Call for Evidence – Revision of the European Chips Act

Air Liquide is a world leader in gases, technologies and services for industry and healthcare. Present in 60 countries with approximately 66,500 employees, the Group serves more than four million customers and patients worldwide with small essential molecules such as oxygen, nitrogen and hydrogen. Present in key electronic hubs across Asia, Europe, and the US, Air Liquide supplies the semiconductor industry worldwide with essential materials, equipment, and services, and contributes to the safety and sustainability of supply chains.

Generating €2,510 million in revenue in 2024, the Electronics business line of Air Liquide is a world reference in designing, manufacturing, and supplying ultra high purity gases and advanced materials for this industry.

I. Executive Synthesis

The introduction of the **European Chips Act** was an important step in supporting the EU's semiconductor industry, focusing on channeling investments in chip manufacturing (Fabs) in Europe. Nonetheless, the Chips Act did not yet address the **critical risks in the upstream supply chain of the molecules, materials, and gases that are necessary to manufacture chips in Europe**.

At least 75% of the Electronics Specialty Gases (ESGs, or Electronics Specialty Materials) needed to manufacture chips are **no longer manufactured in Europe**. Therefore, the European chip industry faces **manufacturing risks** due to its dependence on geographically distant and concentrated sources.

As the absence of each single gas or molecule could halt the chip production**,** strengthening the incoming supply chain of critical materials and gases is a compelling urgency to sustain chip manufacturing in Europe.

Reinforcing the **incoming supply-chain for materials and ESGs**, starting from their raw materials, is crucial and **must be a focus of the European Chips Act revision**.

II. Critical Diagnosis: Acute Upstream Vulnerabilities

The production of microchips relies on an extremely complex and fragmented incoming supply-chain, requiring hundreds (about 200) of highly purified materials, including substrates, metals, photoresists, and especially ESGs and materials, **used for all chip manufacturing** steps, such as deposition, doping, etching, and cleaning.

Europe currently faces **structural gaps** in domestic ESG production capacity:

- About **only one-fourth** of the key ESGs required by the European semiconductor industry are currently manufactured on the continent at the quality grade compatible with semiconductor process requirements. This share is decreasing, as production sites are challenged by fierce global competition and high manufacturing costs, among others.
- This leaves Europe **three-fourth (and increasing)** dependent on sourcing **from outside** the continent these critical Electronics Specialty Gases.

Therefore, the **European chip industry faces manufacturing risks** due to its high dependence on distant, geographically concentrated sources (mainly in China) for ESGs. This reliance creates a **multitude of single**

points of failure: the absence of just one single, high-purity gas molecule – such as those critical for etching (e.g., C4F8, SF6, NF3, …) or deposition – could impact the manufacturing of chips in Europe.

The risk is compounded by evolving global sourcing dynamics:

- **Rapid Non-European Investment:** Non-European countries, notably China, have been rapidly developing as leading manufacturers of ESGs, deploying massive investments and subsidies, and achieving price levels that challenge global competition. This trend is accelerating Europe's supply chain exposure.
- **Raw Material Concentration Risk:** Even when the final ESG product is synthesized elsewhere, the foundational raw materials often trace back to highly concentrated regions. It is estimated that more than 50% of Europe's total ESGs are dependent on a limited number of foundational minerals (e.g., Silicon metal, Fluorspar, …) which have supply chains reliant on a single geographic source (China).

This concentration of both **raw material and final product manufacturing** (synthesis) outside the EU must be seen as a strategic security risk for Europe that should be urgently addressed by the Chips Act revision.

III. Strategic Recommendations: Chips Act 2.0

To ensure the resilience and sustainable growth of the European semiconductor industry, Air Liquide calls on the European institutions to integrate the following strategic pillars into the Chips Act 2.0:

1. Need for an integrated vision of the EU ecosystem

A comprehensive, integrated and shared vision and understanding of all the elements required to effectively manufacture chips in Europe is needed. This must encompass the upstream supply chain of all the molecules — specifically materials and gases — essential for producing chips in the EU. This should include a comprehensive **mapping of all critical material and electronics specialty gases (ESG) dependencies**, including upstream mineral sources, and aligning the capabilities of these supply chains with the needs of the European fabs.

Based on this vision, a **holistic risk assessment** is needed to assess the vulnerability of the EU's chip manufacturing capacity. This assessment must clearly **identify risk factors** for European chip manufacturing, analyze dependencies on external supply chains, evaluate the exposure to logistical risks and criticalities, and project the concrete outcome for European semiconductor facilities if these vital materials were cut off.

2. Need for an effective EU sourcing strategy

The Chips Act 2.0 should also establish a clear, unified European strategy focused specifically on the incoming supply chain for critical materials and gases that are necessary to manufacture chips in Europe.

Key elements of this strategy should include **concrete, measurable, and time-bound goals** for developing onshoring and nearshoring production capabilities to substantially decrease the current reliance on external sourcing. It should also promote international partnerships and trade instruments to manage risk exposure.

3. Need for robust support measures for investments in Europe

To effectively close the EU's manufacturing capacity gap for critical semiconductor materials and gases, the Chips Act 2.0 should provide **targeted financial and regulatory support** to foster investments in the local production of the critical materials and ESGs that are necessary to manufacture chips in Europe – in particular:

- Provide **financial aid for investments** aimed at enhancing the EU's manufacturing capacity for critical semiconductor materials and gases (incl. the construction of new or refurbished ESG plants). Notably, materials and gases should be included in the scope of Pillar II of the revised Chips Act 2.0.
- Institute **mechanisms to mitigate the risk** associated with investing in new European materials and ESG production facilities, recognizing their critical strategic value.
- Expedite **permitting and regulatory processes** for strategic materials and ESG production facilities to ensure swift deployment and implementation.
- Ensure that **support measures** — such as those granted under Important Projects of Common European Interest (IPCEI) — are accessible and tailored for the production of high-purity materials, chemicals, and gases, not solely for chip design or Fab construction.
- Establish **measures to maintain and grow European production capacities of materials and ESGs,** recognizing current dynamics and fierce global competition, while ensuring a global level playing field. Specifically, implement policies that reward European-made molecules.

The **Chips Act 2.0 must secure the EU's "molecular sovereignty."** Strategic investments in Fabs will only yield true resilience if matched by equally forceful, dedicated action to **establish a secure, local, and robust supply chain for the highly purified materials and gases that are the foundation of semiconductor chips.**