ESIA European Solar PV Industry Alliance

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EUROPEAN SOLAR PV INDUSTRY ALLIANCE

RECOMMENDATION PAPER SERIES VI

Save the Foundation of the Photovoltaic Industry Chain - Call for an Industrial Electricity Price in the European Union

Executive Summary

This paper presents the analysis of the Task Force on Electricity Prices which is a subgroup under the umbrella of the European Solar PV Industry Alliance (ESIA) Finance Working Group. Although current electricity market prices in Europe have decreased in the current economic downturn, long-term stable and predictable electricity prices are crucial for investments particularly in the energy intensive parts of the photovoltaic (PV) value chain consisting of silicon metal, polysilicon, ingot/wafer and solar glass. Beyond sufficient CAPEX support for investments in these capital-intensive parts of the value chain, also long-term predictable OPEX in the form of global competitive electricity prices is necessary for investments in the sector. The current provisions in the TCTF fall short of encouraging investments in the member states as they are too restrictive, too complex and do not really facilitate OPEX support needed. But even if the investments were to happen, the NZIA does not create a level playing field vis a vis imports from Asia. The document will provide an overview of the challenges the PV value chain segments are facing and the recommendations how to provide globally competitive electricity prices for an extended period.

Background

With the target of installing more than 320 GW of PV solar panel capacity by 2025, and almost 600 GW by 2030, Europe must rely on a resilient and strong supply chain. Unfortunately, the European PV industry is not competitive compared to large global players, mainly located in Asia. Specifically Chinese solar PV modules are flooding the European market at low prices outcompeting European players at every step of the PV value chain. The main reasons for this development are massive cost differences and political support along the PV value chain:

- Higher operational costs in Europe (e.g. electricity prices, raw material prices)
- Significantly higher capital expenditures for investments in Europe
- Small scale fabs compared to large-scale production in Asia
- Efficient political and financial support of new energy industries in China, USA and India

The combination of all these factors results in a weak domestic PV manufacturing industry in the European Union. Solar PV module producers are fighting for survival, solar cell and solar ingot/wafer players are nearly non-existent. And even comparatively large European players in the upstream sector like WACKER (polysilicon), Ferroglobe (metallurgical silicon) and Interfloat (solar glass) face major obstacles to continue their operations in a profitable or even viable manner. One important reason are the prevailing high and unpredictable electricity costs in Europe compared to other major regions (i.e. China, USA, India). In addition, each European member state has a different reality in terms of availability, prices, costs and regulatory frameworks for electricity. In France, the ARENH pricing scheme for big industrial consumers will expire by end of 2025 and the future pricing mechanism for electricity is still in discussion. Furthermore, although Spain may be one of the cheapest countries for energy in the European Union, electricity prices are still twice as high as those of main silicon metal competitors in other regions. Capacity expansions are not economically feasible in this unfavorable global competitive environment. The European PV manufacturing industry is marginal compared to large and successful global players, mainly located in Asia.

The European target to produce 30 GW of PV components along the whole value chain domestically is not achievable under current operational and political frameworks. Up to now European policies have failed to foster the re-building of a European PV supply chain. In contrast, other major regions have developed efficient policies and support the domestic PV manufacturing industries

successfully. The United States have implemented the Inflation Reduction Act, India fosters its domestic industry via the Production-Linked-Incentive Scheme, and China puts in lots of money and governmental support to dominate the global green energy industries on a long-term trajectory. The huge potential for green energies, specifically photovoltaics and domestic production, remains mostly untapped up to now.

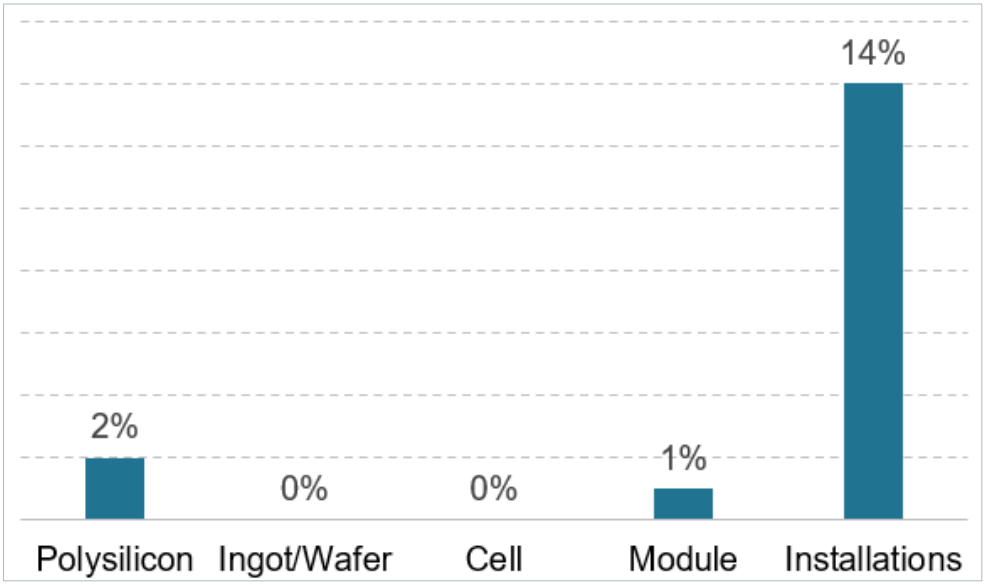

Figure 1. European Share of Global Capacities and PV System Installations (%)

Current European Political Framework

The European Commission initiated the Net-Zero Industry Act (NZIA) and the Temporary Crisis and Transition Framework (TCTF). Both measures aim to support the build-up of a fully integrated and strategic PV manufacturing value chain in the European Union.

The NZIA targets to establish around 30 GW of manufacturing capacity for each step of the PV value chain (silicon, polysilicon, ingot/wafer, cell, module, solar glass, inverter and others). In addition, national PV tenders with “non price criteria” are permitted to support the usage of domestic equipment by providing a competitive advantage against low-priced imports from Asia. But up to now the NZIA completely fails to support the European PV industry in the right manner. Module producers are going bankrupt nearly each month and European solar PV manufacturing capacities are diminishing even further. Expansion projects have severe difficulties to transform their plans into reality. The main reasons are the lack of concrete financial support and the right political environment to build a successful business case. Comprehensive national CAPEX and OPEX subsidies

are prevented by strict EU state aid legislation. The new 'Temporary Crisis and Transition Framework' (TCTF) envisaged in the 'Green Deal Industrial Plan' (GDIP) must adapt the regulatory framework so that the above instruments can be established. In addition, European aid intensity ceilings should be raised. Currently, the maximum rates are 10 to 15% per company, massively below international rates. For comparison: In the USA, the current rate is 70%.

In a nutshell, the current political framework is not able to provide the necessary financial and political measures for a healthy PV manufacturing supply chain in the European Union. National solutions would be much faster and much more efficient and could be adapted to the local realities (which differ sometimes very much between member states). In contrast to the effective political support in the United States and China, European efforts are much weaker. Ultimately, inefficient European policy frameworks endanger the European economic power and could lead to a continuous de-industrialization of the bloc — specifically in the area of businesses with high needs for electricity and raw materials.

Electricity Prices in the European Union

In the European Union electricity prices for large industrial consumers are generally much higher compared to relevant competition markets like the United States and China. Many sectors with high electricity needs, e.g., aluminium and steel industries, but also large parts of the chemical industries, are suffering from significantly higher and heavily fluctuating energy costs compared to their international competitors. This has led to stagnating or even diminishing production capacities in the European Union. Expansion plans increasingly focus on regions with lower energy bills like Asian countries or the United States. This also applies to the energy and capital-intensive parts of the PV value chain: metallurgical silicon, polysilicon, ingot/wafer and solar glass.

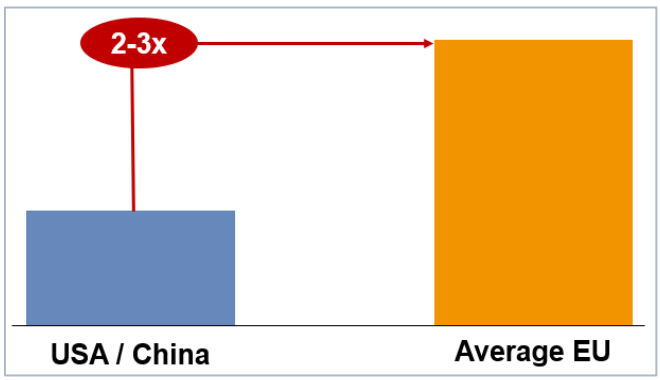

Figure 2. Comparison of Electricity Prices of Large Industrial Consumers

Metallurgical silicon is produced in a power intensive process from quartz and carbon. Ferroglobe, one of the large European players, has several plants in France and Spain and is highly dependent on low-priced electricity to keep its operations profitable. Different national energy market designs and regulatory regimes plus the overarching European regulations are an ongoing concern. WACKER is the last European manufacturer to produce one of the purest materials on earth: polysilicon with purity levels above 99.999999999%. This process needs even more electricity than the production of metallurgical silicon and international competitors in Asia and the United States have a significant competitive advantage from their electricity cost compared to European producers. The next step of the PV value chain — solar ingot and wafer production — is not existent any more in the European Union. Two producers in Norway discontinued their operations recently, with one of them searching for a new location in the United States with a better political and business environment. Last but not least, solar glass producers like Interfloat are also suffering from a non-competitive energy cost level in the European Union. Market observers predict further that many energy intensive industries will have severe difficulties to continue their operations or consider to discontinue or relocate their businesses.

Electricity Used for Production

Electricity prices in the European Union are too high to allow for the expansion or re-establishment of the critical and power intensive parts of the PV manufacturing value chain: metallurgical silicon, polysilicon, ingot/wafer and solar glass. A politically proposed solution is the purchase of Renewable Energies via so-called power purchase agreements. But in reality, these contracts are generally priced too high, available capacities are not sufficient for the high power consumption needs of energy intensive industries and above all the volatile renewables are not suitable to serve the electricity needs of a 24/7 continuous production. The necessary “balancing” on the day-ahead and intraday market would add additional risks and costs, which cannot be borne by companies which experience already intensified cost pressure.

As mentioned above, electricity markets and regulations can differ significantly between member states. Consequently, any future European regulation should set the frame for each country to establish easy, effective and strong support measures to implement an industrial electricity price on a national level. Overarching European regulations should merely allow for and support national measures and not restrict or hinder them. We would like to pick the concept of Contracts for

Difference (CfDs) as an example of how an internationally competitive industrial electricity price could be implemented in an easy manner. Such a stable, predictable electricity price could support energy intensive industries with sufficient green energy at an internationally competitive price level — at least for 10–15 years to secure the necessary planning certainty to support profitable operations and allow for new investments in the European PV industry chain.

Proposal for the introduction of an industrial electricity price (or transformation electricity price) via Contracts for Difference (CfDs)

- The transformation power price consists of two contracts for difference (CfDs). The first CfD is concluded between the state and renewable energy suppliers and sets an indexed electricity price. If, at the time of delivery, the actual electricity market price is below this indexed price, the state pays the difference. If it is above, the renewable energy providers pay the difference to the state.
- The second CfD is introduced between the industry and the state and works on the same principle. Here, too, an electricity price is set. If the electricity market price is below the indexed price, the industry pays the difference to the state. If it is higher, the state pays the difference to the industry.
- The advantages of this structure are obvious: Planning certainty for the energy price enables industrial companies to develop and secure their business models in the long run. The state temporarily assumes a defined financial risk from buffering the two CfDs, but can at the same time devote its full attention to other issues in the course of the demanding transformation.

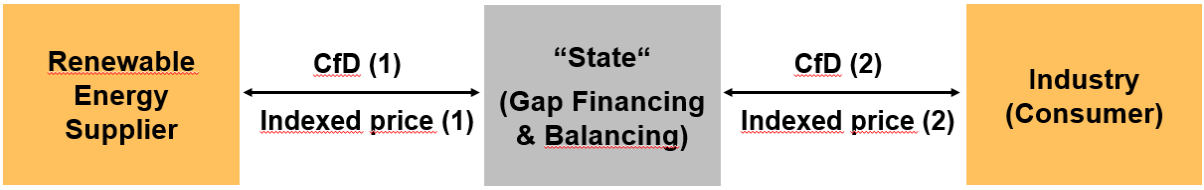

Figure 3. Basic Concept of Industrial Electricity Price via Contracts for Difference

Summary: Call for the introduction of an industrial electricity price as a key element to rebuild a fully integrated PV supply chain in the European Union

Europe must act now to establish a level playing field and ensure that the objectives of the Solar Strategy and the Net-Zero Industry Act are met. The current and potentially growing dependency on

one country, China, threatens security of supply and therefore puts the EU's energy independence and 2030 climate targets at risk. ESIA members, recognising the US' IRA as a best practice (since it is clear, predictable, adequate in terms of duration and magnitude and distributed along the entire value chain) recommend some key improvements in the current EU toolbox for PV manufacturing.

- **First of all: Introduction of an industrial electricity transformation price for energy intensive PV industries. One suitable option could be contracts for difference (CfDs) — governments guarantee for predictable, stable and sufficient volumes of electricity at internationally competitive price levels.**

In addition to this key element further measures would be needed to allow for the effective and sustainable support of a fully integrated European PV manufacturing supply chain:

- Enable fast decision making towards efficient European industrial policies
- Support PV industry via 'Temporary Crisis and Transition Framework' (TCTF)
- Allow national support regimes to adapt to local requirements and frameworks
- Simplify approval processes enabling faster implementation of measures
- Coupling of national tenders to sufficient share of EU domestic production
- Provide sufficient capital expenditures support (CAPEX)
- Create long-term customer demand at secured prices and quantities