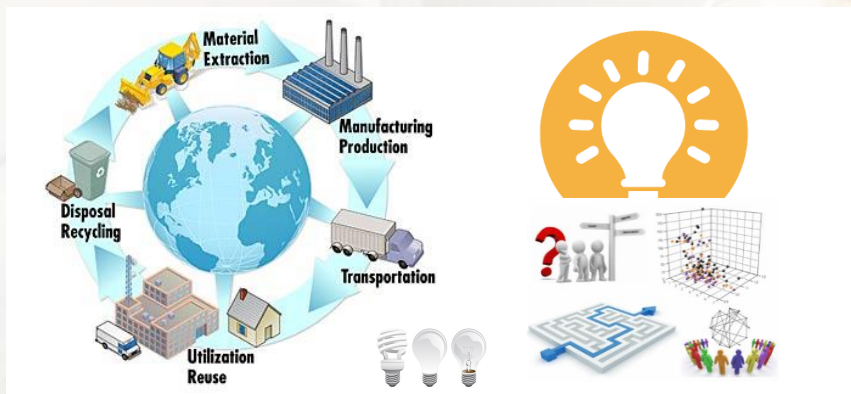


neOCampus Workshop

7th July 2021

Impacts assessments of lighting systems :

Life Cycle Assessment (LCA) and socio-economic analysis of uses and practices



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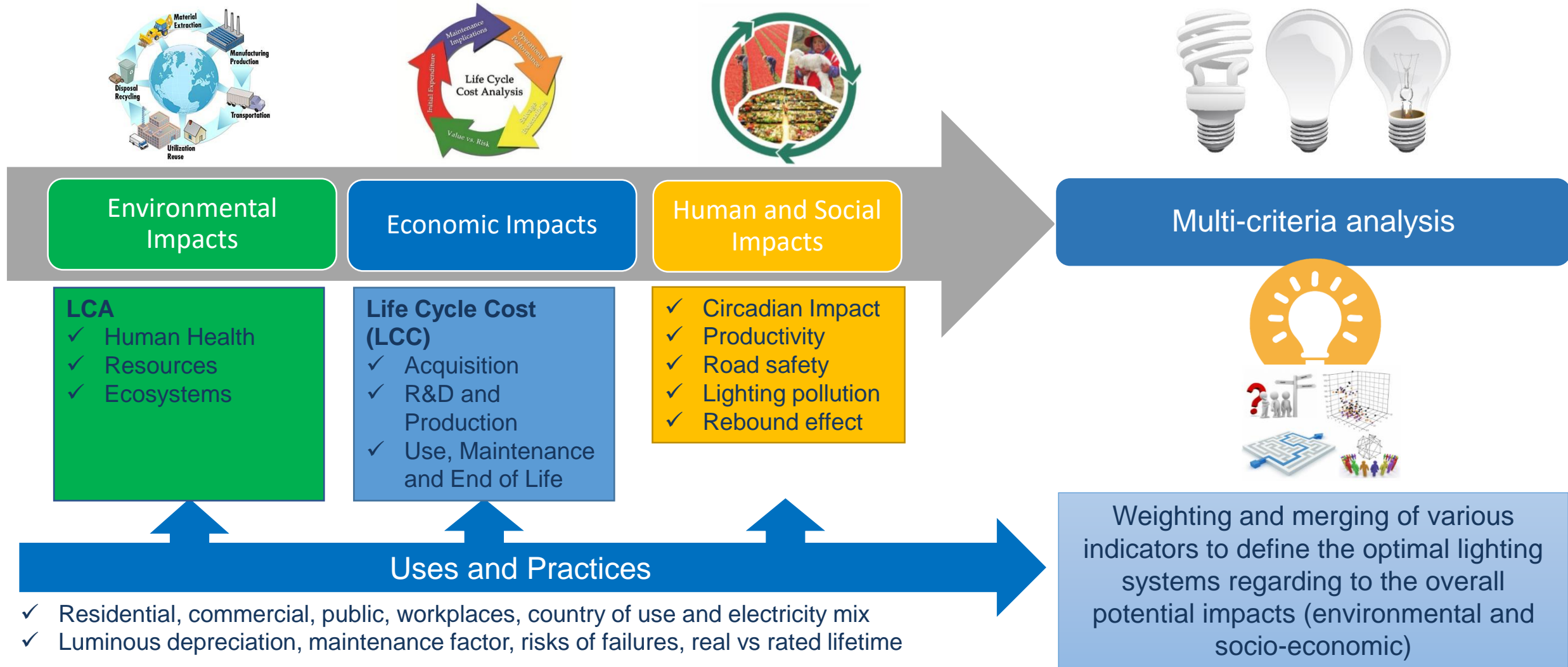
kevin.bertin@laplace.univ-tlse.fr

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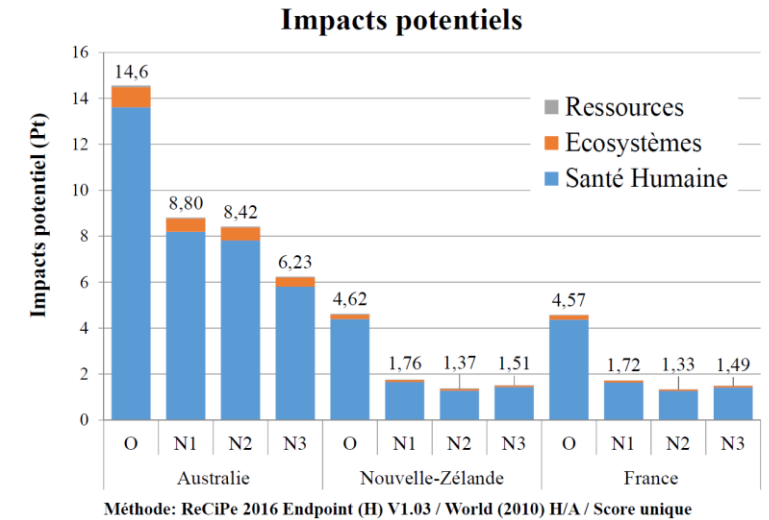
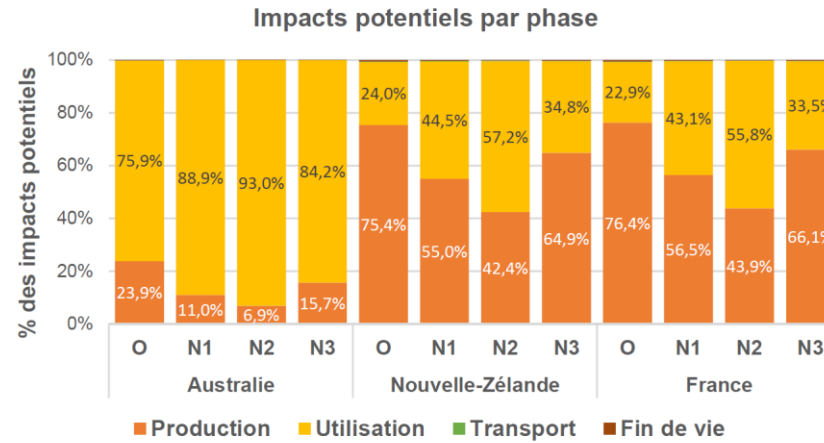
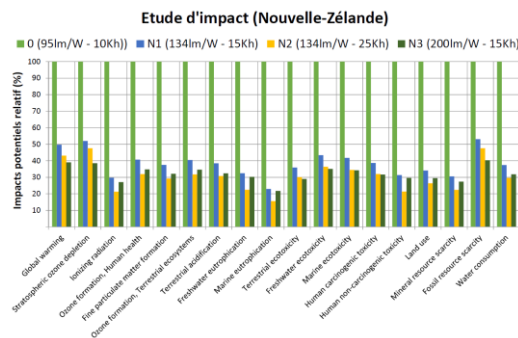
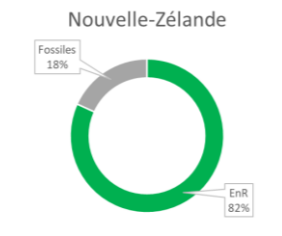
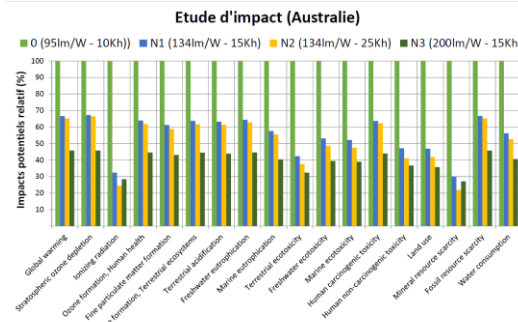
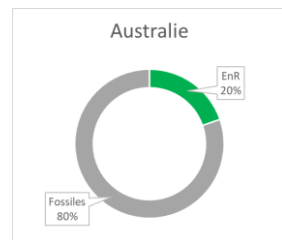
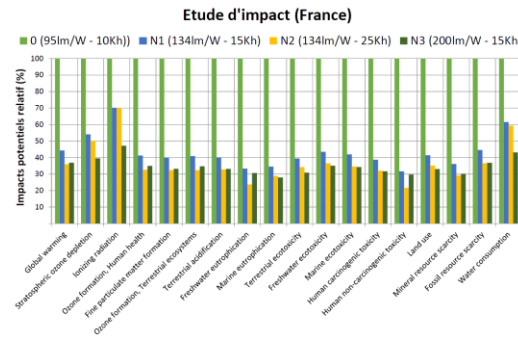
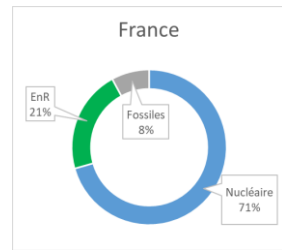
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Methods and Goals



LCA of indoor LED lamps in France¹, Australia and New-Zealand²



- ✓ The impact of the O lamp is much greater than the impacts of N lamps,
- ✓ In Australia, the N3 lamp is the least impactful. Improving lamp lifetime (N1 to N2) has very little effect unlike improving efficacy (N1 to N3). The use phase is responsible for 75.9 to 93% of the potential impacts
- ✓ In France and NZ, the manufacturing phase is the most impactful except for the N2 lamp which has a longer lifespan. The N2 lamp performs slightly better, suggesting that improving lifetime has more effect on potential impacts than reducing power consumption.

Multiple trans-disciplinary problematics

➤ Environment :

- What must be the characteristics of a LED lamp and in particular the duo [**Lifespan - Efficacy**] for it to be considered the most efficient system according to the different energy mixes? How to deduce the outlines of a **quality standard**?
- What are the **impact transfers** in the event of a **reduction in energy consumption** associated to an **increase in the quantity of materials** required for manufacturing (Smart Lighting)?

➤ Socio-economic:

- What is the **economic optimum** for the lifetime of the lamps, depending on the type of use?
- How to quantify the positive impacts of a **reduction in global energy demand**? What are the **socio-economic rebound effects** induced by an improvement in the efficacy of systems (Jevons paradox)?
- How would a "**Lighting as a Service**" strategy and **improved lamp repair and reuse options** contribute to the results of LCA studies?

➤ Impacts on human health, fauna and flora:

- How to qualify and compare **the circadian impact and light pollution** with the impact categories of LCA?
- How to apply this approach to evaluate the most efficient systems for **horticultural lighting**?



Thank you for your attention

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