Second Life EV Batteries

Lesson 2: Second-life batteries uses, in less demanding applications

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In this video you will learn:

- Options after end of life
  - Second-life applications
    1. Electric scooters/bikes repurposing
    2. Off-grid solar hubs
    3. Self-consumption systems
    4. Utility grid support
       - Second-life batteries uses in SESA

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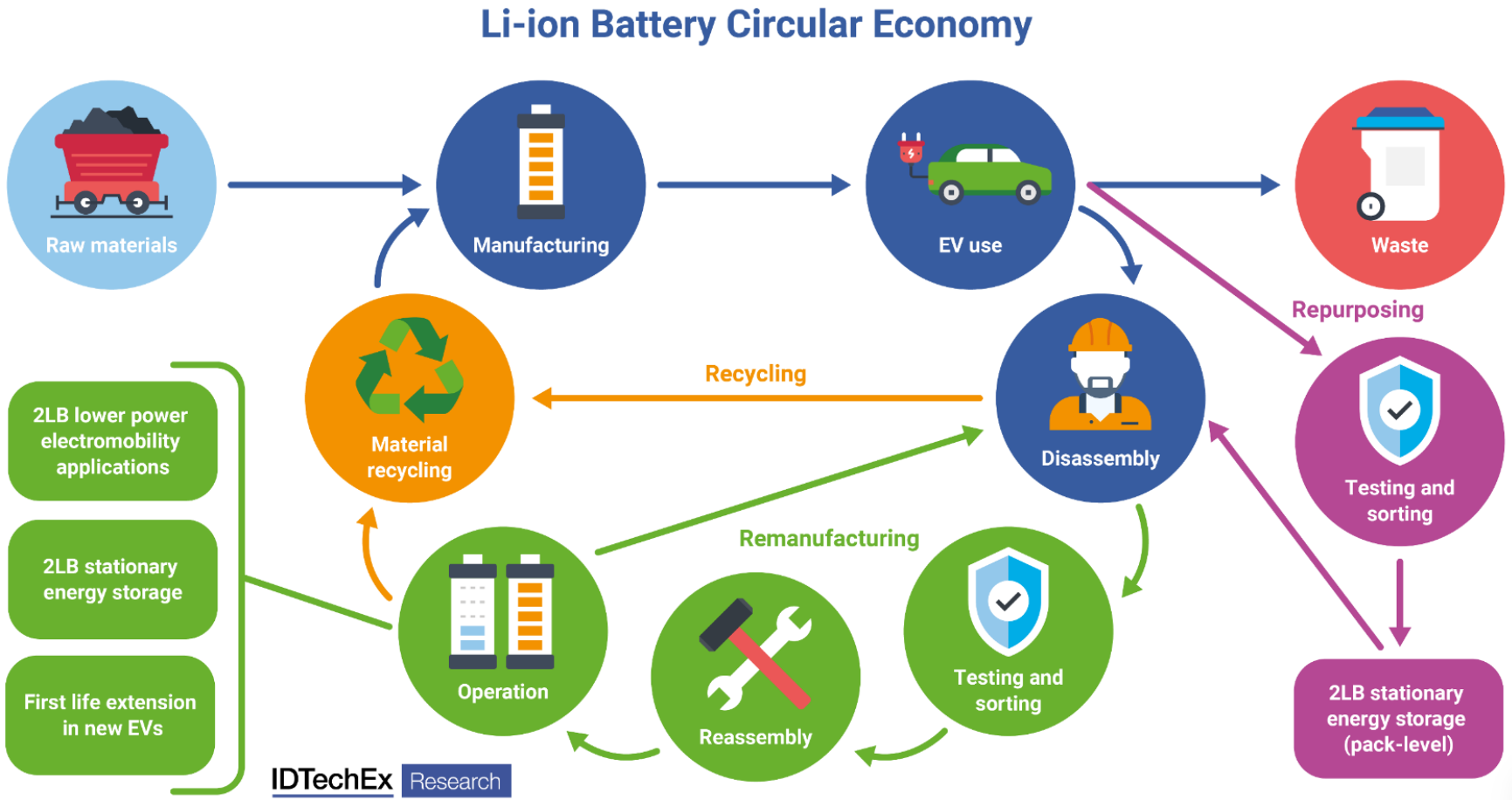
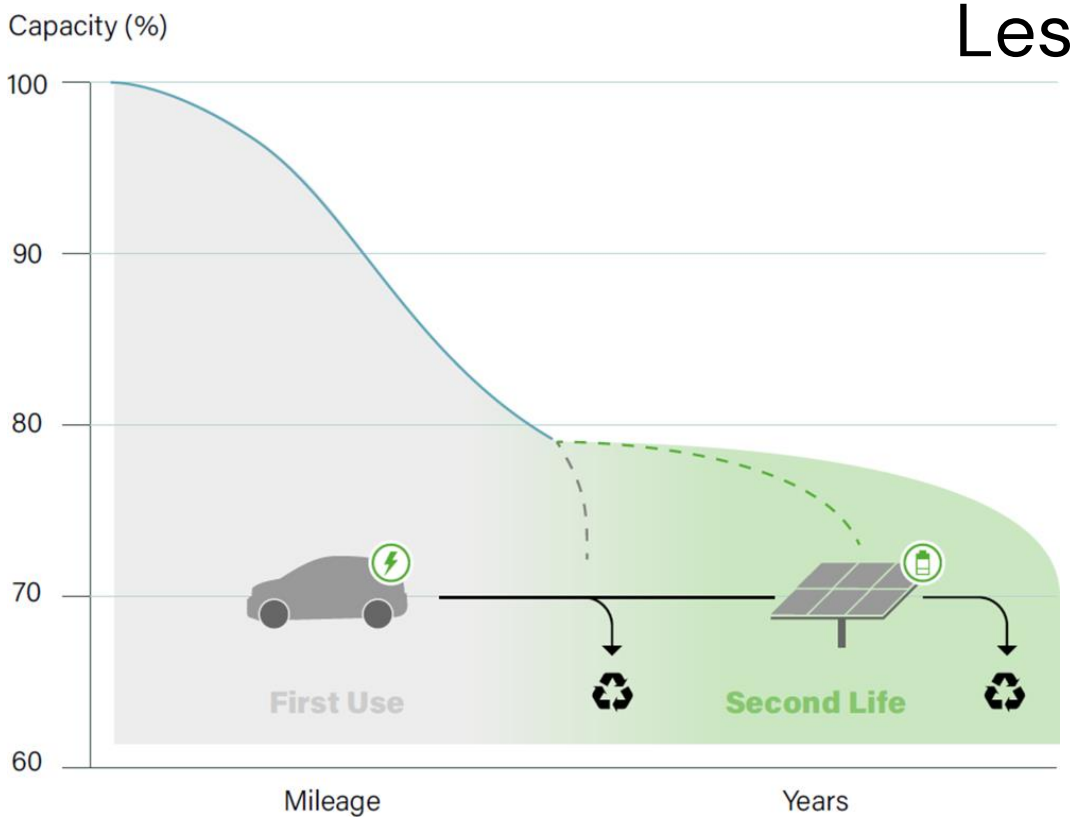
Options after end of life



Conrad Nichols, 2023, IDTechEx: Second-life Electric Vehicle Batteries 2023-2033. https://www.idtechex.com/en/research-report/second-life-electric-vehicle-batteries-2023-2033/924

Second-life applications (SLB)



Less demanding applications:

- ✓ **E-scooters/bikes repurposing**

Stationary applications

- ✓ **Off-grid solar hubs**
- ✓ **Self-consumption systems**
- ✓ **Utility grid support**

Falk, J., Nedjalkov, A., Angelmahr, M., Schade, W., 2020. Applying Lithium-Ion Second Life Batteries for Off-Grid Solar Powered System—A Socio-Economic Case Study for Rural Development. Zeitschrift Für Energiewirtschaft, 44(1), 47–60. https://doi.org/10.1007/s12398-020-00273-x

Electric scooters/bikes repurposing

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- Second-life batteries can be used to power electric bicycles and scooters
- They offer an eco-friendly and cost-effective mode of transportation for short trips
- Reliability and safety testing, during the repurpose process

Image from E-moped firm out to win over West Africa's sceptical moto-taxi drivers | Reuters

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Off-grid solar hubs in remote areas

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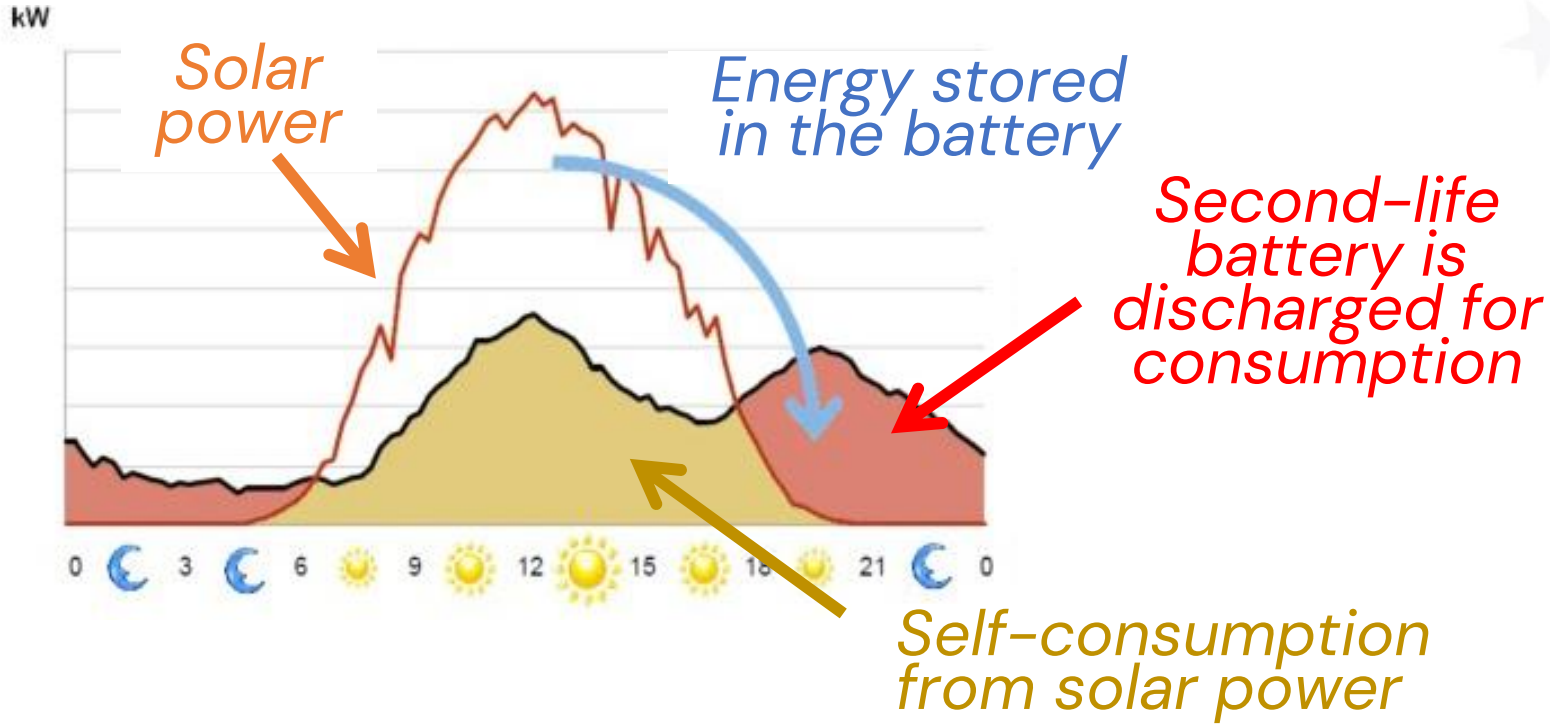
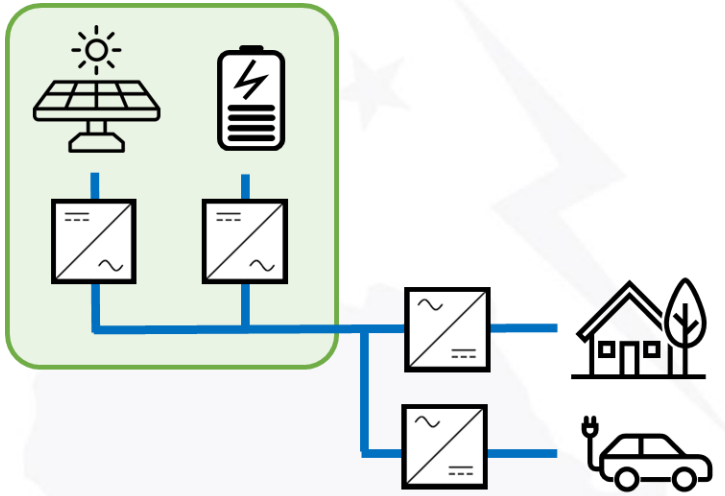
Suitable system sizing: PV and battery capacity to meet all EV demand





For rural electrification in remote or off-grid areas, with limited access to reliable electricity

Source: https://sunfishsolar.ca/solar-options/net-metering/

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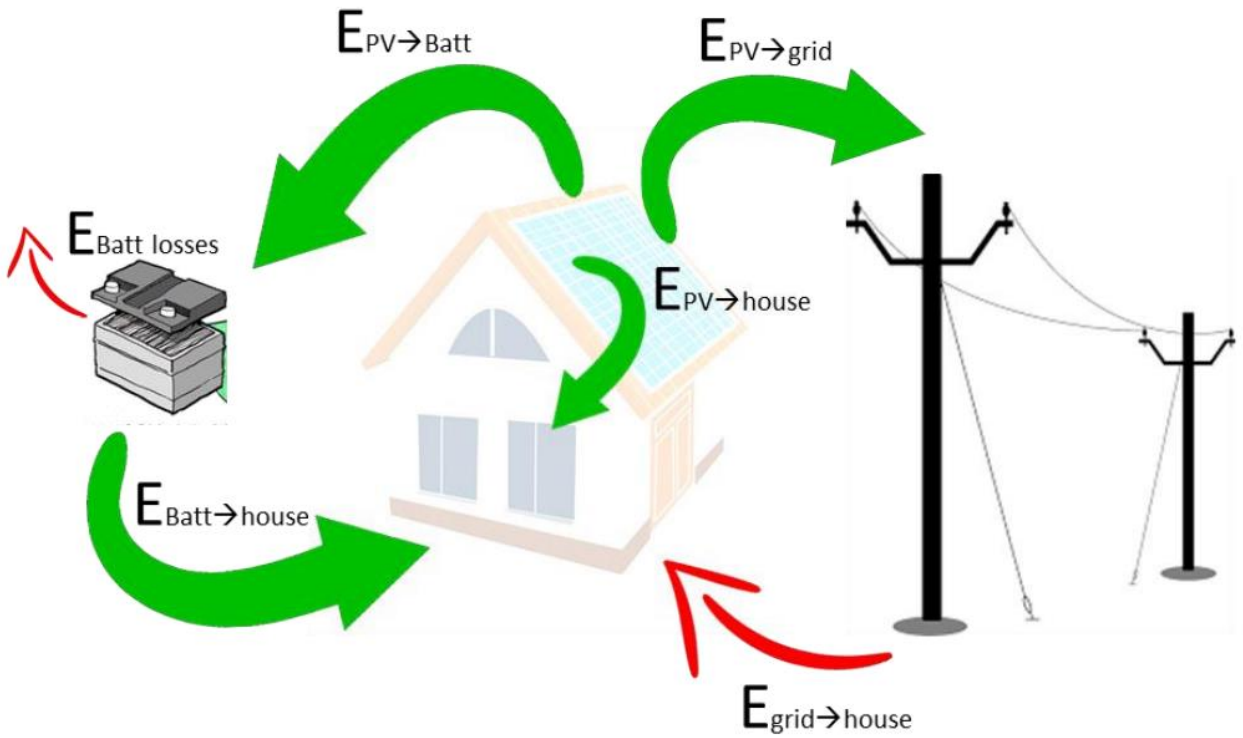
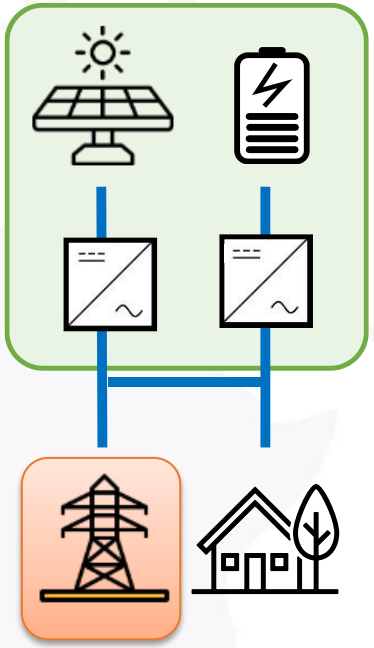
Grid-connected self-consumption

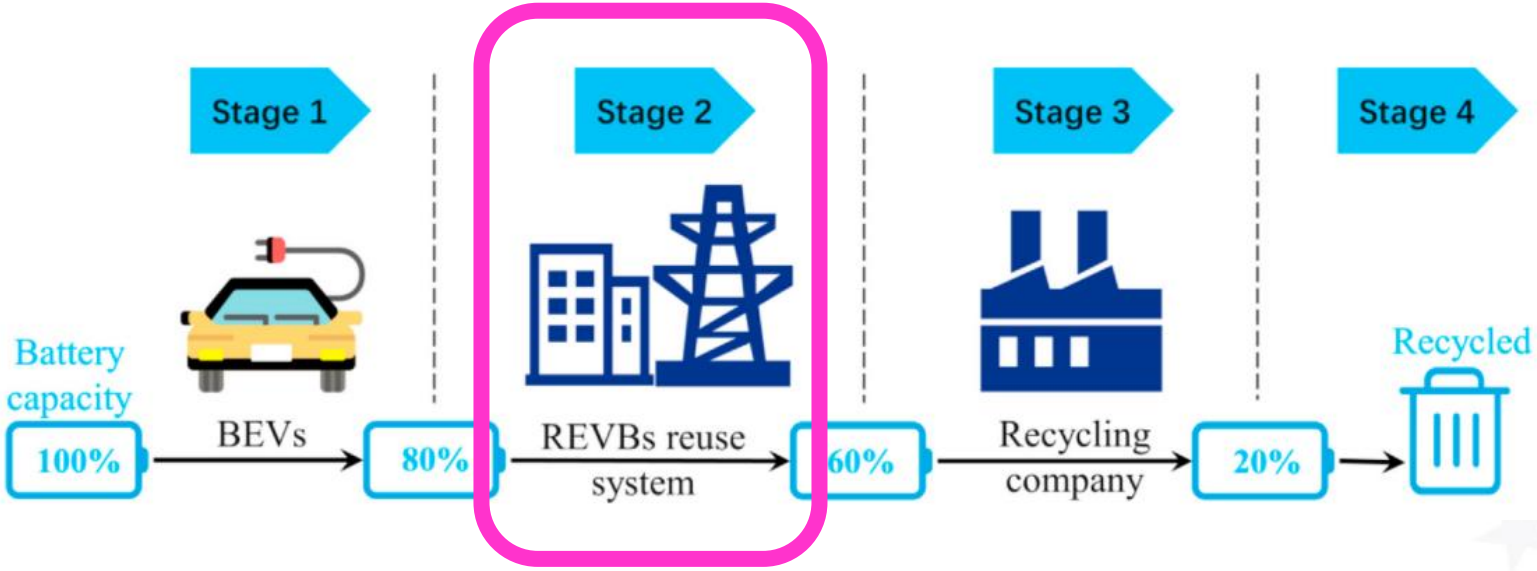
- **Peak shaving or load shifting** to off-peak (and cheap) hours
- **Self-consumption** from solar power
- **Backup power** during outages





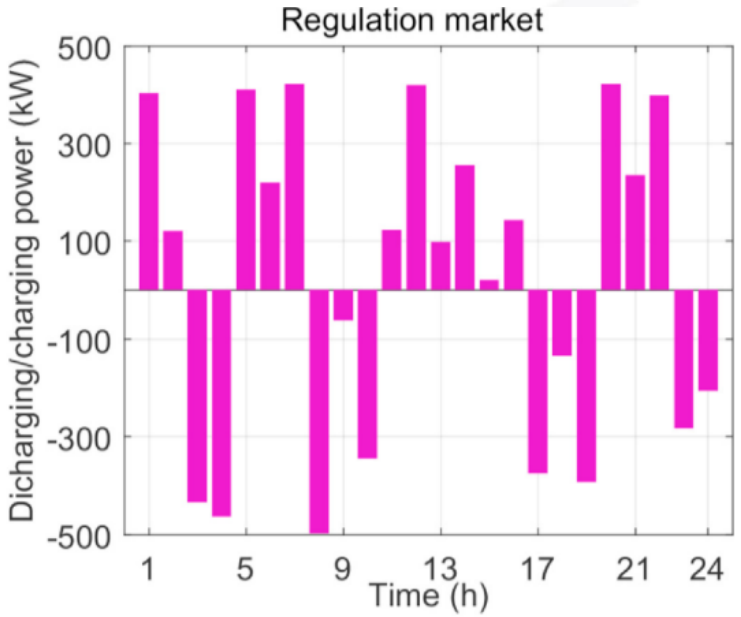
JRC Technical reports, 2018. Sustainability Assessment of Second Life Application of Automotive Batteries (SASLAB). https://doi.org/10.1007/s12398-020-00273-x

Utility grid support



- **Electricity markets and grid services**
- **Based on price signals or remuneration**

Battery operation for one day



Xiao Xu, Weihao Hu, Wen Liu, Daojuan Wang, Qi Huang, Zhe Chen, Study on the economic benefits of retired electric vehicle batteries participating in the electricity markets, Journal of Cleaner Production, v. 286, 2021, 125414, https://doi.org/10.1016/j.jclepro.2020.125414

Second-life batteries uses in SESA

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Kisegi and Katito, Kenya

- **Solar charging hubs** for a range of electrical needs within the local community

Marrakech, Morocco

- **Mini grids in isolated villages** for vulnerable users to enable social and business activities

KwaNonzwakazi and Alicedale, South Africa

- **Containerised off-grid systems (PV+SLB)** for community energy access and micro EVs fleets

repurposing and recycling activities

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Additional References

- Conrad Nichols, 2023, IDTechEx: Second-life Electric Vehicle Batteries 2023-2033. https://www.idtechex.com/en/research-report/second-life-electric-vehicle-batteries-2023-2033/924
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