

What are the technical, regulatory and economical innovations required to foster storage projects development & deployment ?



SUN'R SMART ENERGY - WHO WE ARE AND HOW WE ACT



sun'R power

Solar PV assets developer & owner



Agrivoltaic plants developer and pilot



Storage projects & tech developer

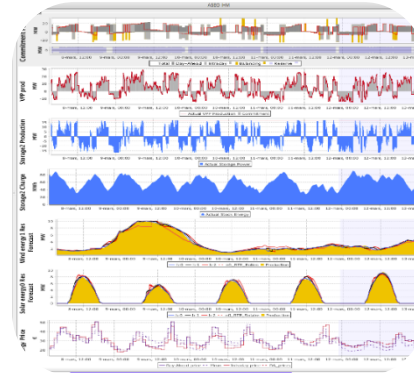
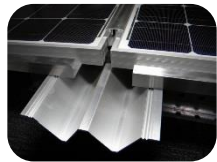
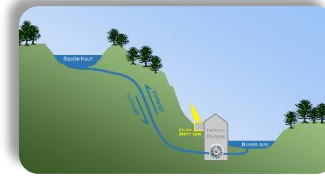
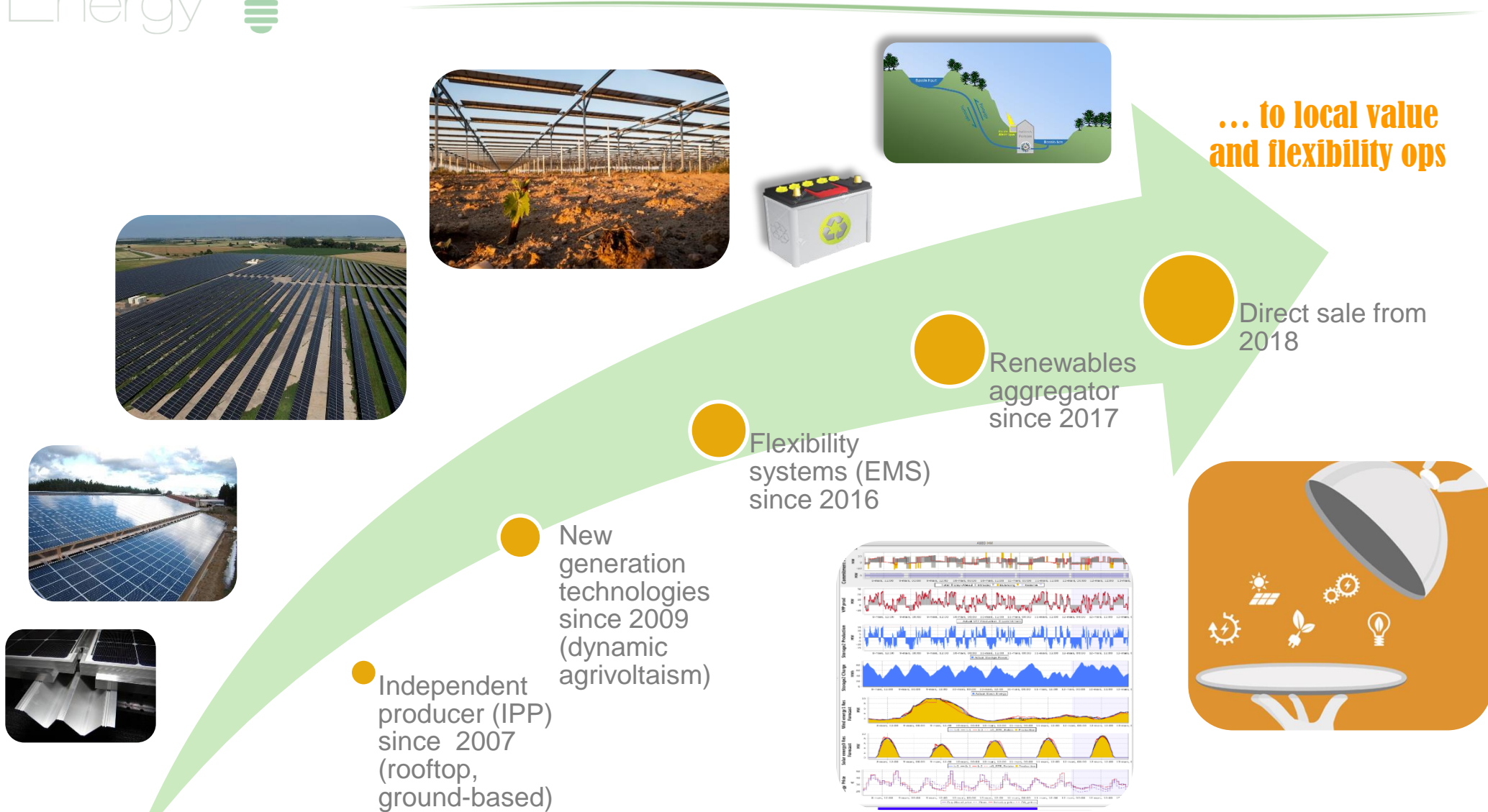
- ✓ Storage dedicated to RES integration
- ✓ Energy Management System
- ✓ Optimizing operational value

Full value-chain operator

- ✓ Renewable energy direct marketer
- ✓ Flexible asset manager
- ✓ Local renewable energy supplier

Sun'R trajectory

Technology incubator to fully integrate Renewables





Our vision of the value chain is a closed circle because money has to circulate the economy

Activations of Storage & Flexibility never follow the same program every day

Renewable Energy cannot be fully delivered to consumers at all time and needs to be stored

Store

Optimize

Combining multiple assets allows to mitigate risks

Agregate

Every quantum of energy generated has to be affected to a consumer only once and taking into account network operation

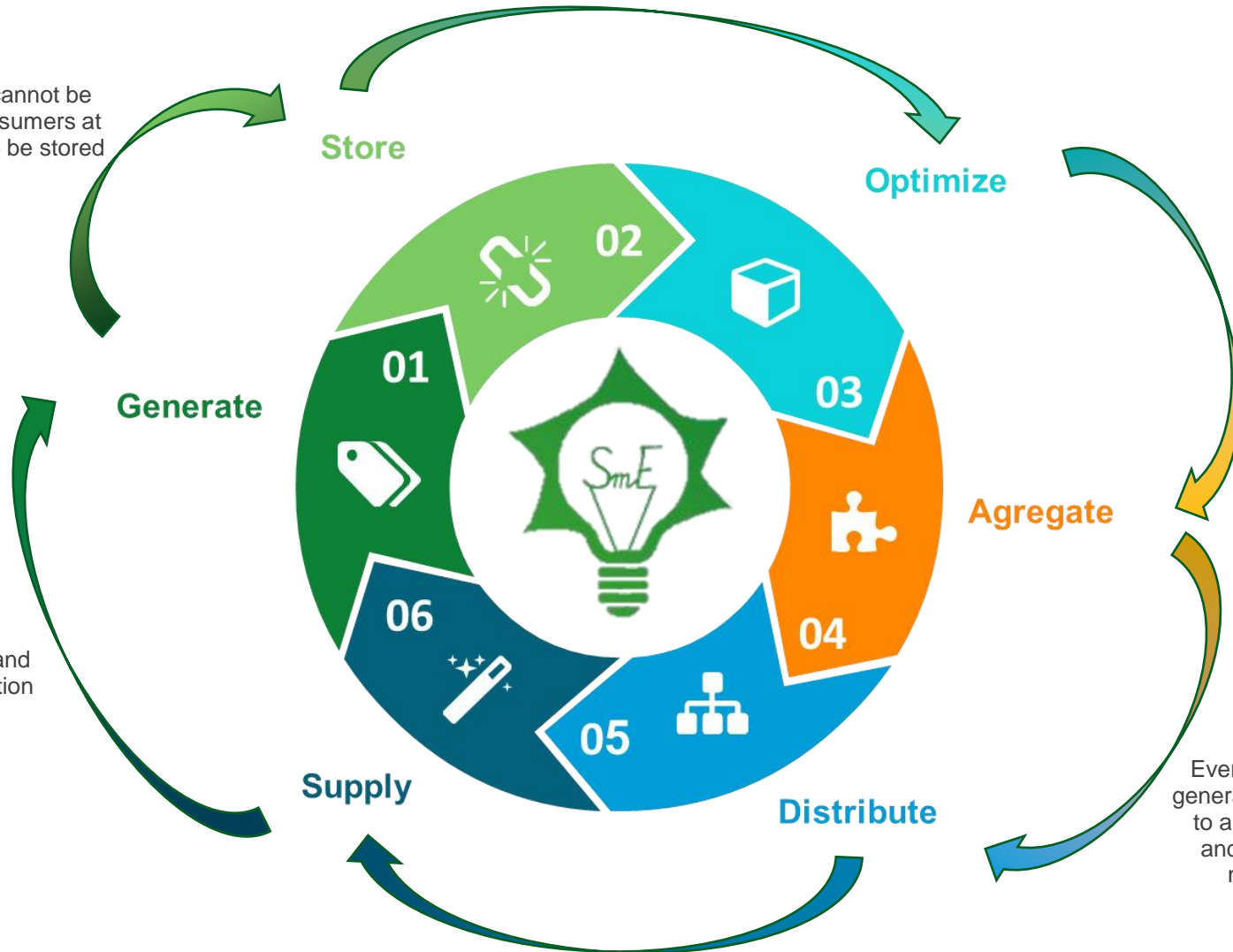
Consumers can, want and should invest in generation

Generate

Supply

Distribute

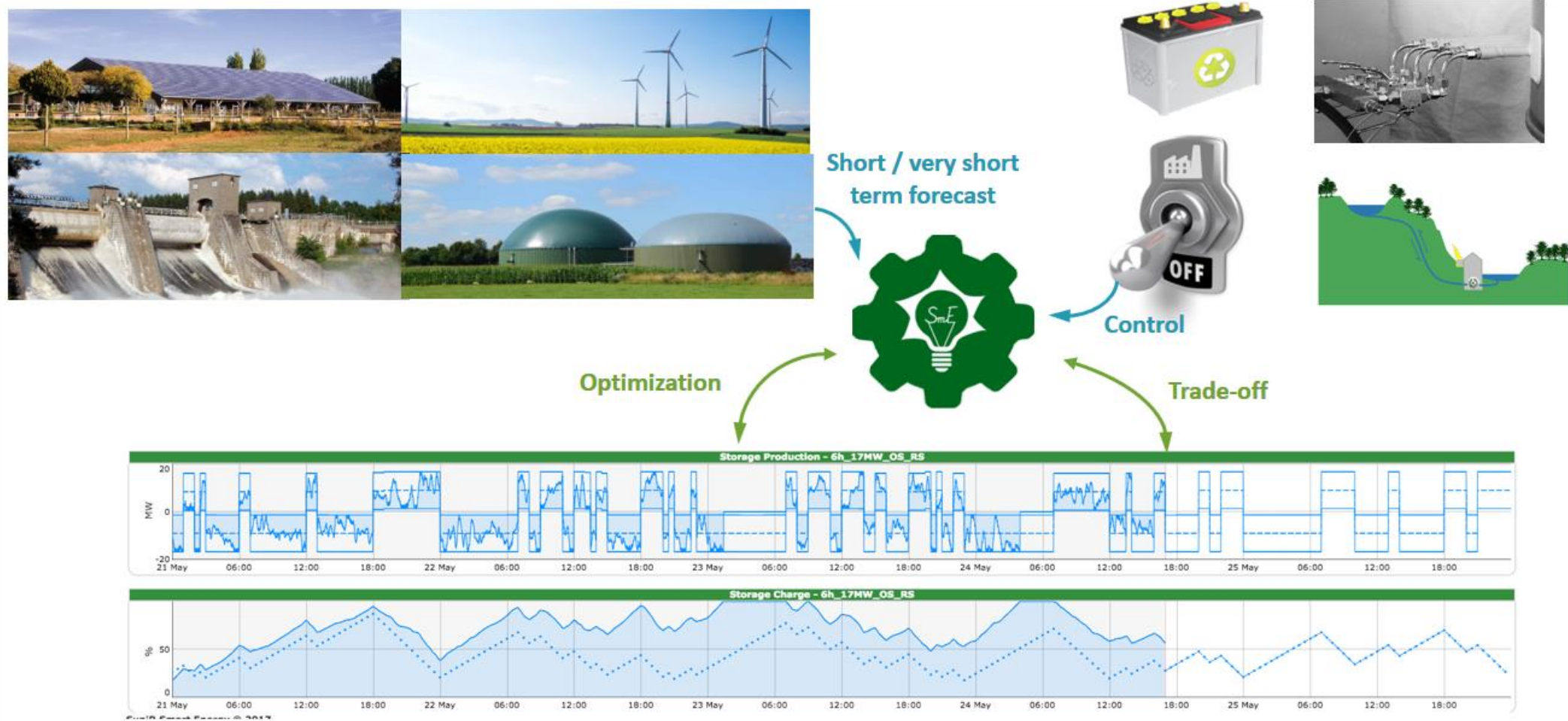
Energy consumed has to be invoiced with price signals incentivizing participation to the Energy transition



STORAGE IS A MUST HAVE OF THE ENERGY TRANSITION
BUT FIELD DEPLOYMENTS ARE STILL SCARCE

How will storage units create sustainable value ?

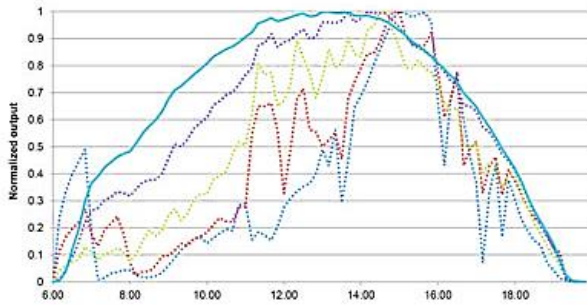
Couple with RES to supply energy & services to the system



How will storage units create sustainable value ?

Be suitable for a broad diversity of services

4 main technical challenges for storage



Dimensions & Dynamics parametered to mitigate intermittency



Fully integrate to the grid to facilitate network operation and defer investment



Capacity to provide any kind of product & service the system needs



Fulfill with environmental requirements to avoid wariness

Storage also faces regulatory challenges

Down to the definition, but value distribution is at stake

Define storage



- ▶ Often taken into account as both a generation & a consumption unit, storage is more than just that
- ▶ Hence, it is expected to be countercyclical

Prove the value of local storage for the distribution grid



- ▶ Analyzing the impact of storage on grid constraints requires advanced modelling but now is accessible
- ▶ The benefits should be measurable and the value be shared (Art. 199 LTECV)
- ▶ Even Transmission could benefit from “virtual lines” based on storage

Create a win-win business model for both storage and grid



- ▶ Assess the current and future techno-economic value of territorial storage
- ▶ One alternative could be to time-stamp GOs to differentiate time-value of RES generation and give storage the unique capacity to change this time-stamp

Make sure the appropriate price signals are sent by the markets



- ▶ Storage can capture value from different markets (arbitrage, balancing, capacity, etc.)
- ▶ Price signals must be coherent function-wise AND time-wise (short term vs long term)

Storage projects become storage units, but their business model is still very unstable

- ✓ The storage industry is still driven by demonstration of test & learn
- ✓ UK tenders have allowed many units to be installed, but revenues are decreasing after the first contracted period.
- ✓ Hence, in a very uncertain market, electrochemical batteries, with shorter payback, are strongly favored against pumped-hydro storage
- ✓ The need for storage, due to RES variability, is long term, so we have to find business models for long term infrastructure investments
- ✓ One economical tool has successfully been tested in Switzerland : contracts for difference based on spread & margin instead of revenues



Sun'R Smart Energy outlook for sustainable storage in the continental EU

- ✓ Together with European countries, France has to consider **decentralized and highly flexible storage units** deployment
- ✓ Small pumped hydro storage (PHS) provides a positive solution for **long lasting (> 40 years) needs**
 - ◆ Both for **technical needs** (supply & demand balance, frequency reserve, local network management, etc.)
 - ◆ And **economical challenges** (RES generation time-shifting to reach sales opportunities)
- ✓ It is a **reasonable risk** to invest in such storage units
- ✓ Yet, siting, dimensioning and operations management must be supported by **tailor-made modeling and decision making tools**



Relevance of storage

Where should it be localized ?

+ Strengths

- Weaknesses



Centralized storage

- ☺ Great capacity in a single unit

- ☹ Ignorance of local stakes
- ☹ Scarcity of suitable sites
- ☹ Requires grid development
- ☹ Public investment



Vicinity storage

- ☺ Capacity mutualization
- ☺ Local issues management
- ☺ Investments optimization
- ☺ Repossession of the energy topic
- ☺ Joint investment

- ☹ Complexity of a new matter



On site storage

- ☺ Individual investment
- ☺ (Self-consumption)

- ☹ Global overinvestment
- ☹ No mutualization
- ☹ If not a real islanding with permanent uncoupling, self consumption raises the question of grid financing

**THANK YOU
FOR YOUR
ATTENTION**



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