European Critical Raw Materials Act Public Consultation
ETIP PV Contribution

The European Technology and Innovation Platform on Photovoltaics ETIP PV welcomes the opportunity to contribute to the European Commission public consultation on the upcoming European Critical Raw materials act. The European Union needs to have a raw material strategy that is consistent with the imperatives of its energy and climate policies, notably with regards to energy independence and for the success of the European Green Deals in terms of jobs and social impacts. As the European platform assessing the research and innovation needs of the PV sector throughout its value chain and towards the market uptake of innovative technologies, the ETIP PV is well situated to provide a perspective on the European Critical Raw Materials Act in the perspective of the energy transition.

1- The EU needs to address vulnerabilities on the current raw materials markets…

The EU needs to rapidly address its supply chain vulnerabilities on the current raw materials market. PV is expected to rapidly become the largest contributor of the European energy transition according to the European Solar Strategy. To get there, the EU has committed to at least 20 GW of domestic PV manufacturing by 2025, the ETIP PV anticipate the potential for over 100 GW of PV manufacturing in Europe by 2030. Achieving this requires an integration of the entire value chain, including the upstream in Europe.

Currently, the EU is facing vulnerability along its raw materials supply chains for PV. On the critical raw materials list of 2020, silicon metal clearly is one of the most crucial one for the PV industry as it is an area where the EU remains a marginal actor despite the presence of production capacity in France, Germany, and Norway. It is crucial to ensure the growth of European metallurgical silicon capacity, which is actively working on the rapid reduction of its carbon footprint to ensure the sustainability of European industry, along with that of the PV sector deployment. Important synergies also exist on this topic with the semiconductors supply chains, and the EU has an opportunity to ensure the security of the core raw materials of two of the most strategic industries of the time. The ETIP PV Strategic Research and Innovation Agenda identifies a target of 20% silicon metal sourced from Europe for the European PV industry by 2030.

Another critical raw material is Polysilicon the base for solar and semiconductor wafer production. EU has a Poly Silicon capacity of ca. 66.000 tons per year in Germany and Norway. This volume will only be sufficient for a downstream solar capacity of about 25GW. The existing production capacity is already booked until 2024/25, which can be a limit to European plans for domestic PV manufacturing expansion. The key challenge to set up new poly Si manufacturing facilities is the heavy investment associated connected with the facts that poly Si is high up the solar PV value chain. It therefore lacks a diversified customer base in the EU to sustain robust additional capacity investments, as there are very few European wafer producers for instance.

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Besides silicon, the EU is also vulnerable on the topic of Indium and Gallium among other key raw materials. These raw materials, which contribute to transforming the silicon wafer into a photovoltaic cell are limited in supply sources, but also in absolute terms. Beyond supply diversification, support to research and innovation is crucial to minimise the use of these materials, and industrialise production processes for PV technologies that rely on alternative materials that are easier to access and less limited in supply.

2- … and anticipate evolution of the global raw materials demand!

Moreover, the Critical Raw Materials act must anticipate the future needs of the European economy, especially when it comes to PV and other technologies of the energy transition. For PV specifically, it is crucial to consider the topic of silver, where the PV industry is rapidly emerging among the main drivers of demand. The EU has an important role to play in furthering the development of upcycling and recycling processes that guarantee a high purity of recycled silver, but also in ensuring the resilience of the global supply chain for raw silver – including via the promotion of domestic production. The ETIP PV SRIA 2021 has for instance identified a target of 30% silver sourced within Europe for the PV industry by 2030. Moreover, investing in research and innovation is crucial to develop viable alternatives to this dependence on one material. European research institutes are already global leaders in the development of alternative to silver-based PV modules using much more plentiful alternatives such as copper, the EU needs to provide a consistent and straightforward framework to accelerate the market uptake of these innovative alternative technologies – including within a European manufacturing sector.

3- Supply chains vulnerability do not only arise from raw materials vulnerability: addressing mid-stream

Critical raw materials are an important component of the challenges of the European industry on the global market, notably for clean energy technologies such as PV. However, the EU is not only facing challenges in sourcing such raw materials: there is a lack of a robust industrial fabric to support the emergence of clean energy technologies in line with the European Union's ambition. Within its critical raw material strategy, the EU needs to address mid-stream processes and build up industrial capacity in that regard.

In the PV sector, some of the main supply challenges are linked not merely to raw material, but to intermediary products such as PV glass and silicon wafers. In the downstream of the PV value chain – module production – the EU is for instance lacking sufficient solar glass manufacturing capacity. Glass is one of the most important cost factor among the materials in PV modules. It also has an extended carbon footprint when imported from non-EU countries. Furthermore, EU is lacking a sufficient module encapsulant foil and aluminium frame production capacities (which are other important components in the total weight and factors in the Total Cost of Ownership of a solar module).

In the new paradigm of fragile global supply chains, vulnerability on such mid-stream components of the supply chain can have a dramatic impact on the competitiveness of the PV industry. The EU needs to build up its

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capacity to provide such products and services to the industries that are at the core of the European transition. Doing this requires both to support investments into production facilities for these types of products, but also encouraging R&I into innovative processes to guarantee the quality and the costs of producing these mid-stream components of clean energy technologies – and ultimately the competitiveness of the European clean energy technology supply chain.

4- Enabling the development of a circular economy while managing the rapid transformation of the European energy sector

The imperative for circularity is one that must become the central principle of the European Union's critical raw materials strategy. The European PV industry is continuously developing processes towards greater resource efficiency. This for instance includes the significant diminution of the thickness of PV wafers or the design of modules that aim to square efficiency, resource efficiency and reliability. Many instances of the ETIP PV Strategic Research and Innovation Agenda (2021) focus on reducing resource use, and embedding circularity within the PV value chain. The ETIP PV SRIA for instance anticipates the potential to reach end of life recycling rates of 90% for silicon, 30% for indium, 70% for silver and 95% for cadmium by 2030.

Despite the potential for a rapid development of the European PV recycling and upcycling value chains, the tremendous growth of PV deployment and manufacturing that is required by the European Solar Strategy also highlights the fact that the PV industry will not be entirely circular quite yet. The rapid growth of deployment means that recycling will only provide a fraction of the materials needs for the manufacturing of PV panels at scale to reach the more than 700 GWdc of capacity required by the European Solar Strategy. Promoting circularity must also enable the responsible sourcing of raw materials for rapidly growing and highly innovative renewable energy technology sectors such as PV.

5- The need for clean raw materials supply chains for the acceptability of the energy transition

The fact that the decarbonization of the economy, and the shift towards renewable sources such as PV will lead to a transformation of the global mining industry – away from massive amounts of hydrocarbons and towards specific raw materials. This shift is also leading to changing extractive and refining processes and areas of production. For the continued acceptability of the clean energy transition, it is crucial to guarantee a clean raw materials supply chain for PV and other renewable energy industries. The example of the revival of mining around lithium in Portugal is a cautionary tale of public backlash that may threaten the stability of the transition and the achievement of the European Green Deal.

Investing in the development of innovative industrial processes for the production of clean energy technologies will allow to valorise a wider range of materials. However, this also needs to include sustainable extraction

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technologies to produce critical raw materials, with minimal environmental impact and as much as possible positive social impacts.

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