

Making the EU Chips Act deliver for French and German industry

A joint proposal by France Industrie, Mouvement des Entreprises de France and the Federation of German Industries (BDI).

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The rationale for an EU Chips Act

The semiconductor industry is critical to our modern economy. As semiconductors are decisive for virtually every industrial product, from automotives to smart home appliances, a reliable supply of chips is vital for Europe's economic success, resilience, digital sovereignty and stability. Furthermore, semiconductors are crucial for enabling Europe's green and digital transition as they are essential for the invention and usage of energy-efficient and intelligent technologies to reduce the continent's CO₂ emissions. In the last few months, companies in France and Germany of different industrial sectors have reported lost revenues due to the shortage. In light of these and continued shortages, French and German industry welcome the EU Commission's proposal for an EU Chips Act, which provides a holistic strategy to strengthen Europe's semiconductor ecosystem. We urge the co-legislators to closely liaise with industry during the legislative process, to ensure that the EU Chips Act will strengthen Europe's semiconductor competencies and the entire value chain – including design, production, and packaging – in order to make it successful in increasing European prosperity and security.

Making the EU Chips Act deliver for industry: 6 recommendations

In light of the announced EU Chips Act, French and German industry urge the European Commission to address the following dimensions, in order to tackle Europe's current semiconductor supply pressures, and to lay the ground for future technological leadership based on industry's demands:

1. Developing a holistic European strategy on semiconductors that addresses the entire semiconductor value chain while refraining from a planned economy on semiconductors
2. Recognising the importance of semiconductors of all natures and all structural sizes
3. Investing in the whole semiconductor life cycle, including CAPEX and OPEX, to enhance the competitiveness of Europe's semiconductor industry
4. Investing in existing and new semiconductor production facilities in Europe (e.g. by using targeted, agile and fast state aid exemptions), and thus, enhancing the EU's economic resilience
5. Attracting and training specialists for the European semiconductor industry
6. Striving for international cooperation – for instance within the framework of the Trade and Technology Council – while refraining from a subsidies-race

When taking everything together, the European Commission – together with the European Parliament and the 27 EU Member States – should aspire to strengthen Europe's already existent strengths while reducing current weaknesses.

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Current semiconductor market developments & their implications for industry

The world is currently experiencing a significant supply pressure on semiconductors with far-reaching repercussions for companies and consumers across the globe. This shortage is complexifying the global economic recovery from the pandemic. For example, the global automotive sector alone is expected to have lost hundreds of billions of dollars in revenues in 2021 due to the chip shortage¹ and current waiting times for the delivery of chips are around ten weeks longer than usual.² This is the result of both supply and demand-related developments in the global semiconductor market. Apart from a steep increase in demand of consumer electronics caused by the pandemic-related shift of millions of people into home offices and home schooling³, other events, such as accidents at factories⁴, geopolitical uncertainties and logistical bottlenecks⁵ have further exacerbated the situation. In light of the projected continued increase in demand of semiconductors, political initiatives to augment semiconductor production capacities are highly appreciated by French and German companies. However, as increasing chip production capacities is both extremely costly and time-intensive, the constraints in meeting chip demands are likely to persist in the foreseeable future. Therefore, investments are needed to establish a stronger European semiconductor ecosystem which will increase the EU's global competitiveness.

The semiconductor supply pressure has significant adverse effects on the global economy, hitting the European industrial base. After the damage the pandemic caused, the lack of semiconductors is now constricting the manufacturing activity. Within the German manufacturing sector, the automotive industry has been severely hit by the shortage – for example, several companies in Germany were forced to slow or even close down production in 2021, resulting in revenue losses corresponding to 1.6 per cent of German GDP.⁶ So far, 40 per cent of German companies have reported lost sales because of the shortages⁷. Likewise, the French economy has also suffered greatly under the semiconductor shortage. The manufacturing sector is being slowed down significantly, as critical semiconductors are not delivered on time.⁸ In addition, chip supply constraints in the European ICT industry have impeded essential access to education, healthcare and remote work, as well as provided challenges for SMEs.

Like semiconductors themselves, the supply chain for semiconductors is highly complex, involving stakeholders of different sizes and technical expertise who all make essential contributions before a semiconductor can be shipped to the customer. To enhance the resilience of Europe's semiconductor industry, all these steps need to be addressed. Currently, no single company or country is self-sufficient in the manufacturing of chips. Therefore, the supply chain for semiconductors spans across the globe, with a strong division of labour characterising the process, resulting in many interdependencies. The production process consists of the chip design, wafer production, wafer testing, packaging, and final testing. This process is supported by multiple flows of raw materials. Each step requires

¹ AlixPartners (23.09.2021) *Shortages related to semiconductors to cost the auto industry \$210 billion in revenues this year, says new Alixpartners forecast*. Retrieved from <https://www.alixpartners.com/media-center/press-releases/press-release-shortages-related-to-semiconductors-to-cost-the-auto-industry-210-billion-in-revenues-this-year-says-new-alixpartners-forecast/>

² OECD (2021), *OECD Economic Outlook, Volume 2021 Issue 2: Preliminary version, No. 110*, OECD Publishing, Paris, <https://doi.org/10.1787/66c5ac2c-en>.

³ Semiconductor Industry Association (26.02.2021) *Chipmakers Are Ramping Up Production to Address Semiconductor Shortage. Here's Why that Takes Time*. Retrieved from <https://www.semiconductors.org/chipmakers-are-ramping-up-production-to-address-semiconductor-shortage-heres-why-that-takes-time/>

⁴ Baraniuk, C. (27.08.2021) *Why is there a chip shortage?* Retrieved from <https://www.bbc.com/news/business-58230388>

⁵ Vakil, B. & Linton, T. (26.02.2021) *Why We're in the Midst of a Global Semiconductor Shortage*. Harvard Business Review. Retrieved from <https://hbr.org/2021/02/why-were-in-the-midst-of-a-global-semiconductor-shortage>

⁶ OECD (2021), *OECD Economic Outlook, Volume 2021 Issue 2: Preliminary version, No. 110*, OECD Publishing, Paris, <https://doi.org/10.1787/66c5ac2c-en>.

⁷ Ewing, E. (05.10.2021) *Fears of a 'bottleneck recession': How shortages are hurting Germany*. New York Times. Retrieved from <https://www.nytimes.com/2021/10/05/business/germany-economy.html>

⁸ De Montpellier, C. (26.08.2021) *Supply constraints and recruitment difficulties weigh on French companies*. ING Bank N.V. Retrieved from <https://think.ing.com/snaps/supply-constraints-and-recruitment-difficulties-weigh-on-french-companies>

highly specialised costly facilities and equipment, as well as intellectual property. As semiconductors travel the globe multiple times before they are delivered to customers, the semiconductor supply chain is highly sensitive to logistical disruptions.

Most of the global semiconductor production is concentrated in Asia, North America and Europe. While half of all manufactured chips are made on behalf of US-based companies, the overwhelming majority of manufacturing plants is located in Asia, with China, Taiwan, Japan and South Korea producing over two thirds of all chips. The EU, by comparison, designs nine percent of chips and produces eight percent. Semiconductors exist in a variety of different specifications and some regions have specialised on certain types of chips. One main differentiator is the structural size, which is measured in nanometres (nm). The smaller this size, the more complex the production process, with the most advanced chips being in the sub 10 nm range, in which Taiwan currently accounts for nearly half of global supply.⁹

The worldwide semiconductor market is expected to generate a revenue of over 600 billion USD in 2022,¹⁰ which is the result of double-digit growth rates for years. As semiconductors have a very wide range of application, the industry is highly interconnected with the rest of the global economy. While on a global scale, the data technology and communication industries accounted for almost two thirds of all chip sales in 2021, the largest buyers in the EU are the automotive and electronics industries, which together are expected to have a 63 per cent share of all EU-wide purchases.¹¹ Hence, the EU Chips Act should address current and future requirements of Europe's leading industrial sectors. Thereby, it would be also beneficial from a labour market perspective, since inter alia the automotive and electronics industry employ over 2.2 million people in France and Germany alone.

The importance of semiconductors stretches way into the future than the just immediate economic recovery from the pandemic. The European Commission has declared that Europe must undergo a green transition to be climate-neutral by 2050. This objective is inscribed in the European Green Deal and is necessary to fulfil the commitments of the 2015 Paris Agreement. Semiconductors underpin Europe's green transition, as they are a prerequisite for intelligent and energy-efficient technologies and infrastructures that will enable this ambitious plan to succeed.¹² Therefore, the green transition's success depends considerably on whether the EU can secure sufficient quantities of semiconductors.

The chip industry is growing rapidly, and this trend is not expected to come to a halt as current global growth rates are forecasted at nine percent for 2022.¹³ Nonetheless, the shortage is expected to continue well into 2023¹⁴, not least because some foundries have sold out their capacities through the end of 2023. Therefore, we welcome the European Commission's recognition that the EU's semiconductor manufacturing capacity has to at least quadruple to reach the 2030 goals.¹⁵

⁹ ZVEI (2021) *Zukunftsstrategie und Marktentwicklung: Halbleiterindustrie Deutschland und Europa*. Retrieved from https://www.zvei.org/fileadmin/user_upload/Presse_und_Medien/Pressebereich/2021-103_ZVEI_Digitalisierung-und-gruene-Transformation-treiben-Welt-Halbleitermarkt/ZVEI-Pressekonferenz-Halbleiter-2021.pdf

¹⁰ Semiconductor Industry Association (03.12.2021) *Global Semiconductor Sales Increase 24% Year-to-Year in October*. Retrieved from <https://www.semiconductors.org/global-semiconductor-sales-increase-24-year-to-year-in-october-annual-sales-projected-to-increase-26-in-2021-exceed-600-billion-in-2022/>

¹¹ ZVEI (October 2021) *Semiconductor Strategy for Germany and Europe*. Retrieved from https://www.zvei.org/fileadmin/user_upload/Presse_und_Medien/Publikationen/2021/November/Halbleiterindustrie_fuer_Deutschland_und_Europa/Semiconductor-Strategy-for-Germany-and-Europe.pdf

¹² ZVEI (October 2021) *Semiconductor Strategy for Germany and Europe*. Retrieved from https://www.zvei.org/fileadmin/user_upload/Presse_und_Medien/Publikationen/2021/November/Halbleiterindustrie_fuer_Deutschland_und_Europa/Semiconductor-Strategy-for-Germany-and-Europe.pdf

¹³ European Semiconductor Industry Association (30.11.2021) *The worldwide semiconductor market is expected to increase 25.6 percent in 2021, continuing to grow by 8.8 percent in 2022*. Retrieved from https://www.eusemiconductors.eu/sites/default/files/ESIA_WSTS_AutumnForecast2021.pdf

¹⁴ Alexander M., Meissner F., Kirschstein T. (15.12.2021) *STEERING THROUGH THE SEMICONDUCTOR CRISIS*. Roland Berger. Retrieved from <https://www.rolandberger.com/en/Insights/Publications/Steering-through-the-semiconductor-crisis.html>

¹⁵ ZVEI (2021) *Zukunftsstrategie und Marktentwicklung: Halbleiterindustrie Deutschland und Europa*. (see above)

French and German industry’s recommendations for an EU Chips Act that delivers for industry

French and German industry are united in their support of the European Commission’s proposal for an EU Chips Act. However, we want to encourage the European Commission, the European Parliament and the European Council to set a realistic target. The Commission envisages that by 2030 “the production of cutting-edge and sustainable semiconductors in the Union is at least 20% of world production”. Companies across Europe currently produce about nine percent of the global semiconductor production. However, while some fabs – in particular in Asia – already produce very small semiconductors (2-7 nm), Europe’s production capacities lie in the 20 nm+-range. Therefore, the EU should aspire for 20 percent of world production in semiconductors of all natures and sizes. This still requires a quadrupling of production capacities. Moreover, Europe’s industry sectors continue to require semiconductors of all structures and natures.

Building on the EU Chips Act’s five objectives, French and German industry would appreciate, if the co-legislators were to consider the following points during the legislative process:

Objective 1: Strengthening Europe’s research and technology leadership towards advanced chips

Policy recommendations

Based on current and future demands of Europe’s industrial sectors, the European Commission and Member States must recognise in all their semiconductor-related initiatives, such as the EU Chips Act, the Chips Joint Undertaking, the Quantum Technologies Flagship and the IPCEI, the importance of semiconductors of all natures and all structural sizes. Only if Europe produces semiconductors of all natures and sizes, and heavily invests in research and innovation, will Europe achieve long-term technological leadership and economic prosperity.

French and German industry welcome the European Commission’s aspiration to strengthen Europe’s research and technology leadership on semiconductors. To this end, the establishment of the Chips Joint Undertaking is the right approach to leverage on the experience with Europe’s successful research and innovation programme – Horizon Europe – while enabling the development and deployment of cutting-edge and next generation semiconductors as well as quantum technologies that will reinforce the Union’s advanced design, systems integration and chips production capabilities. However, while we appreciate the European Commission’s proposal to earmark 1.65 billion Euro from Horizon Europe for innovation projects focused on semiconductors and quantum technologies, we urge the European Commission, the European Parliament and European Council to refrain from diverting any further money from the already very small Horizon Europe budget. Rather, when aspiring to fund new key technologies, the European Commission together with Member States should spend extra money. If Europe aspires to strengthen its future economic resilience, it has to invest large sums in key technologies.

To meet the European Commission’s ambitious target of 20 percent of global semiconductor production taking place in Europe by 2030, time is of the essence. Therefore, we encourage the European Commission and Member States to quickly agree on the projects that can be co-funded under the Important Project of Common European Interest Microelectronics and Communication Technology (IPCEI ME/CT) and approve early allocation of funds. In addition, we encourage Member States to provide

organisations that receive funding under the IPCEI ME/CT with fast-track planning and approval procedures to ensure that Europe benefits from the second IPCEI as quickly as possible.

Objective 2: Building and reinforcing capacity to innovate in the design, manufacturing and packaging of advanced chips, and turn them into commercial products

Policy recommendations

The European Commission, the European Parliament and Member States shall agree on a European Chips Act that provides a holistic European strategy on semiconductors that addresses the entire semiconductor value chain without being too dirigiste.

In light of the Russian invasion of Ukraine in violation of international law, the European Commission and Member States together with industry should identify and unlock alternative sources of supply for gases and metals also within the EU.

The European Commission, the European Parliament and Member States shall reinforce Europe's semiconductor capacities of all natures and all structural sizes.

If the European Commission, the European Parliament and Member States aspire to achieve the policy goal of 20 % semiconductor manufacturing capacity in Europe by 2030, planning and approval procedures must happen faster.

The current semiconductor shortage has significant repercussions for Europe's economy. Europe's resilience strongly depends on strategic research and development for the whole semiconductor value chain. Therefore, France Industrie, the Mouvement des Entreprises de France and the Federation of German Industries (BDI) welcome the proposal to establish a 'Chips for Europe' Initiative with the intention to reinforce the EU's semiconductor technology and innovation capacities as well as to ensure the EU's semiconductor technology leadership in the mid- to long-term. However, the Chips for Europe Initiative will only be successful if the co-legislators perceive the Initiative as crucial for economic and societal prosperity in the era of a successful twin transition, for which semiconductors are a prerequisite. To this end, the European co-legislators must agree on a holistic approach that strengthens R&D efforts, secures supply chains, extends manufacturing capacities, and fosters international partnerships.

For the upcoming political negotiations, France Industrie, Medef and BDI urge the co-legislators to consider the following remarks:

- **The Chips for Europe Initiative must address semiconductors of all natures and all sizes:** The European Commission should always align its activities with European industry's requirements. For example, while the approach of expanding production of chips < 5nm in Europe is vital to ensure Europe's long-term competitiveness, Europe's industries will continue to require semiconductors of larger sizes as well. Henceforth, we appreciate the Commission's intention outlined in the Chips for Europe Initiative to fund research and manufacturing projects that provide a concrete path to 2 nm production in Europe within the next decade. These projects are paramount, since technologies, such as artificial intelligence (AI), machine learning, 5G / 6G and High-Performance Computing (HPC), require chip solutions in the 5 nm and sub-5 nm range. However, it is wrong to assume that innovation only takes place in node shrinkage. European industry's current and future demand for industrial production capacities in the 12-

40nm technology corridor and in the More-than-Moore technologies continues to increase. Therefore, the European Commission should not decide on its own which structural sizes or technologies Europe needs to invest in. Rather, in close dialogue with industry, the European Commission should develop a pathway that ensures Europe's long-term economic resilience and that contributes to the realisation of the twin transition. In doing so, policymakers should build on the EU's strengths in speciality technologies, e.g. Gallium nitride-based solutions, which will be fundamental for sensors, RF, EV and other power solutions. Therefore, we suggest not to earmark the announced 11 billion public funding for projects dedicated to certain nodes but rather to award them based on project applications.

- **Applying a broad definition of “leading edge”:** Bearing the above stated in mind, French and German industry urge the European Commission to consider the following proposal for their definition of “leading edge” technology in the EU Chips Act: “leading edge describes the most advanced position in an area of activity”. This definition recognises that solutions across technologies can be leading edge and that this term should not be used synonymously with structural sizes.
- **Identifying and unlocking alternative sources of supply for gases and metals:** In light of the Russian attack of Ukraine in violation of international law, the European Commission and Member States together with industry should identify and unlock alternative sources of supply for gases and metals also within the EU. In addition, alternative materials and precious metals, especially those with improved recycling possibilities, should be increasingly used in production.
- **Ensuring the continued supply with energy:** In light of the current discussions concerning energy supply shortages, German and French industry want to flag that the stability and continuity of energy supply is of utmost importance for Europe's semiconductor industry. Energy outages are likely to lead to production downtimes of several months (~3 months), as clean-rooms as well as other sensitive equipment used for production and packaging of semiconductors can be severely damaged as a consequence of a power outage.
- **Refraining from public export controls and improving supply chains:** Semiconductor technologies, regardless of their structural size, have complex needs in terms of supply chain with very specific tools and products that are sourced globally. Therefore, securing the supply chain end-to-end is key. In this regard, upstream semiconductor players operating in Europe must be able to rely on open markets to secure the shipping of critical materials from the US and Asia, thus, ensuring the resilience of the European semiconductors industry. To this end, it is necessary that upstream users, whatever their structural size, are able to import to, produce in and export from the EU and have improved access to critical components and raw materials. Nonetheless, within Europe, politics and industry should strengthen their efforts to create an integrated semiconductor value-chain and to coordinate efforts in order to better forecasts future industry and consumer demands.

Apart from the measures proposed by the European Commission in its EU Chips Act, the following further measures need to be considered to strengthen Europe's semiconductor ecosystem holistically:

- **protect European IP:** While maintaining an international outlook is crucial in light of the semiconductor industry's global ties, the European Commission together with like-minded countries should help European companies in protecting their valuable intellectual property

integrated in chips. Whilst for some other forms of IP, such as in the case of copyright, there is a specific legal protection against circumvention of technological protection measures (TPM) in order to prevent unauthorised access and use of copyrighted material, we miss a similar protection for TPMs that could be used to prevent unauthorised access and use of trade secrets / confidential data contained in chips. Therefore, we propose to integrate a specific provision in the European Chips Act that prohibits the circumvention of TPMs implemented to protect chips against unauthorised access and the use of data contained therein. This provision could be similar to those under Article 6 of the Copyright Directive 2001/29/EC against the circumventions of TPMs. Alternatively, such protection may be set by providing that circumvention of those TPMs to gain unauthorised access and use of data contained therein qualifies as unlawful acquisition and use of trade secrets under article 4 of the Trade Secrets Directive 2016/943. By protecting European intellectual property against unauthorised circumvention of technological protection measures and use of data in hacked chips, the European Commission would increase for European companies the economic rationale for investments in leading edge chips design.

- **public planning and approval procedures:** Finally, if the European Commission and Member States aspire to significantly enhance Europe's semiconductor production capacities, Member States must adapt their planning and approval procedures which often hinder a quick establishment of new manufacturing sites. While European industry regards it as highly important that environmental protection, biodiversity as well as an exchange with civil society are considered when developing large infrastructure projects or planning new production sites, the current very lengthy planning and approval processes, including for IPCEI-related projects, represent a significant competitive disadvantage for Europe vis-à-vis other parts of the world. Henceforth, the European Commission and EU Member States should cut red tape and shorten planning and approval processes in order to make Europe as attractive as possible for investments in the microelectronics industry. German and French Industry welcome respective national announcements in the German coalition agreement on halving planning and approval procedures as well as the France 2030 plan supporting the semiconductor industry.

Objective 3: Putting in place a framework to increase production capacity to 20% of the global market by 2030

Policy recommendations

To enhance the competitiveness of Europe's semiconductor industry, the European Commission and Member States must invest in the whole semiconductor life cycle, including CAPEX and OPEX.

To enhance the EU's economic resilience, the European Commission and Member States must invest in existing and new semiconductor production facilities in Europe (for example by utilising targeted, agile, and fast state aid exemptions).

France Industrie and BDI welcome the European Commission's proposal to introduce state aid tools that go beyond the currently available toolbox. We appreciate that the Commission proposes up to 100 percent of funding for first-of-a-kind facilities in the Union. The Commission's proposed definition of "first of a kind" (cf. Article 2 paragraph 10 Chips Act-Regulation) is a step in the right direction to ensure that European companies can receive state aid for facilities that are not yet available in the Union but that might already exist in other parts of the world. With the proposal for "first-of-a-kind-facilities", the

European Commission establishes an instrument that is vital for the establishment of innovative factories in Europe.

To strengthen Europe's resilience in key digital technologies, the EU and Member States have to make investments in leading edge technologies and production sites in Europe as attractive as possible – otherwise they will establish production sites, R&D as well as other business units in other parts of the world. In this regard, French and German industry welcome the support under state aid law for IPCEI projects in areas such as microelectronics, battery cell production, hydrogen or “low carbon industry”, which should be continued in addition to the proposed first-of-a-kind facilities.

Apart from the EU Chips Act, the establishment of a second – and maybe even a third – IPCEI for microelectronics and communication technologies is vital dimension to achieve the EU's goal of 20 per cent of global manufacturing capacity being located in Europe by 2030. To ensure that future IPCEIs contribute as efficiently as possible to the Commission's targets, it is paramount to shorten the time an IPCEI requires from concept to implementation, and thereby enhance its ability to strengthen Europe's economic resilience. Therefore, a significant simplification of procedures compared to current IPCEI processes is required. This could be achieved by:

- **splitting up future IPCEIs into several, more focused IPCEIs to establish smaller / more targeted projects:** Rather than covering the entire microelectronics value chain with one very big IPCEI, the European Commission should split up IPCEIs into smaller IPCEIs or set up smaller, more focused projects within the EU Chips Act that always address one neatly defined dimension of the value chain. For example, rather than proposing an IPCEI Microelectronics and Communication Technology, in future, the EU Commission should open separate IPCEI calls on semiconductor design, on materials (including polysilicon, wafers, chemicals, gases etc.), on equipment, on semiconductor production capacities (including Front-end and Back-end), and on packaging (Ex: Bumping / 3D). At the same time, the Commission should broaden the scope and perimeter from first industrial deployment to the full manufacturing value chain. In doing so, the European Commission would reduce the coordination efforts for companies and national ministries. In addition, it thereby would reduce the time it takes from initiating a call to handing out grant agreements, and implementing projects.
- **accelerating approval and planning processes:** The EU and Member States should speed up planning and approval processes to ensure that European semiconductor projects are ready for implementation within months rather than years (See above). In addition, government bodies should transparently inform about national and European funding possibilities – ensuring that companies of all sizes are aware of respective possibilities.
- **developing more agile and less complex funding schemes to accompany the required private and public investments:** Various funding programmes are required to develop innovation but also to invest in new or refurbished manufacturing facilities, in particular, in the product and material supply chain, located in Europe. In order to strengthen the resilience of Europe's semiconductor supply chain, investments should also be allocated for facilities, in which molecules and pre-products required for the manufacturing of semiconductors are produced.

When agreeing on projects that receive funding under pillar two of the European Chips Act or within the framework of IPCEIs, Member States and the European Commission should always ensure that these facilities will match the concrete demands of Europe's industries. This is of particular importance,

as a semiconductor production site, which is not operated at full capacity results in annual costs of one to two billion Euros.

Apart from funding for research and the establishment of production / packaging sites – which are very important dimensions of the semiconductor value chain – the EU should also consider how to enhance Europe’s attractiveness as a business location in the long-run. To this end, public co-funding of CAPEX (land costs, building costs etc.) should be considered in order to ensure that production sites will be set up in Europe rather than in China.

In addition, the EU should also address the OPEX dimension. In comparison to other regions, energy and labour costs are comparatively high across the EU, especially when compared to the US and China. While the EU average electricity price in 2021 for industry amounted to \$0.142 per kWh¹⁶, in China, companies had to pay \$0.099 per kWh¹⁷, and in the US, \$0.104 per kWh¹⁸. Henceforth, companies in the EU had to pay more than 40 per cent more per kWh in 2021 than in the US and in China. This represents a significant economic disadvantage, as it has direct repercussions for product prices. At the same time, one has to bear in mind, that these figures show electricity prices before the beginning of Russia’s invasion of Ukraine and the respective global increase in energy costs. Moreover, the shift towards climate-friendly industrial processes is an additional challenge for Europe in the international race for semiconductor production. This necessitates not only large amounts of renewable electricity, but also finding solutions that enable the purchase of green electricity for industry at competitive prices. One regulatory approach could be to implement state-supported Contracts for Difference (CfD) for industrial electricity consumption that are coupled with renewable Power Purchase Agreements (PPAs). This would effectively guarantee globally competitive electricity prices for climate-neutral manufacturing by setting the strike-price level of the CfD in relation to key international competitors outside Europe, while contributing to the integration of renewables into the system and the stepwise decarbonisation of electricity supply. To this end, the European Commission should address electricity costs as a key dimension for creating a globally competitive European semiconductor ecosystem.

Companies from both within and outside the EU should have the possibility to benefit from funding proposed within the framework of the EU Chips Act. However, it is paramount that all companies that benefit from European tax-payers’ moneys must comply with the same legal requirements in order to ensure a level-playing-field.

¹⁶ Eurostat. 2021. URL: File: Electricity prices for non-household consumers, first half 2021 v5.png. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Electricity_prices_for_non-household_consumers,_first_half_2021_v5.png

¹⁷ GlobalPetrolPrices.com. 2021. URL: https://www.globalpetrolprices.com/China/electricity_prices/

¹⁸ eia. 2022. Electric Power Monthly. URL: https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a

Objective 4: Addressing the acute skills shortage, attracting new talents and supporting the emergence of a skilled workforce

Policy recommendations

Member State governments and the European Union must support industry in its efforts to attract and train specialist for the European semiconductor industry by:

- offering more vocational and academic training especially in STEM subjects,
- setting up university courses to train Europe’s future semiconductor specialists,
- enhancing Europe’s attractiveness for highly skilled graduates (e.g. by offering tax vouchers and ameliorating certain social services),
- building on the “Pact for Skills” initiatives also for the semiconductor industry, and
- establishing a “European Competence Centre for Microelectronics”.

Currently, German companies alone are confronted with a huge shortage of skilled labour amounting to roughly 276,000 STEM experts¹⁹ – of which roughly 96,000 are IT specialists²⁰. The situation is similar across many EU Member States. This has far-reaching repercussions for achieving the European Commission’s aspiration to reshore huge proportions of the global semiconductors value chain to the EU. If Europe aspires to hold 20 per cent of semiconductor production by 2030, this will only be possible if companies across the EU will be able to employ the talents they require.

France Industrie and BDI, therefore, welcome that the European Commission addresses the skills shortage in the EU Chips Act . Offering vocational and university training programmes is paramount for expanding Europe’s semiconductor industry. We welcome the proposals flagged in the Commission’s Communication and would urge the European Commission and Member States to swiftly implement the following measures together with industry and academia:

- **offering more vocational and academic training especially in STEM subjects:** Europe must step up both its vocational and academic training especially in STEM subjects. As vocational and academic training normally take three to five years, EU Member States have to act rather quickly to overcome the skills shortage by 2030, and thereby, to achieve the EU Commission’s semiconductor target set for 2030.
- **setting up university courses to train Europe’s future “semiconductor” specialists:** Since an average fab employs about 2,000 highly skilled professionals, politics, universities and industry should together establish Bachelor, Master and PhD courses that provide targeted training for young Europeans interested in working in the semiconductor industry.
- **enhancing Europe’s attractiveness for highly skilled graduates:** Europe must be attractive for highly skilled university graduates and those finishing their apprenticeship. Henceforth, the

¹⁹ Gesamtmetall. 2021. In Kürze: MINT-Herbstreport 2021. URL: https://www.gesamtmetall.de/sites/default/files/downloads/nmf_mint_herbst-report_2021_factsheet_final.pdf

²⁰ Bitkom. 2022. IT-Fachkräftelücke wird größer: 96.000 offene Jobs. URL: <https://www.bitkom.org/Presse/Presseinformation/IT-Fachkraefteluecke-wird-groesser>

EU Member States should consider offering tax vouchers, improving social services or providing accommodation to those young talents that decide to work in Europe.

- **establishing a “European Competence Centre for Microelectronics”**: A “European Competence Centre for Microelectronics” should be established. Such as centre should help fusing the expertise of existing research institutions, skills in the field of teaching and the curriculum of the relevant courses of study. While academic freedom should remain unaffected; the focus should be on closer interlinkages between academic institutions and industry’s requirements. The objective is to improve academic, technical and information technology education, to update it along new industrial requirements and to increase the talent pool for the semiconductor industry in Europe. This should be aligned with the activities of French and German companies, such as providing young talents with possibilities for internships and apprenticeships.

Objective 5: Developing an in-depth understanding of the global semiconductor supply chains and anticipating future crisis

Policy recommendation: “crisis monitoring mechanism”

Instead of implementing the Commission’s proposal – within the EU Chips Act – for a very dirigiste crisis monitoring mechanism that entails far-reaching market interventions, the European Commission, the European Parliament and Member States should agree on a foresight mechanism that is proportionate, effective, ensuring the respect of competition rules, trade secret and industrial property rights and not over-invasive.

Increased transparency and a better understanding of critical supply chains is key to anticipate and effectively address future disruptions. Therefore, a certain degree of monitoring might be useful – especially in light of similar approaches outside the EU. However, German and French industry are very critical of the European Commission’s concrete proposal to establish a crisis monitoring mechanism that entails far-reaching market interventions. There are many unanswered questions regarding the mandatory release of information, mandatory prioritisation of production, joint procurement, and export controls. Moreover, as significant parts of the semiconductor supply chain are headquartered outside the EU, French and German industry doubt that such an approach will be practical.

The co-legislators should note that most semiconductor products are not “off-the-shelf” or “one-size-fits-all” components. Rather, they possess very specific technical specifications per product and customer. A chip developed for one industry cannot be easily used by another. In addition, chip factories are only able to manufacture a specific range of node sizes and transistor technologies. Consequently, the European Commission will encounter massive difficulties when initiating the ‘crisis stage’, as it will be impossible for a fab to swiftly produce different semiconductors and / or to produce for different customers.

We oppose the excessive information gathering proposed by the European Commission in Article 20 of the Proposal for a Regulation establishing a framework of measures for strengthening Europe’s semiconductor ecosystem (Chips Act). If a third party would gain access to these information – gathered by the European Commission – about the European semiconductor industry’s production capabilities, production capacities and current disruptions this could have severe repercussions for Europe as a whole. Furthermore, we oppose the Commission’s intention to impose fines on companies that provide incomplete or no answers to the Commission’s call for information.

French and German industry have many questions surrounding the practical implications and implementation of the “crisis monitoring mechanism”. For example, it is still unclear how the European Commission will define which concrete types of semiconductors need to be produced; how it will set up an EU-wide coordinated procurement, and how as well as which stakeholders or actors in the supply chain would benefit in case the crisis stage was activated.

Close alignment with industry would be of highest importance before introducing and activating of any crisis instrument. If set up, the European Semiconductor Board should immediately institutionalise consultations with the (semiconductor) industry. The European Commission and Member States should recognise industry’s unique ability to monitor market developments and allocate scarce resources accordingly.

Policy recommendations: “International Cooperation”

The European Commission must strive for international cooperation at eye-level while refraining from a subsidies-race, by

- refraining from any attempt to set up a closed semiconductor value chain in Europe,
- fostering cooperation on semiconductors with the US Administration in the framework of the Transatlantic Trade and Technology Council, and
- working together with international partners in international standardisation bodies to advance international standardisation roadmaps and technical norms.

From a global economy perspective, it is important to note that currently no single state or region is autonomous in terms of producing semiconductor. While almost 75 per cent of global semiconductor production capacity is located in Southeast Asia²¹, countries like Taiwan, South Korea and China do not dominate the semiconductor market. This is largely due to the high degree of division of labour along the semiconductor value chain. The USA, for example, is dominant in the crucial area of chip design and is home to 10 per cent of global production capacities, which are continuously expanded. Europe has its strengths in the area of sensors, actuators, power electronics, microcontrollers and imaging processors, which are crucial for both the energy and the mobility transition. Other European strengths can be found, for example, in basic chemical materials, mechanical and plant engineering, and a significant global market share in the field of communication technologies.

Furthermore, securing the availability of imported materials and products in Europe and facilitating the shipping and customs procedures is paramount to ensure the resilience of the EU’s semiconductor industry. Semiconductor technologies, regardless of their structural size, have very complex supply chains of highly specialised tools and raw materials, such as essential gases and chemicals, that are sourced globally. Therefore, essential gas and chemical material suppliers to the semiconductor manufacturers operating in Europe, whatever their size, should be able to import to, produce in and export from the EU by relying on open markets. Therefore, establishing agreements with third countries such as China, Japan, Korea or the United States to secure the availability of selected / critical raw materials, such as gases, and products required by semiconductor manufacturing is essential and needs to be

²¹ZVEI. 2021. Zukunftsstrategie und Marktentwicklung Halbleiterindustrie: Deutschland und Europa. https://www.zvei.org/fileadmin/user_upload/Presse_und_Medien/Pressebereich/2021-103_ZVEI_Digitalisierung-und-gruene-Transformation-treiben-Welt-Halbleitermarkt/ZVEI-Pressekonferenz-Halbleiter-2021.pdf

secured. Shipping from Asia and the US, as well as customs procedures, should also be facilitated by implementing priority treatment on container ships, customs clearance and import GHG quota.

Indeed, taking into account the entire supply chain by developing a semiconductor ecosystem would ensure a better forecast for future industry and consumer demand. To anticipate further crisis, it is therefore necessary to include chemical raw and basic materials, such as gases and related products, under the “raw material definition”.

Apart from the EU, several other countries – in particular the US and China – are currently aspiring to augment their semiconductor production capacities. An overall increase in semiconductor production capacities is of utmost importance in light of increasing demands across industries. Hence, we welcome the Important Project of Common European Interest (IPCEI) Microelectronics and Communication Technologies (IPCEI ME/CT) and the European Commission’s proposal for an EU Chips Act. Nonetheless, the European Commission and EU Member States should strive for global value chains instead of protectionism and a global subsidies race.

France Industrie, Medef and BDI welcome that the European Commission aspires to utilise existing or new fora to cooperate with like-minded countries in its efforts to enhance the crises-proofness of the global semiconductor industry. To this end, we urge the European Commission, the European Parliament and Member States to:

1. **refrain from any attempt to set up a closed semiconductor value chain in Europe.** According to a study conducted by Boston Consulting Group²², the establishment of a closed value chain in a single region would require investments of approximately one trillion euros and would lead to a significant increase in the price of microelectronics in the range of 35 to 65 per cent. In conjunction with already higher energy and labour costs in Europe, semiconductors from such a European factory would not be competitive on an international scale.
2. **foster cooperation on semiconductors with the US Administration in the framework of the Transatlantic Trade and Technology Council.** With the US Chips Act and the EU Chips Act, the USA and the EU have announced public and private investments of about 45 billion Euros each to strengthen the semiconductor industry – together this is just 2/3 of the Chinese state investment. The US Administration and the EU should seek transatlantic cooperation and jointly develop a strategy that strengthens the transatlantic semiconductor value chains from design to production, including raw materials and packaging. The EU and US should jointly identify bottlenecks in the value chain and work towards a more balanced global supply chain. Moreover, both the EU and the US should strive for a reciprocal reduction of investment barriers as well as the avoidance of new trade restrictions used as retaliation measures. In addition, coordination of export control measures is critical to prevent negative impacts on European or US companies along the semiconductor value chain. Thus, export controls should be implemented multilaterally and in a strategic, targeted manner to address concrete security issues posed by products that are intrinsically sensitive. Extraterritorial rules, which are unilaterally controlled and impact items that clearly do not pose a security threat, should be removed, such

²² Boston Consulting Group and SIA. 2021. Strengthening the Global Semiconductor Supply Chain in an Uncertain Era. URL: https://www.semiconductors.org/wp-content/uploads/2021/05/BCG-x-SIA-Strengthening-the-Global-Semiconductor-Value-Chain-April-2021_1.pdf

as the American licences imposed for the export towards other regions of the world of European electronic products including American technologies.

- 3. work together with international partners in international standardisation bodies to advance international standardisation roadmaps and technical norms:** Cooperation on standardisation is key to achieve economies of scale and deliver affordable, high-quality products to end users. With rapidly growing technology trends such as autonomous driving, Industrial Internet of Things (IIoT), electric vehicle (EV) charging, 6G, cloud and quantum computing, a globally harmonised standardisation system is vital for all actors along the value chain as well as for users and consumers. Fostering dialogue in areas of mutual interest with leading stakeholders would contribute to a deeper common understanding of the requirements related to standards and their implementation.

Imprint

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