Press release

Photovoltaic Equipment

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Photovoltaic Roadmap (ITRPV): Eleventh Edition Online

- **Fast growing wafer size expected**
- **Ongoing reduction of PV system costs observed**

Frankfurt, April 28, 2020 - The 11th edition of the International Technology Roadmap for Photovoltaic (ITRPV) is now available as download. Fifty-seven leading international poly-Si producers, wafer suppliers, crystalline-Si (c-Si) solar cell and module manufacturers, PV equipment suppliers, and production material providers, as well as PV research institutes and consultants jointly provided the data basis for this edition. The 11th edition of ITRPV summarizes over 100 parameters along the c-Si PV value chain in numerous charts and discusses the results. Due to Corona (SARS-CoV-2) spread, the new ITRPV edition will be released this year online. In May / June, a webinar will be offered to discuss the results and a printed version will be available soon.

The cumulated PV-module shipments surpassed 650 GWp in 2019 and the price experience curve with its historical learning continued at a learning rate of 23.5 percent. According to the findings, the PV industry

will keep this learning rate up over the next years by continuing the linking of cost reduction measures with the implementation of cell perfections, with enhanced and larger silicon wafers, improved cell front and rear sides, refined layouts, introduction of bifacial cell concepts, new cell and improved module technologies.

The market share of monocrystalline silicon (mono-Si) wafers in 2020 will be close to 75 percent and will continue to grow. In contrast, the market share of multicrystalline silicon (mc-Si) wafers will shrink continuously from about 20 percent in 2020 down to only 5 percent until 2030. The 2019 dominating wafer format of 156.75 x 156.75 mm² will disappear within the next 3 years and will be replaced fast by larger formats. Future mainstream will be formats of 166.0 x 166.0 mm² (M6) or even larger ones like 210.0 x 210.0 mm² (M12).

The continued roll out of PERC cell technology and the implementation of half-cell module technology enabled higher performing module products in 2019. Due to the current diversification in wafer formats, module dimensions are also changing. The comparison of different module types only by the common module label power may be misleading as module powers of ≥ 500 Wp are possible today with existing cell technologies by using larger wafer formats. Module area efficiency (module label power divided by module area in m²) is therefore a helpful parameter to compare different module types and module technologies.

PERC p-type mono-Si modules show an average area efficiency of 203 W/m² in 2020. This will increase to 225 W/m² in 2030. Modules with n-type cell concepts, especially those using tunnel oxide passivation technologies, are expected to be ahead of p-type PERC with 208 W/m² in 2020 and with up to 230 W/m² until 2030. HJT modules reach area efficiencies of 210 W/m² in 2020 and are expected to outperform other c-Si module types with close to 240 W/m² within the next 10 years.

ITRPV

The ITRPV (International Technology Roadmap for Photovoltaic) is updated regularly by the VDMA with contributions from leading international crystalline silicon producers, wafer suppliers, cell manufacturers, module manufacturers, PV machine builders, material manufacturers as well as PV research institutes and consultants. The aim of the ITRPV is to inform suppliers and customers about anticipated technology trends in the crystalline silicon (c-Si) based photovoltaic industry and to stimulate discussion on required improvements and standards.

For additional information, please visit the website (itrpv.org).

Do you still have questions? Dr. Jutta Trube, VDMA Photovoltaic Equipment,
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