

# *SiC and GaN Applications in Electric Vehicles: Current Issues*

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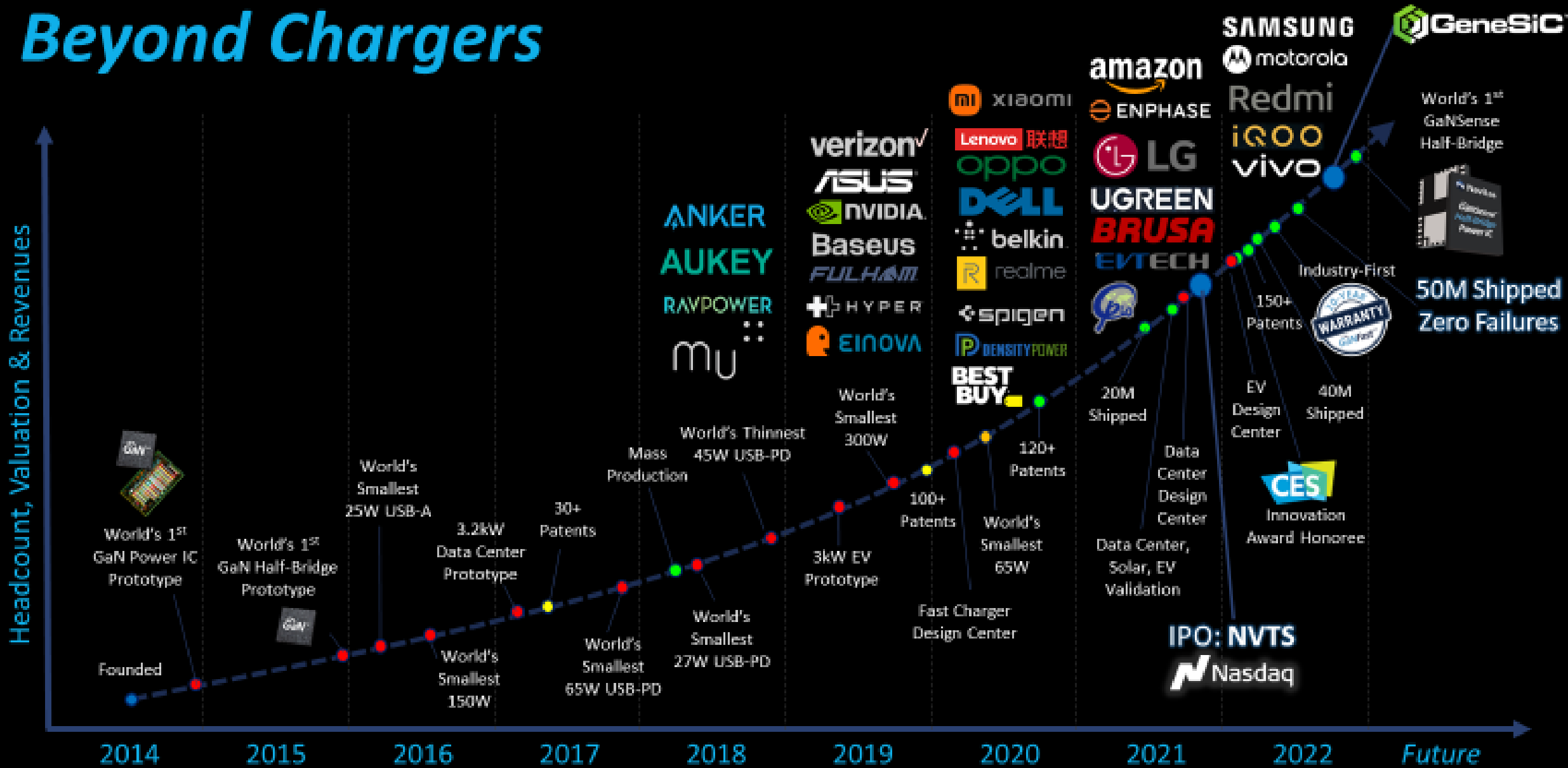


# Navitas

*Energy • Efficiency • Sustainability*

- Customer understanding how to get the full benefit from using WBG
- Reliability and quality
- Offering the best WBG technology for the solution
- Solving supply chain issues
- Cost roadmap
- Environmental CO2 impact / ESG

# #1 in Power GaN & Accelerating Growth Beyond Chargers



*“The main advantages of Navitas GaN power ICs, are simplicity of driving high-speed switching performance, increased reliability and compact form factor”  
(Dr Bernhard Budaker, vice president at BRUSA)*

# EV

# Datacenter

*“Navitas is an excellent partner with industry-leading GaN IC technology...to create new, breakthrough standards for high-performance computing, as the world’s demand for data increases.”  
(Robin Cheng, VP of Compuware’s R&D team)*



**Navitas Opens World’s First GaN IC Design Center Dedicated to Electric Vehicles (EV)**

**Navitas Opens New Design Center Focused on Enabling GaN-based Data-Centers**

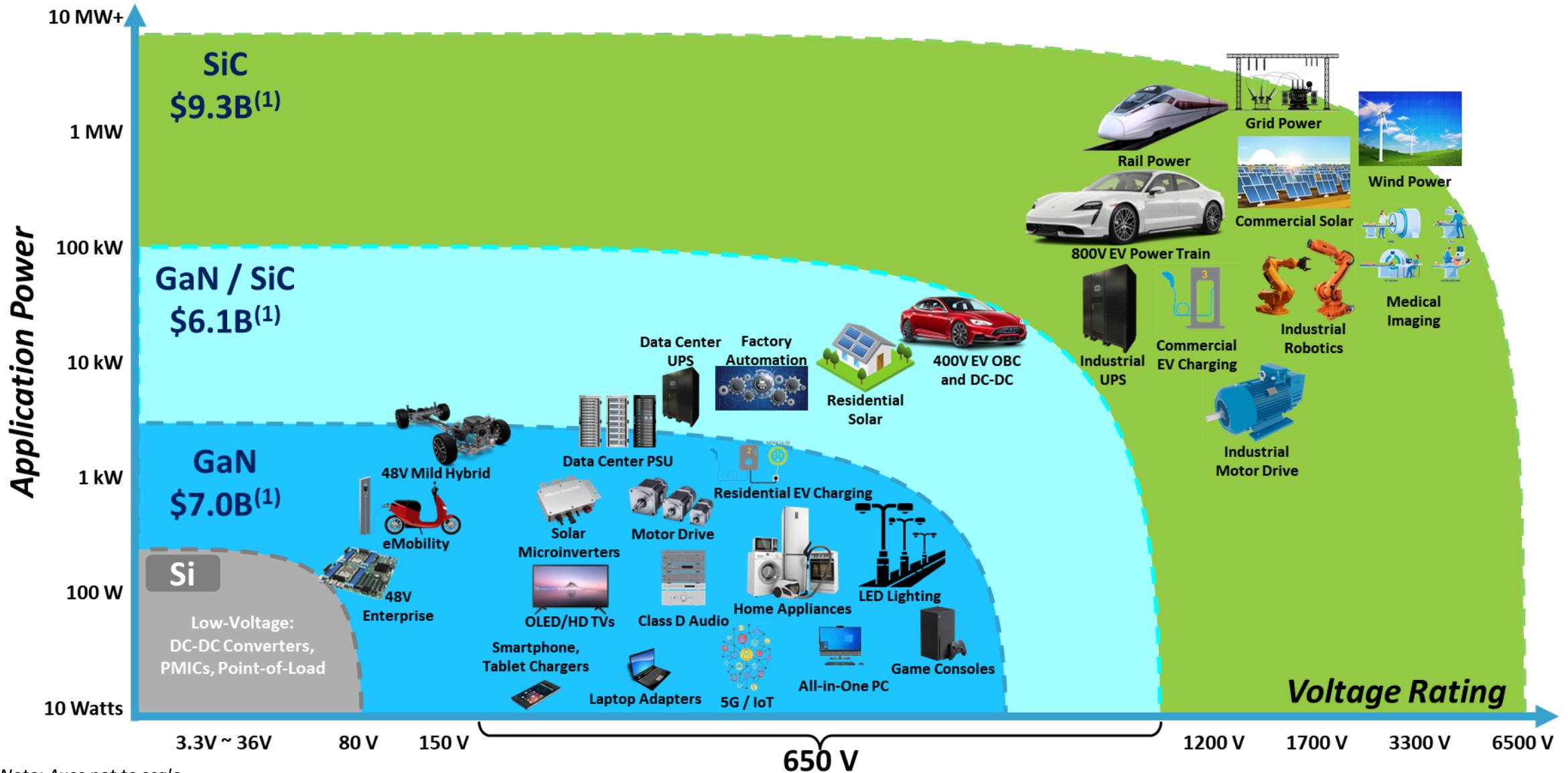


**GaNFast™**

**GeneSiC**  
SEMICONDUCTOR

*Pure-Play Next-Gen Power Semiconductors*

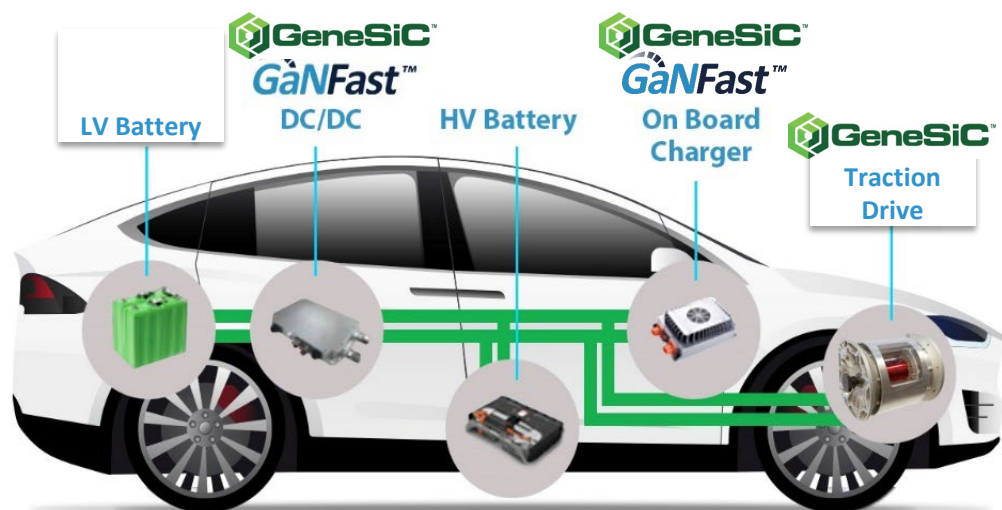
# Only Pure-Play Next-Gen Power Semi Company Navitas



Note: Axes not to scale

Note (1): 2026E potential, Source: Yole, DNV, IRENA, Fraunhofer ISE, IHS, Cisco, Hyperscale, Peer annual reports, Wall Street research.

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## Dedicated EV System Design Center

- 3 platforms
  - 400V 6.6 kW W bi-directional charger (2-in-1)
  - 800V 6.6 kW bi-directional charger and DC-DC (3-in-1)
  - 22 kW wall charger to 400V, 800V

## \$12B/yr Potential for GaN/SiC by 2030<sup>(1)</sup>

- ✓ OBC > \$38
- ✓ DC-DC > \$12
- ✓ Traction drive > \$286
- **Total:** > \$330 per EV = \$10.1B
- ...and > \$1.9B in road-side chargers

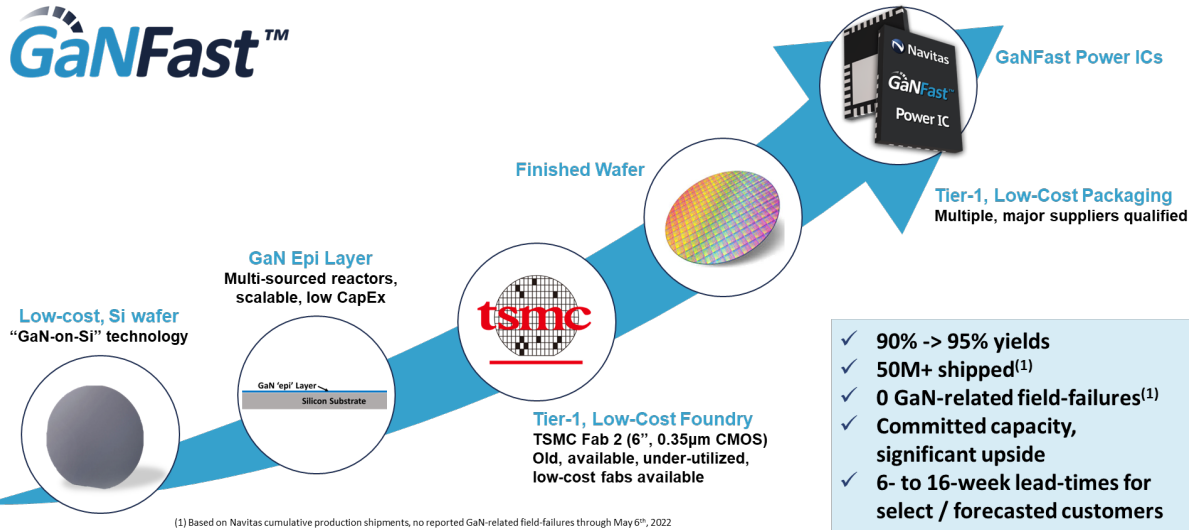
## Synergistic & Engaged Customers



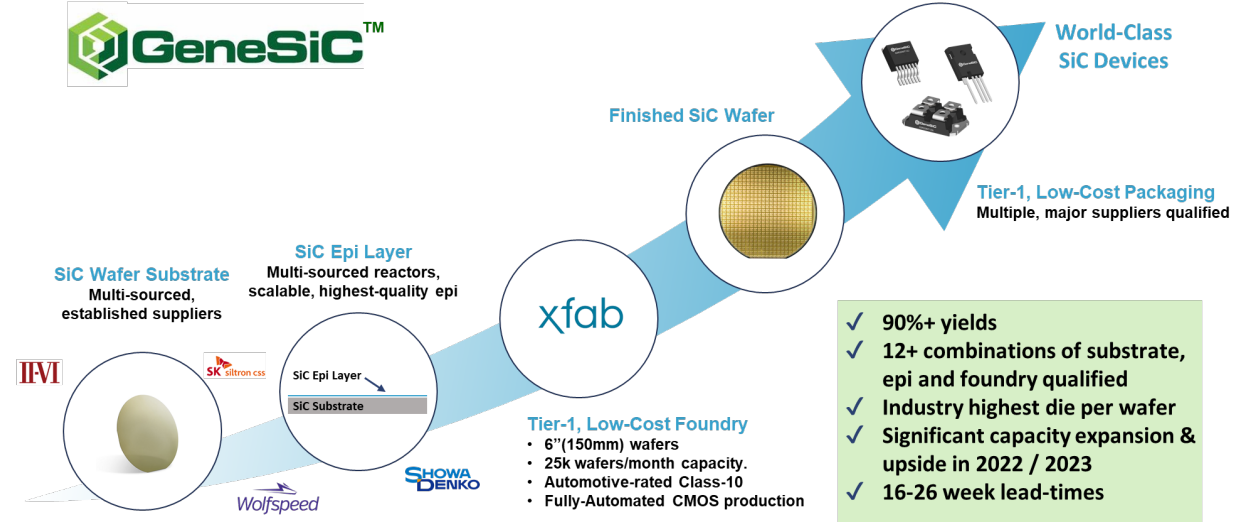
Note: Assumes 150 kW traction inverter, 100 kWh battery, \$100/kWh battery cost and typical 230 mile range. (1) Estimate 2030, 30M EV/yr, based on DNV and Navitas analysis (2) Based on BCG Research, Yole Research and Navitas analysis.

# High Capacity, 60% Shorter Lead-times

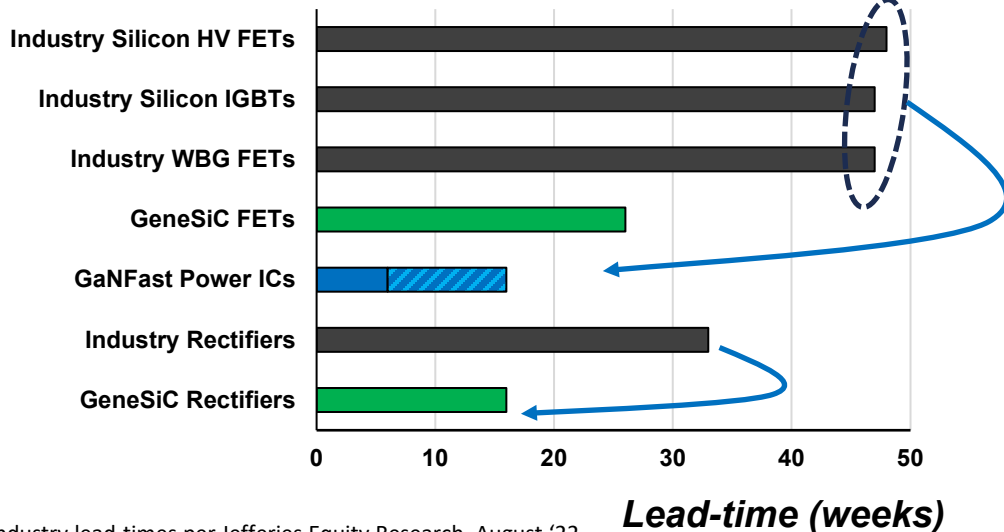
**GaNFast™**



**GeneSiC™**



## Navitas ~60% shorter lead-time



- Immediate availability for 1k prototyping
- GaNFast: Power ICs at 6-16 weeks
- GeneSiC: Rectifiers 16 weeks  
FETs 16 weeks

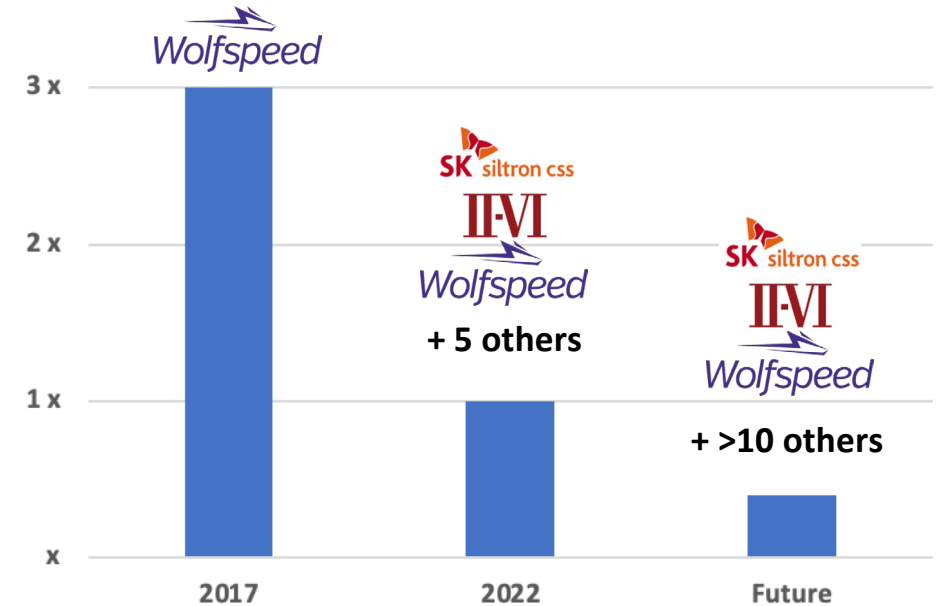


## Manufacturing & Materials Cost Structures

	Substrate	Epi	Wafer Fab	Total Cost
<b>GaN</b>	Silicon very low cost many suppliers	GaN moderate cost growing suppliers	Silicon Fab low cost standard equip't	<b>1x → 0.6x future</b>
<b>SiC</b>	SiC high cost many suppliers	SiC moderate cost many suppliers	Silicon Fab low / moderate cost some non-std equip't	<b>1.7x → 1.0x future</b>

*All above are relative to today's GaN wafer fab costs (ie, 1x).  
Relative costs are Navitas best estimates across the industry.*

## SiC Substrate Mfg Cost & Suppliers



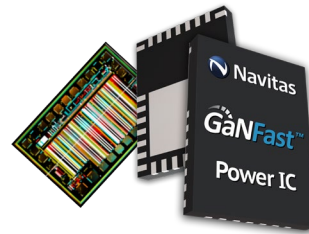
- GaN has inherent manufacturing cost advantage utilizing Si substrates (vs SiC substrates)
- GaN and SiC epi costs are similar and reducing
- Wafer fab processing costs can be low when utilizing older, retrofit Si fabs
- SiC substrate cost structures and supplier options are improving dramatically

# Leader in Sustainability



February '22 First GaN sustainability report based on global standards.

Every **GaNFast™ IC** saves<sup>(3)</sup>  
**4 kg CO<sub>2</sub>**



**4x-10x** lower component CO<sub>2</sub> footprint than silicon<sup>(1)</sup>

**28% lower** lifetime CO<sub>2</sub> footprint for chargers / adapters<sup>(2)</sup>

**Accelerates** transition from ICE to EV by **3 years**, saving **20%/yr** of road-sector emissions by 2050 <sup>(4)</sup>

GaN saves up to **2.6 Gton / year** by 2050<sup>(5)</sup>



May '22 World's first semiconductor company CarbonNeutral® certified



August '22 First 100,000 tons CO<sub>2</sub> saved



October '22 Recognized for industry-leading sustainability reporting

*Thank You*

*Let's go GaNFast™*

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**Navitas**

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