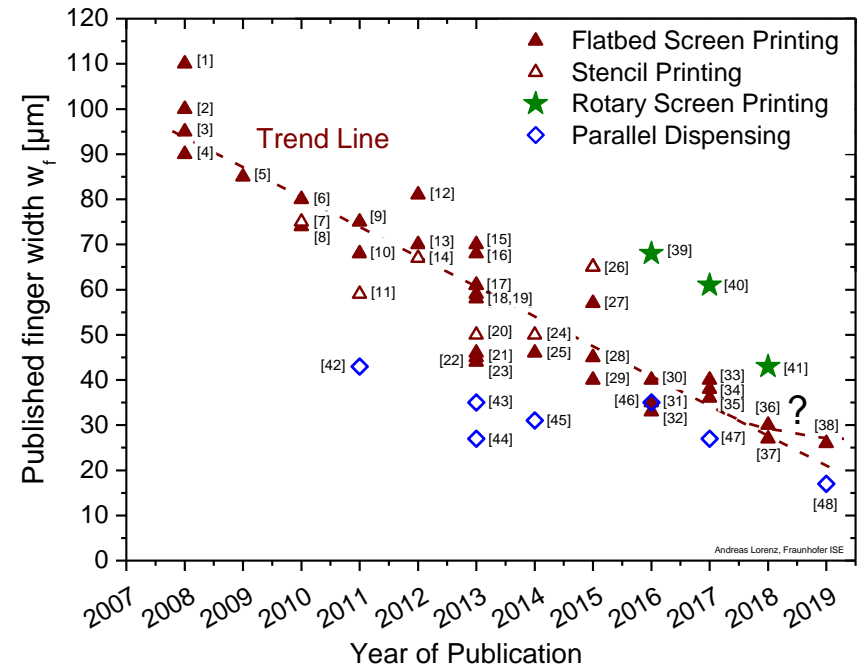


Marketplace Discussion

Topic 1: Development of screen printed finger width – how narrow can we go?

Discussion topics:

- Will the trend to reduce screen printed finger width continue in the future?
- Where is the limitation and does it make sense to further reduce the finger width?
- What will be future challenges and solutions in the field of flatbed screen printing?



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Comments/Results – Reduction of finger width:

- Since 5 years, screen printing is already over the limit (which has been defined earlier)
 - but still further innovation is going on (knotless screens, coating of mesh/emulsion, etching of wires, stencil printing)
- A further reduction of line width will be technically possible
 - A further reduction of finger width $< 20 \mu\text{m}$ in mass production is expected
- However, major questions are:
 - Which line shape do we need/accept?
 - Which costs are we willing to pay („low hanging fruits are harvested, now we come to the high hanging fruits“)
 - Further optimization/finger reduction will be primarily triggered by the trends in cell interconnection
 - Participants expect a clear trend towards 12-Wire-Interconnection which will trigger further finger width reduction

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Comments/Results – Challenges and Solutions:

- Further reduction of finger width will address new challenges with respect to paste development, firing process and screen technology
- Mesh and paste development must go hand in hand
- Knotless screens will be needed to realize contact fingers $< 20 \mu\text{m}$ with adequate height and uniformity – however, combination of knotless screens with selective emitters is difficult (alignment problems)
- Throughput of screen printing is not considered as the current major bottleneck in PV production lines (i.e. I-V-measurement is more critical)