ENERGY LOCAL STORAGE ADVANCED SYSTEM

Energy Local Storage Advanced system

Economic and environmental advantages

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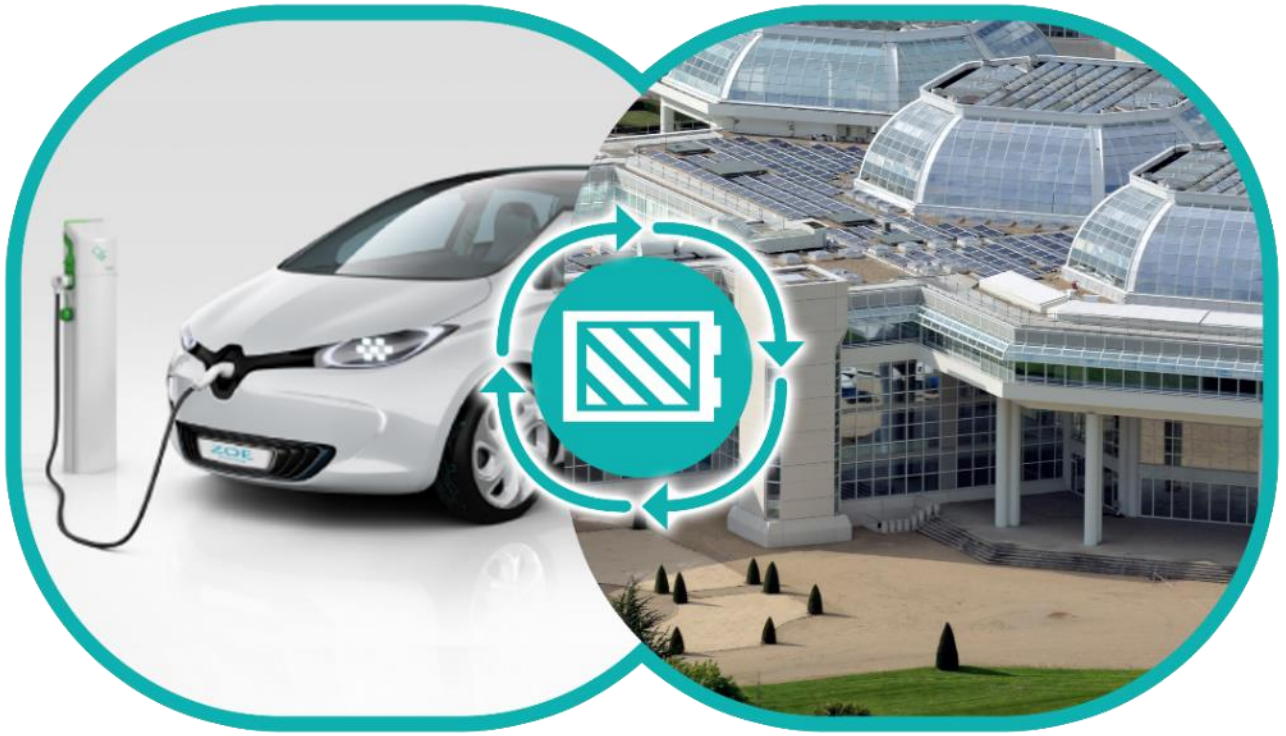
Linking Mobility and Buildings

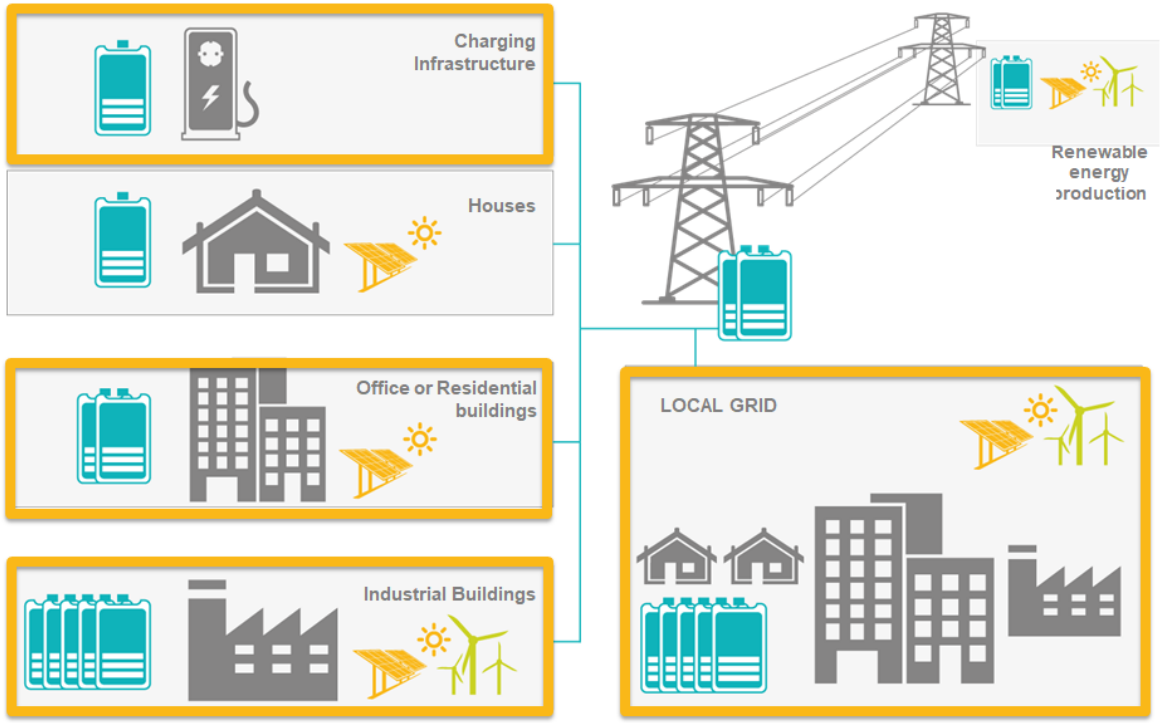


Pictures by Renault, Bouygues

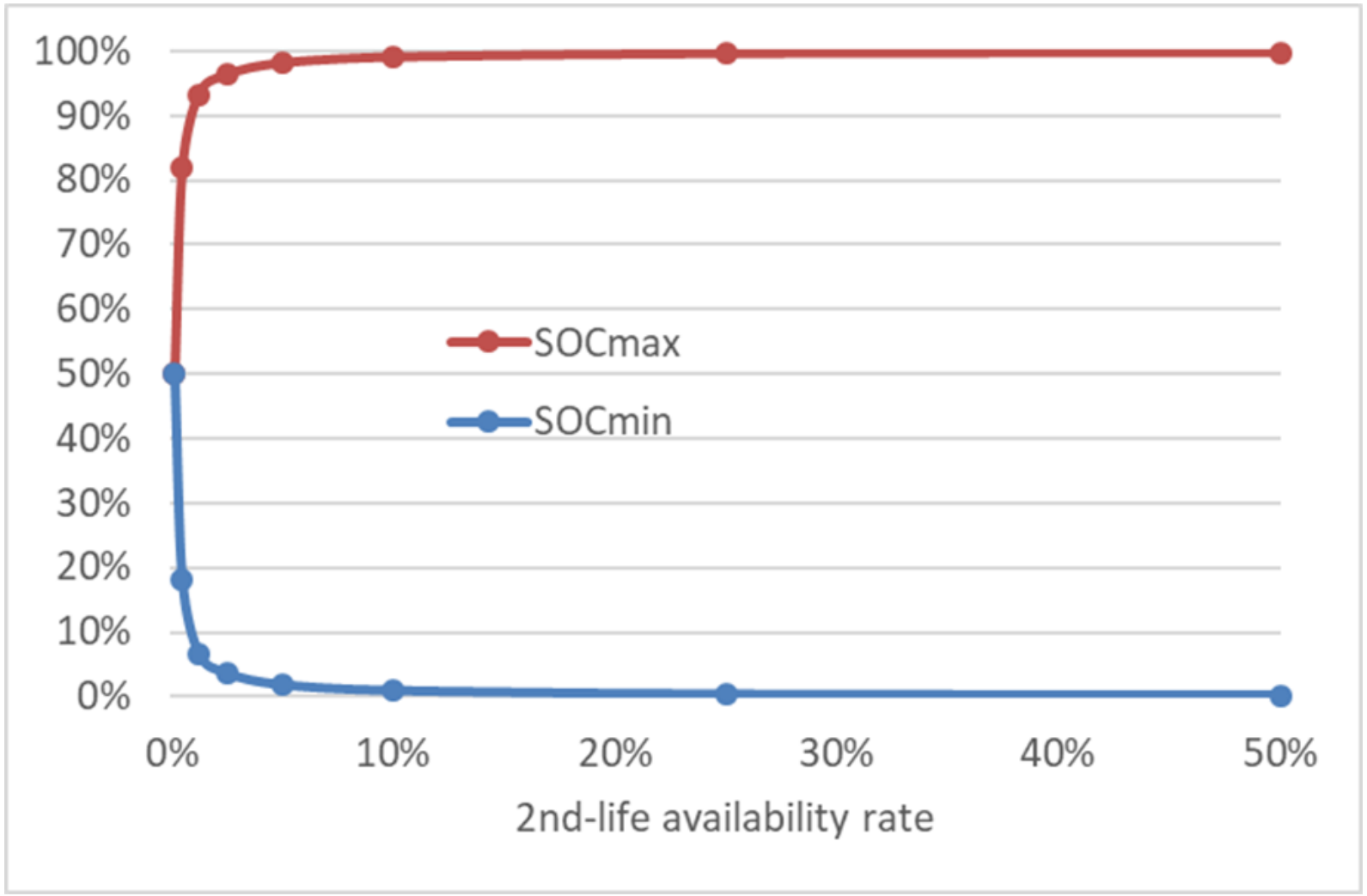
ELSA Vision

ELSA brings distributed storage solutions to maturity

- a stationary 2nd life for electric vehicle batteries
- *smart storage systems for multi-energy integration in* business buildings and residential districts
- local ICT-based energy management systems
- commercially optimised use of storage for the transition towards renewable energies

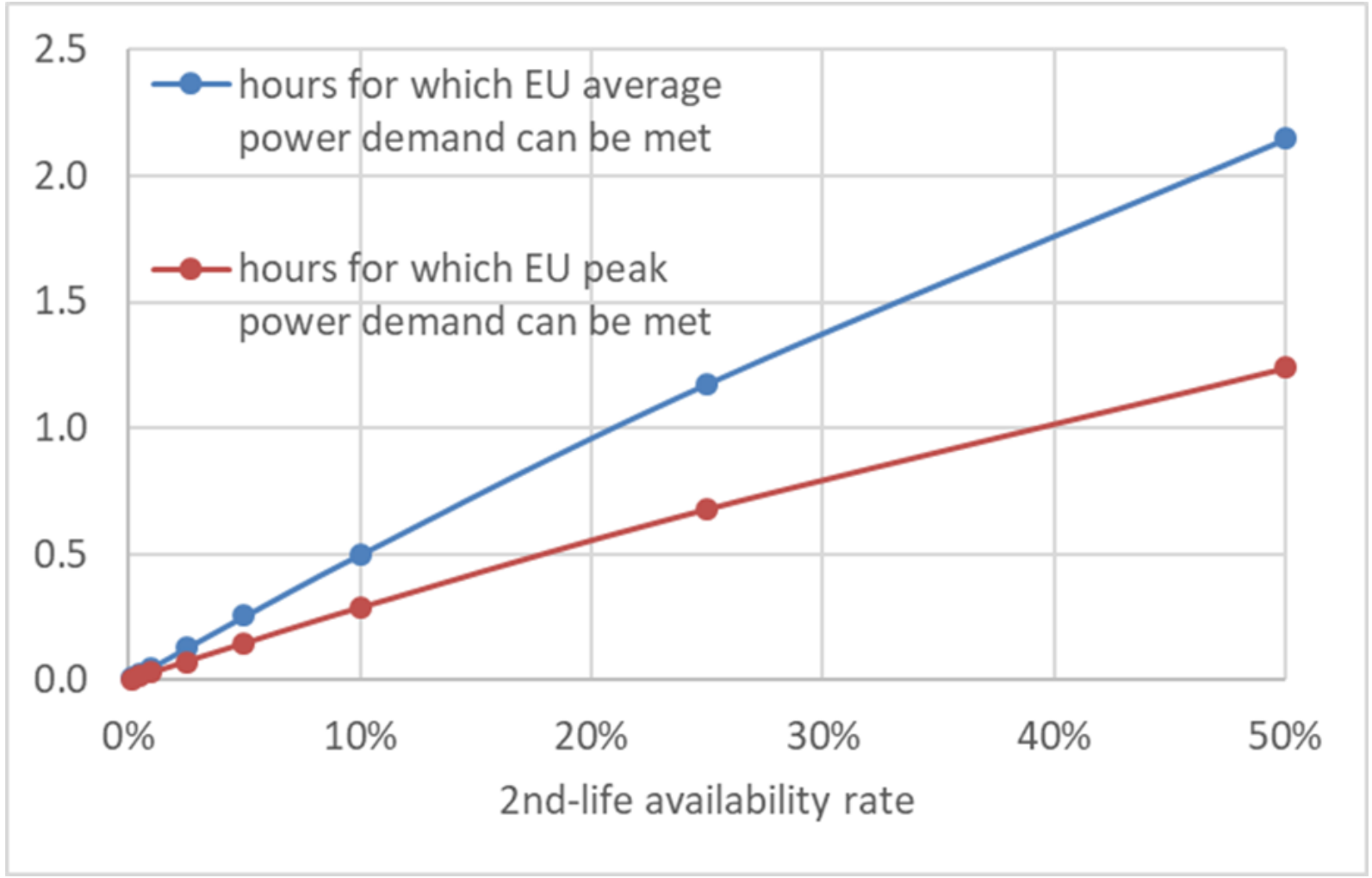


Average SOC of 2nd-life batteries needed for incidental PR provision in UCTE zone

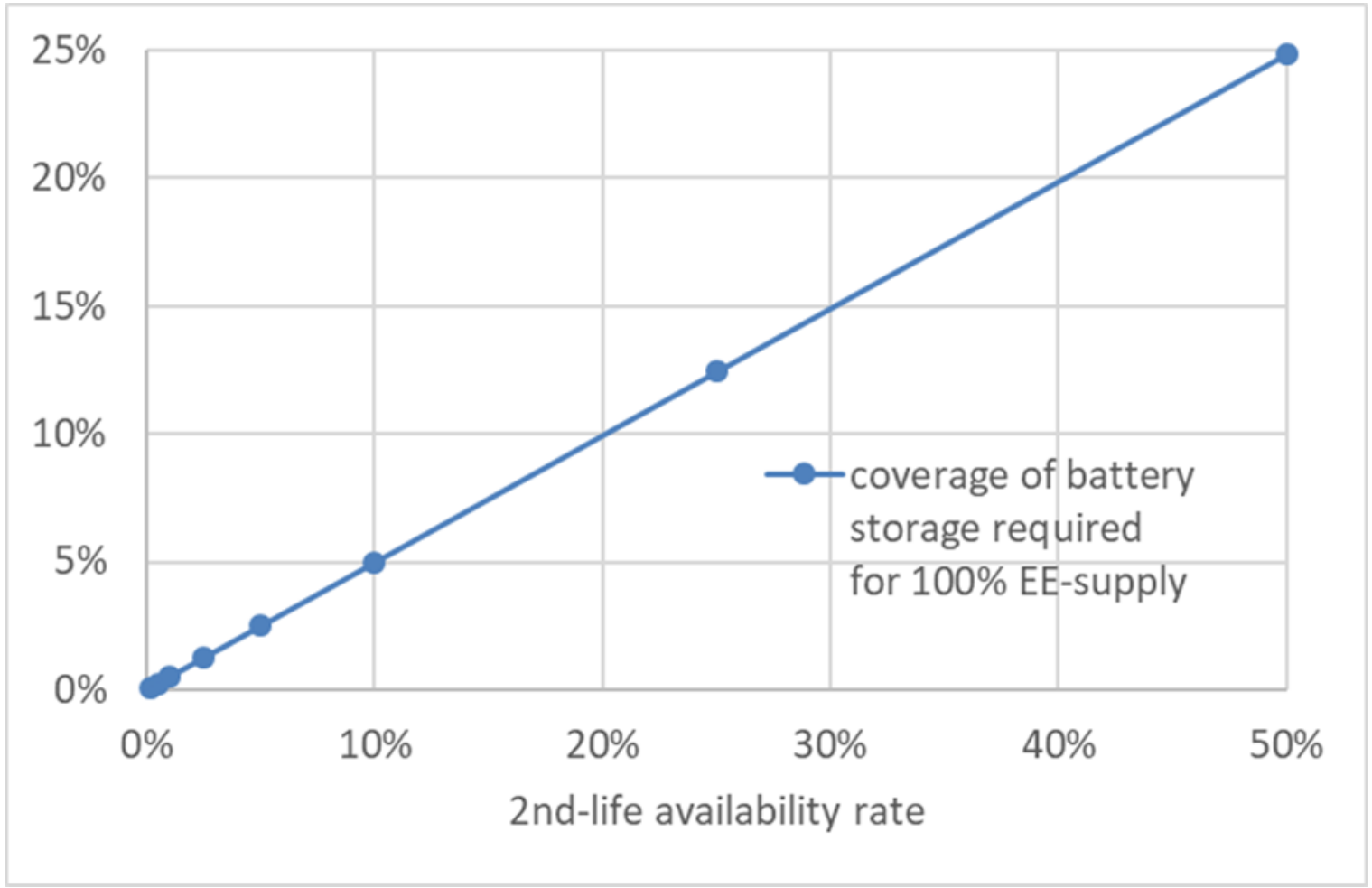


- EU vehicle stock considered
- 2nd-life use rate = 50%
- If SOC is on the average in the displayed range the UCTE need for PR can be met in addition to other services provided by same ELSA ESS

Number of hours for which ELSA ESS can meet the EU average / peak power demand



Fraction of battery storage required for 100% EE-supply in EU + Norway + Island + Switzerland + Balkan Countries + Ukraine + Turkey that can be met by ELSA ESS



- 3,320 GWh_e of batteries needed for 100% EE
- *The role of storage technologies for the transition to a 100% renewable energy system in Europe.* Child, Michael, Bogdanov, Dmitrii & Breyer, Christian. IRES 2018 Proceedings.
- -> Much less new batteries needed

Key messages economic impact

- ESS bring flexibility into the energy system -> more RE with zero marginal cost can be used.
- If operators of ELSA-type ESS receive a revenue equal to the marginal value of the last ESS deployed, a perfect market leads to a deployment of ESS thus that they generate on the average a 2-3 times higher value to the overall electricity supply system than they cost.
- Most of the value corresponds to avoided OPEX of back-up power plants as ESS allow reducing curtailment of RE.
- As 2nd-life ESS cost less than new ESS, a perfect market leads to a higher deployment and a higher total value for the overall electricity supply system.
- The higher risk to fail of 2nd-life ESS is reflected by wacc of 15% and maintenance cost of 10% of the initial investment.

Key messages of environmental impact

- 2nd-life ESS have generally a lower environmental impact than new ESS because a major part of the ESS consists of components which were used in an electric vehicle before and their environmental footprint can be allocated entirely to the vehicle life-cycle.
- Generally, stationary ESS can have a positive environmental impact depending on their way of operation. As 2nd-life ESS are a bit cheaper their deployment in a perfect market is larger and the environmental impact of their operation higher compared to new ESS.

ELSA-type energy storage systems