



Waasland Cohousing Community (Sint-Niklaas, Belgium). For this PV installation, 226 second-life PV modules were combined with 5 new PV modules.
(Photo credit: CIRCUSOL)

Preliminary Environmental and Financial Viability Analysis of Circular Economy Scenarios for Satisfying PV System Service Lifetime

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Circular Economy Scenarios for Satisfying PV System Service Lifetime

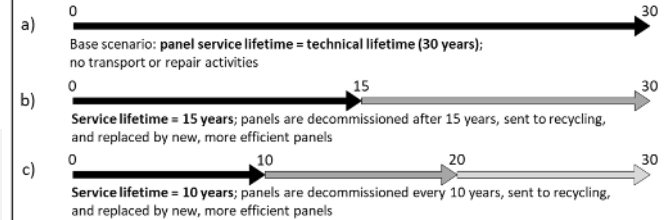


Increasing volume of **PV panels** will be **decommissioned** in the future, before reaching the end of their **service lifetime** (25–30 years).

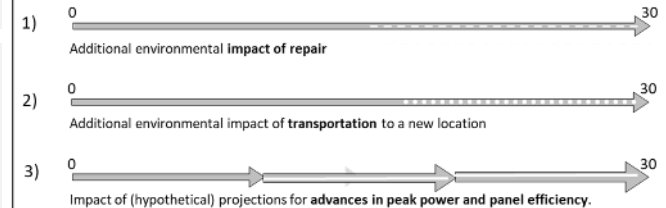
Prematurely decommissioned panels can be recycled, but some could also be repaired and **reused**.

- Is satisfying the lifetime of a prematurely decommissioned PV panel **environmentally** more favourable than recycling and replacing with a more efficient new panel? What are the boundary conditions?
- Is there a viable business case for buying and reusing a prematurely decommissioned older panel? Is it competitive with a “recycle and buy new” route from a **financial perspective**?

Baseline Scenarios



Sensitivity analyses



In this report, **different scenarios**, all with a **time horizon of 30 years**, are compared from environmental and economic perspectives.

Main findings



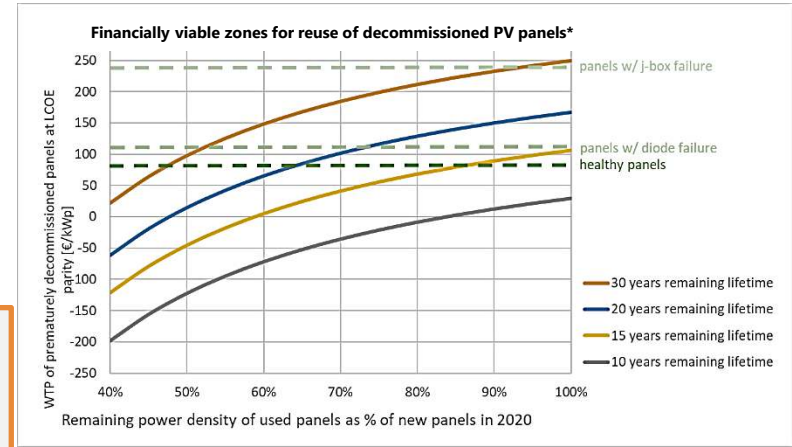
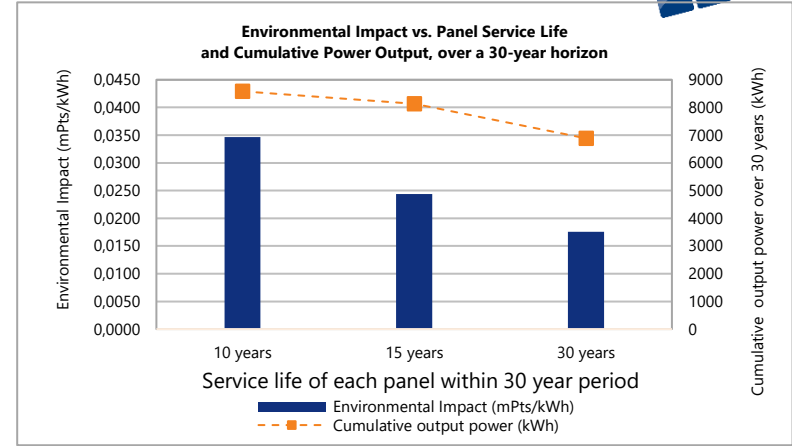
Life Cycle Analysis

- Satisfying the **30-year service lifetime** of (mc-Si) PV panels is **favourable** from an **environmental perspective** for the three scenarios examined:
 - ✓ even when additional repair or transportation is required to reach the 30-year lifetime;
 - ✓ and even when prematurely decommissioning panels were replaced with higher efficiency panels (with greater cumulative power output)

Financial Viability Analysis

- From an **LCOE perspective**, theoretically there is a **positive business case** for reusing decommissioned panels depending on condition and remaining power density
 - In the figure, solid lines express willingness to pay (WTP) for prematurely decommissioned panels, which depends on remaining power density. When they are above dashed lines (condition), used panels are attractive.

PVPS *The financial viability analysis is preliminary and can be expanded. See report for some additional analyses, for instance from the residential or utility buyer's perspective (net present value), suggesting neither case is attractive in practice.*



* ground-mount, utility-scale, mc-Si

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