



ARKEMA

Kynar® PVDF Li-ion Battery Applications

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Arkema at a glance

WE ARE INNOVATION DRIVEN

- **8,7 billion** revenue in 2019
- **20,500** talents
- Presence in **55** countries
- **15** R&D centers on 3 continents
(Europe, Americas et Asia)
- **1,600** researchers, **60** R&D partnerships
- **222** patents filed in 2019, 67% relating to sustainable development issues



Our world is changing fast, accelerating demand for new materials



Future of mobility Urbanization Environment Industry 4.0 Consumer demand

Lightweighting

Insulation

Wind, solar, hydrogen

3D printing

Personalized designs

Durability

Energy efficiency

Water treatment

Miniaturization

Performance

Batteries

Modular construction

Renewable resources

Smart devices

Sustainability

Arkema Materials in the world of Battery

Inside the Cell

Outside the Cell



Raw material
Refining



Active
materials



Cell
production



Module & Pack
Production



Vehicle
Integration



Recycle

ALBONE®

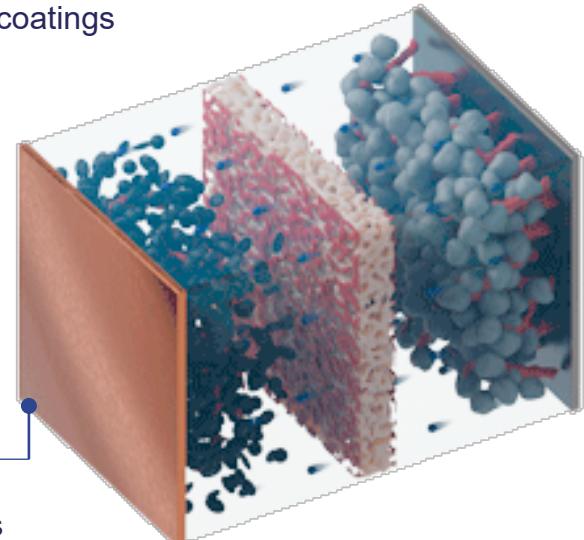
Purification of Ni

ARRMAZ

Li Collectors

KYNAR®

PVDF Binder & Separator
coatings



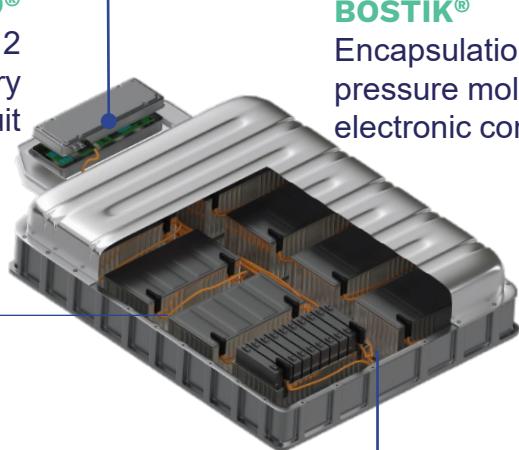
FORANEXT®
Ultra Pure LiFSi Salt

INCELLION™

New Anode Binders
Rheology Additives

**RILSAN® &
RILSAMID®**

PA11 & PA12
for battery
cooling circuit



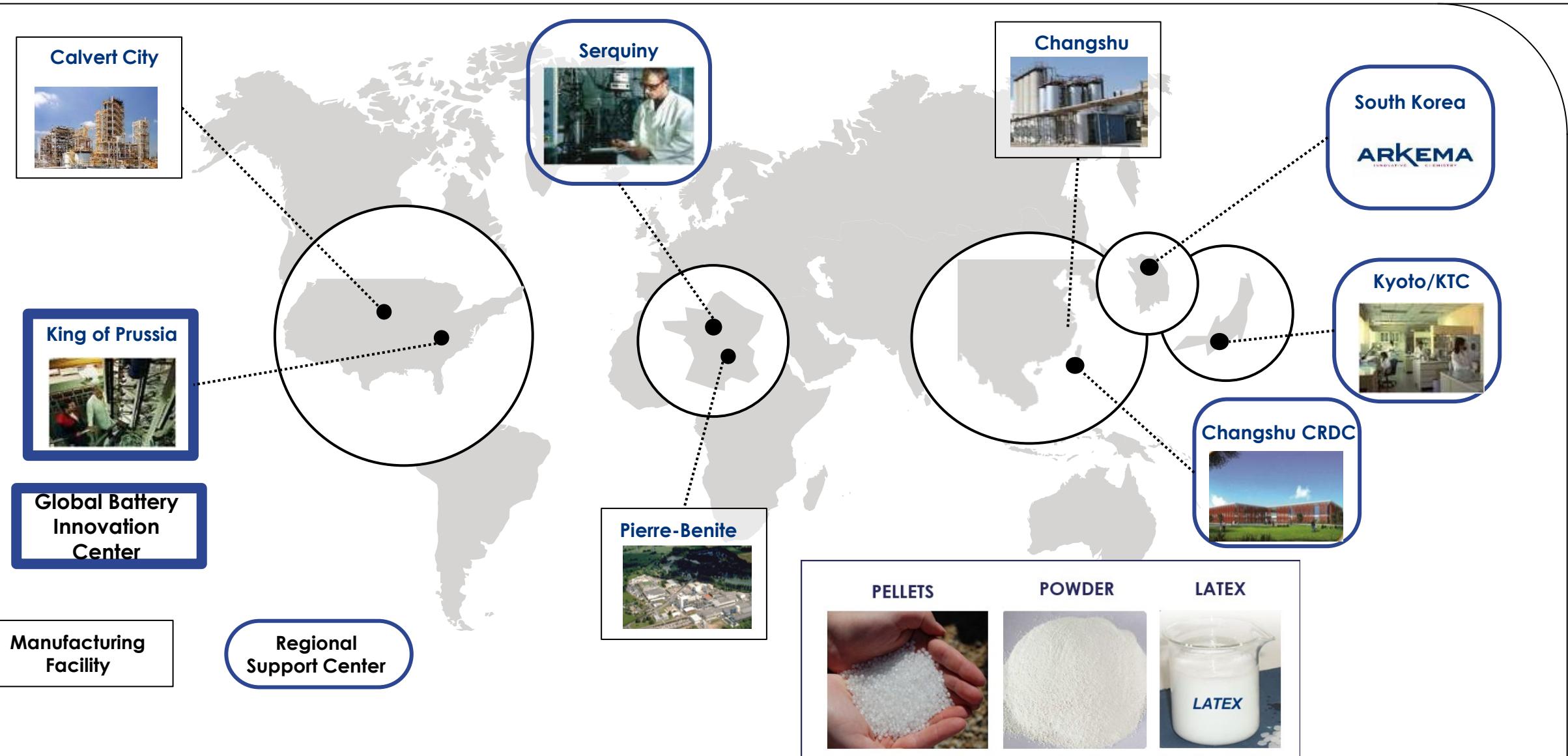
BOSTIK®

Encapsulation & low
pressure molding for
electronic components

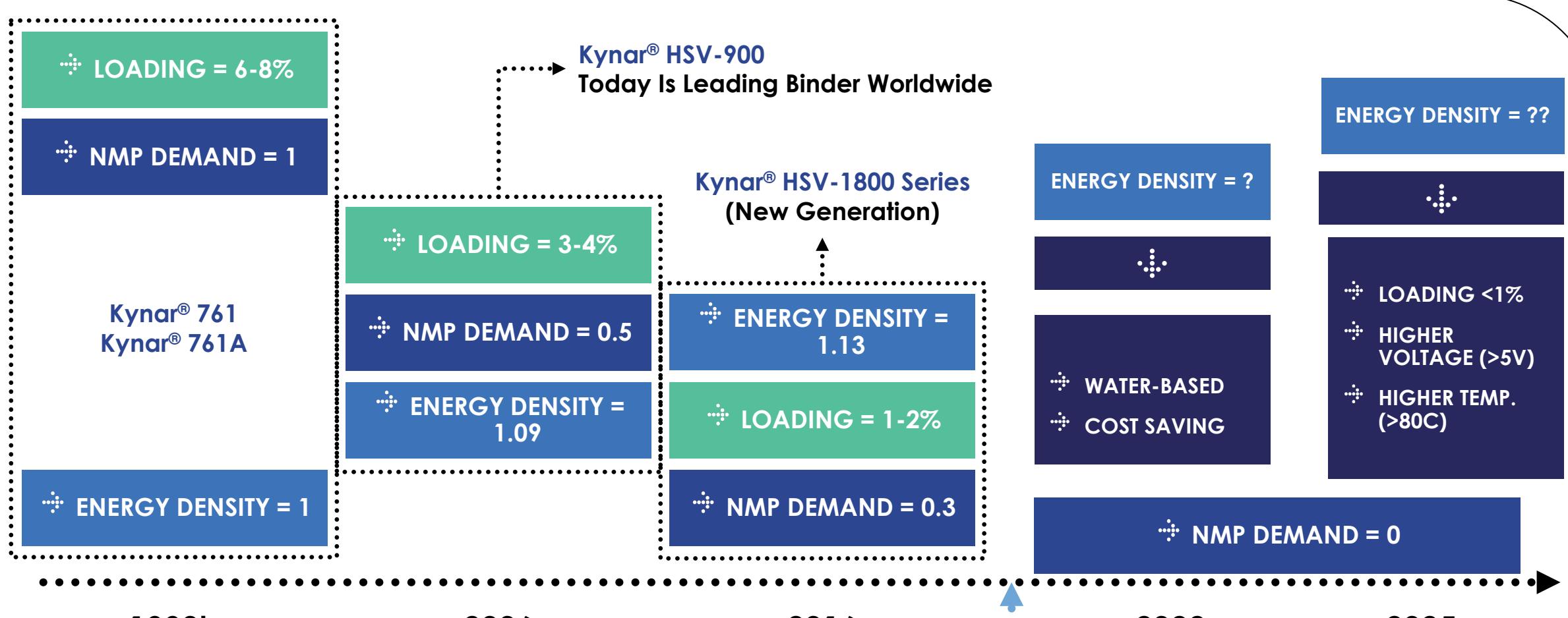
**RILSAN®
ORGALLOY®
KEPSTAN® PEKK**

in high performance
connectors

KYNAR® PVDF GLOBAL FOOTPRINT



EVOLUTION OF KYNAR® BINDERS



*Energy Density is normalized to 1
*NMP Demand is for 1g of cathode

KYNAR® PVDF BROAD PRODUCT PORTFOLIO = a toolbox for customers

Key fine-tuning parameters...

- Molecular weight
- Crystallinity
- Copolymer content
- Functionalization

For tailor-made properties of Kynar PVDF

- Adhesion
- Flexibility
- Electrolyte uptake (swelling)
- Dissolution speed
- Phase separation speed

