



AESEMI

ASOCIACIÓN ESPAÑOLA DE LA INDUSTRIA DE SEMICONDUCTORES

Proposals and recommendations on
the future Regulation of measures to
strengthen the European
Semiconductor Ecosystem
(Chips Act)

June 2022

1. AESEMI´s introduction.....	3
1.1. Introduction and context.....	3
1.2. The commitment of the semiconductor industry as a starting point for the development vectors.....	3
1.3. The European Chip Law: the beginning of a new horizon for the sector.	3
2. On the Proposal for a Regulation of the European Parliament and of the Council establishing a framework of measures to strengthen the European semiconductor ecosystem in Europe (Chips Act).....	5
2.1. General assessment of the incentives proposed.	5
2.2. Improve the development of manufacturing capabilities in Electronic Design Automation (EDA).....	5
2.3. Strengthening the European ecosystem by focusing also on mature industries, such as analogue and automotive.	6
2.4. Increasing investment in production, through new possibilities for experimentation	7
2.5. Strengthen security of supply to improve semiconductor production capacity in Europe.	8
2.6. Strengthen intellectual property mechanisms.	8
2.7. Creation of a network of centres of high competence.....	9
2.8. Improve R&D tax incentives.	9
2.9. Boosting the recruitment of specialized staff and attracting talent.....	9
3. On the Proposal for a Council Regulation amending Regulation (EU) 2021/2085 setting up Joint Undertakings under Horizon Europe as regards the Chips Joint Undertaking.	12
4. Conclusions.	13

1. AESEMI's introduction

1.1. Introduction and context.

AESEMI is the Spanish Semiconductor Industry Association, an entity that represents the main Spanish companies dedicated to microelectronic design and semiconductor manufacturing. The Association was founded at the end of last year 2021 by the companies Wiyo (Yocto Technologies), Imasenic, Kdpof and ICMálaga. Its creation was motivated by the deep need to provide the sector with its own entity to channel the feelings of the industry in such a dynamic context as the one we live in, in which semiconductors have become a strategic asset on which key industries for the European Union depend.

The objective of our association is to provide visibility to all the companies that are part of the semiconductor ecosystem in Spain. Thanks to this platform, **we boost not only the growth of this industry, but also open a window of collaboration for large companies to find incentives to invest in our country to meet the commitments of decarbonization and digitization** signed in the European Union, which are a common factor for all industries, already at a global level. It is also a fundamental part of our objectives to distinguish the capacity of universities and professionals, as well as to position Spain as a technological center with disruptive options and capabilities.

1.2. The commitment of the semiconductor industry as a starting point for the development vectors.

At the Spanish Semiconductor Industry Association, we are aware of the essential role played by microelectronics in the 21st century, necessary to support technological advances and the huge demand for ever faster, more connected and powerful devices, but at the same time smaller, more efficient and sustainable.

Semiconductors are undoubtedly an essential element for the industry to develop new products and services such as connected and intelligent mobility, or for implementing 4.0 capabilities in our industry, not only in Spain but throughout Europe. Without chips, the digital sector could not exist. Despite this need, the reality in the European Union has resulted in a permanent clash with the lack of supply since, until now, the focus of mass production of these components has been in Asia and America. In this sense, many European sectors, such as automotive, energy, communication and health, as well as strategic sectors, such as defense, security and space have been threatened by such supply disruptions.

In AESEMI we are aware of this situation and for this reason **we are working to strengthen the semiconductor industry in the European Union and especially in Spain, since otherwise it will be impossible to achieve the joint objective of strategic autonomy for Europe.**

1.3. The European Chip Law: the beginning of a new horizon for the sector.

The European Commission, aware of the enormous challenge facing the Union in terms of technological capabilities, has clearly stated its commitment to the semiconductor industry through its proposal to regulate the sector in the "European Chips Act", which aims to strengthen the capabilities of the innovation, development and manufacturing ecosystem of these components to guarantee the necessary supply to the European industry through significant financial incentives and a solid regulatory framework, with a special focus on guaranteeing safety

in the production chain. According to the Commission's latest reports, it is stated that the Union has the necessary assets to become an industrial leader in the semiconductor market of the future.

From the Association, we are more than aware of the unique window of action that is opening for Europe and, in particular, for all the agents of the sector to be able to participate in the process of ideation and development of the regulatory framework of the industry. For this reason, we place ourselves at the disposal of institutions and public and private agents to be able to debate the bases for the future of our sector, and we formulate the proposals and considerations contained herein.

2. On the Proposal for a Regulation of the European Parliament and of the Council establishing a framework of measures to strengthen the European semiconductor ecosystem in Europe (Chips Act).

2.1. General assessment of the incentives proposed.

Although the overall assessment of the proposed Chips Regulation is positive, **one cannot overemphasize the fact that the incentives proposed are geared to accommodate macro projects that will mainly strengthen the large companies in the semiconductor industry, leaving small companies in the background**, whose access to financing will be largely conditioned by projects that are ancillary or complementary to those proposed by the large companies.

Therefore, although this will have a positive impact on some European Union economies that have a more consolidated semiconductor industry, in Spain the reality of the sector, where there is no manufacturing capacity and the industry depends entirely on foreign companies to carry out these processes, means that, **as the incentives are designed, they will not generate the expected momentum.**

In general, more incentives are needed for the design segment of the value chain, as it is a key capability in the semiconductor market to design novel systems adapted to different user needs. In the case of Spain, only chip design functions are developed. Today, most European and Spanish companies run their businesses on the basis of fabless models in which they outsource all (or part) of their manufacturing to foundries, and in Spain there are 20 companies dedicated to microchip design.

For this reason, **the Union should build and strengthen its own capacity to innovate in design and facilitate the process of subcontracting with foundries to streamline their production process. This objective is fully in line with the European Chip Strategy**, where Europe should build and strengthen its own capacity to innovate in advanced chip design in order to play a relevant role in this part of the industry. This will ensure in Europe, and more specifically in our country, the long-term supply of chips, serving the needs of industry and the public sector and stimulating innovation in the broadest sense.

For its part, we believe that in Europe's efforts, it would be more viable to set up semiconductor production facilities that primarily supply the Community's industrial fabric, giving priority to the installation of factories that supply our own industry (health, vehicles, domestic appliances), as opposed to 2nm nodes, which represent a high cost and would be less viable in the short-medium term.

On the other hand, for smaller nodes, a common fund could also be created, where European companies would have guaranteed shares in non-European foundries to boost future technologies, such as AI, and 5G-6G communication.

2.2. Improve the development of manufacturing capabilities in Electronic Design Automation (EDA).

In the Chips Act it is proposed to build an innovative virtual platform, which is available in the Union and integrates existing and future resources and facilities by providing extensive libraries and **Electronic Design Automation (EDA) tools**.

This type of software is essential for semiconductor design, as it allows working in an integrated environment executing operations at very different levels within the design phases of a chip. The design flow encompasses very disparate tools, for which there are currently no suppliers within the European Union. An EU open-source EDA tool would be an exceptional step forward to enhance EU design capabilities, as it would avoid the current dependence on foreign design software, which has costs that are almost unaffordable for small companies.

In this regard, we consider that:

1. **The European Chip Infrastructure Consortium should be responsible for studying the feasibility of proposing a design flow with an open-source toolset**, i.e. a completely European software package to provide the EDA design, and the different countries of the Union should be assigned the development of each of the specific programmes that make up the Flow, defining and monitoring the compatibility of all the components with each other and with other market components. The weakest point in this respect would be how to finance this software.
2. In this context, EDA tools must be compatible with prototype and low-production foundries, as well as with European foundries, and integrate existing standards such as Risk-V, which European industry is currently supporting.
3. However, as regards the creation of open libraries or design models in the European Union, their contribution and use should be voluntary, **independent of the use of free software, since the designs of each company are the real added value and differentiating factor of the Chip**.
4. In addition to design-aided design software, **it is intended to build a large-scale design infrastructure for integrated semiconductor technologies** through a virtual platform, facilitating user cooperation with design houses, start-ups and SME IP providers. Therefore, the Commission should facilitate the membership of interested parties, including innovative SMEs, so that they have full information and access to the design infrastructure, with clear IP rules.

2.3. Strengthening the European ecosystem by focusing also on mature industries, such as analogue and automotive.

There are currently two main strategies employed in industry for the development of electronic components such as semiconductors: more Moore and more than Moore. The first route follows the line of developing technologies with smaller nodes (digital such as AI), in which the European industrial fabric is not as specialised, while the second focuses on larger nodes that concentrate on delivering the best performance and diversifying integration technologies, such as in semiconductors used in the analogue or automotive market, in which European companies are well positioned.

On this basis, the Chips Act has a clear focus on digital edge technologies (small nodes) with an explicit reference to 2 nm nodes. However, it should not be forgotten to further strengthen Europe's capacity in the market where it is strong and on which most of its industry depends.

The following is proposed:

1. Care should be taken not to focus only on smaller production capacities and to reinforce the model of More than Moore's foundries (mature technologies), where Europe is strongest. We therefore propose that the European Chip Infrastructure Consortium should focus not only on future technologies such as AI, but also on the technologies that industry currently consumes in the majority and put forward proposals to promote them and boost their greater robustness and lower consumption (FG-SOI type) rather than in the direction of the sub-nanometer.
2. Foster investments in innovation for nodes over 5nm, ensuring that we create the necessary capacities for the future demands of bigger nodes, and we don't focus in what the market can already provide.
3. Encourage investment in a foundry that can develop the necessary technology modules to More than Moore.

2.4. Increasing investment in production, through new possibilities for experimentation

Regarding increased investment in production, we consider it essential to explore the following initiatives:

1. **Investment in pilot lines, as well as in advanced design of test and experimental facilities and tools, while having pilot lines for access to the supply chain under open conditions** is essential for the production of EU companies. Similarly, the creation of unique world-class facilities would facilitate the process.
2. In the same way that an innovative virtual platform for software is proposed, we propose a virtual platform for open prototyping, so that the contracting of **manufacturing batches for prototyping (shuttles) with concrete deadlines in different European Open Foundries is coordinated with an annual planning in advance**. In this way, the investment of prototyping and low production foundries will be favored, for progressive scaling up before going to high production. SMEs from different European countries and research centers would be able to contract a certain area for their prototyping, so that this virtual platform, which is understood to be financed with EU funds, should recover all its investment if the different companies contract 100% of the available area. In this way, SMEs would have economic access to silicon and, more importantly, would be able to plan their projects according to established deadlines and prototypes. The spirit of the proposal is similar to Europractice, but with a more industrial approach and independent of the Foundries.
3. **Investment in new technologies applied to the semiconductor industry should be encouraged and prioritised**, such as the development of chips for use in quantum computing, which can be combined with both existing and easy-to-apply manufacturing technologies, such as room temperature CMOS, and novel technologies such as carbon nanotubes.
4. With regard to the chip fund, we believe that too frequently, companies have to appeal to financial models based on venture capital or participatory capital funds, which in most cases do not have sufficient muscle to sustain the investment until the maturity period of this type of product; periods of five, seven or ten years are common to mass-produce markets large enough to make a chip profitable. Therefore, these funds end up converting the company into the "product", revaluing them with patents and tax incentives

accumulated to be sold to third parties before the product reaches the market, often losing the resources invested over the years.

We propose to:

- i) Study models of joint state entry into the company's capital, with returns and exit of capital during the first years of production or sale of participation guaranteeing the activity.
- ii) Study models from other countries such as Israel, or tools such as innovative public procurement.
- iii) **Attracting external investment is essential to have the capacity to produce the most advanced chips, to serve users with new needs and to diversify access to markets, addressing those where Europe is not present today, while strengthening security of supply in critical sectors such as public safety.**

For this reason, **we call for more incentives for international microchip companies to set up in the Union and the Member States, as well as a strategic plan for international agreements with countries that already have a manufacturing industry.** In this way, Europe can become a fertile ground for foreign companies to set up such centers.

2.5. Strengthen security of supply to improve semiconductor production capacity in Europe.

Security of supply is not only about implementing open Foundries in Europe, but also about supporting second source strategies that involve Fabless companies and final assemblers in the transposition (redesign) and qualification of existing key proprietary products into new European Foundries. Therefore, we recommend:

1. Opt for the **establishment of Open EU Foundries** as a counterpart to Integrated Production Facilities, since the first offers a significant degree of their production capacity to other industrial players, such as fabless semiconductor companies. Regarding this topic, we consider that public-funded Open Foundries **should have a permanent mandate for attending productive requirements from the existing European design industry, especially for European fabless players.**

Today there is insufficient support for this type of companies, which requires large investments in order to gain access to the international production fabric. At the same time, it would be very useful to strengthen the production of equipment for this industry, which involves the development of manometric technologies.

2. Ensure that, in installations recognized as open foundries by the European Union, permits for such installations and foundries are granted through fast-track procedures.

2.6. Strengthen intellectual property mechanisms.

With regard to the strengthening of intellectual property mechanisms, we consider the following to be essential:

1. Create foundries that enable the development of new IPs proposed by fabless companies. The model needs to be well thought through so that ownership of new IPs can be preserved.
2. Consider establishing mechanisms to defend against IP theft internationally.

2.7. Creation of a network of centres of high competence.

Finally, it is appropriate to address the creation of a network of centres of high competence along the following lines:

1. Support the network of competence centres proposed by the European regulation to provide expertise to SMEs, end-users, start-ups in order to facilitate open, transparent and non-discriminatory access. They could become poles of attraction for innovation and highly qualified talent.
2. However, we convey the need to ensure that these centres do not become public instruments that replace innovation activities more suited to private industry, which would end up competing with them and hindering the development of SMEs and Europe's innovative fabric.

2.8. Improve R&D tax incentives.

The semiconductor industry is characterised by intense R&D activity, with companies reinvesting more than 15% of their revenues in research into next-generation technologies.

1. Facilitate the recognition of companies in the sector as **innovative SMEs so that they can more easily benefit from R&D&I tax deductions.**
2. **Improve legal certainty and make it accessible to small and medium-sized industry players.** In this sense, the European Union would bring great added value to the industry through the elimination of administrative barriers, the increase of financial guarantees for long-term investments, the adaptation of calls for proposals to the design and development deadlines of a standard semiconductor. Similarly, the reduction of administrative burdens in the follow-up phase of implementation and final justification, together with the implementation of public entities to support the submission of applications and advice on procedures, would be very valuable.

2.9. Boosting the recruitment of specialized staff and attracting talent.

The Commission must address the severe skills shortage, attract new talent, and support the emergence of a skilled workforce, as the current shortage is limiting efforts to strengthen the ecosystem.

1. **The Commission should promote a comprehensive Semiconductor Talent Attraction Plan, including graduate and postgraduate degrees in this field.** In addition, policies, and grants for the recruitment of specialized engineers should be included, for example by promoting microelectronics at university level.
2. We recommend the implementation of a strategy to promote and **facilitate the establishment of design centers, owned or operated by established European**

- semiconductor companies**, in countries with little activity in the sector. This would train engineers in European third countries with knowledge and experience of the real industry.
3. With regard to point b), this aid for the establishment of external design and development centers does not have to take the form of tax incentives, direct aid or contracting (which is also possible). It would be interesting to consider that in the countries where these centers are set up, they could be considered as companies belonging to the country where they carry out their activity, and could participate in the European sphere as SMEs, provided that they do not impose the costs of the parent company in these countries. This would achieve goals such as the distribution of knowledge, the creation of competent design centers, taking advantage of the flexibility and dynamism of SMEs and speeding up the time to market for designs thanks to their belonging to consolidated companies, but, above all, making it possible for medium-sized industry in those countries where they are established to access micro-integration technology, ultimately creating local synergies and broadening the semiconductor ecosystem.
 - i) In this respect, the EU is in an excellent position to implement this strategy due to the quality of its engineers and the numerous ancillary industries in the automotive, machine tool, tourism, health, etc. sectors, which in a few years could climb up the qualitative ladder by incorporating micro-integration into their development capacities. It is an initiative that requires little direct investment, potentially very beneficial but requires rethinking the legislative points concerning subsidies and the considerations of related/dependent companies and groups of European companies.
 4. **The Europractice model**, which is already very successful in Europe with universities and public research institutes, could be extended to start-ups and SMEs.
 5. Incentives for the recruitment of research staff should be strengthened and increased, as well **as incentives for research staff coming from other countries**, i.e. through the contracting of non-EU staff.

3. On the Proposal for a Council Regulation amending Regulation (EU) 2021/2085 setting up Joint Undertakings under Horizon Europe as regards the Chips Joint Undertaking.

In relation to the Chips Joint Undertaking, we make the following assessment:

The European Commission's proposal for a Regulation in this area is excessively generic and fails to take into account the particularities of the R&D&I process in the semiconductor industry, which makes it difficult to undertake projects with the current administrative procedures, and therefore the long timeframe for product development in the semiconductor industry, as well as its cost, must be taken into account. If this remains the case, it will not be possible to develop chips with nodes smaller than 65 nm in the calls launched under this programme because their cost would be close to or even higher than the total budget of a consortium.

For this reason, we propose:

1. Reflecting the capabilities of small companies, highlighting that in semiconductors, big innovation is done in small companies.
2. To highlight that devoting the bulk of the budget in the European industrial framework to the 2nm nodes would not be the most advisable thing to do, since in order to meet the objectives of guaranteeing supply, the budget should be focused on providing supply with mature technologies, which are those that are eminently used in the Community's industrial fabric.
3. Allow the cost of developing a chip or other semiconductor industry-related product (packaging, assembly, semiconductor manufacturing equipment) in a European programme to get extra funding from the Chip Joint Undertaking. Or ensure that this is at least partially funded.
4. In calls where costs are not 100% funded, allow full funding of costs related to semiconductor product development.

4. Conclusions.

As it has been exposed throughout the document, AESEMI's general assessment of the Chips Act package is eminently positive, given that it provides the sector with its own regulatory framework and specific mechanisms for dealing with supply crisis situations, as well as creating specific structures to guide and channel the large amounts of investment that have been planned by the European Commission.

However, it is worth making some general comments on the proposed package, given that the objectives set out in terms of guaranteeing supply and strengthening the Community's industrial fabric will be unattainable if certain aspects of the Chips Act are not redirected. Following on from what has been said previously throughout the document, and without being exhaustive in nature, our fundamental proposals are set out below in the form of three essential commitments:

- **The European Union should make a clear and decisive commitment to boosting the capabilities of its native fabric**, rather than encouraging large companies in the sector to deploy production facilities, so that investments and incentives are targeted at companies in the semiconductor value chain that have emerged from the Member States themselves. Such an approach would maximize the benefit especially for small and medium-sized enterprises, as they would be provided with many more capacities and tools to enhance their activity.
- **The European Union must ensure that all the assets resulting from the major investment processes provided for in the regulations (assisted design tools, virtual platforms, etc.) are aligned with international manufacturing standards and processes**, otherwise the EU would be turning into a technological silo which, rather than being autonomous, would be isolated from the rest of the semiconductor production clusters.
- In order to achieve the production targets that have been set out in the regulations and the capacities relating to the guarantee of supply, it is necessary to match the incentive technologies and investment areas with the real needs of our industry, and not to promote the development of technologies that will only be used by non-EU manufacturers. This is particularly evident when it is proposed to promote the development of semiconductors of less than 2nm, when European industry, due to its technological needs, is leveraged on 65nm semiconductors; or when it is proposed in the text that foundries recognized as being of public utility, in order to speed up the processing of their installation, can only be so recognized if they address cutting-edge technologies.