



Response of ETIP-PV to statements at 'Readying for TW era' conference

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At the end of his presentation to the ETIP PV Conference [Readying for the TW era](#), Mark van Stiphout of DG Energy displayed three provocative questions:

- *Is the European photovoltaic ecosystem, and the research and innovation system, going to become marginal in the global context like its manufacturing industry?*
- *Is Europe in the position of seizing the opportunity and taking a leading role in providing the world with sustainable photovoltaic products?*
- *Is the European photovoltaics innovation cycle broken?*

We take the opportunity to respond to these questions here.

The description of something as “marginal” is subjective. The latest survey of the EU PV manufacturing industry that we are aware of is from 2015¹, when the PV manufacturing industry’s global turnover was € 33bn, of which € 5 bn was in the EU. But PV is a fast-moving business, and even if a country or bloc is “marginal” today (or in 2015), this does not condemn it to marginality forever.

One can also ask, “‘Marginal’ in relation to what?” Mexico’s energy minister recently said she wants “‘everything’ – innovation, technology, added value – to stay in Mexico,”² even though the country will likely only ever produce a small proportion of the world’s PV modules. What matters for her, quite reasonably, is the presence of the industry in her country in absolute numbers rather than in relative numbers. The EU should think in the same terms, at least as its PV manufacturing industry begins to rebuild.

The motivation for building up a domestic PV ecosystem is to reduce the cost of electricity for a country’s consumers while keeping wealth in the national economy and creating jobs. Supporting profitable PV companies should be a public policy objective regardless of their size. Speakers at ETIP-PV’s conference included Staübli, which has 45% of the world market in connectors for PV systems; Wacker, which produces 60 ktonnes poly-Si / year, enough for 15 GW of PV; and Singulus, which before the end of the year is expecting to receive “large orders from several customers” for CIGS equipment³. German inverter manufacturer SMA sold 8.5 GW of inverters in 2018 and there have been positive announcements from Centrotherm⁴ and Norsun⁵.

¹ Reported in [Assessment of Photovoltaics \(Trinomics, 2017\)](#), Figure 2.2

² [Mexico needs domestic PV-making push, minister says at plant launch; PV-Tech 14 Aug 2019](#)

³ [Press release SINGULUS TECHNOLOGIES Reports Results for the First Half Year, 14 Aug 2019](#)

⁴ [Big order bringing work to Germany, June 2019](#)

⁵ [New equity injection to double production capacity to 1 GW, June 2019](#)





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Strategies exist, too, for companies to establish globally competitive ingot-to-module manufacturing businesses in Europe. One has recently been published by VDMA⁶. They involve vertical integration (or at least proximity to and a close working relationship with suppliers), large-scale (min. 5 GW), and full inclusion of transport costs in the cost of imported modules. Including a return on equity and interest on debt to finance construction and operation, a Europe-based large-scale fab could sell modules at 25 c€/W_p compared to Chinese production using state-of-the-art PERC technology at 24 c€/W_p. Taking account of the strategy of European companies to focus on technologies that deliver more kWh per W_p installed, the small remaining competitiveness gap could easily be closed. Policymakers could do more to steer EU module buyers towards higher quality products, particularly modules with good environmental footprint⁷.

A widely held view⁸ is that manufacturing will set up close to where there is a market for PV end-products. The good news is the EU installation market is expanding rapidly. Solar Power Europe predicts that under its Medium Scenario demand will “surge by over 80% to 20.4 GW” 2018-2019, and by “18% to 24.1 GW” 2019-2020, “which would be a new installation record, surpassing the 22.5 GW Europe added in 2011.” The difference with 2011 is that PV now requires very little subsidy⁹ making it less vulnerable to politics. This increase in demand would therefore be a firm enough basis on which to rebuild EU manufacturing. In a recent note to investors, Switzerland-based Meyer Burger stated its view that “more than half of the solar power capacity will be installed outside China in the future,” leading it to refocus on Europe (Germany) as its centre of manufacturing¹⁰.

⁶ [European photovoltaic production can be profitable](#) (VDMA, 2019). 3-page abstract available to download

⁷ See requests in ETIP-PV 2017 Open Letter, FhG-ISE's 2018 Open Letter (signed by ETIP-PV) and, more cautiously, SPE's [An Industrial Strategy for Solar in Europe](#) (2019, p13) and ESMC. Trinomics, 2017 noted, “A home market which offers more room for differentiated products would be beneficial for manufacturers who seek to compete on the basis of differentiation.”

⁸ Including from 18 interviews conducted by Trinomics 2017 (see Fig 2.6)

⁹ [August announcement](#) of a record low bid for any renewable energy technology tender anywhere in the world won for PV in Portugal (but price was criticised by a commentator for being too low)

¹⁰ [Meyer Burger press release](#), 15 Aug 2019





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Status and prospects of Europe's R&D capacity; cooperation between industry and research centres

Industry has faith in Europe's R&D capacity. Germany's Mechanical Engineering Industry Association (VDMA) says, "the technological competence is available here [in Germany and Europe]". Van Stiphout himself displayed [NREL's famous chart](#) tracking records in cell and module efficiencies. European PV research centres continue to be well represented among the record-breakers. They are also well represented in rankings related to basic science¹¹ and applied science¹².

Research for the EC by Trinomics¹³ has highlighted the contribution that EU-funded research has made to European companies. It wrote, "EU funding played an important role in the cost reduction of PV modules by consistently supporting projects that improved the efficiency of PV cells and modules, as in the case of consecutive projects HETSI, HERCULES and DISC." DISC results are to be commercialised at a 100 MW production plant in Hungary, belonging to Ecosolifer¹⁴. Von Ardenne [credits the externally funded projects](#), often conducted with research centres, that have helped it in recent years. Nexwafe, pioneering a technique to produce high quality monocrystalline silicon wafers cost-effectively, received an [investment](#) from EIT-Innoenergy. Innovfin EDP has lent [15 M EUR](#) to

Oxford PV, which will apply its world-leading perovskite technology to a 100 MW HJT line supplied by Meyer Burger¹⁵ at a site in Germany.

Meyer Burger will "partner [with REC in Singapore] on a 600MW HJT / SmartWire equipment deal", which could be extended to "gigawatts of HJT module production."¹⁶ Enel Green Power is also betting on HJT. However, it is just one technology that Europe is developing to respond to the risk of "commoditisation of equipment and technology for PERC" (Meyer Burger's words).

Solitek, a Lithuanian company, has participated in several EU projects¹⁷ and just announced that it has installed its bifacial modules in an innovative configuration in Ukraine, with hopes to sell it to Scandinavia and Benelux next year¹⁸. Solitek is now collaborating with a Finnish company using IBC cells produced with ISC-Konstanz's technology¹⁹. EU research centres were instrumental during the middle of this decade in developing "TOPCon" (Tunnel-oxide passivated contacts)²⁰, commercialised by Netherlands-based equipment manufacturer Tempres.

We believe, therefore, that the conditions for a renaissance in EU manufacturing of PV are being fulfilled. Some of the EU's enthusiasm for batteries could be extended to PV, where the bright embers of an industry are ready to re-ignite.

¹¹ [Nature Index 2019: Helmholtz Gemeinschaft and CNRS](#)

¹² [Reuters's 2016 list of the world's most innovative research institutions includes CEA and Fraunhofer in the 1st and 2nd spot. A year later, when the survey was most recently repeated, they still ranked high \(at 2nd and 3rd\).](#)

¹³ [Study on impacts of EU actions supporting the development of renewable energy technologies, Technology Sector Report, Solar PV \(Deliverable D2.4\) – draft conference attendees; Trinomics, 2018](#)

¹⁴ [Press article Aug 2018 and updated with contact to Ecosolifer management 3/09/2019: "In 09/2019, Ecosolifer will start producing HJT cells with a minimum efficiency of 23,5% with one shift. By 1/01/2020, 3 shifts and 24/7 production will have started, so from 1-1-2020 full capacity of 100 MW/year will be reached."](#)

¹⁵ [Press release Meyer Burger receives initial order for HJT production line from Oxford PV for about CHF 20 million; 8 Aug 2019](#)

¹⁶ [Meyer Burger press release 12 Feb 2018](#)

¹⁷ [SUPER PV, CABRISS, Eco-Solar, Circuso!](#)

¹⁸ [Solitek press release 2 Sep 2019](#)

¹⁹ [Valoe press release 19 Feb 2019](#)

²⁰ [PV-Tech 15 Dec 2018](#)

