



Circular Business Models for the Solar Power Industry

General Introduction
February 2019



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 776680.



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CIRCUSOL in Numbers



EC funding €7M

Jun 2018
—
May 2022

15 partners
7 countries

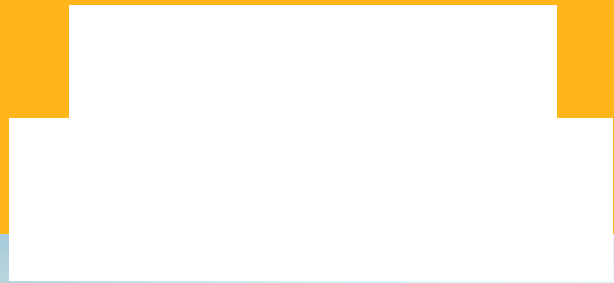
5 large-scale
demonstrators





**Circular business models for the
solar power industry**



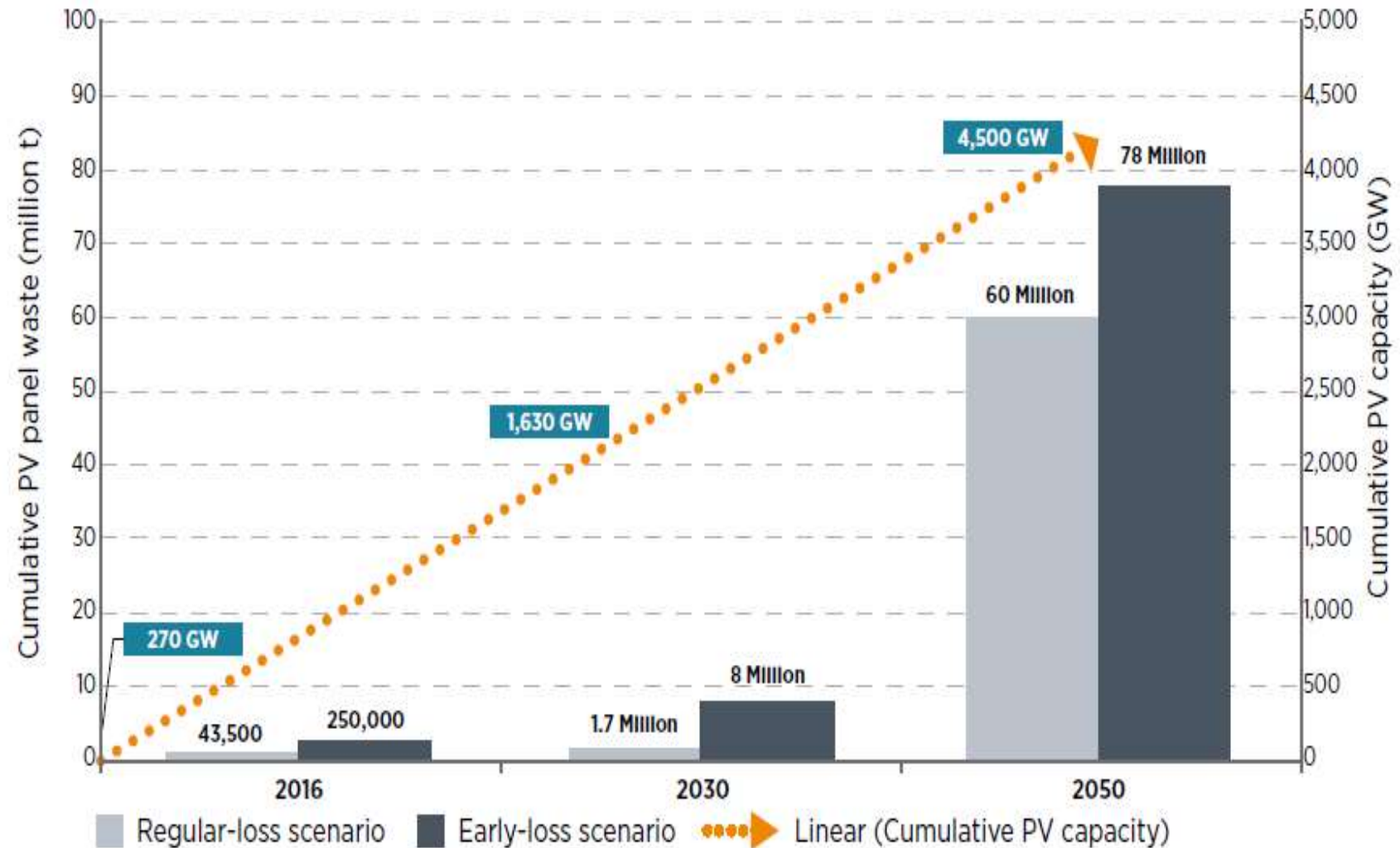


Giga factory, Tesla, U.S.



5GW solar park in Saudi Arabia

Global PV waste projections 2016-2050



Source: IRENA/IEAPVPS, June 2016



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Electric vehicle outlook to 2040

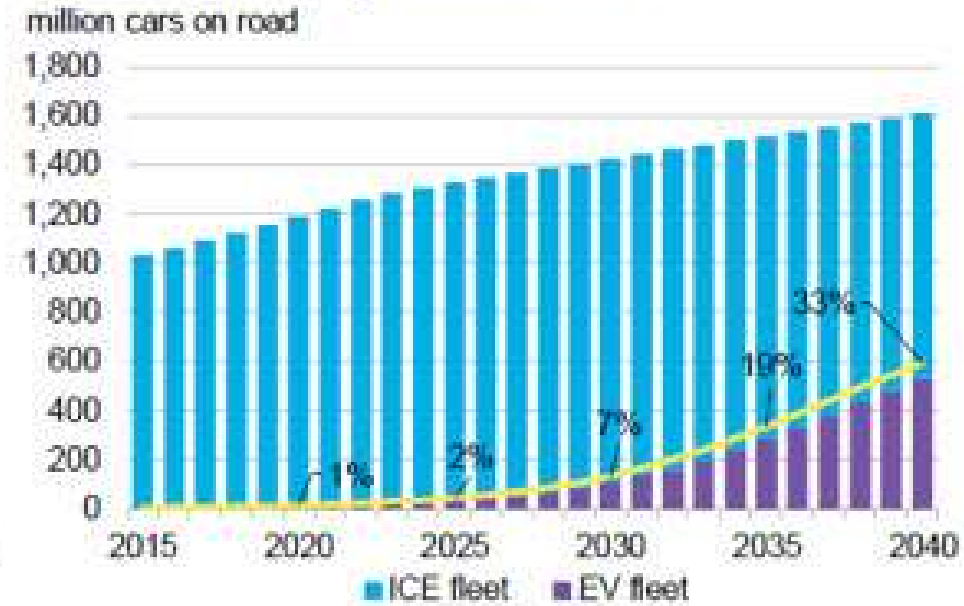


Annual global light duty vehicle sales



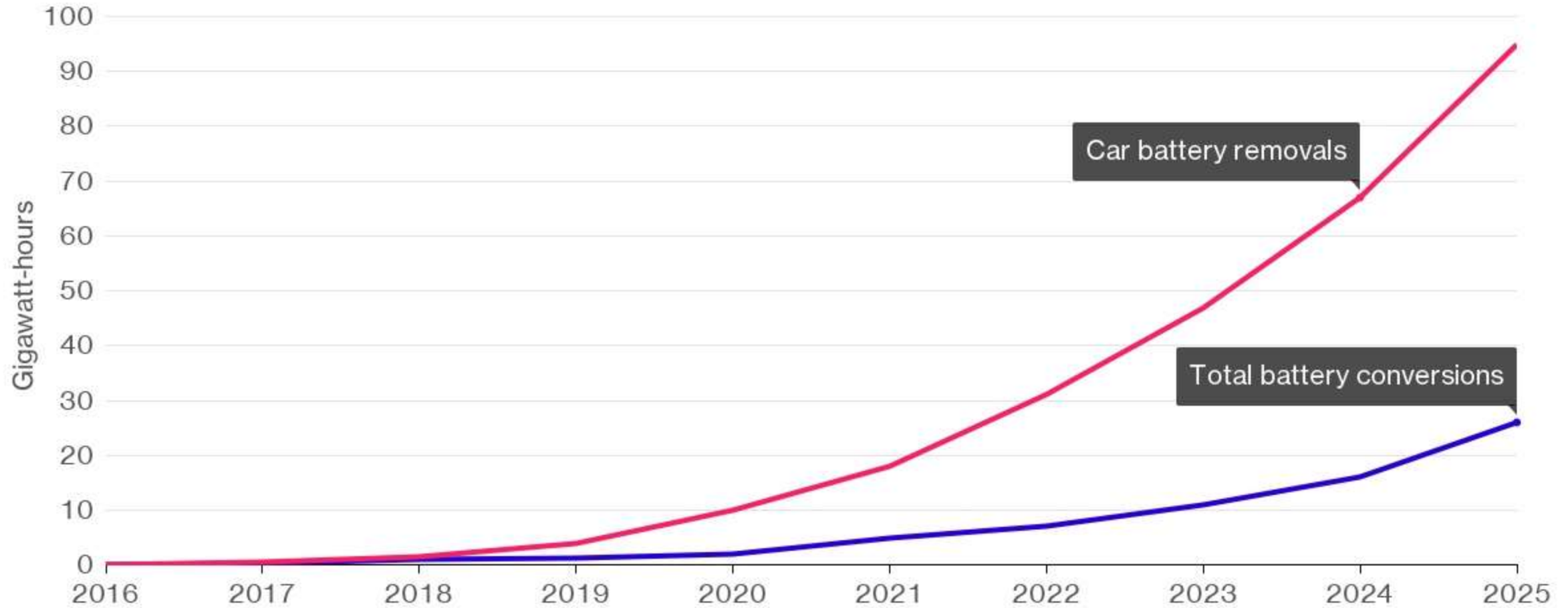
Source: Bloomberg New Energy Finance *EVO* 2017

Global light duty vehicle fleet



Plenty of Old EV Batteries Coming Soon

Can be converted to home energy storage



Source: Bloomberg New Energy Finance

Bloomberg 

BY 2030...

8 million

tons of PV

**WILL BE DISCARDED AS
"WASTE"**

2 million

old batteries

**WILL BE REMOVED
FROM EV**

13 GW

solar power for EU

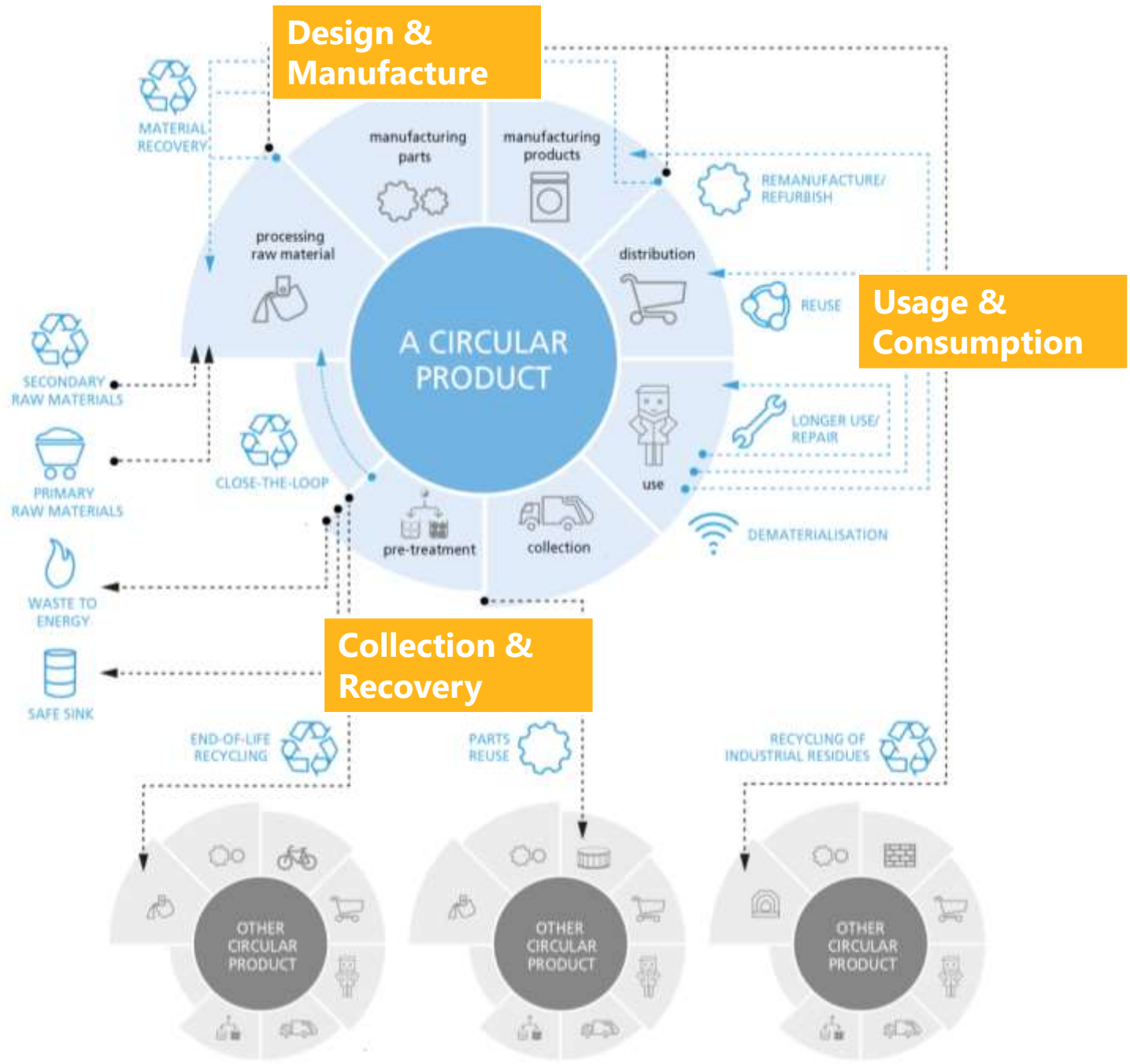
**CAN BE PROVIDED BY
SECOND-LIFE PV**

25 GWh

storage capacity for
renewable energy

**CAN BE PROVIDED BY
SECOND-LIFE
BATTERIES**





CIRCULAR ECONOMY

involves ALL phases in product life cycle.

aims to unite environmentalists and economists.



PRODUCT SERVICE SYSTEMS (PSS)

“Tangible products and intangible services designed and combined so that they jointly are capable of fulfilling specific customer needs.”

— U. Tischner et.al.(2002)

Solar power industry is familiar with PSS:

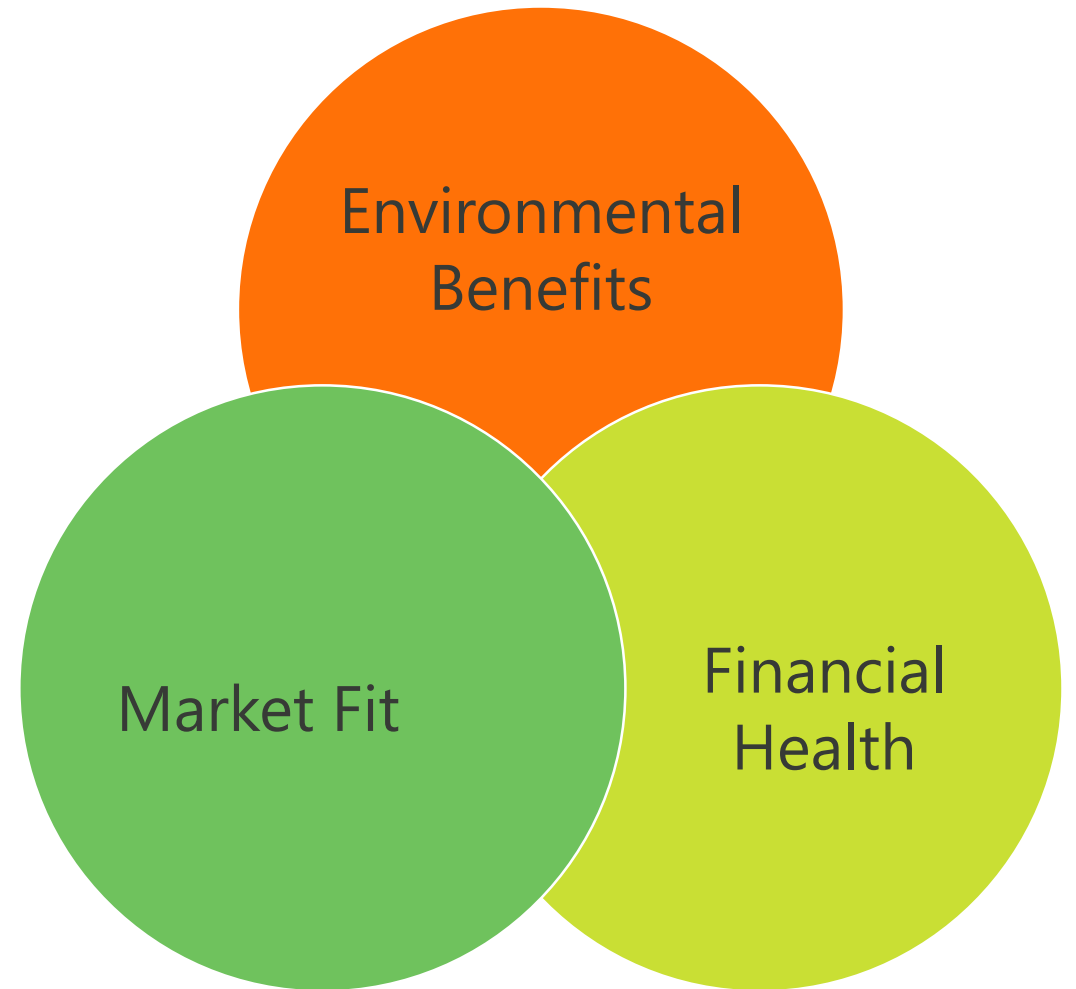
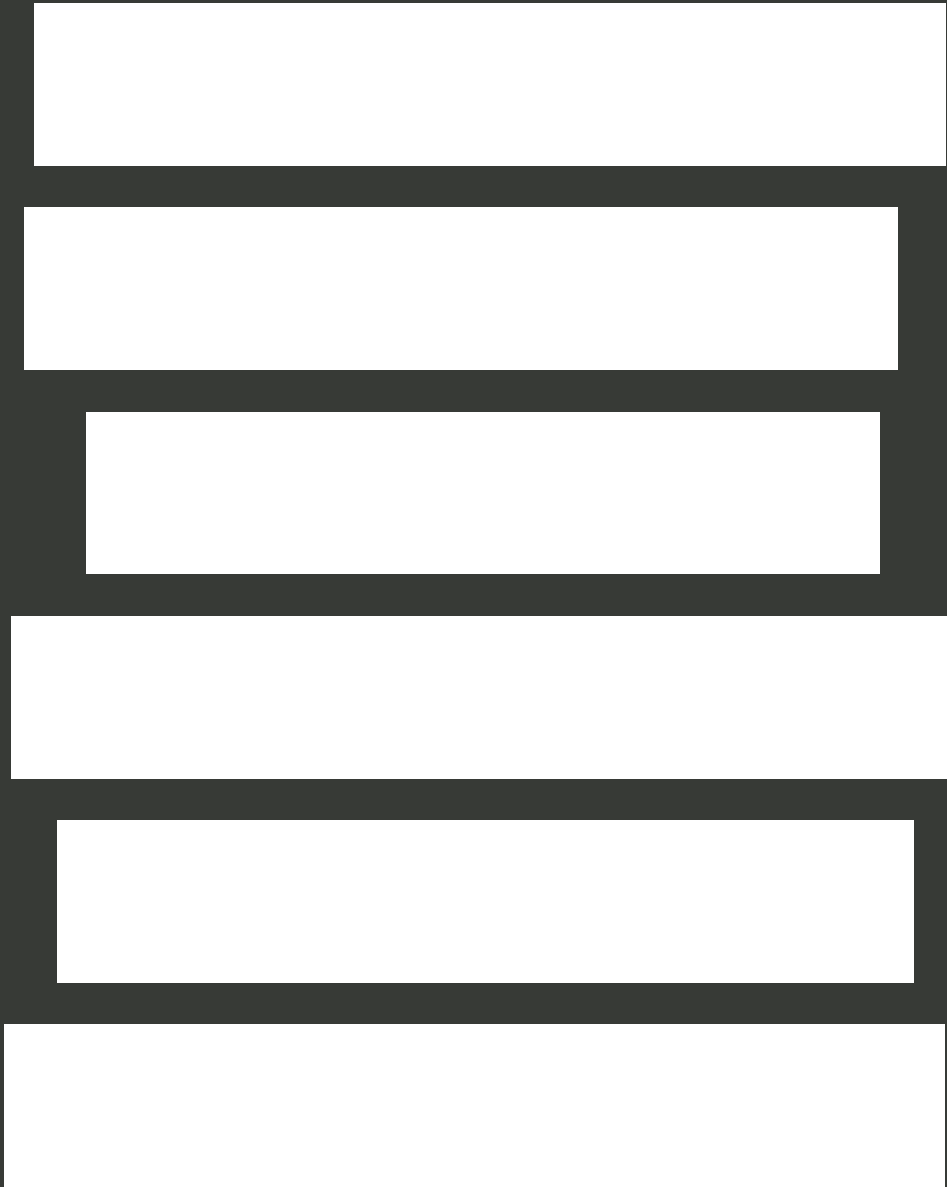
- PV leasing
- PPA (Power Purchase Agreement)

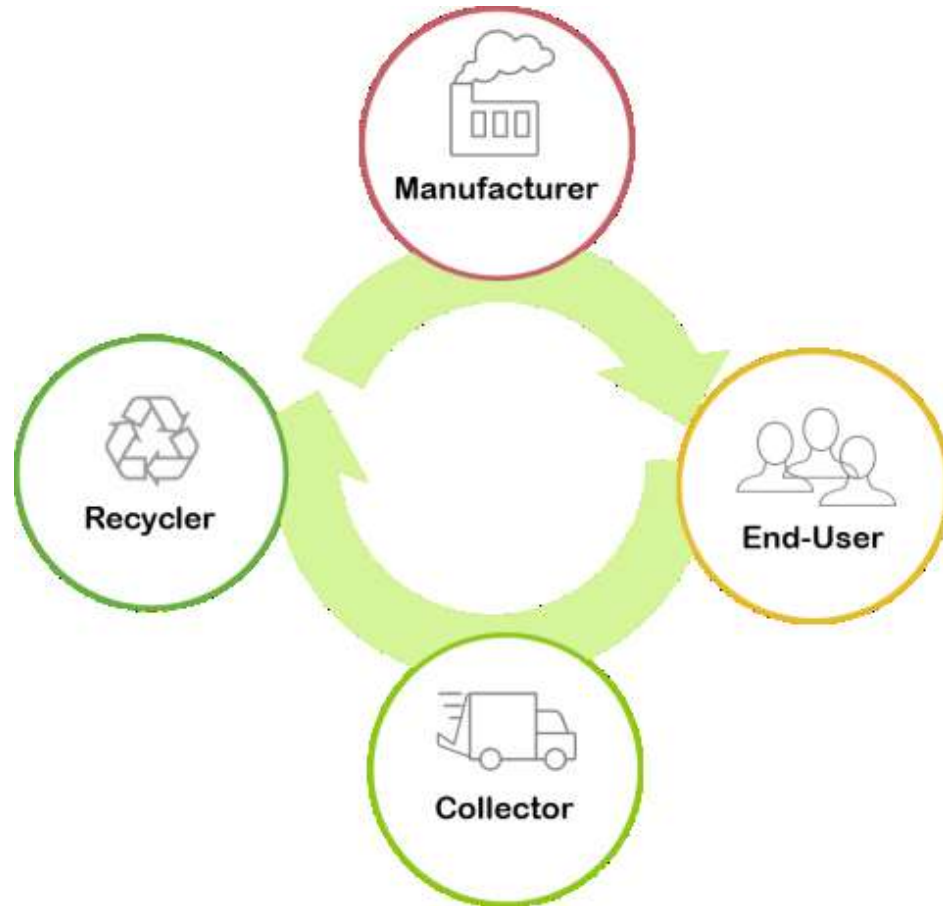


PSS has been the growth engine of US residential PV market



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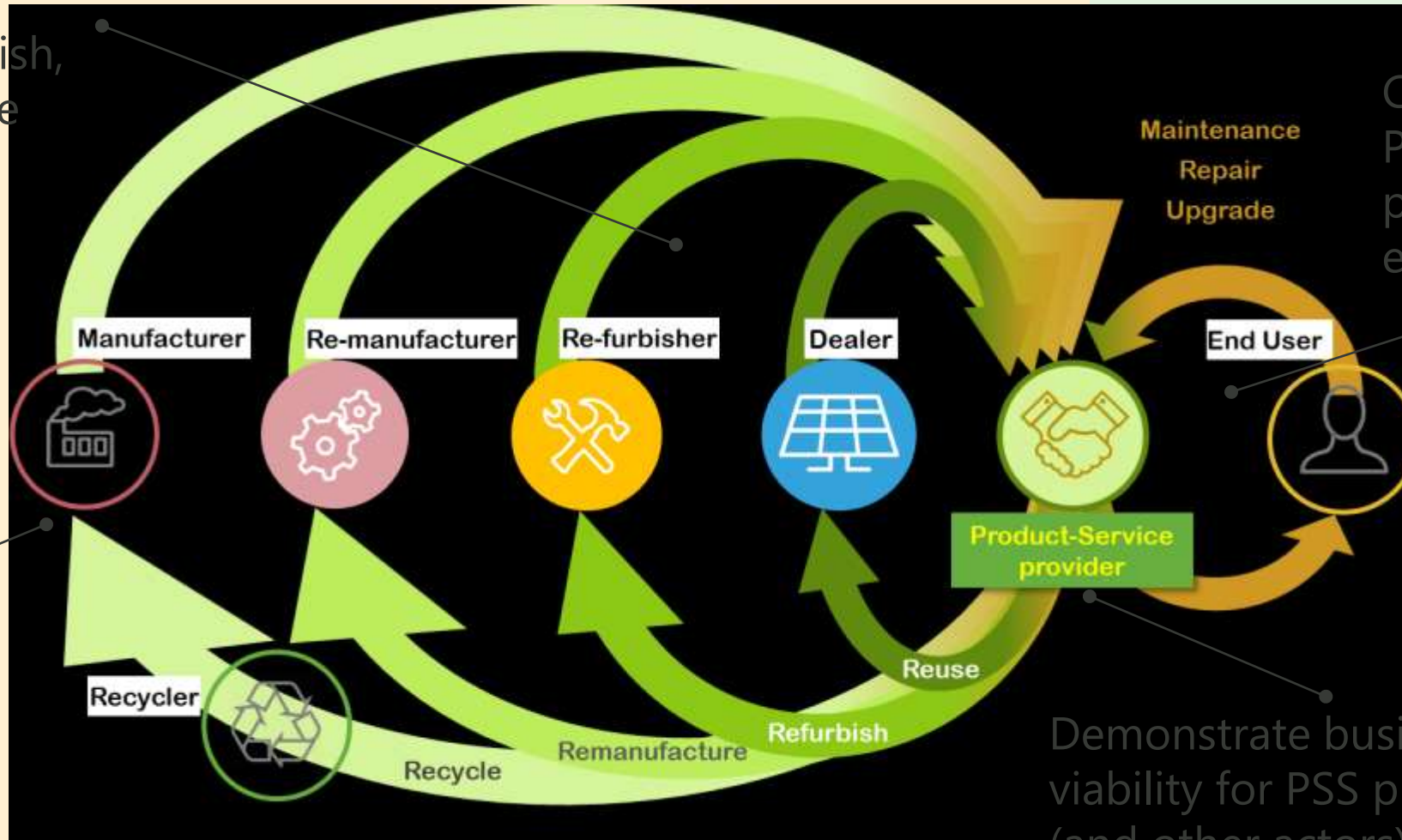
RECYCLING

Is the ultimate circular path;
But it should not be the only
and default path.

The most environmentally
friendly and economical paths
should be prioritized.



Develop "second-life" paths — re-use, refurbish, remanufacture



Incentivize "design for circularity"

Demonstrate business viability for PSS providers (and other actors)

Co-create solar PSS value propositions with end-users

Circular PSS Model = Circular Product Management + Value-added Product-Service

DELIVERABLES



5 real-life solar service demonstrators, providing triple-win evidence



Certification protocols for second-life PV and batteries



Circular service model & policy innovation toolset



Business cases for circular PV product design



Market segment

Cloverleaf

Storage-as-a-service,
Commercial



Waasland
Co-housing
Solar service,
Residential



SecondSun4grid
Energy management
service, Utility



ScalingPSS
Scaling process,
Residential



REScoop PV
Regional
replication,
Residential



Scale

Demonstrators

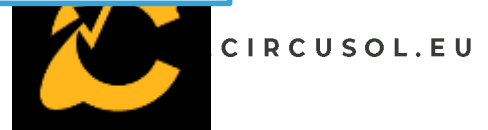
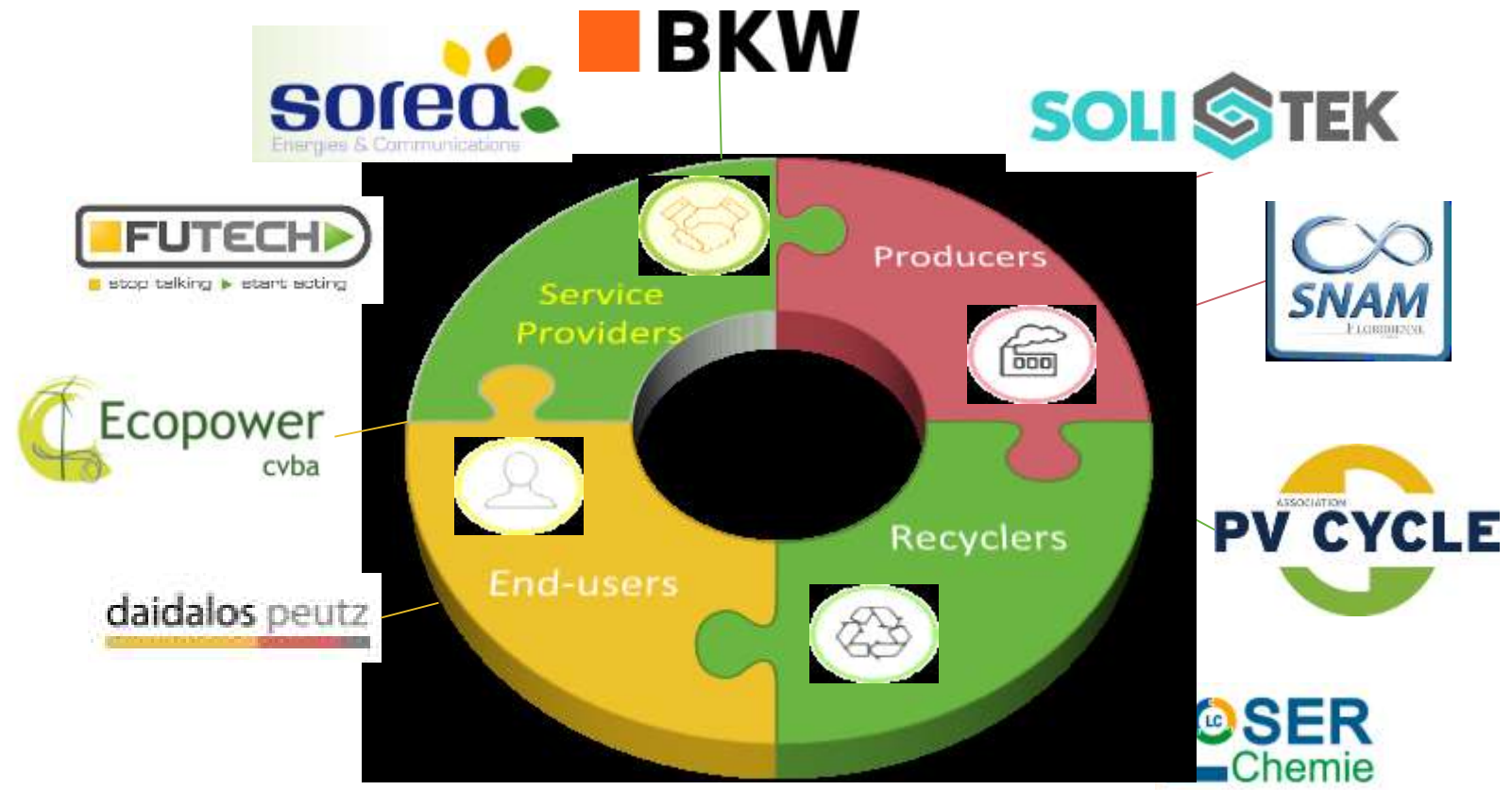
Cloverleaf, storage as a service

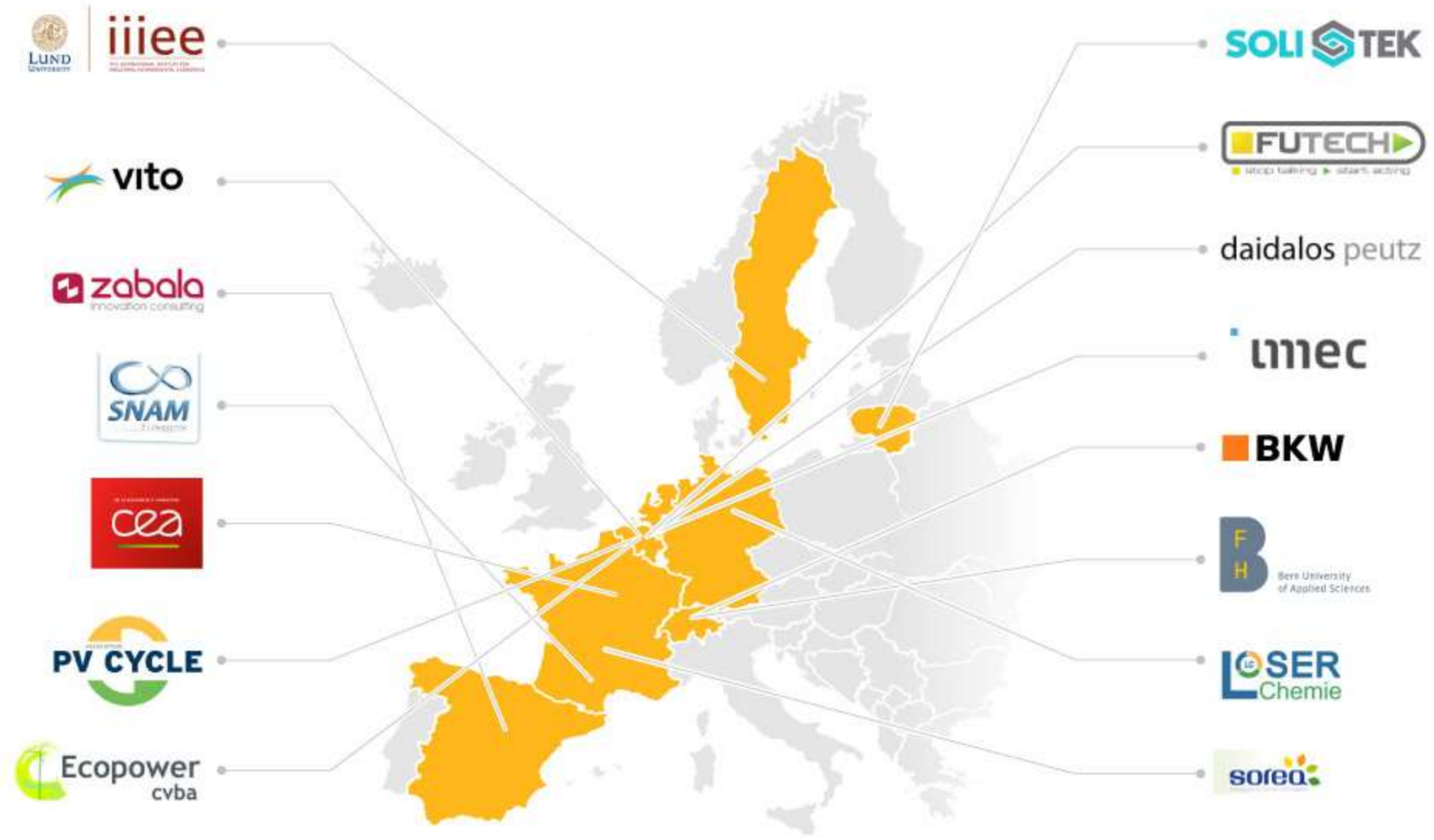


Waasland 2nd-life PV as service



Meet the partners







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You decide what interactions suit you best – Examples:

- Receive newsletters
- Participate in events
- Exchange knowledge
- Provide feedback
- Collaborate in implementation, dissemination or exploitation

Would you like to know more?
...maybe also take part in the innovation?

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