

# Polar Semiconductor, LLC

Minnesota's Largest Semiconductor Manufacturer with  
Decades of Innovation and Wafer Fabrication Excellence



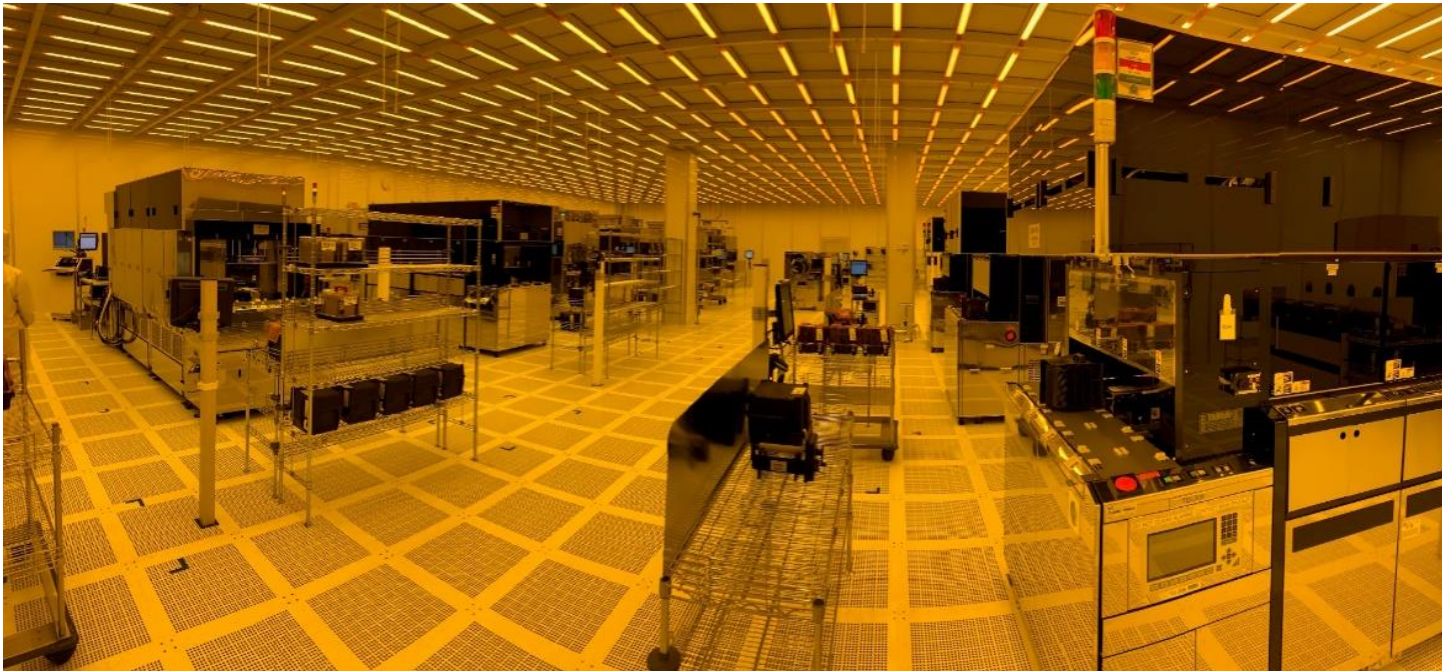
Surya Iyer, PhD, President (Adjunct Engineering Professor at University of St. Thomas)  
Testimony to Minnesota Senate Committee on Jobs and Economic Development  
Wednesday, January 25, 2023





# Polar Semiconductor – High Voltage and Power Devices

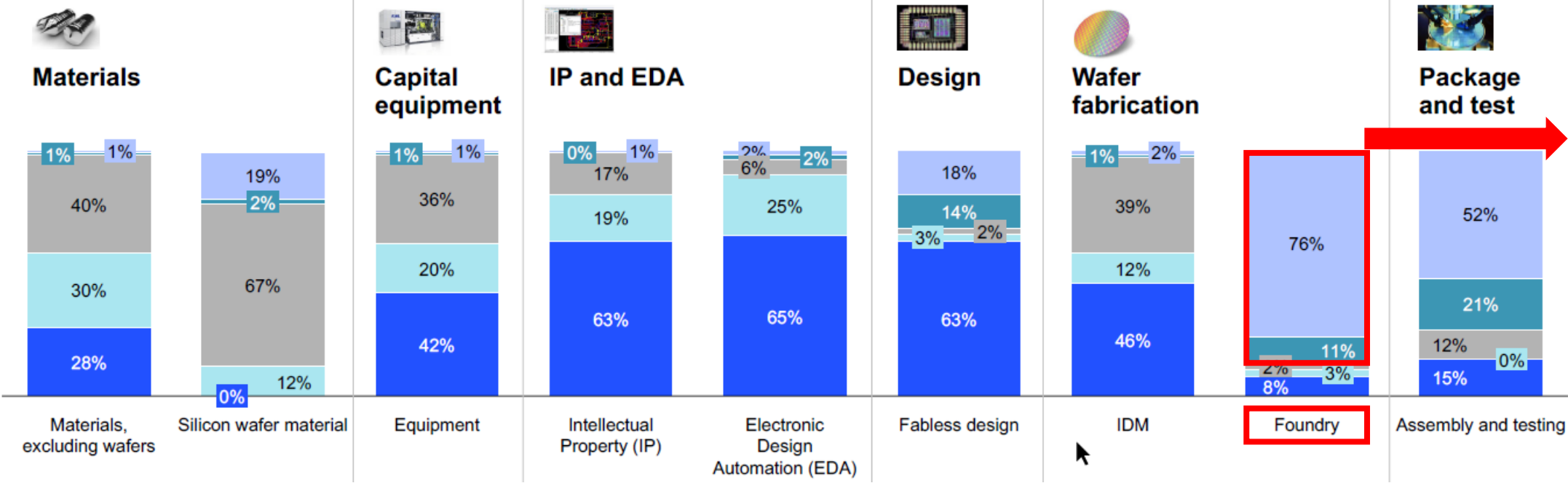
- Manufacturer of Integrated Circuit (BCD, BiCMOS) and Discrete (MOSFET, IGBT) 8-inch silicon wafers for the Power and Sensor markets.
- Six decades of semiconductor manufacturing excellence; grew out of Control Data.
- Class 1 cleanrooms with current capacity of 20K wafers per month. IATF 16949 (automotive) and ISO 14001 (environmental) 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 the Mid-West.



# Polar Addresses a Critical Gap: Foundry for Power & High Voltage Semiconductors

Semiconductor value chain, % share of 2020 sales

Regions: Taiwan China ROW Europe U.S.



Dominated by TWN, CHN



**Polar produces unique technologies required for automotive, particularly suited to XEV vehicle transition, and aerospace & defense. 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.**

# CHIPS and Science Act: At-A-Glance

	Program	Funding	Initiatives
<b>\$52B over 5 Years</b>	Manufacturing incentives	\$29B for leading edge node chips	Advanced semiconductors
		\$10B for current node chips and wider value chain	Secure critical supply chain (automotive, defense) Specialty technologies
	R&D and Centers of Innovation	\$11B	Strengthen US leadership in semiconductor R&D and manufacturing through National centers and institutes
	DoD Commons	\$2B	Lab-to-Fab and productization Advanced R&D
	25% Tax Credit	No cap (approx. \$24B)	

- **National Security and Innovation:** Re-shore critical sector semiconductor manufacturing, promote R&D. Level the playing field to compete with Asian government incentives and subsidy in a capital intensive industry.
- **Workforce Development:** Create good paying jobs. Increase industry participation of economically disadvantaged individuals and under-represented populations such as women, people of color, rural workers, and veterans.
- **Stronger Communities:** Build regional clusters with partnerships between ecosystem companies, universities / colleges. Leverage local and regional businesses and organizations to maximize shared benefits.

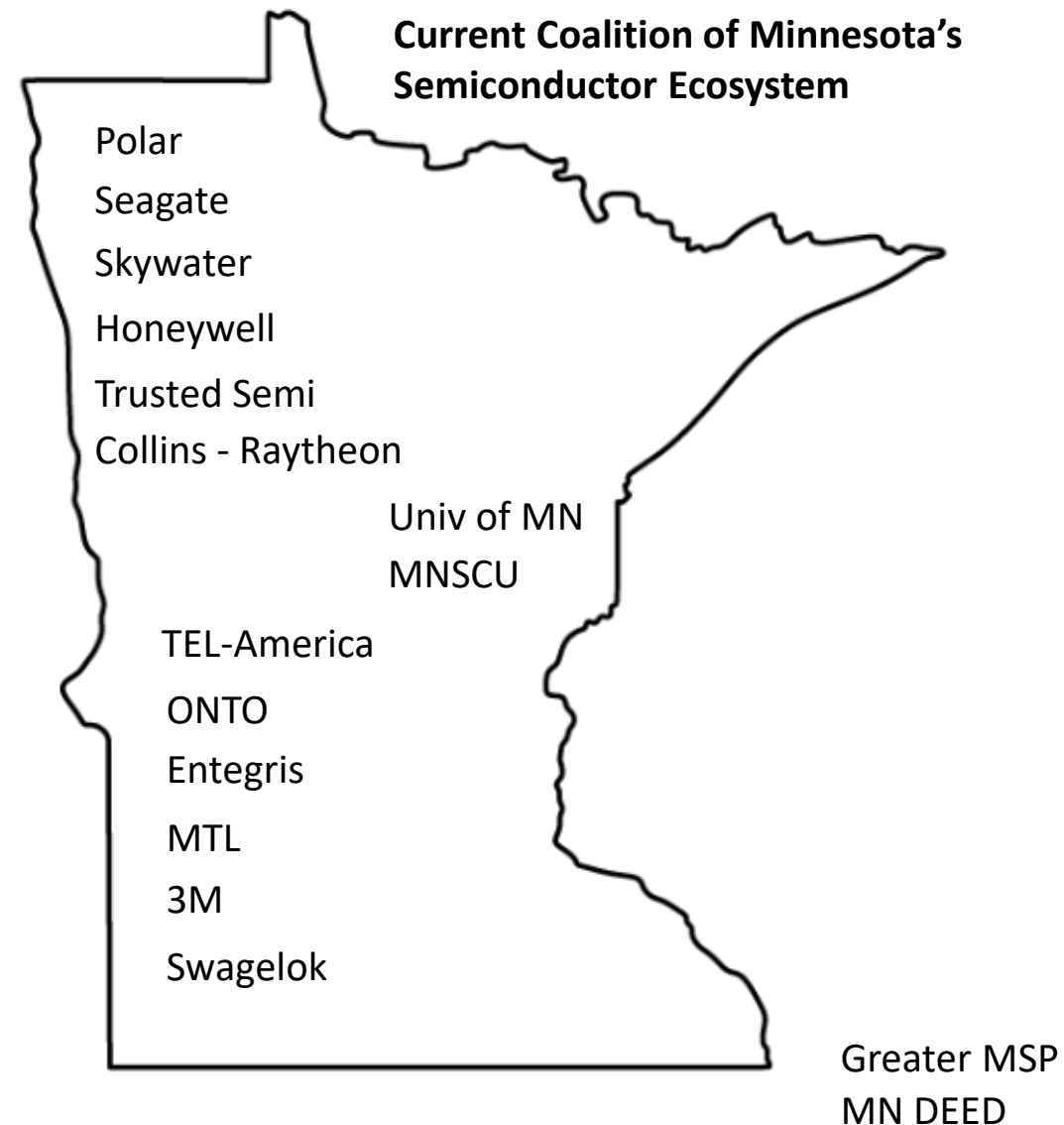


# CHIPS and Science Act: Polar's Approach

Guidelines	Polar Strategy and Plan
<ul style="list-style-type: none"> <li>• Increase scale for competitiveness</li> <li>• Attract private capital</li> <li>• Secure customer commitments and partnerships</li> <li>• <b>Secure state and local incentives</b></li> <li>• Workforce development</li> <li>• Inclusive and broadly shared gains</li> <li>• Protect taxpayer dollars</li> </ul>	<ul style="list-style-type: none"> <li>• Approx. double current fab capacity in 18 – 24 months.</li> <li>• Partner with US Based Private Equity. Total project investment is in \$100sM.</li> <li>• Re-shore existing customer advanced analog technology from Taiwan.</li> <li>• Develop advanced discrete technology with fabless customer. Protect US innovation IP.</li> <li>• Partner with Univ of Minnesota and ecosystem partners for advanced smart manufacturing.</li> <li>• Partner with MN-DEED, City of Bloomington.</li> <li>• Create workforce pipeline with Univ of Minnesota as hub, state technical colleges as partners.</li> <li>• Create several 100s of direct and indirect high paying skilled jobs.</li> <li>• Employ minority, veteran or women-owned businesses; labor union contractors.</li> <li>• Provide solid business plan with customer commitments, financial projections, growth potential, and address specific US strategic gaps.</li> </ul>
<ul style="list-style-type: none"> <li>• R&amp;D</li> </ul>	<ul style="list-style-type: none"> <li>• Partner with Microelectronics Commons (DoD) and University of Minnesota for next generation technology development.</li> </ul>

# A Singular and Timely Opportunity for Minnesota

- Significant “CHIPS of the North” ecosystem of semiconductor companies – chip makers, chip making equipment suppliers, and other related vendors.
- 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 – to feed potentially thousands of new direct and indirect jobs.
- 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 in hi-tech R&D and manufacturing.



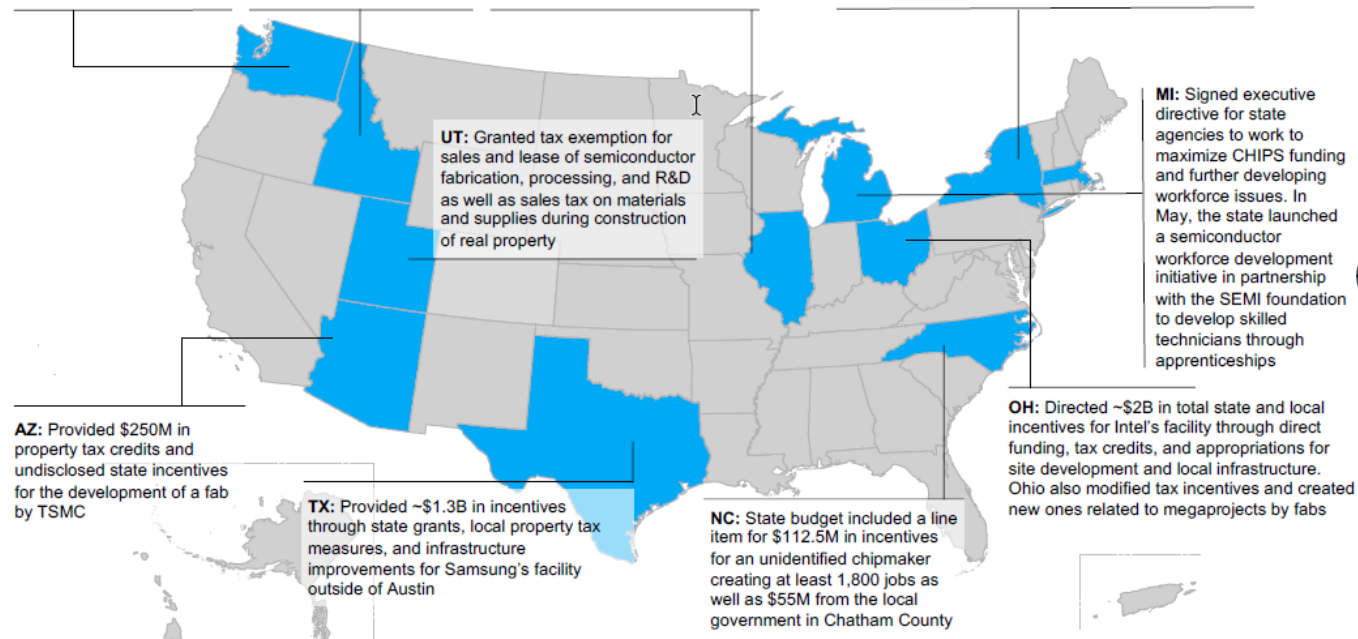
# State Investments to Support Federal CHIPS Act exceed \$15B

**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

- **Minnesota's investment in its semiconductor ecosystem will be a pre-requisite for successful CHIPS grant applications.**
- **Timing is critical. US Department of Commerce, through its program office in NIST, is expected to announce request for proposals starting in March, 2023.**
- **Robust state support is needed to maximize CHIPS funding and impact. Note that semiconductor facilities are very capital intensive with expansion and new projects in the range of \$100M to \$20B.**