See Hsueh, C.-C. and D.-Z. Chen (2015). A taxonomy of patent strategies in Taiwan's small and medium innovative enterprises. *Technological Forecasting and Social Change* 92: 84-98.

Examples of such policies include the promotion of an EU label for LED products and services with a high environmental performance, the development of a European instrument to ensure that LED product technical specifications are accurate, and barriers to trade for LED products that do not meet key standards such as a long lifespan or a high degree of recyclability.

2. Strengthen the resources of European LED firms

Few policy initiatives aim to specifically support eco-innovation in the lighting industry. In 2011, a Green Paper published by the European Commission⁴ suggested innovative finance strategies for large-scale SSL deployments to overcome installation cost barriers. Many European lighting firms are willing to eco-innovate. For those involved in general lighting they aim to adopt LED technologies; for those already operating LED technologies, they seek to further improve their ecological performance in all areas (energy consumption, e-waste, hazardous materials, precious metals, ...). But especially small firms lack in-house financial resources to pursue these strategies, and there is a lack of funding to support SMEs' eco-innovation (B5) as well as a lack of EU policies to support eco-innovation (B11). There is also an inadequate support from national policies (B2), which could be addressed by supporting consumers that purchase ecodesigned LEDs (see section 3 below).

Specific financial instruments supporting the development of eco-innovative LED products and services should thus be developed, such as leasing light business models or eco-innovation vouchers. Measures should also be taken to help firms overcome the difficulties to access EU instruments supporting eco-innovations (B15). In California, an "Efficiency and Conservation Block Grant Program" (EECBG) granted USD 37.3 million to 40 small cities and counties to develop LED street and parking area retrofit projects. Policy makers should take steps to expand such support to green public procurement in Europe.⁵

To help European LED firms develop highly eco-innovative products and services, with the support of European lighting associations, policies should develop training and education programmes across Europe, and integrate eco-innovation issues into management and engineering curricula. This could help firms overcome the lack of well-trained and educated staff on eco-innovations (B6). Being able to hire skilled eco-innovation staff (engineers, technicians, managers, sales persons, human resources managers, etc...) would enable SMEs to reinforce their eco-innovation strategies and capabilities. Staff exchange could also help diffuse eco-innovation knowledge and practices, including between large and small firms.

3. Support the demand for eco-innovative LED products and services

If consumers had a greater knowledge of the economic and ecological advantages of LED products and services (B8), they would be more willing to buy them (B9). It is therefore essential to raise the awareness of consumers about these advantages, including when they are public authorities that can use green public procurement. This stresses that eco-innovation push measures should be used together with demand pull initiatives, so as to support the sustainability transition of the lighting industry by enabling the European LED sector to develop and diffuse its ecodesigned LED products and services. For example, in addition to the wider diffusion of green public procurement, a reliable and user-friendly European label helping consumers choose LED products demonstrating a high environmental performance could be put in place in the EU.

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More information:

<http://www.cyc-led.eu>

⁴ See "Lighting the Future: Accelerating the deployment of innovative lighting technologies", COM(2011) 889 final.

⁵ See for example the DOLL project in Denmark, <http://blog.sirris.be/blog/intelligent-leds-replace-traditional-streetlights>.