

Polar Semiconductor, LLC

**CHIPS and Science Act Testimony to Minnesota Senate
Committee on Energy, Utilities, Environment, and Climate**



Monday, January 9, 2023



A Singular and Timely Opportunity

- **Why in Minnesota**
 - **Existing ecosystem of semiconductor companies – chip makers, chip making equipment suppliers, and other related vendors.**
 - **“CHIPS of the North” Ecosystem is at an inflection point – poised for growth.**
 - **Abundance of water (aquifer). Affordable and reliable utilities and systems e.g. Electricity. Not in an earthquake zone.**
 - **Strong STEM pipeline: University of Minnesota, MNSCU, private universities and technical colleges.**
 - **Synergy with Medical Device Industry.**
 - **Accelerate growth and development for mutual and statewide benefit.**
 - **History of Semiconductors and (Super)Computing. Control Data Corp., Univac, Cray Research.**
 - **Opportunity to rekindle the DNA and regain leadership.**

- **Role of Company:**
 - **Scale to achieve long term viability and profitability.**
 - **Attract private capital.**
 - **Secure local and state incentives**
 - **A private-public partnership is required for a successful proposal.**
 - **Focus on projects that secure and build resilient Supply Chains (e.g. automotive).**

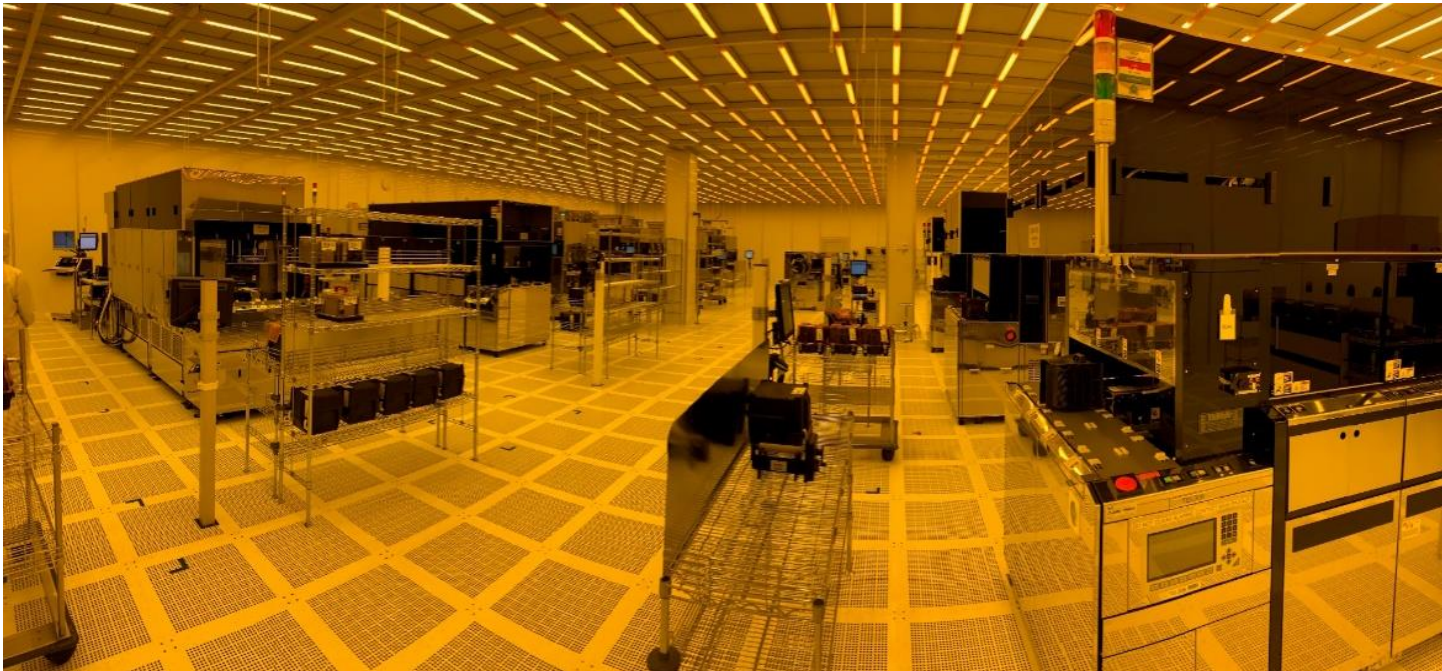
- **Role of Ecosystem**
 - **Collaborate, Collaborate, Collaborate. Greater MSP is facilitating a wide group of chip makers, equipment makers, educational institutions and other stakeholders.**
 - **Projects that build communities with broad economic and human resource gains.**
 - **Workforce development projects that enable experiential training, apprenticeships. Involve training and jobs organizations, educational institutions, and companies. Increase participation from economically disadvantaged and BIPOC communities. Opportunity to grow with a state-wide workforce development effort.**

- Role of Local and State Government
 - Secure match funding. [States like TX, AZ, NY, OH have invested \\$15B+ in support.](#)
 - Note that semiconductor facilities are very capital intensive with expansion and new projects in the range of \$100M to \$20B in each case.
 - Act fast; CHIPS request for proposals will likely open in February.
 - Bring a state-wide perspective and be the glue that strengthens the ecosystem coalition. Are there other potential collaborations and opportunities across the state?
 - Protect taxpayer dollars by supporting thoroughly vetted projects.
 - Be the North Star for National Security and Supply Chain Resiliency. Semiconductors are the new Steel!

Polar Semiconductor – High Voltage and Power Devices

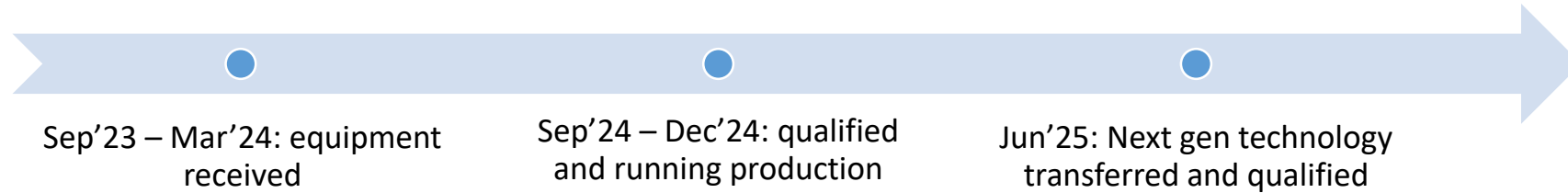


- Manufacturer of Integrated Circuit (BCD, BiCMOS) and Discrete (MOSFET, IGBT) 8-inch silicon wafers for the Power and Sensor markets.
- Six decades of semiconductor manufacturing excellence; grew out of Control Data.
- Class 1 cleanrooms with current capacity of 20K wafers per month. IATF 16949 (automotive) and ISO 14001 certified, and ASIL (automotive) compliant – Quality is embedded into company culture.
- A stable, long tenured, and diverse workforce of approx. 550 associates operates 24x7x365. Employees have deep roots in Minnesota and Mid-West.



Capacity and Capability Expansion Plan

- Massively expand already operating 200mm fab within next 18 months. Substantial investment in \$100s M. Partner with US based Private Equity.



- Resulting in: (1) re-shoring of IC technologies, and (2) co-developing advanced discrettes with fabless customers (protecting their IP). [Polar will compete in the Foundry marketplace, filling a huge gap in US capabilities.](#)
- Currently produce unique technologies required for automotive and aerospace & defense, particularly suited to XEV vehicle transition. Expertise in high voltage and power semiconductor processing. Capability and demand exists to transfer next generation analog and discrete technologies (another major gap in US capabilities) within next 24 months.

Appendix

- **Surya Iyer, PhD. President of Polar Semiconductor LLC. Previously with Cypress Semiconductor, Applied Materials.**
- **Resident of Edina, MN. Former Chair and member of Energy and Environment Commission. Former member of Transportation Commission.**
- **Adjunct Professor of Engineering at University of St. Thomas since 2006. Board member – SEMI / Fab Owners Alliance.**
- **Graduate work and Management education at WashU StL, Stanford, Wharton**

Thank you! And please accept my invitation for a Tour of Polar's Fabs.

State and local gov'ts have enacted incentives laws to attract investment—applying directly to companies and broader industry

Preliminary Current as of 8/24/2022

Key semiconductor incentives from state and local governments, 2021-22

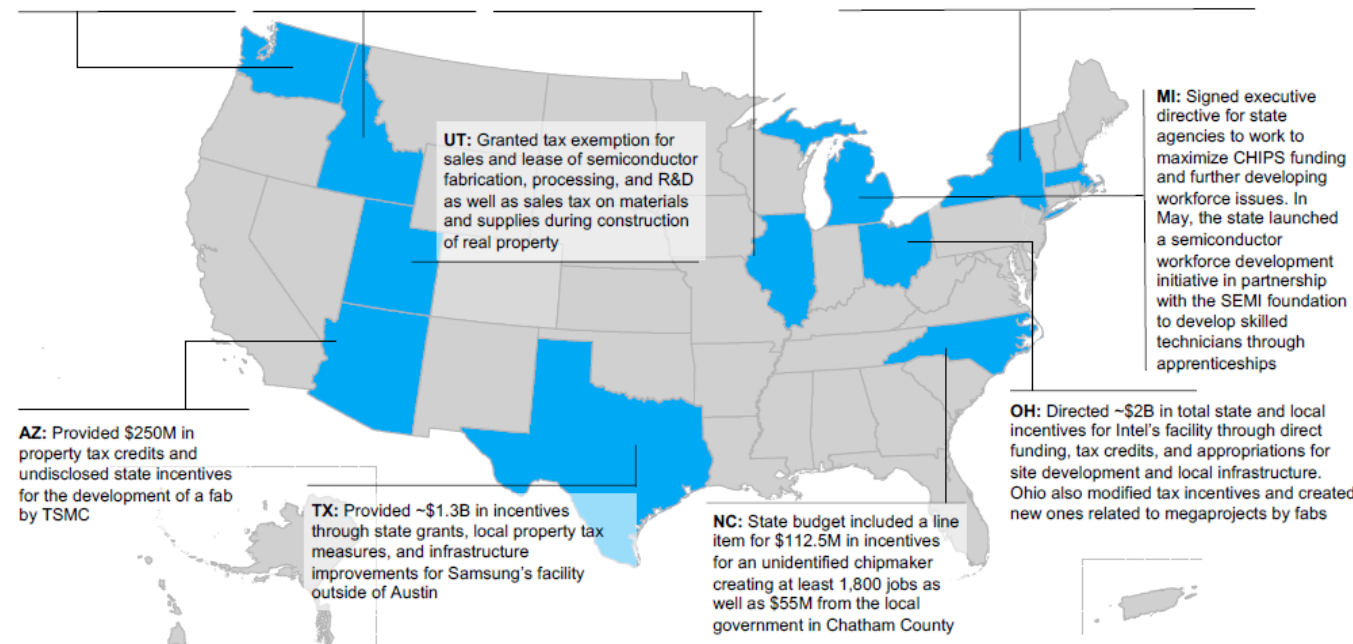
Summary

WA: Extended beneficial tax credits and employment rules for manufacturers and processors for hire of semiconductor materials to 2028

ID: Enacted sales tax exemptions for sales or leases of semiconductor fabricating, processing, R&D, and real property

IL: Created the Manufacturing Illinois Chips for Real Opportunity (MICRO) Program enacting to be various tax incentives for manufacturers of semiconductors, microchips, or semiconductor or microchip component parts

NY: Signed bill expanding eligibility of CHIPS projects in the Excelsior tax credit program—offering up to \$10B in incentives over a 20-year period. CHIPS projects must be in the semiconductor sector, meet sustainability requirements, and must result in at least \$15 of private investment for every \$1 of state investment



Key states have directed **~\$15B in dedicated incentives** through a portfolio of **grants, tax credits, and infrastructure upgrades** over the last 18 months

States, universities, and foundations have partnered on **workforce development** programs including **apprenticeships, training, and reskilling** to build talent pipeline

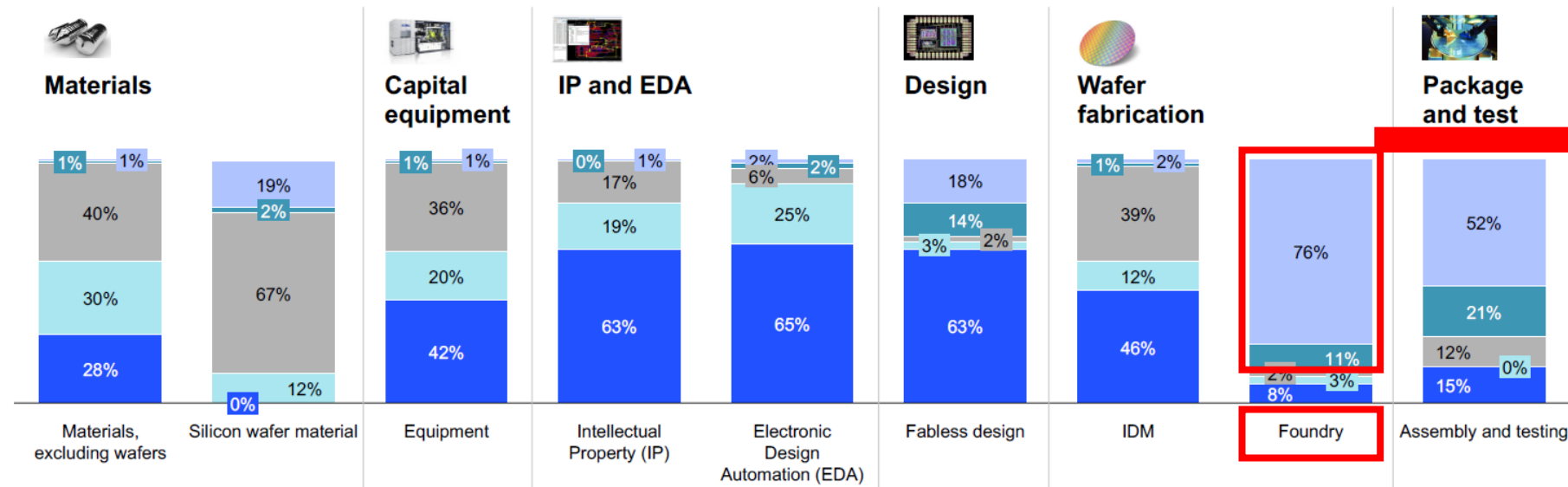
States are jockeying to land **NIST's National Semiconductor Technology Center—NY, OH, and TX** have been very proactive

Polar Addresses a Critical Gap in US Supply Chain: Foundry for High Power High Voltage Semiconductors

US is strong in equipment, EDA, IP, and design but has very little wafer material, **foundry**, and package & test capacity

Semiconductor value chain, % share of 2020 sales

Regions: Taiwan China ROW Europe U.S.



Dominated by TWN, CHN

