The essential contribution of the lead and lead battery industries to the EU's defence sector

The lead and lead battery industries play a vital role supporting the European Union's military capabilities and regional security. They are a **cornerstone** of the EU defence sector, providing essential applications and robust supply chain security via an established, economically viable domestic value chain. It needs to be maintained and supported as just one example of Europe's complex and critical defence supply chain.Batteries made in Europe are used in military vehicles, submarines, security and public safety systems, radiation shielding, and marine applications. And lead itself is the preferred metal for use in small calibre military ammunition. Together, these applications underscore the **strategic importance** of both the lead and lead battery sectors.

Europeanising defence supply chains is fundamental to European security. The European preference concept is a core component of the Security Action for Europe (SAFE), the European Defence Industry Programme (EDIP), and the next Multiannual Financial Framework. In this context, it is important to avoid replacing a well-established European supply chain with ones dominated by third countries.

Ensuring a stable and sustainable lead and lead battery supply chain – made in Europe and recycled in Europe – is vital for the EU's defence capabilities and regional security.

The industry's ongoing innovations in lead battery technology, performance and applications, alongside the recycling of lead battery materials, further supports the EU's strategic autonomy goals and reinforces its global competitiveness in this vital area.

It is essential that the EU maintains the manufacturing, research and recycling capabilities of the lead and lead battery industries as part of its defence industrial base. Any regulatory activity should be viewed through this prism and be proportionate. In addition, the EU should commit to supporting a multi-technology eco-system of battery technologies and a secure supply chain for lead and lead batteries used in the defence industry.

Security of supply is paramount to ensuring the ongoing capability and readiness of the EU defence sector. Several key aspects highlight the strategic importance and contribution of lead battery supply chain security:

– Lead batteries are a stable and sustainable power supply and energy storage solution.
– They are produced domestically in the EU, supported by a strong recycling infrastructure, in a European value chain spanning at least 17 Member States.
– This closed-loop lifecycle ensures that every used lead battery available for collection in the EU is recycled, and more than 75% of lead used in the EU to make new lead batteries comes from recycled sources.
– The nature of the EU's lead battery value chain promotes resource efficiency, reduces dependency on external sources, and strengthens the EU's raw material and product security and therefore its strategic autonomy.

Lead and lead batteries are indispensable in various defence-related applications, including:

- **Military Vehicles**: Many NATO countries utilise EU-produced 6T AGM and gel lead batteries in military vehicles, including tanks, armoured personnel carriers, and larger military vehicles. These specialist batteries provide reliable power solutions for critical operations in combat situations and wherever the military need to operate.
- **Military aircraft**: Lead batteries are used in more than 80 different types of military aircraft.
- **Submarines**: EU producers supply advanced lead batteries as propulsion batteries for diesel-electric submarines and standby batteries for nuclear submarines.
- **Energy Storage**: Lead battery military microgrids are chosen for their safety and reliability by several NATO countries.
- **Radiation Shielding**: Lead-based shielding is used in security measures at airports, border crossings, ports, and military installations. This shielding is essential for baggage and cargo screening, body scanners, and for neutron activation and x-ray techniques used in non-destructive testing of aircraft components.
- **Ballast and Trimming Weight**: Lead is used as ballast and trimming weight in marine applications, including naval weapons, ships, and submarines, providing necessary stability.
- **Ammunition**: Lead is the preferred metal for use in small calibre military ammunition.
- **Security and Public Safety**: Lead batteries are important in security and public safety applications, including fire engines, helicopters, incident support vehicles, maritime GPS, customs and border patrol vehicles, weather stations, and search and rescue services.
- **Electronics**: Lead solders are used in defence electronics due to their proven reliability and durability in demanding conditions. Defence products have extremely long lifetimes of up to 90 years; lead-free alternatives cannot be safely used for repair and maintenance of lead-containing components.
- **Free-machining and Casting Alloys**: Leaded steels and brasses are used to make a broad range of components for marine applications, tanks and other defence applications.

Lead battery military microgrids: a case study

Military microgrids serve as a dual solution for in-theatre tactical needs, providing on the spot safe and transportable power and also significantly decreasing reliance on petroleum-based fuels. In a project with the U.S. military, transportable microgrid technology, following NATO specs for power and voltage, was developed using lead batteries produced already for NATO, as well as battery technology currently produced domestically in the US and Europe.

The lead battery microgrid was a robust solution capable of operating safely between -20 °C and 40 °C, with this temperature tolerance being a unique advantage for lead battery technology. Furthermore, lead batteries are a preferred solution as they can tolerate significant damage from mechanical, ballistic, or electric sources without creating further danger to soldiers from thermal events.

Conclusion: locally sourced lead batteries used for UPS applications and NATO specified 6T AGM batteries utilised in APCs and military vehicles can be used immediately to provide critical power, from supporting temporary barracks to communications equipment, while decreasing diesel fuel consumption from mobile diesel generators.

For Europe's future, lead matters.

Lead Matters