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ENERGY STORAGE

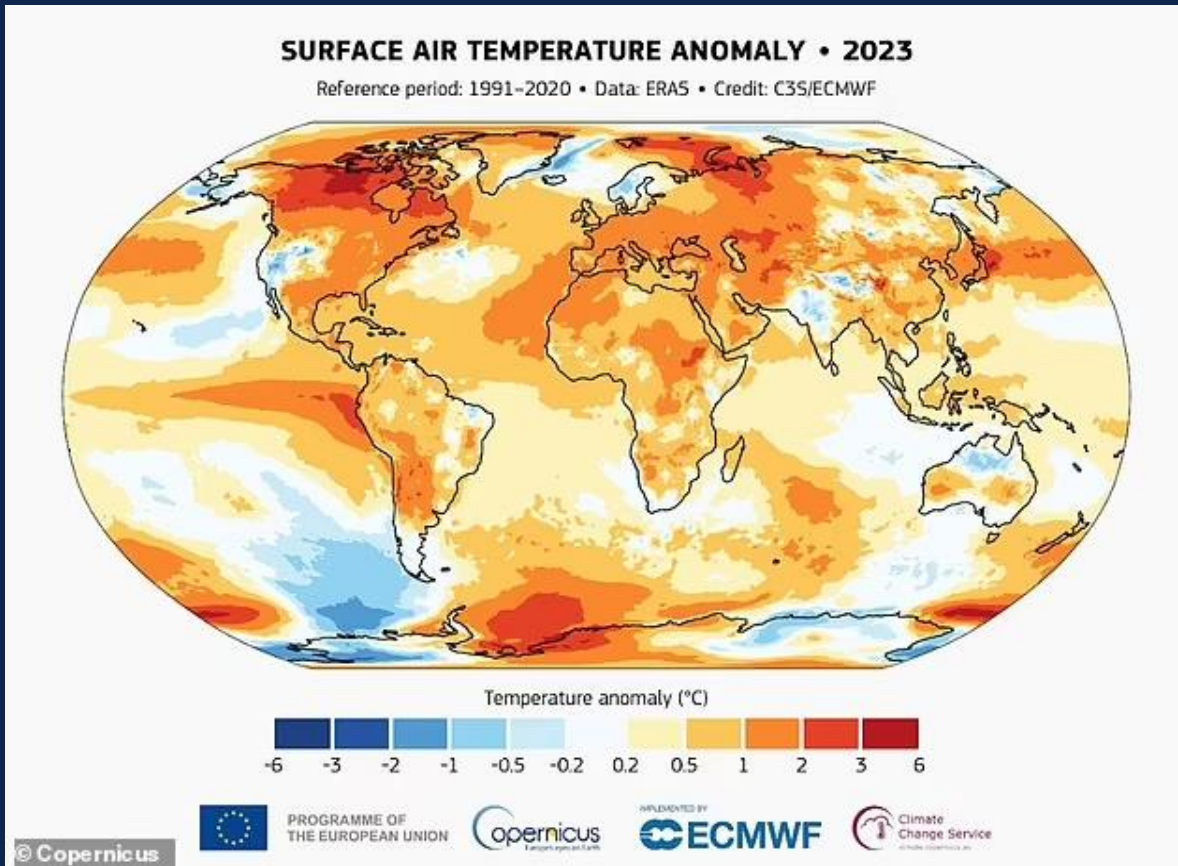
**Massive Energy Storage based on the Carnot Battery technology**

*Let's speed-up the Energy transition*

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# 2023 - Officially the hottest year on RECORD



**“The evidence is irrefutable:  
greenhouse gas emissions are choking  
our planet & placing billions of people  
in danger.”**

Antonio Guterres – UN General Secretary

**“Every ton of CO<sub>2</sub> adds to global  
warning”<sup>(1)</sup>**

**Energy Transition must accelerate  
NOW to achieve carbon neutrality**

(1) IPCC 2023: Sections in: Climate change 2023: Synthesis Report

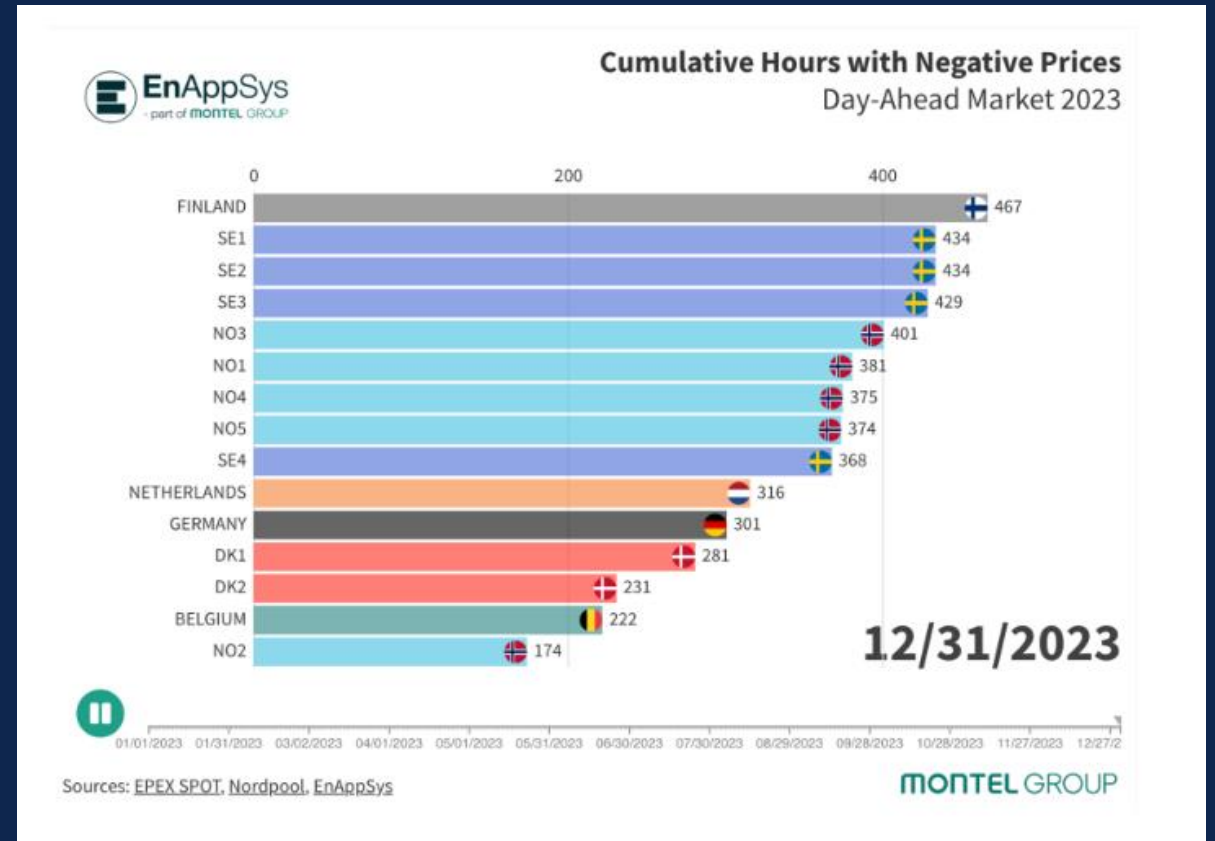
# Energy Transition

## Strong alignments around:

- Renewable Energies: Solar, Wind, Hydro, Biomass
- Nuclear: Existing Fleet Life-Time Extension as well as New Program
- Sobriety and Energetic Performance
- No more fossil fuels for electricity Generation to come from 2025 or 2030 or 2040 or 2050

### Our vision:

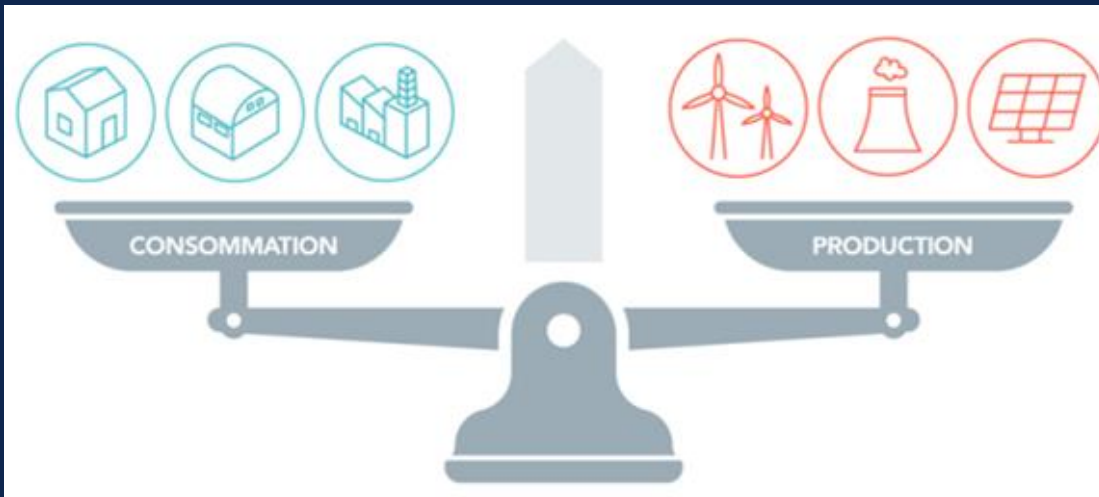
Energy transition will not be solved by Green Energy Generation only.  
Storage and Flex are key at all levels for Consumers, Grid and Generation.



# Energy issues

**Problem n°1 :**  
**Integrating intermittent green  
energies into the grid**

A QUESTION OF BALANCE

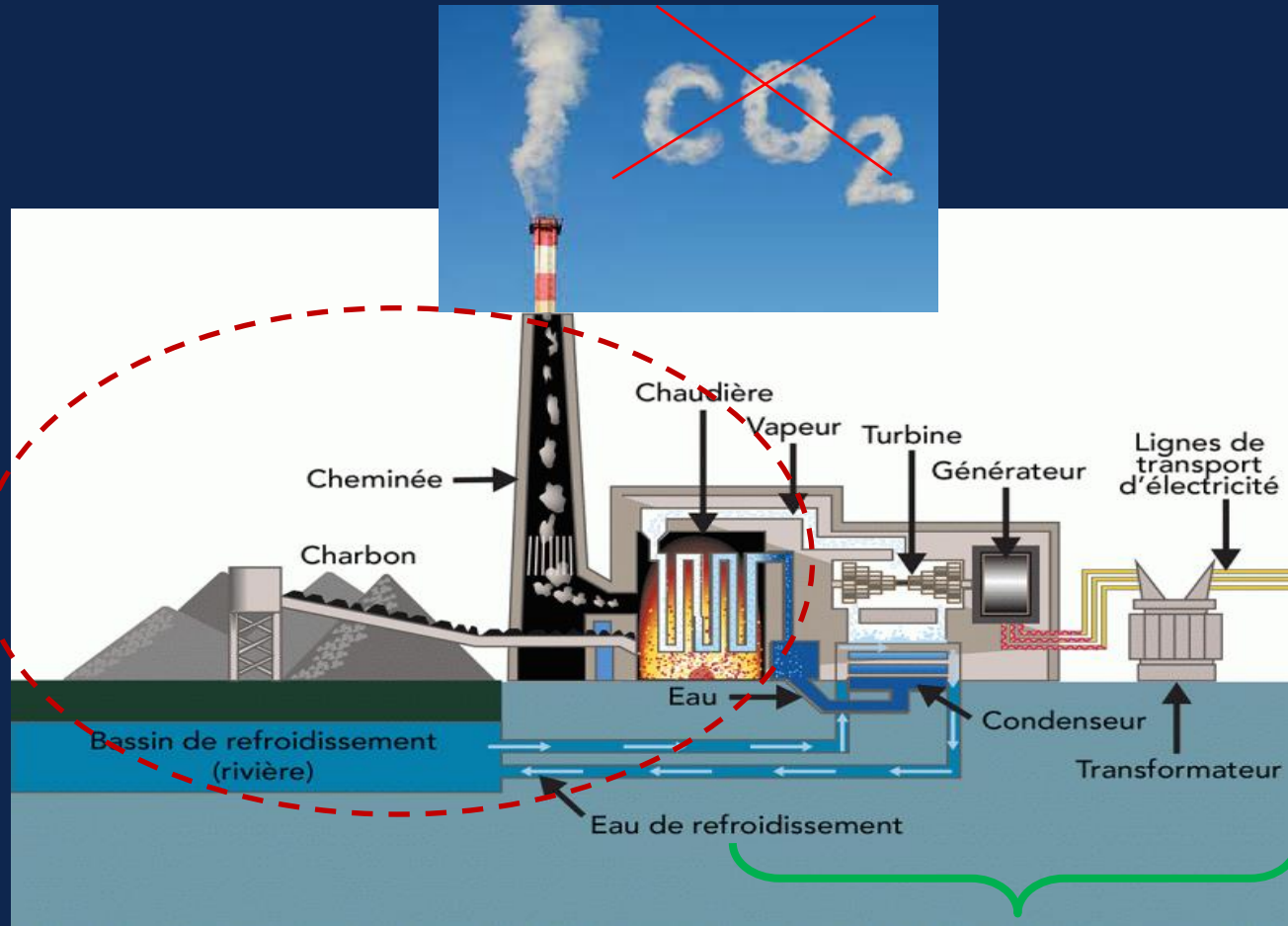


**Problem n°2 :**  
**Necessary dismantling of coal  
power plants**



Grid Balance required at all times  $\pm 1\%$ .

# Storabelle Re-Purposing



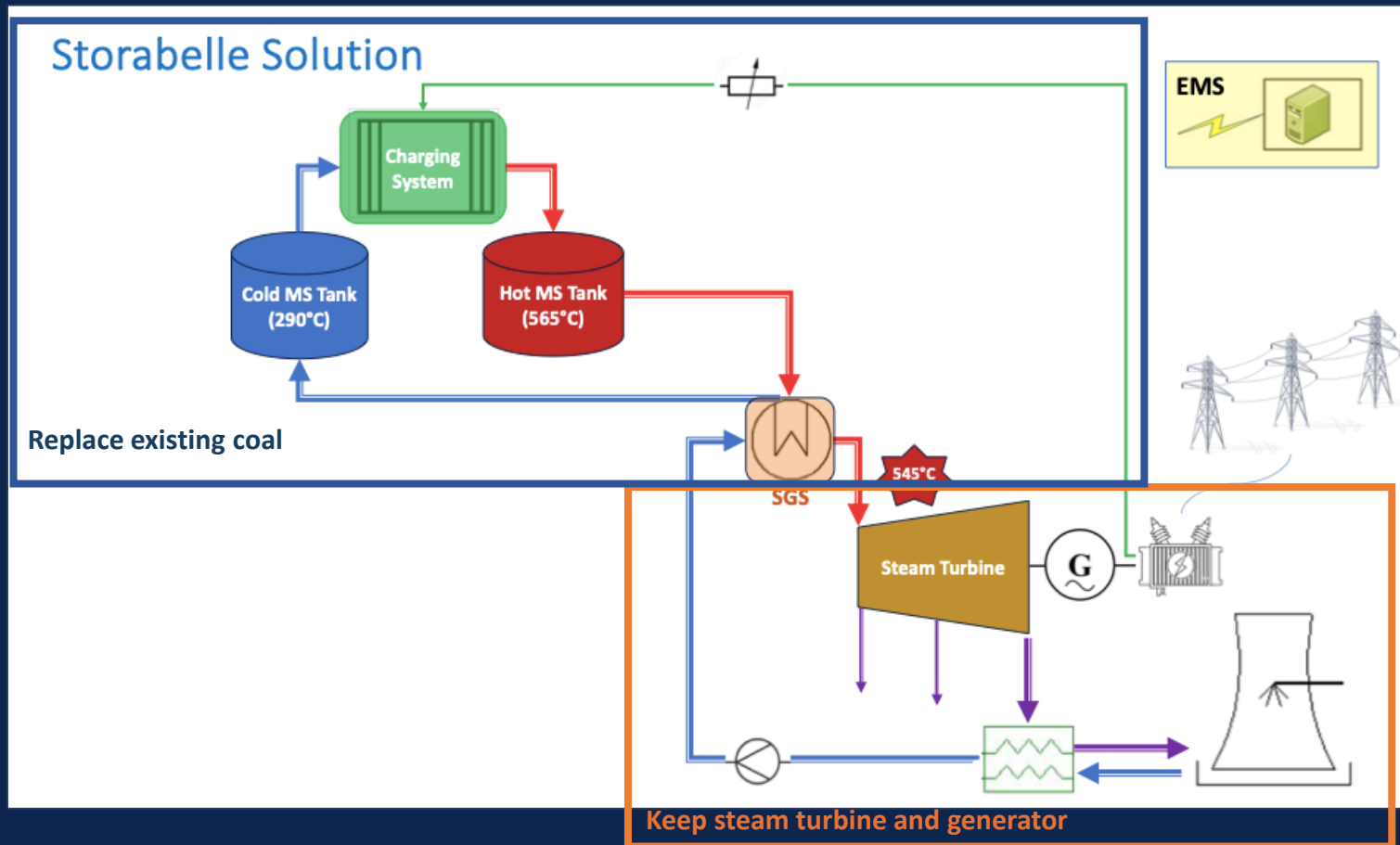
Accelerate the energy transition by converting CO<sub>2</sub>-intensive power plants into clean energy storage/production facilities.



Decommissioning

Repurposing

# Storabelle is the global solution for Grid-scale Long Duration Energy Storage (LDES)

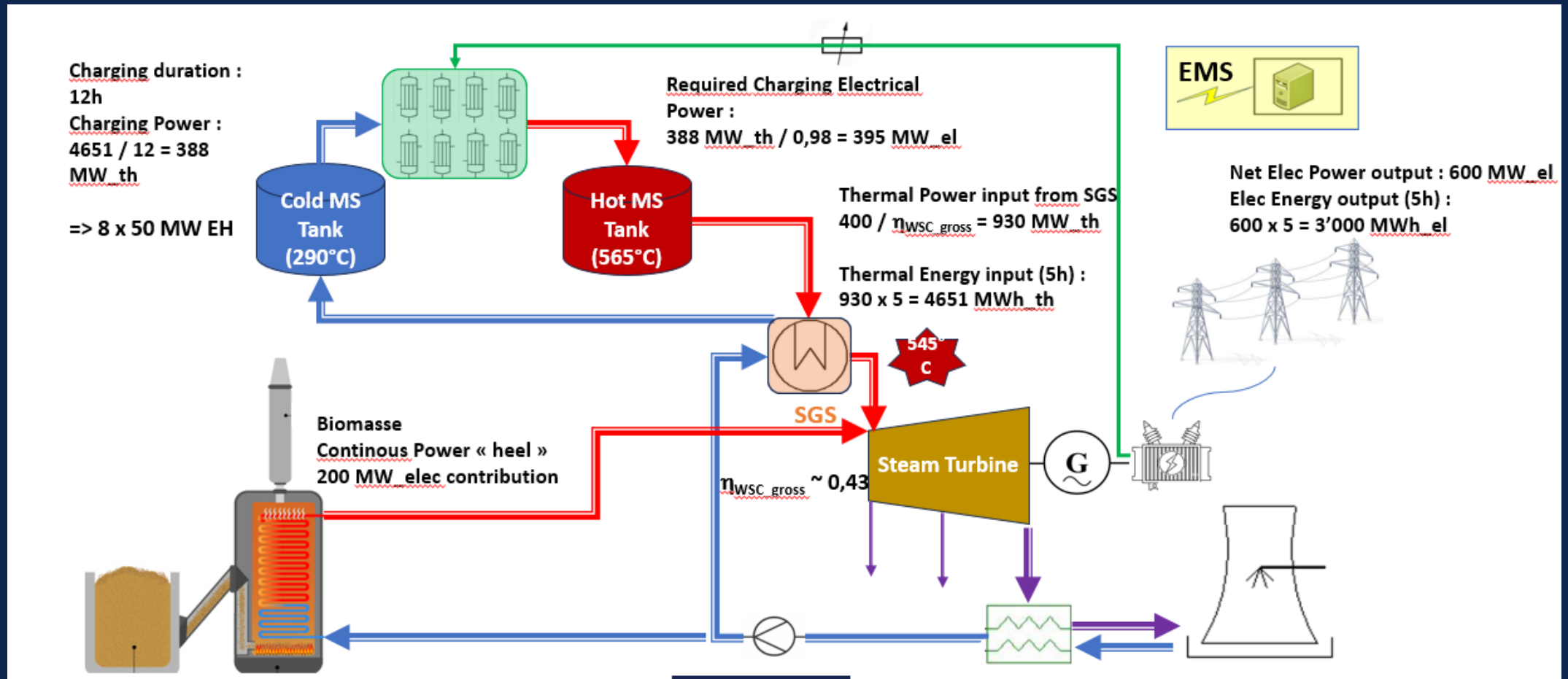


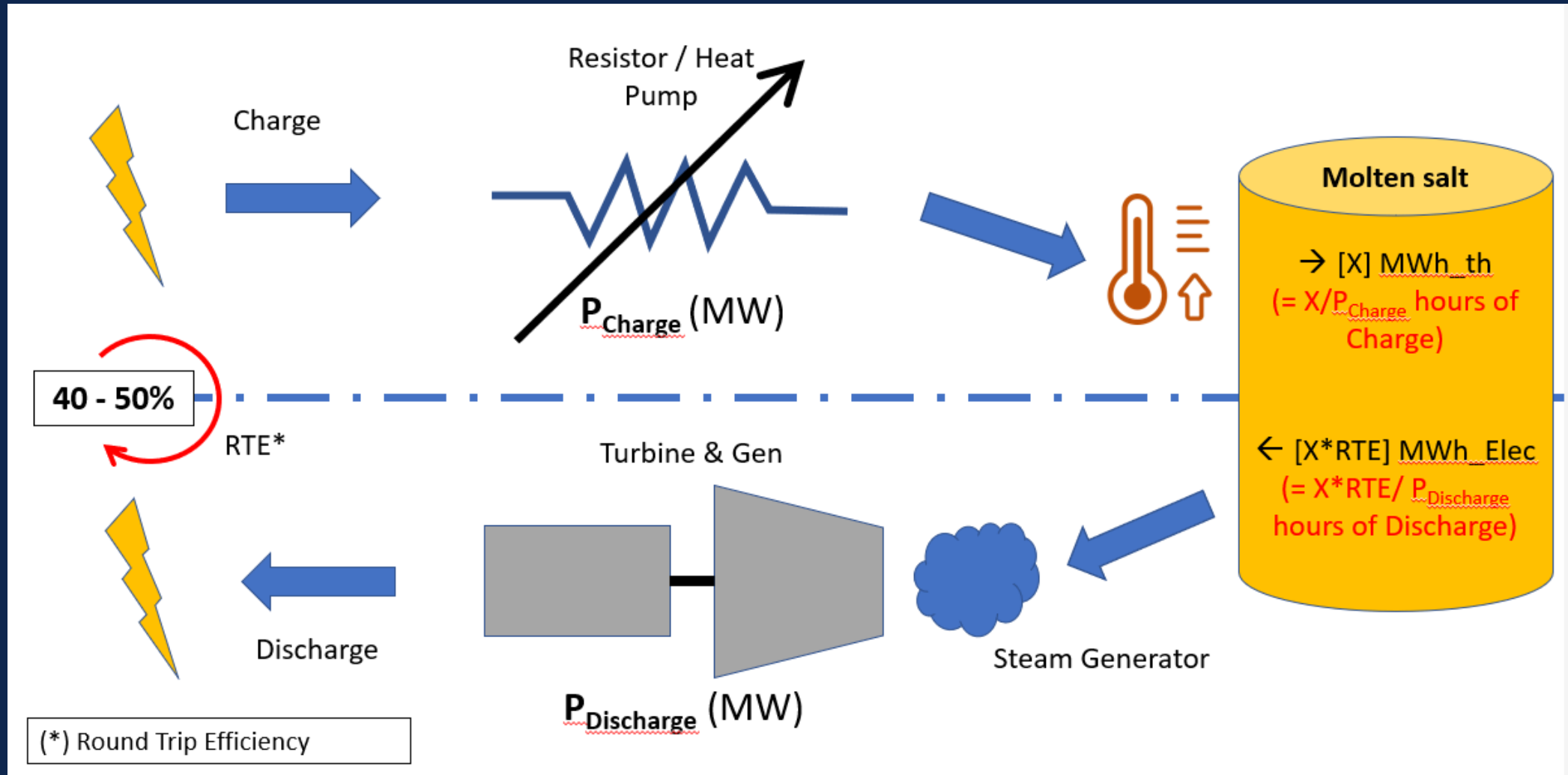
**Repurposing  
of steam plants**

**Molten Salt  
technology**



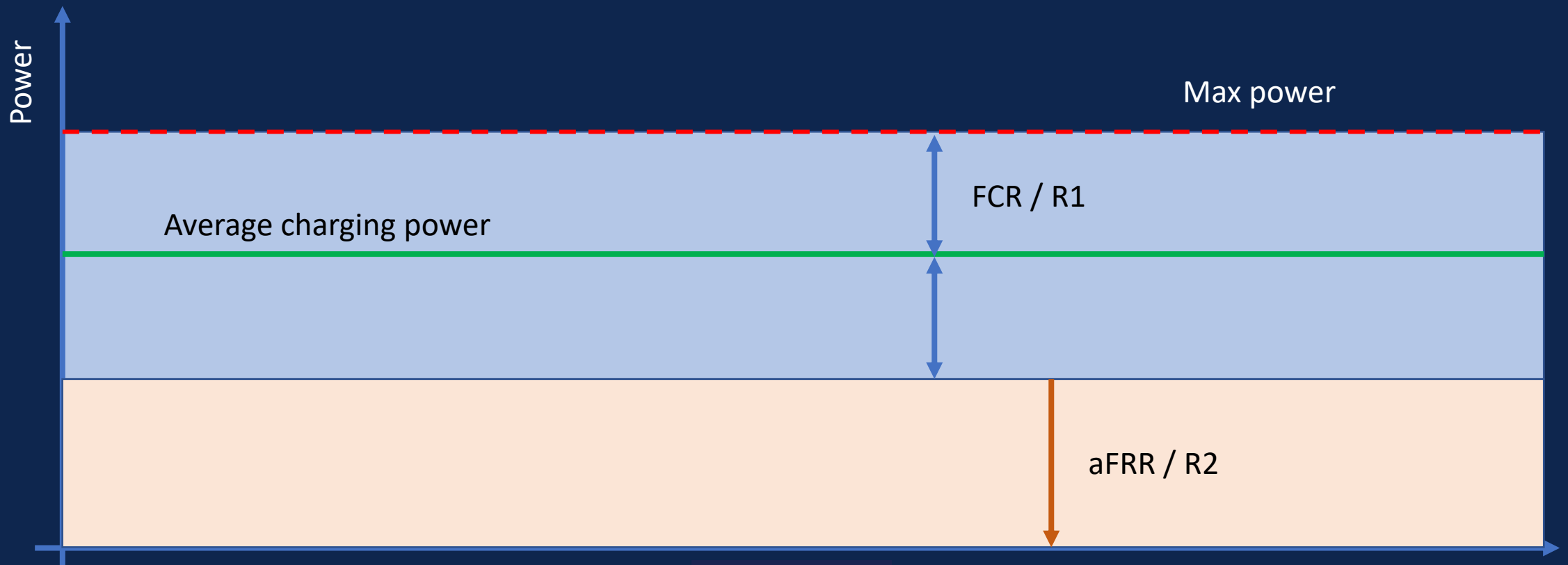
# Storabelle alternative : Charging duty made by Electrical Heaters + Biomass boiler





# Charge → Grid services

- Electrical Heater = resistors. Power electronics → modulation

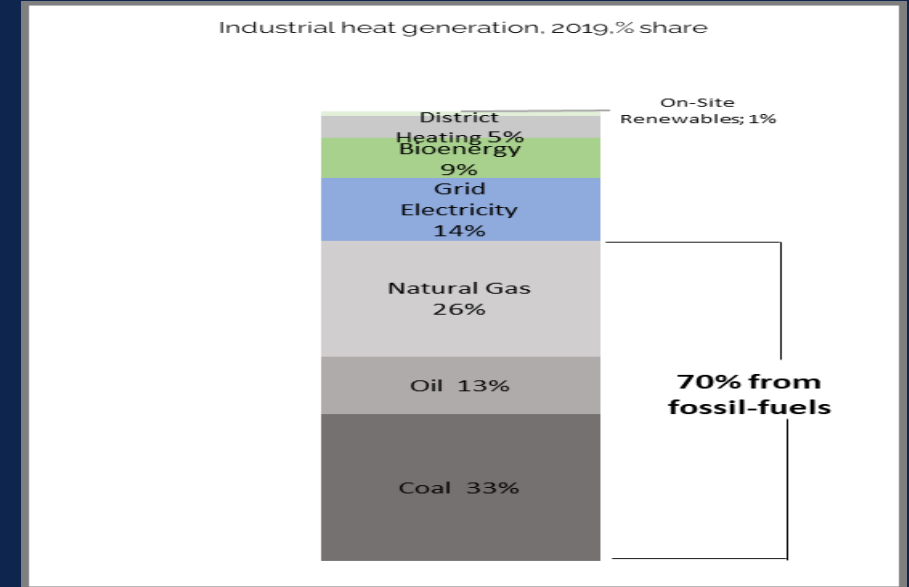
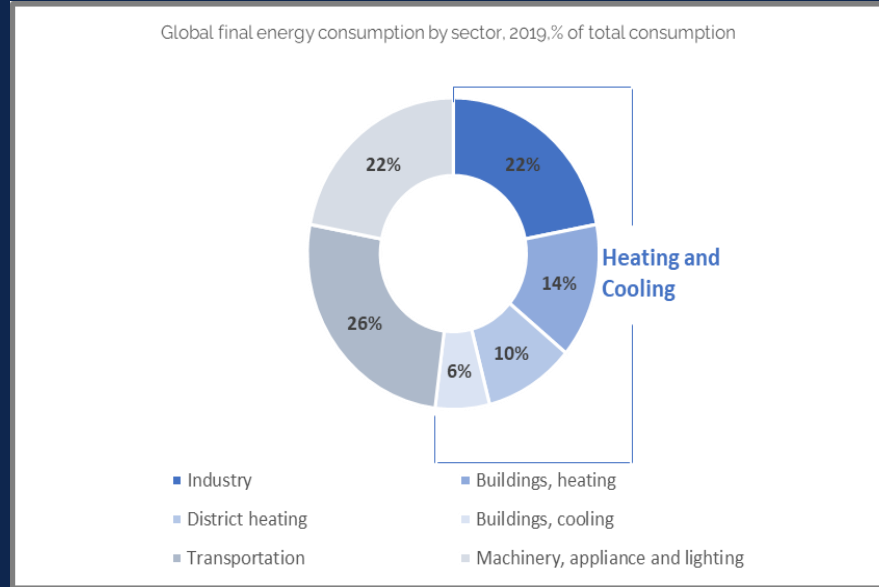


# Business Model

- ❑ New type of **Grid-Scale storage**, new partner for Grid managers. Similarities with PHES\*.
- ❑ Ability to **absorb the fluctuation in RE production** as well as in consumption (EV Charging Station, etc.) and therefore **limit the need for peaker plants**.
- ❑ Business Model including a **combination of Capacity** (MW), Grid Services (FCR, aFRR, mFRR, RR), **Arbitrage** (MWh), and **Hedging**.
- ❑ **Low marginal-cost electricity** (PPA and/or SPOT and/or RE overproduction...) is **converted into thermal energy** in the charging cycle, stored, and then **further reinjected into the Grid** when economically relevant.
- ❑ Revenue is generated by **stacking various value pools**:
  - Intrinsic value:
    - Capacity (MECAPA)
    - Grid services (FCR, aFRR, mFRR, RR)
    - Price arbitrage (SPOT – Intra Day)
  - Extrinsic Value (Derivative Products)
- ❑ **Storabelle** may be a source of **regulatory innovation**.
- ❑ **“Green 24/7 PPA”, “Green 24/7 Heat & Electricity as a Service”**

# Market Opportunity 2: Decarbonization of the industry

- ❑ Heating and cooling account for **+50% of global final energy consumption**
- ❑ **70%** of industrial heat is generated by fossil fuels source, accounting for **20%** of global energy-related CO<sub>2</sub> emissions



## Potential Industrial Markets



Refinery, Chemical and petrochemical



Iron and steel



Paper, pulp and print



Non-metallic minerals



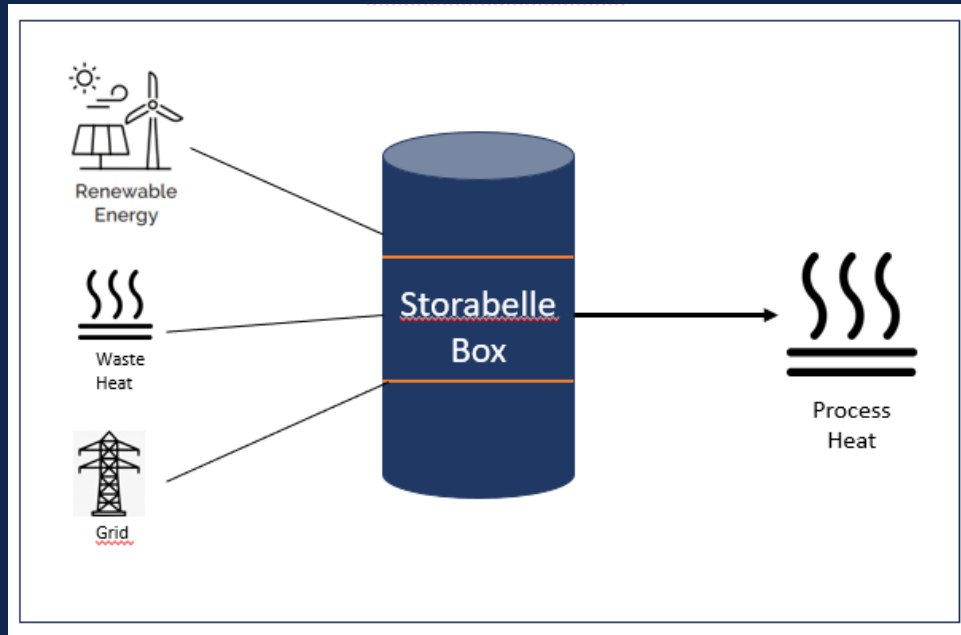
Food & beverage



Non-ferrous metals

# Market Opportunity 2: Decarbonization of the industry

## Our Solution: Storabelle Box



Thermal Battery with proven molten salt technology  
Steam temperature range: from 150 to 600°C

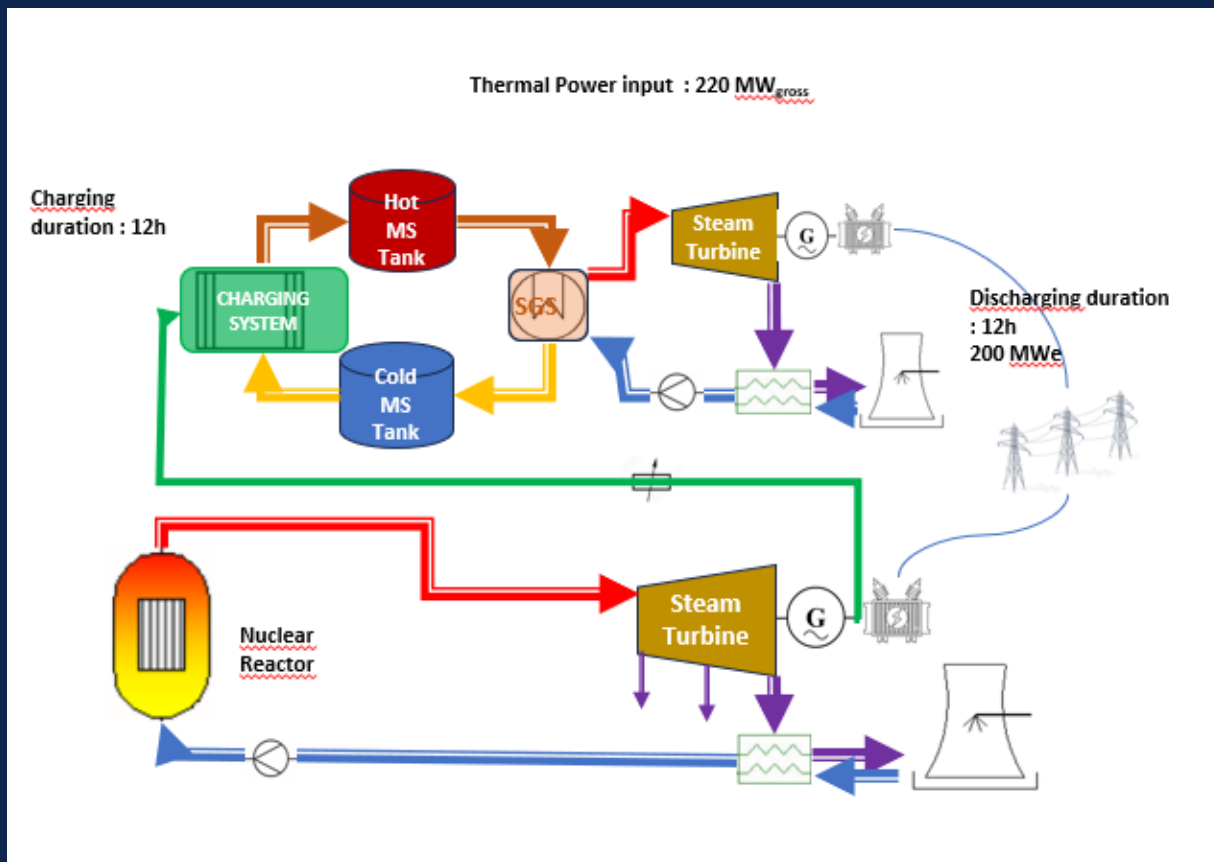
Reduce the CO<sub>2</sub> emission for process heat  
generation at competitive price

Reduce energy cost by taking advantage of off-peak  
electricity price

Safe - no risk of fire

Eco-friendly - molten salt is recyclable  
Storabelle box is cobalt/nickel free

# Market Opportunity 3: Reducing nuclear modulation to support the development of renewable energies



In France, priority is given to the production of Renewable Energies.

The modulation of the global production has to be done by the Nuclear Reactors.

Frequent modulation is **detrimental to the longevity of the nuclear plants** as well as for the **Maintenance and Operational costs**.

To keep the Nuclear Plants at their base load, Storabelle offers to add their technology to the existing plants.

The principle is to **store** the extra nuclear electricity (when the Renewables are predominant) and use it to heat Storabelle's molten salts. When the Renewable energies return low, the heat contained in Storabelle's batteries is used to create steam and thus electricity from a new turbine/generator plant.

Storabelle will provide the complete solution, from the capture to the discharge (inc. turbine, generator, transformers, etc...)

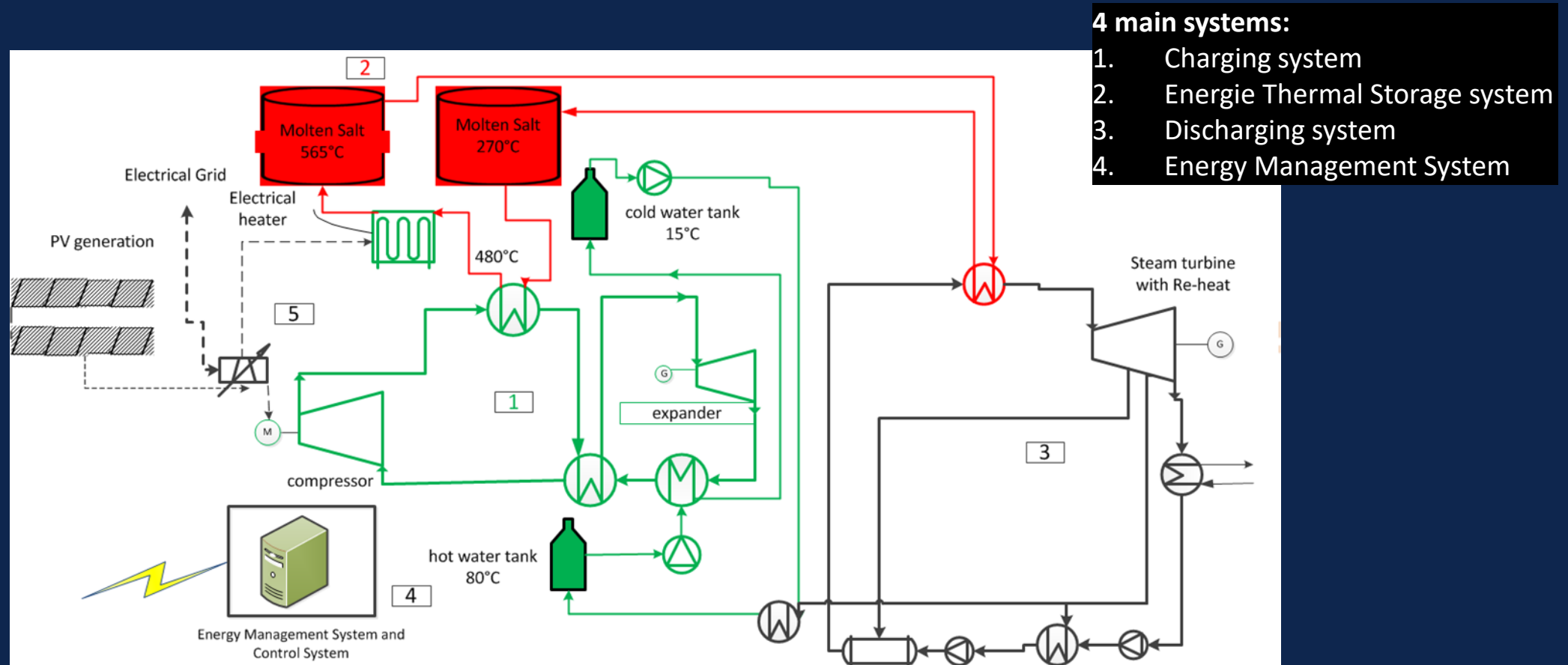
# Market Opportunity 4: PV with Storage *(BTM)*



- ✓ 24h/day, 365 day green electricity where high global but not direct radiation
- ✓ Dramatic decrease in PV costs compensates efficiency penalty
- ✓ Combining off-the-shelf technologies
- ✓ 12h storage may increase PV penetration from 30 to 80% - 90%
- ✓ Cost of electricity competitive with conventional plants
- ✓ Cost of electricity far better than using Li-Ion batteries
- ✓ 800m x 800m PV =>  $\pm 1\text{TWh/an}$  (115 MW 24/7)

*J.M. Gordon, Th. Fasquelle,... Providing large-scale electricity demand with photovoltaics and molten salt storage  
Renewable and Sustainable Energy Reviews, 2020, 10.1016/j.rser.2020.110261.hal-03030834*

# Market Opportunity 4: AMSES Experience



# The Team



*Frédéric*



*Pierre-Jérôme*



*Gilbert*



*Marc*



*François*



*Michael*



*David*

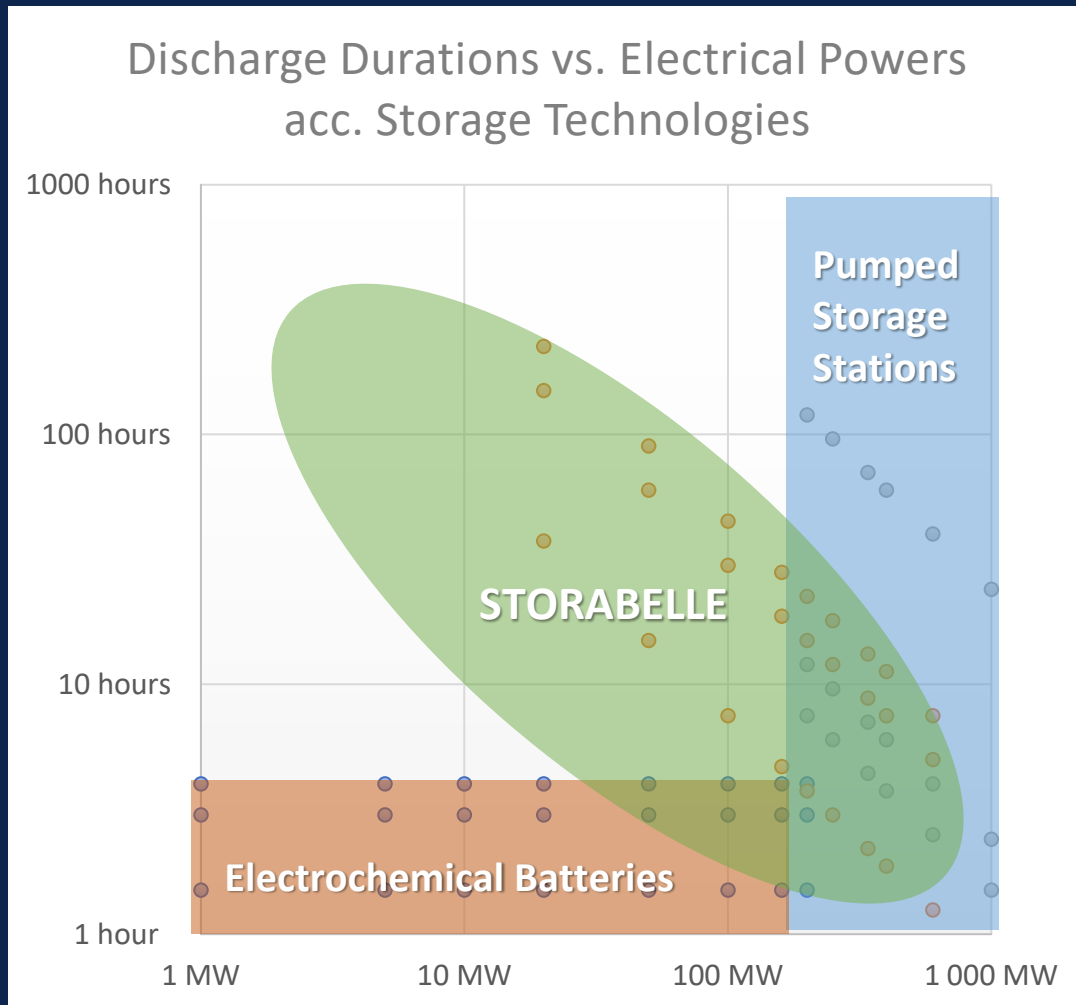


Decades of experience in the energy sector  
Extensive international network

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# Storabelle positionning



**High Capacity**  
**Long Duration Energy Storage**

➤ **50 MW to 600 MW**

➤ **From 4 hours to > 100 hours**

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# R&D Program



The Storabelle solution is immediately available to meet the 2030 decarbonization objectives... but we are investing heavily in R&D to accelerate the energy transition.

High power/High  
T°C Electrical  
Charging System  
(ECS)

Proprietary  
Integrated Energy  
Management  
System (EMS)

Innovative and  
reliable storage  
system



3 Patents with CEA

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# Storabelle Business Model *Future revenue streams*

## Revenue stream #1 Conversion of Asset *EPC / EPCM*

- ❑ **Phase 1: FEED studies + EPCM** for the Repurposing of the Plant  
*Plant integration & automation services for ST, Gen, BOP, DCS,...*
- ❑ **Phase 2: FEED studies + EPCM + EPC** for the Repurposing of the Plant

## Revenue stream #2 Energy Management System *Smart Trading / Arbitrage*

- ❑ **SaaS for charge/discharge management of Storabelle modules** including grid & market opportunities, availability, etc.
- ❑ Storabelle will partner with a utility company with trading capabilities
- ❑ **Yearly fee** based on gross margin generated from Asset.

## Revenue stream #3 O&M and other services

- ❑ **O&M and related services**, SGS, Salt...
- ❑ Supply of Molten Salt on Storabelle specs (IP under development with the CEA) and Services: Reloading, Recovery, Reprocessing,...

## Revenue stream #4 Storabelle equity venture

- ❑ **Revenue stream of the Asset owner**
- ❑ **Development, Acquisition of Thermal Power Generation assets, Repurposing, O&M, Asset Management within our own SPVs**

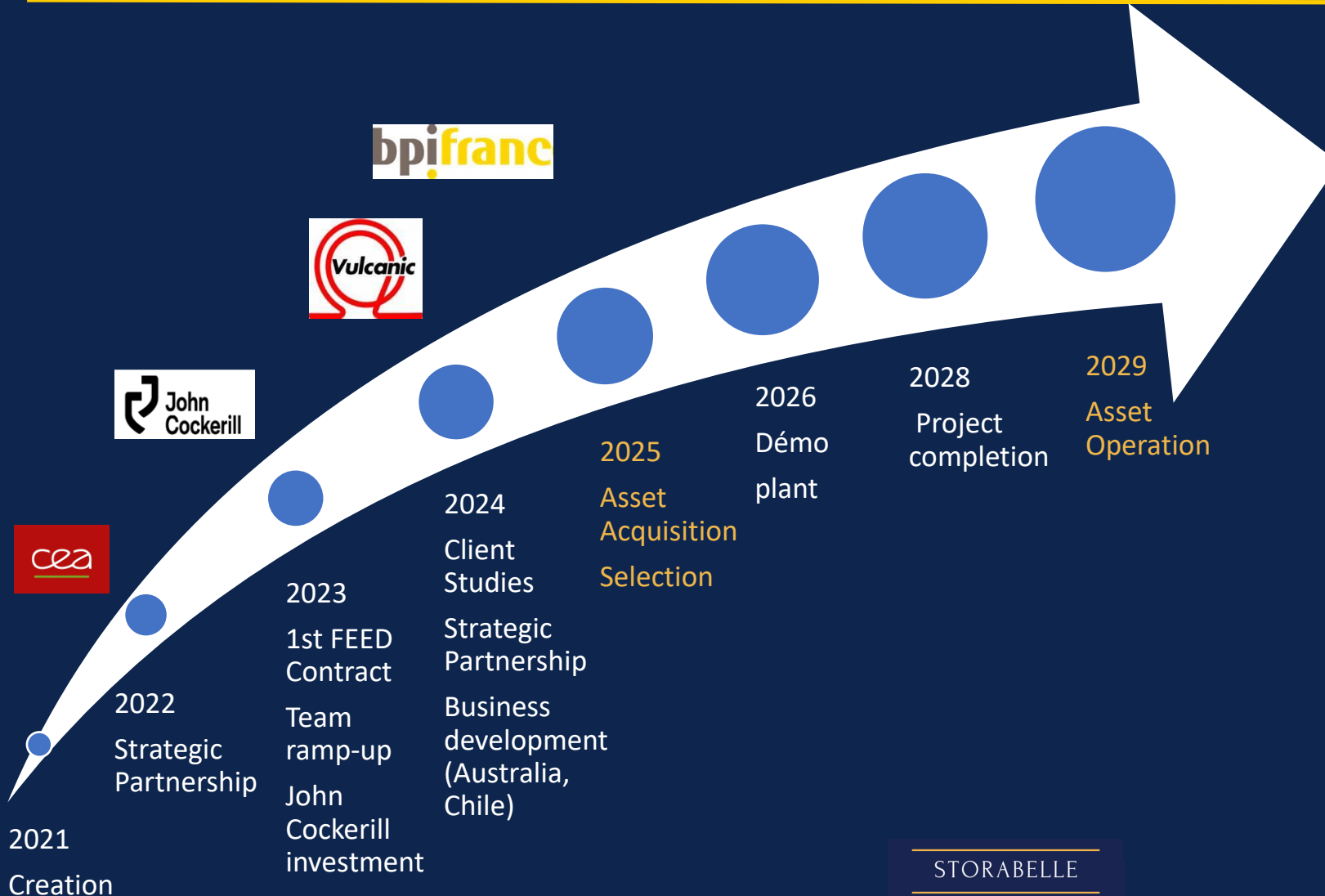
## Our 2040 vision:

**1) Install 20 storage assets** within 10 countries: EU, America, Asia,.. Representing **4GW / 50GWh**

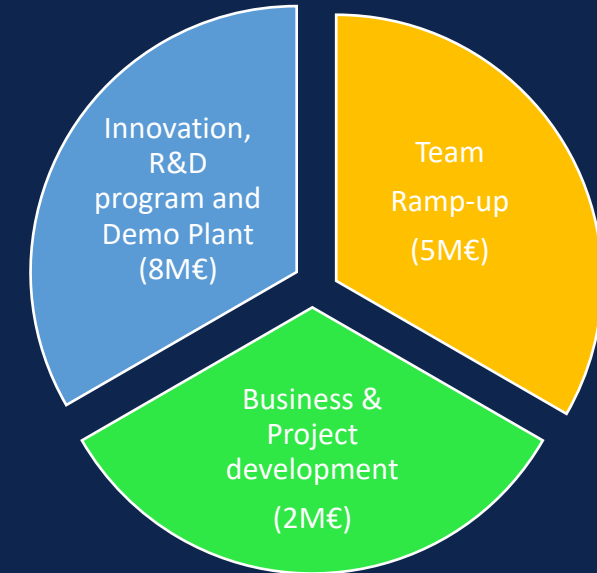
**2) Own & Operate 10** (out of the 20) storage assets which we have developed, acquired, and repurposed 1,5GW / 20GWh.

**Green 24/7 Heat & Electricity as a Service**

# Fund Raising



**15 M€** to speed-up the Energy Transition  
**2,25 M€** already secured.



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Let's speed up energy transition !

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# Our solution is ready for market, safe, ecological and reliable

## Molten Salt Technology

- ❑ Proven and reliable solution: CSP
- ❑ Highest Technology Readiness Level (TRL 9)
- ❑ Safe with no explosion and no combustion risk
- ❑ No supply chain or sovereignty risks
- ❑ Recyclable as fertilizer



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# Advantages of Storabelle solution

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- ✓ Fast permitting
- ✓ Cost effective
- ✓ Sovereignty
- ✓ Ready for market
- ✓ Scalable
- ✓ Safe

# Environmental and Social Impact



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