Technology Advances for Pilot line of Enhanced Semiconductors for 3nm

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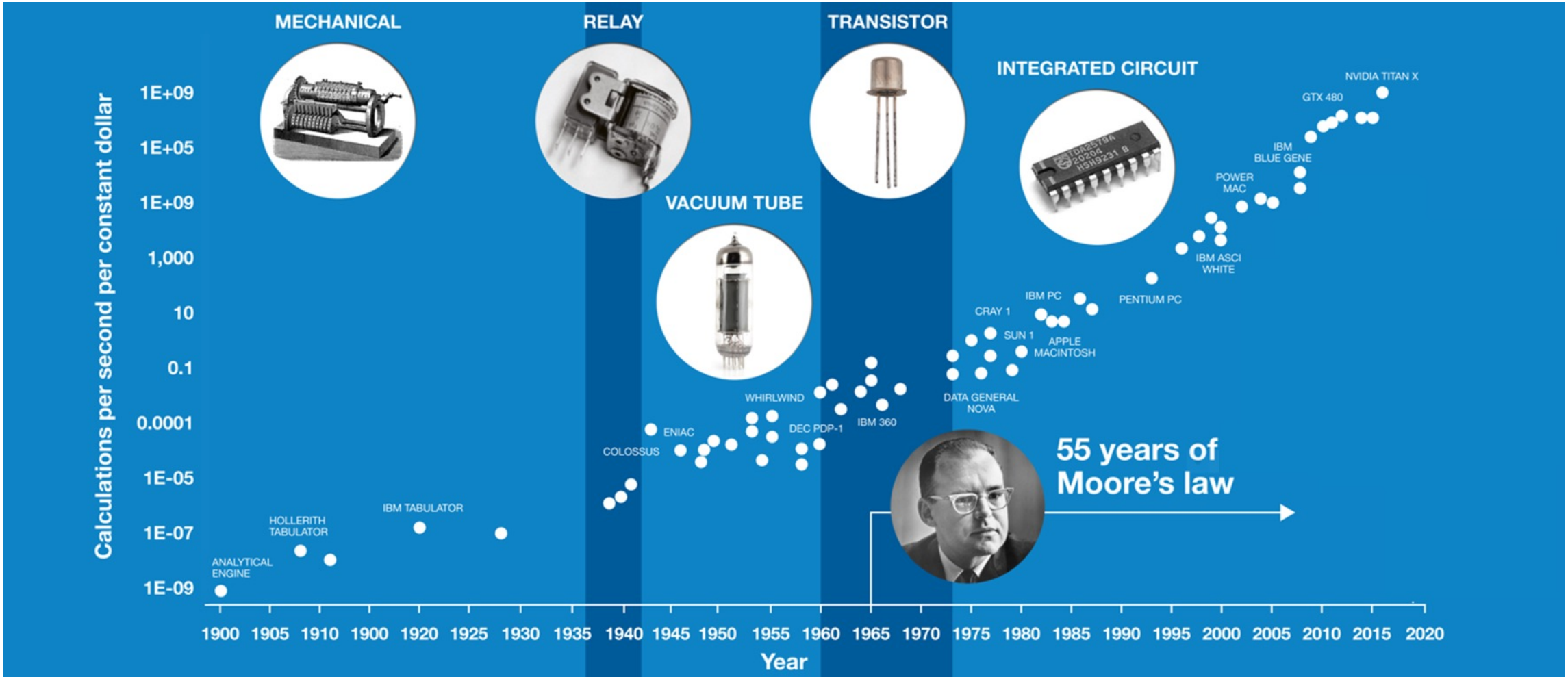
“This project has received funding from the ECSEL Joint Undertaking (JU) under grant agreement No 783247. The JU receives support from the European Union’s Horizon 2020 research and innovation programme and Netherlands, Belgium, Germany, France, United Kingdom, Israel, Switzerland.”.

The world has been **improving computer power** for 120 years

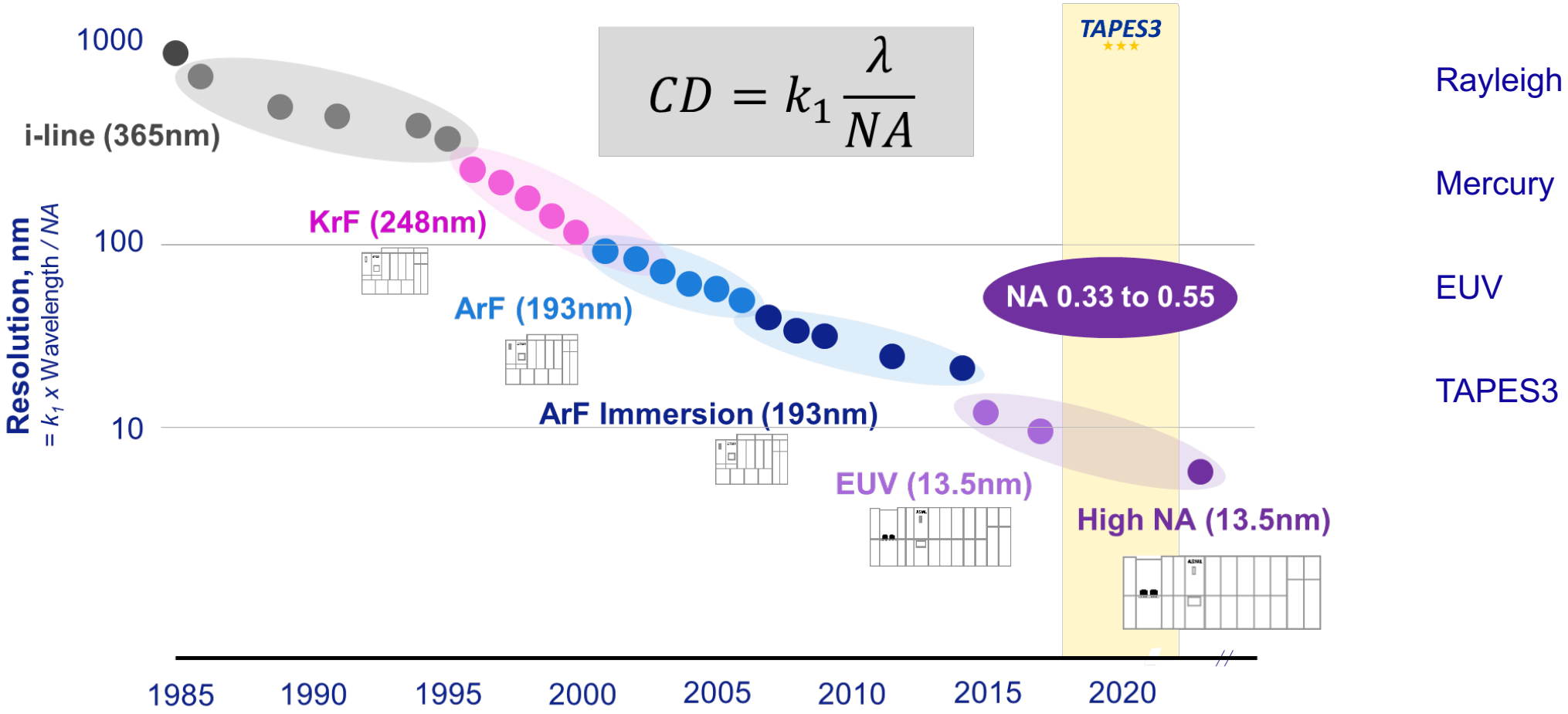
18 orders of magnitude increase of calculation speed per dollar, and still continuing



Source: Ray Kurzweil, Steve Jurvetson

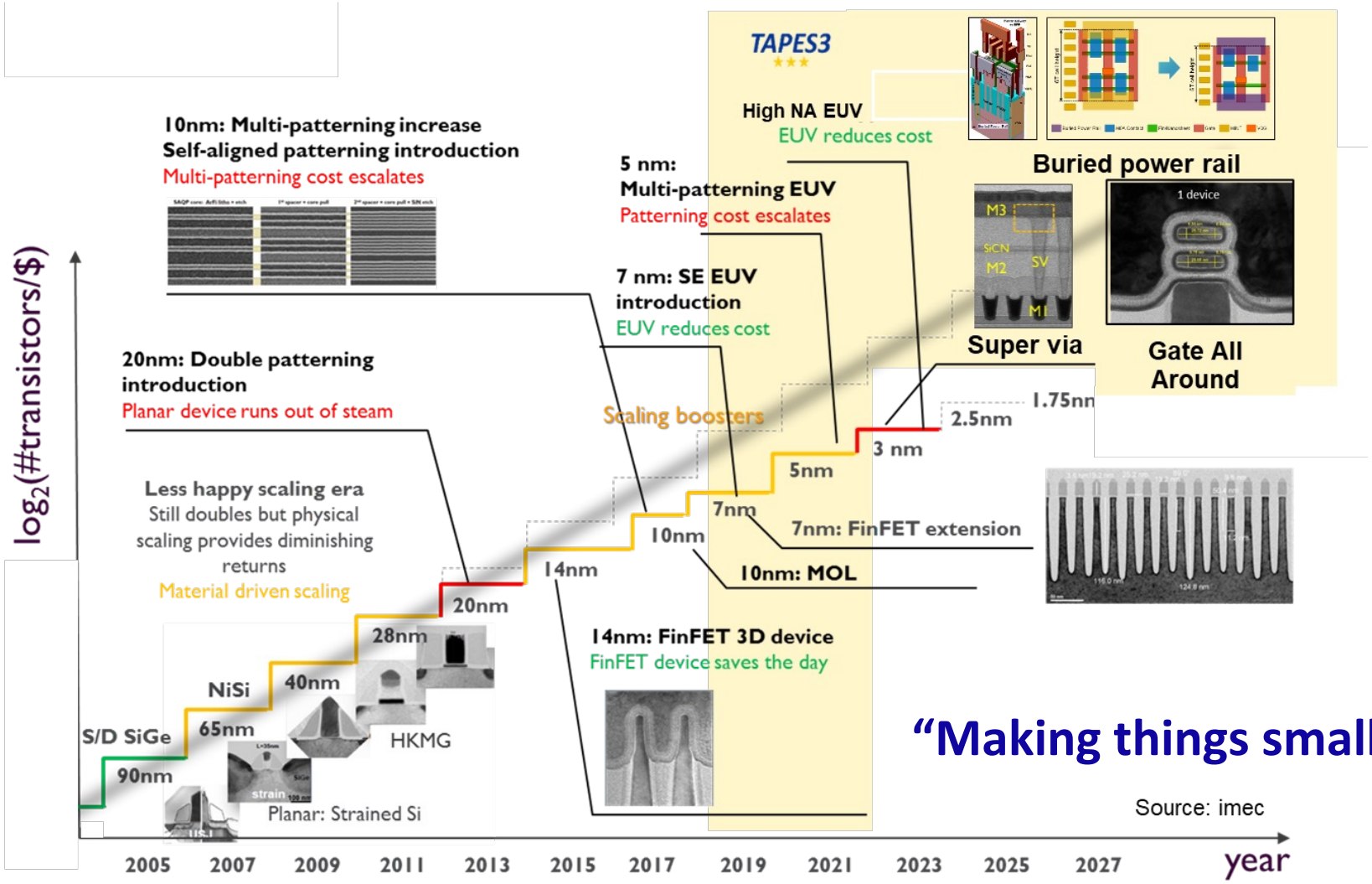
TAPES3 goal: To enable Semiconductor Industry to progress to the 3nm node

By reducing minimum feature size…..



TAPES3 goal: To enable Semiconductor Industry to progress to the 3nm node

…..and by improving technology for chip manufacture



From 2D To 3D

Gate All Around a larger surface on the same size

Super Vias and Buried Power Rail to cram more transistors in the same area

“Making things smaller to make greater things”

TAPES3 - 4 pillars

Lithography

- Numerical Aperture 0.33 → 0.55
- Optics & Image performance
- Productivity

Metrology

Measurement solutions for:

- High Aspect Ratio and gate all around stacked features
- Smaller dimension & alignment

Mask Infrastructure

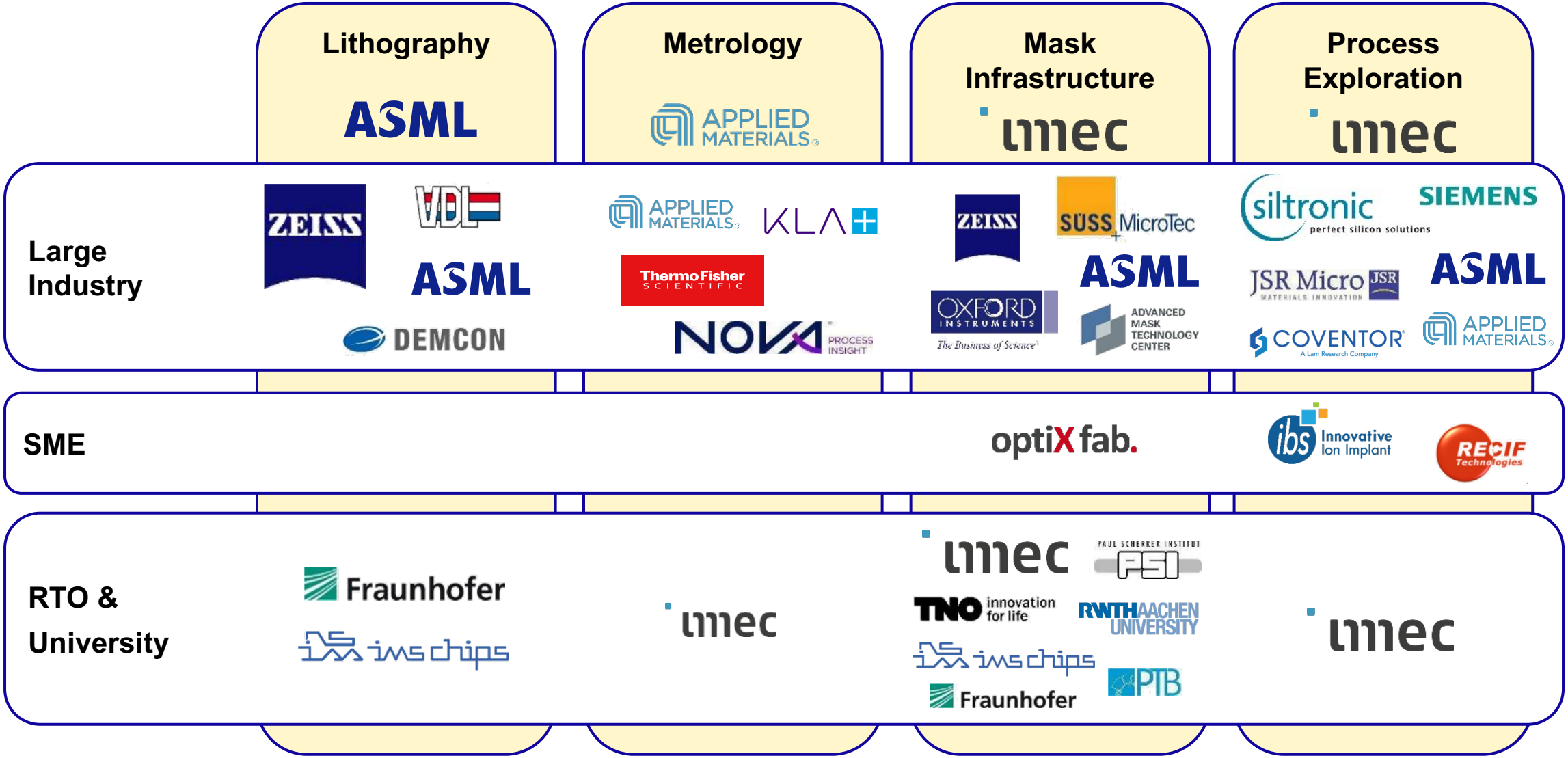
- Absorber materials & processing
- Mask tuning, repair & Inspection
- Mask storage effects

Process Technology

- Patterning
- Device & Interconnect options
- Yield prediction, wafer handling
- Scaling boosters

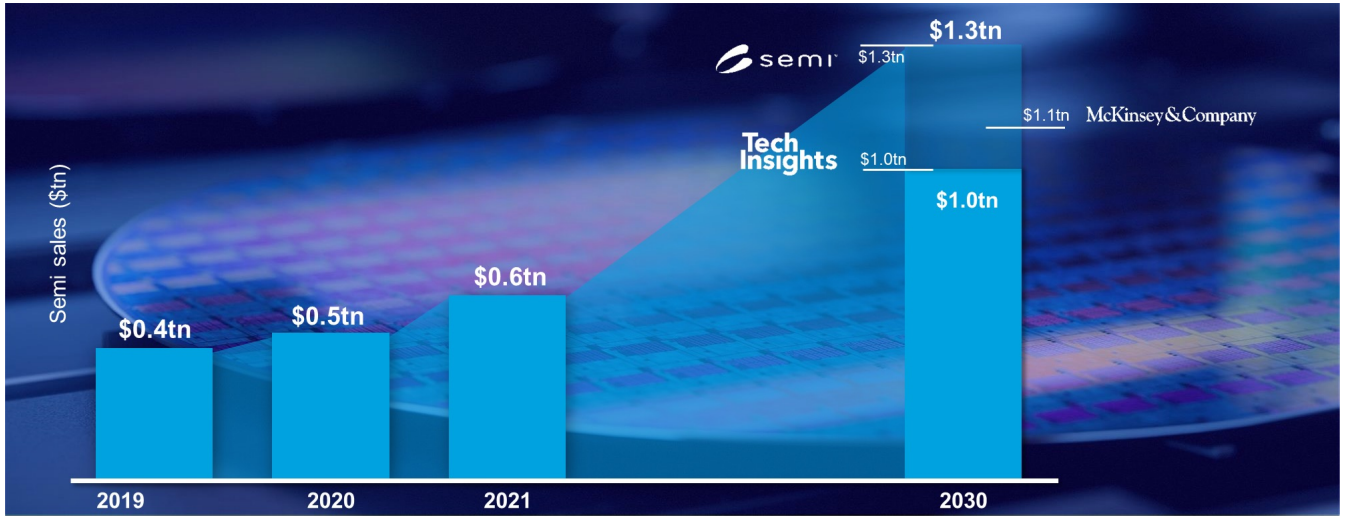
TAPES3: Pillars & project partners

A unique ECO system of semiconductor expertise united around **imec's pilot-line**



26 Partners in 7 countries, Belgium, Germany, France, United Kingdom, Israel, Switzerland and The Netherlands

Impact: Worldwide…



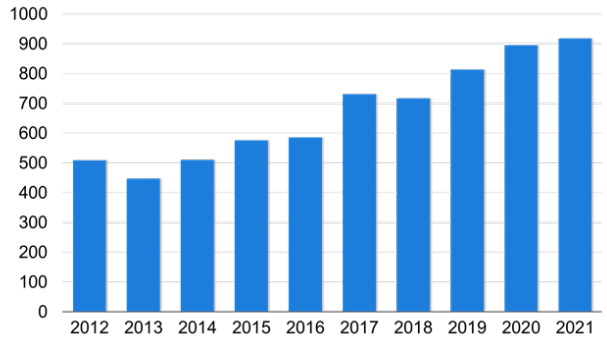
Sources: TechInsights, McKinsey, SEMI.org

TAPES3 supports the chip industry to continue its worldwide growth from $0.6 trillion to $1.0 trillion in 2030

… closer to home …

Knowledge creation

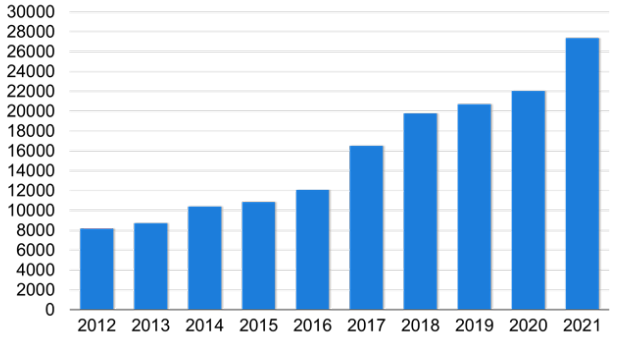
- Number of First Patent Filings per year



ASML, Demcon, IBS, Thermo-Fisher (NL), Prodrive, imec, VDL and Zeiss

Value creation

- Net sales (M€) in Litho-, Metrology- and Process Equipment per year



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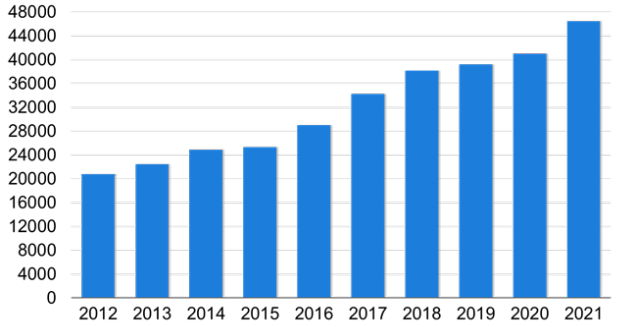
Job creation

- # of highly skilled jobs over the years



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Thank you

Please visit our “More Moore” booth

Amsterdam

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Continuing effort in pushing technological boundaries