

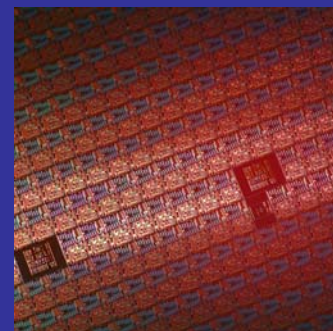


Accelerating the next technology revolution

Now's the Time ...

Dan Armbrust
SEMATECH

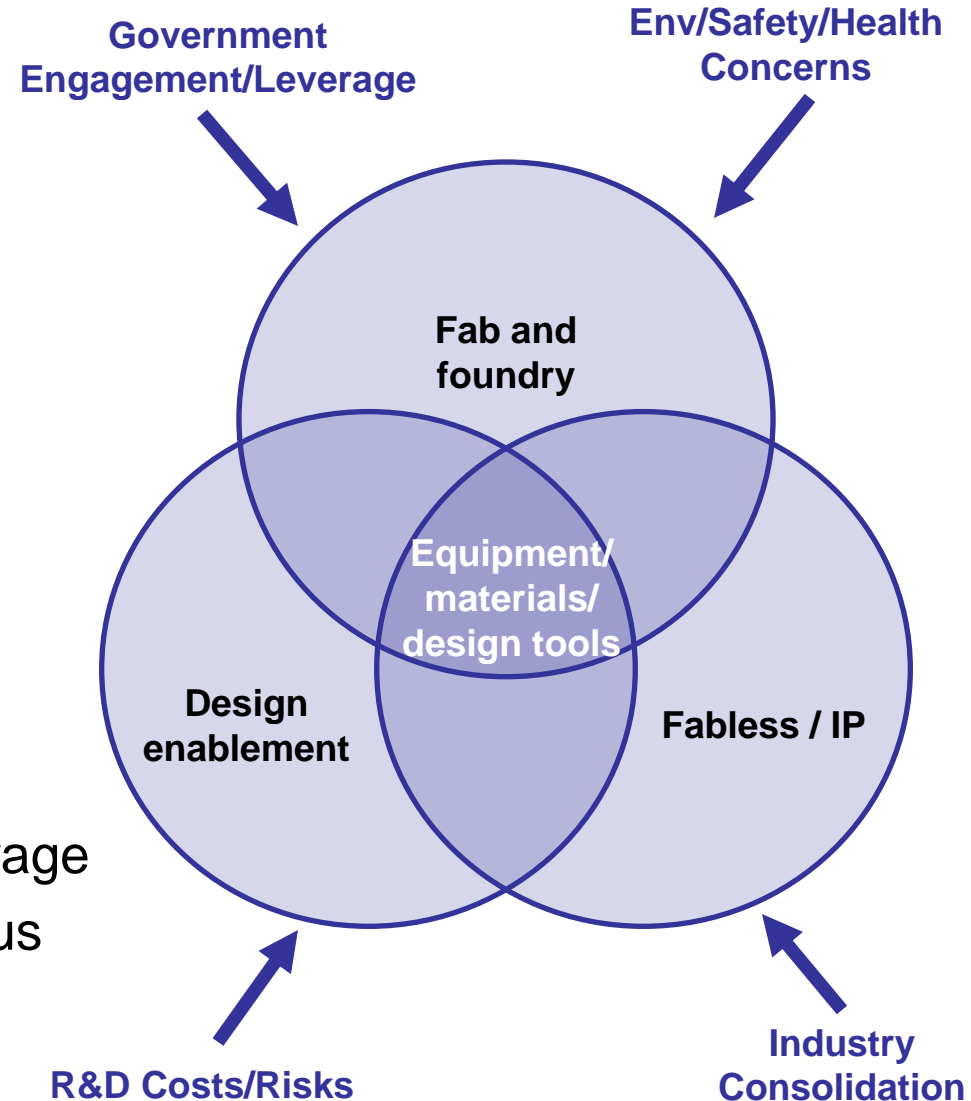
SIA Board Meeting
November 5, 2009



Critical time for our industry



- Economic crisis abating
- Fundamental issues remain
 - Business challenges
 - R&D costs rising
 - Industry consolidation
 - Technical challenges
 - R&D harder, with greater risk
- New influences
 - Government engagement/leverage
 - Environment/Safety/Health focus



Industry consolidation



“There has been strong consolidation in semiconductor manufacturing; both in equipment supply as well as capacity. ...only a very few chip makers are capable of being at the leading edge.”

- VLSI Research

R&D challenge

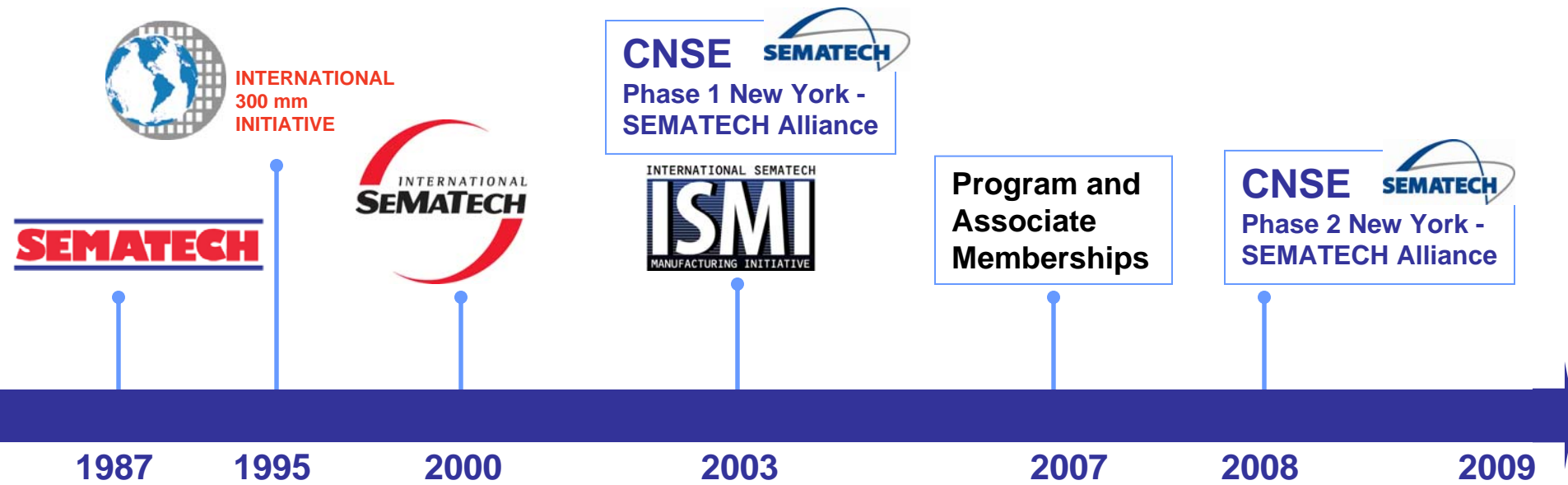


- “The industry faces as much as a 30%, or about an \$8 billion, decline in capital equipment R&D budgets from 2009 through 2013. At the same time, however, the semiconductor industry has several critical projects in the development stage – post-193-nanometer (nm) lithography (i.e., extreme ultraviolet [EUV] lithography), new interconnect materials, and new transistor structures and materials – all requiring significant capital outlay.”
- “To ensure the same [historic] funding levels in the future, wafer fab equipment vendors, for example, would have to raise the R&D fraction of total sales from an average of 14% to a level of 20%.”
- “The failure of any one of these technology developments to make it to market when needed could potentially slow the semiconductor technology road map and, thus, the engine that has driven productivity and growth during the last four decades – not only in the semiconductor market but also the entire industrialized world.”

- *Gartner Dataquest*

SEMATECH evolution

A dynamic industry consortium



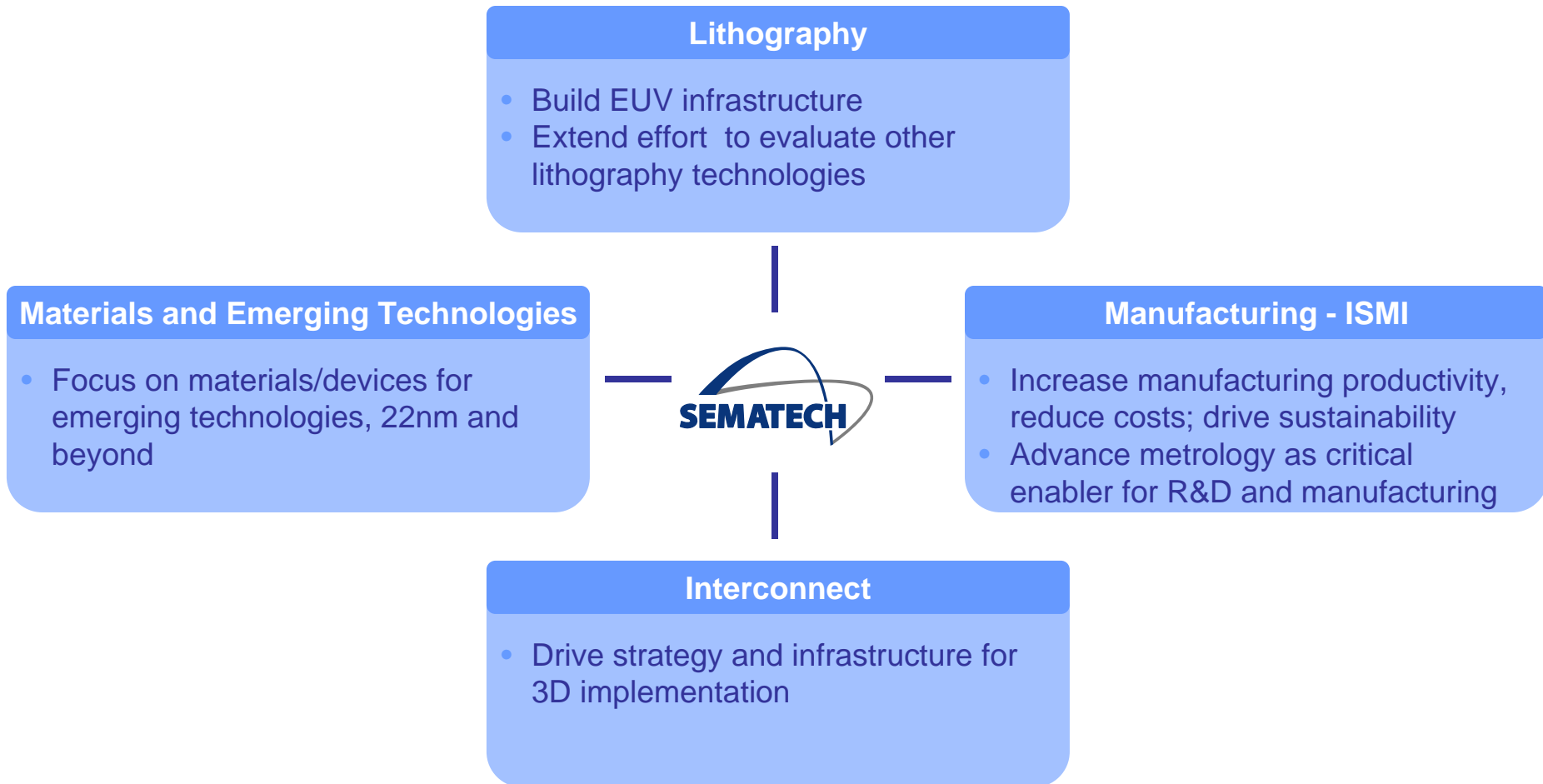
Contributions

- Helped stabilize US based players
- 300mm wafer size transition
- Mfg. productivity improvements
- Infrastructure for next generation technologies

Directions

- US only to global consortium
- Greater manufacturing focus
- Supplier participation
- Leveraged funding

SEMATECH programs today



One possible trajectory



- Roadmap slows and costs increase
 - EUV transition delayed
 - Productivity initiatives fail to gain traction (300mm+ and/or 450mm)
- Revenues flat/decline, profits diminish
- Consolidation continues
- Cooperative efforts such as collaborations/consortia wither as companies become inwardly focused

We need to act before the next discontinuity/disruption occurs

A better way...



- “The IDMs, foundries, fabless and equipment companies must pool resources and create new ways to stretch R&D funding...and keep critical programs on track.” – *Gartner Dataquest*
- “The merchant mask makers’ capability to invest in new technology like EUV is constrained by their financials....The mask industry needs a viable strategy to attack this problem. It is pretty clear that a well funded consortia type approach would give the best and fastest results.” – *VLSI Research*
- “The opportunity exists for industry consortia to focus the R&D dollars more precisely on what is needed for the industry, thus helping the industry move ahead while developing a new R&D model ...”
– *Gartner Dataquest*

How SEMATECH will lead



Positive plan of action:

- Drive success in traditional strengths including:
 - EUV lithography by forming mask infrastructure consortium
 - Future productivity through 300mm NGF and 450mm
 - ESH (Environment/Safety/Health) by leveraging initiatives
 - 3D packaging through standards and R&D/prototyping center
 - New materials through continued screening/characterization
 - Engagement with equipment/materials suppliers
- Initiate and broaden engagement with fabless and design enablement companies
- Leverage renewed government interest
- Grow and optimize industry/government/university alliance for semiconductor and nanotechnology in Albany
- Be open to rethinking roles and alignment of the various industry consortia and organizations

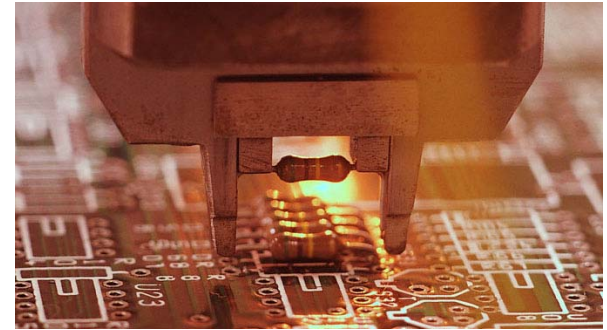
Accelerating the next technology revolution



Research



Development



Manufacturing

