

Key Recommendations for the EU Mandate 2024-2029

Towards a more competitive semiconductor industry for Europe



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Key messages

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Introduction

Semiconductors (or so-called 'chips') are in every product and service today. No car, plane, phone, PC, watch, data centre, solar PV, wind turbine, tablet, robot, medical device, or space equipment would exist without chips. They are the **foundation of all modern electronic devices, hence the key enablers of the digital and green transitions**. As such, chips have a tangibly positive impact on citizens' everyday life.

Based on pure numbers, chips are the most manufactured device in human history. In 2023, the global semiconductor industry produced more than 900 billion chips (approximately 100 semiconductors per person). Given their crucial role for Europe's industrial resilience, the EU has set itself a target of reaching 20% market share in global chip production. The EU Chips Act has been a first, important step in strengthening the EU's semiconductor ecosystem.

Now, the European Semiconductor Industry Association (ESIA), representing the European leadership in semiconductor research, design, and manufacturing, would like to lay out its policy recommendations for the 2024-2029 political mandate. The overarching goal is to further boost the semiconductor industry in Europe. This must be underpinned by a **holistic industrial strategy** including policies for research, innovation, manufacturing, trade, sustainability, and a skilled workforce.

A new governance for a holistic policy strategy

ESIA calls for a holistic, coherent policy strategy and regulatory approach across all policy areas, to boost the EU's semiconductor industry.

The sector requires policies that will put competitiveness at the forefront and enable it to further grow and invest in Europe. The adoption of the EU Chips Act has been a fundamental building block. Its implementation and further development will be decisive for the EU's success in championing in the global race for technology leadership. To not lose momentum, ESIA advocates for an immediate '**Chips Act 2.0**' process. The aim is to improve initiatives, reconsider its scope, and assess gaps. The approval process, for instance, for the so-called first-of-a-kind manufacturing facilities must be quicker, if Europe wants to reach its objective of 20% global chip production share by 2030. Since European semiconductor companies are competing with companies from third-country jurisdictions, Europe's state aid regime must be made future proof.



In addition, ESIA calls for a **European smart policy approach with a competitiveness check** at its core. Policies across all areas – environment, technology, trade, energy, manufacturing, finance, reporting, skills, and talent growth – need to be balanced, consistent and follow a pro-business approach. Conflicting policies and extensive administrative requirements block the European semiconductor industry’s ability to compete globally and thrive and, consequently, contribute to the overarching EU goal of supply chain resilience. This competitiveness check must apply to new regulatory initiatives as well as to the existing legal framework.

To implement the above-mentioned holistic policy strategy, ESIA urges the European Commission to **launch the Alliance for Processors & Semiconductor Technologies and involve industry in the work of the European Semiconductor Board** (ESB, created under the EU Chips Act), without delay.

Beyond the Alliance and the ESB, a **one-stop-shop for microelectronics** in the next Commission, for example, a dedicated **‘Chips Envoy’** responsible for the *overall* industrial policy approach to semiconductors, is a necessity. The strategic role of the semiconductor industry should also be acknowledged by strengthening the unit ‘Microelectronics’ at the Commission with additional resources and competences, to build up in-depth expertise and business intelligence. This would ensure a coherent strategy and coordination, streamlining the manyfold parallel work streams, from research to trade policy.

Furthermore, a European Parliament Semiconductors Intergroup should be explored, to facilitate a regular exchange and develop a sustainable knowledge base.



A European approach to open trade

The **semiconductor industry is truly global**.

Semiconductors rely on a complex international supply chain with a manufacturing process including several hundred steps to design, manufacture, assemble, test, and eventually deliver chips to the customers. A multitude of different companies in various countries are typically involved in that process. The production of one chip can take up to 6 months.

The semiconductor ecosystem is best viewed as a global common, with interdependencies built into it *by design*. These interdependencies range from critical raw materials and derivatives, chemicals, and materials, to design, equipment, production, packaging, and testing. Consequently, as one of the most globalised sectors, the semiconductor industry **requires a high degree of openness along the supply chain**.

Chip manufacturers also need to be able to scale, meaning serving global markets, to be competitive. A valid business case often starts with sales of high-quality parts in the 500 million units' range. The European market alone will not be able to provide such scale.

ESIA acknowledges the need to protect critical assets and the rationale underlying the EU Economic Security Strategy. Still, ESIA believes that a **more positive approach to economic security is required** which is based on support and incentives, rather than a defensive approach that relies on restrictive and protective measures.

Partnering with other regions, including the US, Japan, and Korea, is another crucial element. Alignment of policies and collaborations will be key to enhancing the resilience of our ecosystem. ESIA therefore calls on EU decision makers to **make international partnership agreements a key priority for 2024-2029**.

The EU must also achieve a **better coordination amongst Member States on export control**, which is consistent and provides a more powerful position toward third countries. The overall approach to export control needs to remain true to its original objective, that is, to contribute to international peace and security. ESIA advocates for the creation of a structured mechanism at EU level that permanently involves the industry on this topic. For example, the semiconductor industry should have a permanent advisory role in an official body, which should be competent for export control coordination. This would help foster an effective, predictable, and transparent EU approach.

In sum, ESIA wishes to see a strong European strategy on open trade, which balances the need of the sector to access global markets, the necessity to protect, and the need for international partnerships.

Proportionate sustainability measures for semiconductors

Semiconductors are a **key enabler of low-carbon, energy efficiency, and carbon footprint reduction solutions**. They optimise energy usage in, amongst others, transportation, manufacturing, and consumer products. Thus, semiconductors are an indispensable lever for achieving the EU's climate goals and are crucial in implementing the green and digital transitions. Simply put, there is no net-zero economy without chips.

Consequently, ESIA calls on EU decision makers to acknowledge the essential role of semiconductors in achieving the EU climate goals. This must be reflected in all upcoming legislation – regardless of whether such legislation covers renewable energy, electric vehicles, or energy management of IoT devices.

Semiconductor manufacturing is one of the **most complex manufacturing processes** that exist today and requires hundreds of production steps to carve the raw materials into a fully featured chip.

Most of these steps use chemicals, meaning that chemical policies are central to the semiconductor industry. The sector is committed to reducing its environmental footprint, by making production processes more efficient and adopting and pursuing carbon neutrality goals. ESIA member companies have already been able to reduce their absolute emissions by 33% and their emissions per cm² of wafer produced by 54% in the period 2010-2022. Moreover, ESIA companies have increased their energy efficiency by 9% within the same period, while increasing the share of renewable electricity use significantly (in 2022, the share of energy from renewable sources amounted to 67%).

The semiconductor industry only uses comparatively small quantities of specialty chemicals and has successfully phased out certain harmful ones. For some, however, there are no viable alternatives yet. Hence, the EU must **refrain from restricting the sector's use of these chemicals and materials**.



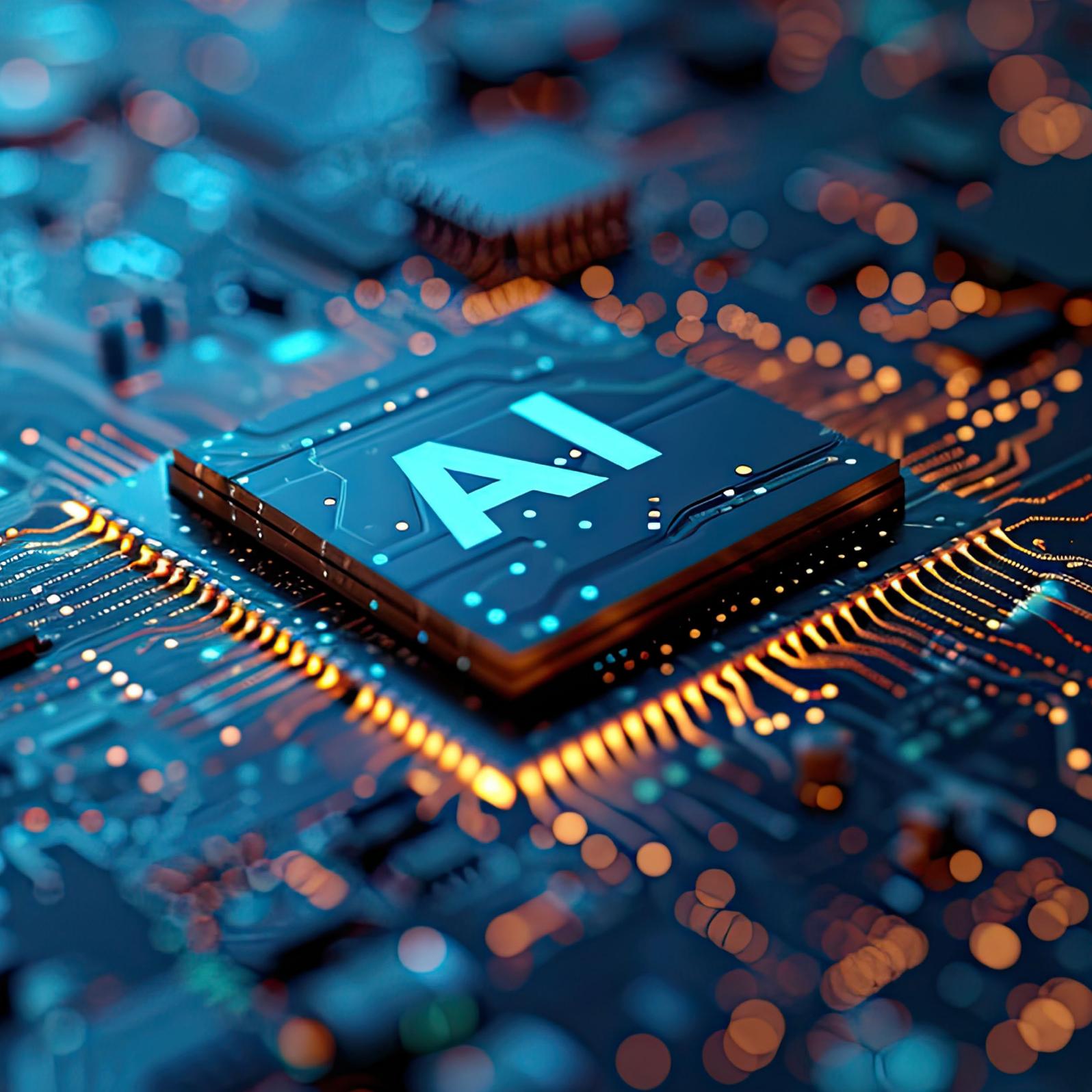
Otherwise, the European semiconductor industry will be at a competitive disadvantage compared to other regions. To accelerate the replacement of specialty chemicals and materials of concern in the semiconductor manufacturing process, ESIA calls on policy makers to establish dedicated research and innovation programmes on sustainable manufacturing. Since the development of alternatives and substitution timelines are long (between 10 and 25 years), ESIA urges policy makers to create fast-track procedures for such projects.

Concerning re-use, recycling, and repair requirements of devices, it is crucial to understand that **semiconductors cannot be treated like end-products**, that is, destined for consumers. They are small components of larger end-user products. The main material of a chip is silicon, extracted from sand. In addition, minute amounts (atom level) of metals, such as gold and copper, are melted within the chip. Due to the chip's

small size, marginal quantities of precious material, and the extremely high complexity of dismantling it, the re-use, recycling, and repair of chips at scale is not a practicable option.

In addition, the use of recycled materials in manufacturing presents significant challenges. Semiconductors require very high quality and purity level of inputs in the production process. An impure particle equivalent to “a grain of salt in an Olympic-size swimming pool” would already be intolerable, posing major threats to the functioning of a chip.

Consequently, ESIA calls on policy makers to **thoroughly assess regulatory initiatives in these areas** and consider excluding semiconductors from the scope.



Research & innovation to boost Europe's chips strengths

When it comes to research and innovation initiatives, the EU must shift gears and allow for **faster and more flexible approaches** to enable its semiconductor industry to position itself at the top.

Semiconductors are one of the world's most research- and capital-intensive technologies. The EU is advancing complex and strategic projects in semiconductor technologies with the existing Important Projects of Common European Interest (IPCEI) 'Microelectronics' and 'Microelectronics and Communication Technologies'. In today's highly competitive environment, the IPCEI is a critical instrument. **Future IPCEIs, however, must be simpler to access, faster to process, and implemented more swiftly.** An approval process which takes multiple years is not a best practice and should be avoided.

Furthermore, the EU should look beyond IPCEIs. An **assessment and revision of the existing research and innovation programme landscape is necessary** to identify gaps and develop new, customised instruments, and, ultimately, support highly strategic initiatives.

Continued public-private partnerships in both low and high technology-readiness levels are essential to maintain Europe's competitiveness. EU programmes such as Horizon Europe and Joint Undertakings (JU) such as the EU Chips JU contribute to boosting collaboration between the industry and research and technology organisations. **ESIA calls on EU decision makers to maintain and strengthen early involvement of the industry** in the development and implementation of future EU initiatives, such as Framework Programme 10. Public support should focus on strengthening European strengths. In areas where Europe needs to build *new* competences, international collaboration with trusted partners should be the way of choice.

Talent shortage challenges for the semiconductor industry

The **skills shortage** is a serious challenge for the European economy and particularly for the semiconductor industry. Several new semiconductor manufacturing sites will be constructed in Europe over the next few years, and this will require between 10.000 and 15.000 new skilled workers. Experts predict that there will be a shortfall of up to 350.000 employees in the broader European semiconductor ecosystem by 2030.

The lack of a skilled workforce must be understood as **one of the most severe risks** to the sector's ability to stay ahead of competition. A scenario based on the status quo will lead to serious gaps in the operation of manufacturing sites and, equally importantly, in the design of semiconductor innovations.



ESIA welcomes initiatives such as the EU Talent Pool and sees it as an important steppingstone. However, to effectively tackle the issue, more efforts are needed. ESIA therefore urges the **EU Institutions to join forces with Member States and launch an EU-wide education strategy** to attract talents to STEM subjects. Emphasis should be put on explaining the impact of the semiconductor industry on people's everyday life. These efforts must explicitly target schools, from primary level onwards, and universities. Expanding and strengthening dual learning (combining apprenticeships and school education) across Europe and increasing students' early exposure to technology and industry must be core building blocks of the EU strategy.

Furthermore, Europe currently lacks the capacity and capability in specific semiconductor education. There are only a few focused training centres that offer relevant study programmes. As a result, talents undertake research and training outside the EU.



ESIA consequently calls on decision makers to **strengthen the cooperation between Member States and industry to develop a holistic European semiconductor talent curriculum**. This should be injected into schools and EU projects under Erasmus+ and the Digital Europe Programme.

Finally, ESIA believes that the recently established European Semiconductor Regions Alliance (ESRA) should closely cooperate with the sector to further promote collaboration between all the relevant players in the ecosystem: industry, research, and education. **Pooling regional initiatives is essential for effectively training and educating talent in Europe** and attracting a highly skilled international workforce to the European semiconductor industry.



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