TEESMAT®

OITB Workshop
Brussels, April 2nd 2019

1- What is TEESMAT and why?

TEESMAT :

an open innovation Test bed for Electrochemical Energy Storage MATerials

- The European battery market is expected to increase by a factor of 4 to 10 by 2025 (250B€)
- The development of a competitive battery value chain in Europe is one of the top priorities of the European Commission.
- **Progress of electrochemical energy storage devices (EESD) depends on characterization and understanding of all basic processes**.

➔Access to **advanced characterisation solutions** enables industry to apply a knowledge-based approach, which is essential to **accelerate innovation and reduce the cost of technologies**.

Objectives of TEESMAT

TEESMAT aims to bring a comprehensive response to these critical bottlenecks faced by EU stakeholders in the field of electrochemical energy storage materials.

Overall objective:

To lower the barriers of access to industrially relevant, novel problem-solving techniques and services, including characterization and data analytics for large and small companies.

The **three core objectives of TEESMAT** are:

OBJECTIVE #1 - To set-up an **Open Innovation Test Bed** (OITB) to provide effective, centrally managed access to advanced materials' characterization, modelling and data informatics;

OBJECTIVE #2 - To demonstrate the OITB's added value by solving persistent, high-impact industrial problems;

OBJECTIVE #3 - To ensure the OITB's growth, longevity, financial sustainability and stakeholder support.

3- How does it work?

30 types of novel characterization techniques enable multi-scale and multi-modal assessment of:

1- the **Material Nature** (intrinsic properties)
and
2- the **Material Performance** (components, cell level)

3- How does it work?

Industrial Challenges & Needs are organized as **five pillars** under which materials characterization activities will be carried out independently:

- **Production process**
- **Performance** (at beginning of life)
- **Durability**
- **Safety**
- **Standards & Regulations** (S&R)

Novel techniques for assessing **Material Nature & Performance** will be developed and provided in ***four common approaches***

Material properties

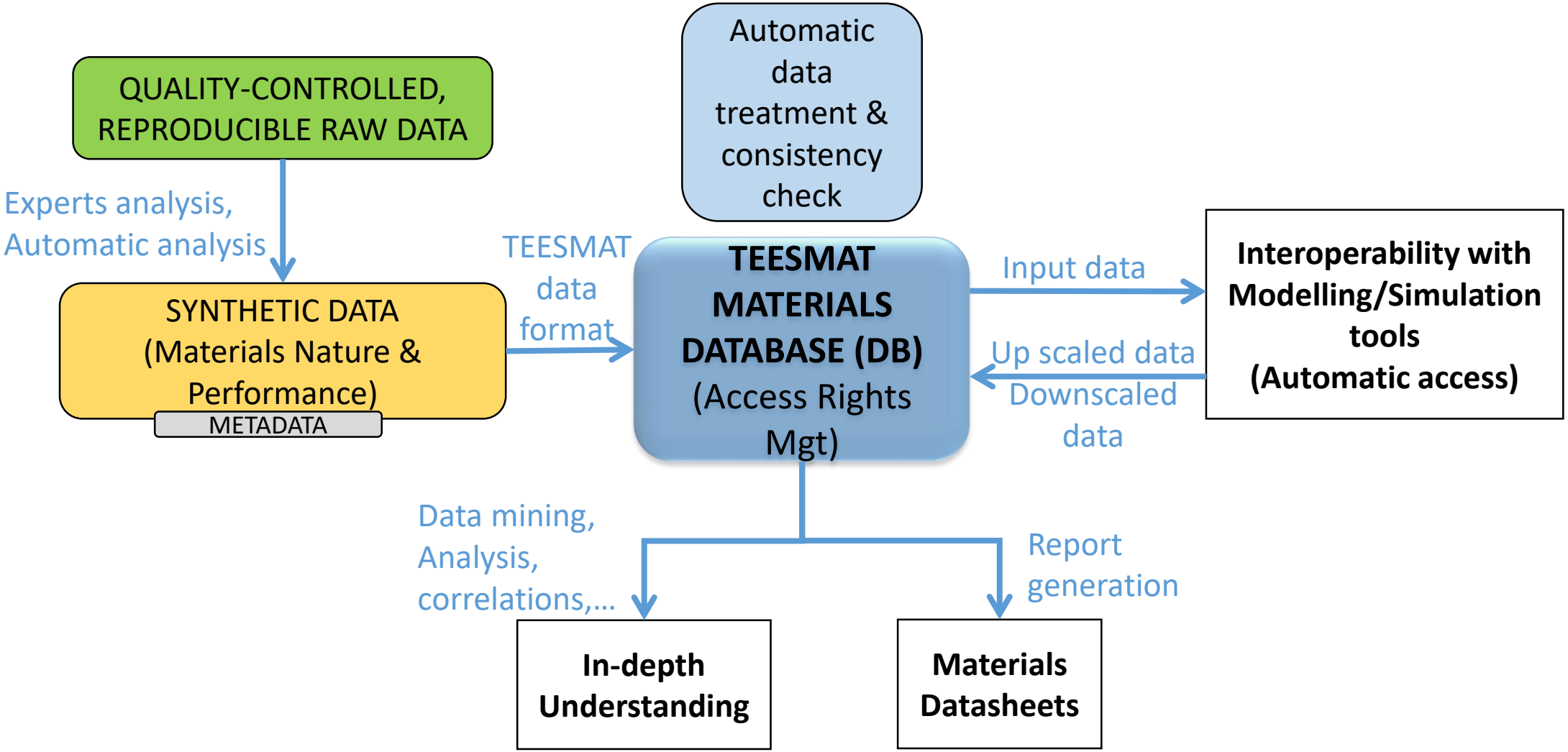
Material functionalities

Material in operando

Material after operation

(normal or abusive)

… link to TEESMAT material database



SERMA

legal entity & Single-Entry-Point of the testbed

Collaborative Framework Agreement for the testbed

Secondary Agreements between SERMA and SPs

Service Planning Tool

Single Entry Point (SEP)

Standard Operating Procedure (SOP)

Material Transfer Agreements

European Commission

INDUSTRIAL CHALLENGES & NEEDS: Production process / Performance / Durability / Safety / Standards & Regulations

Problem-solving regarding

Materials Performance

Processability

Electrical capability

Chemical stability

Thermal stability

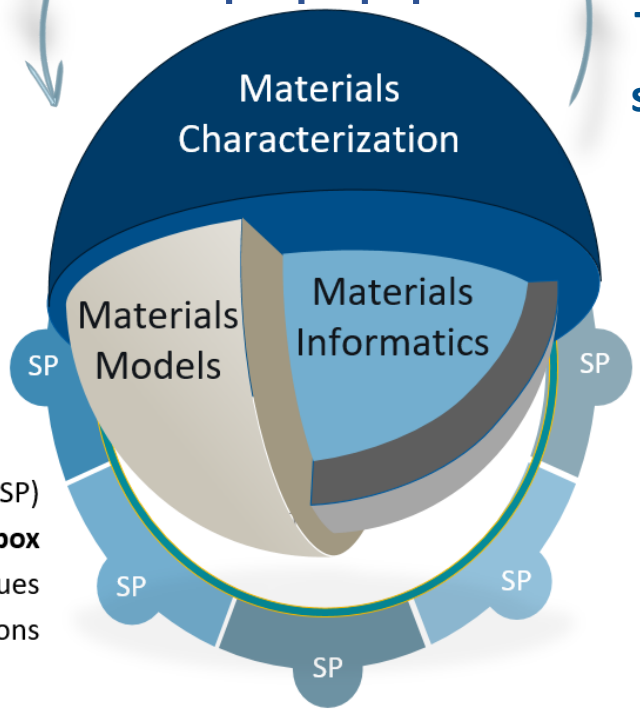
Physical integrity

Hybrid (multi-modal)

SUs Needs

Samples

Feedback



Testbed services

Service Providers (SP)

Service Toolbox

30 types of novel techniques

Modelling/simulation add-ons

Problem-solving via

Insight into Materials Nature

Chemical (3D)

Electrochemical

Thermal

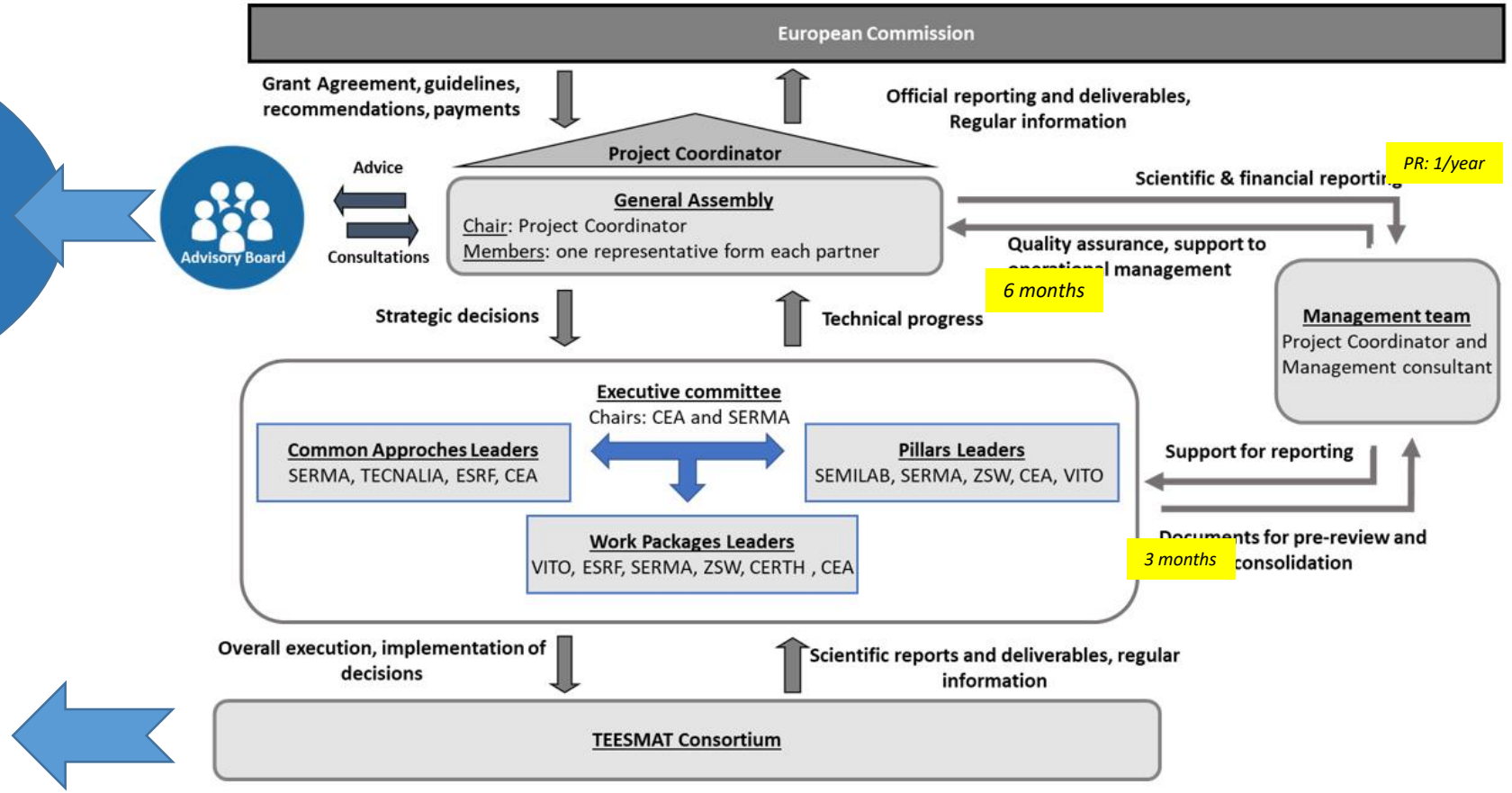
Structural (3D)

Mechanical (3D)

Hybrid (multi-modal)

Management structure & plans for networking

- EMMC, EMCC
- EIT RawMaterials
- Recharge Batteries
- H2020 NFFA Europe
- EMIRI



- Newsletter
- Website
- Single Entry Point
- Service Planning Tool
- Database
- Summerschool project

What we expect for the future…

Battery market is > 25B€. However, only a tiny part will be dedicated to characterizations.

We estimate that TEESMAT platform could sell 800 services in year 5 after the project by the Single Entry-Point and carried out by the linked SPs.

		M42+ 1Y	M42+ 2Y	M42+ 3Y	M42+ 4Y	M42+ 5Y
Sales	Sales forecast - number of services sold (problem-solving, access to workflows & models)	267	342	437	590	800
	Annual % increase in services sold		(+28%)	(+28%)	(+35%)	(+35%)
	Average selling price in k€ (with +5% yearly	24.3	25.5	26.8	28.1	29.5
Revenues	OITB Annual Revenues in M€	6,5	8,7	11,7	16,6	23,6
	OITB Cumulative revenues in M€	6,5	15,2	26,9	43,5	67,1
OPEX & CAPEX	OPEX in M€	3,0	3,9	5,1	7,1	9,8
	CAPEX Investments in M€ (based on 20 SPs in Y1)	1,3	1,7	2,3	3,3	4,7
Profits	OITB Annual Profit in M€	2,2	3,0	4,2	6,2	9,1
	OITB Cumulative Profit in M€	2,2	5,2	9,5	15,6	24,7
	OITB Profit as % of total revenues	34%	35%	36%	37%	38%
Job creation	**Total OITB Hiring projections (Full Time Equivalents)**	**5,4**	**6,9**	**8,8**	**11,9**	**16,1**

2 main advantages to be demonstrated by the end of the project:

➔Lowering characterization cost via standard procedures (competitiveness of platform)

➔Accelerating delivery time for characterization techniques.

Thank you for your attention

Questions ?