2026-May-14

# AI jako akcelerátor energetické účinnosti: od DeepFab po kognitivní energetické sítě se SiC/GaN

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**STROJÍRENSTVÍ OSTRAVA 2026**

Energetika a AI jako nástroj snižování energetické spotřeby

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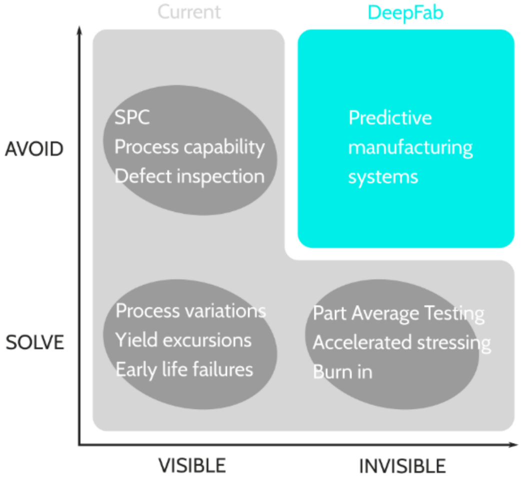
# AI jako akcelerátor energetické účinnosti

**AI pro polovodiče … a polovodiče pro AI**



… ve třech hlavních rovinách

- AI v průmyslové výrobě polovodičů (onsemi):
  - **DeepFab** ke zvýšení efektivity výroby
  - **AI/ML** jako integrovaná součást výrobních zařízení – optimalizace procesů
  - Komplexní AI aplikace (**R&D technologie**, **optimalizace výroby**, **ESG**, **multi-modal AI**)
  - **AI pro efektivní návrh čipů a validace** polovodičových řešení (EDA)

- Vývoj vysoce účinných SiC/GaN řešení pro moderní energetické aplikace:
  - **AI power grid** jako zásadní řešení pro udržitelnou energetiku
  - **Low power AI**
  - exponenciální globální **růst segmentu AI HW**

- Využití rámce **IPCEI AST** pro R&D AI power grids a následné ověření v praxi:
  - **living-lab** v regionálním podnikatelském inovačním ekosystému **CÉRKA** (Trojanovice)
  - příležitosti pro spolupráci na globální, evropské, národní regionální úrovni

# DeepFab

https://inferencetech.com/deepfab.html

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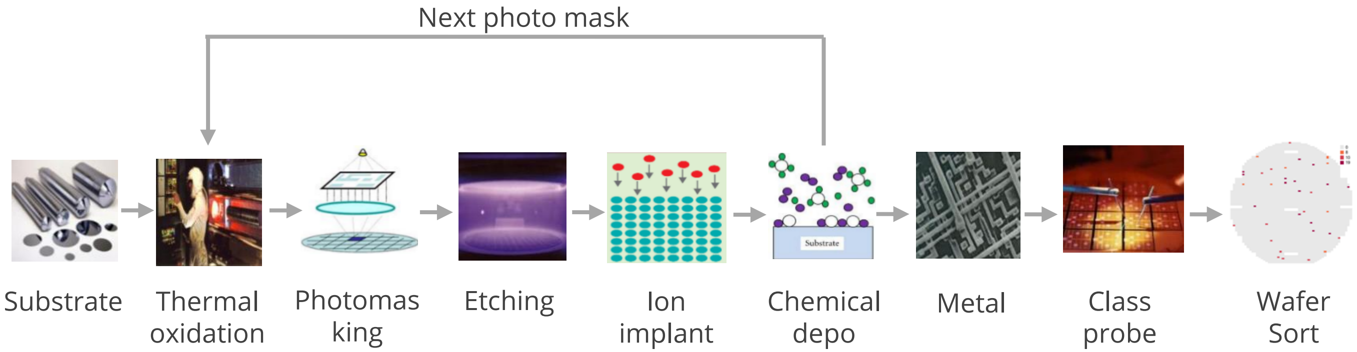
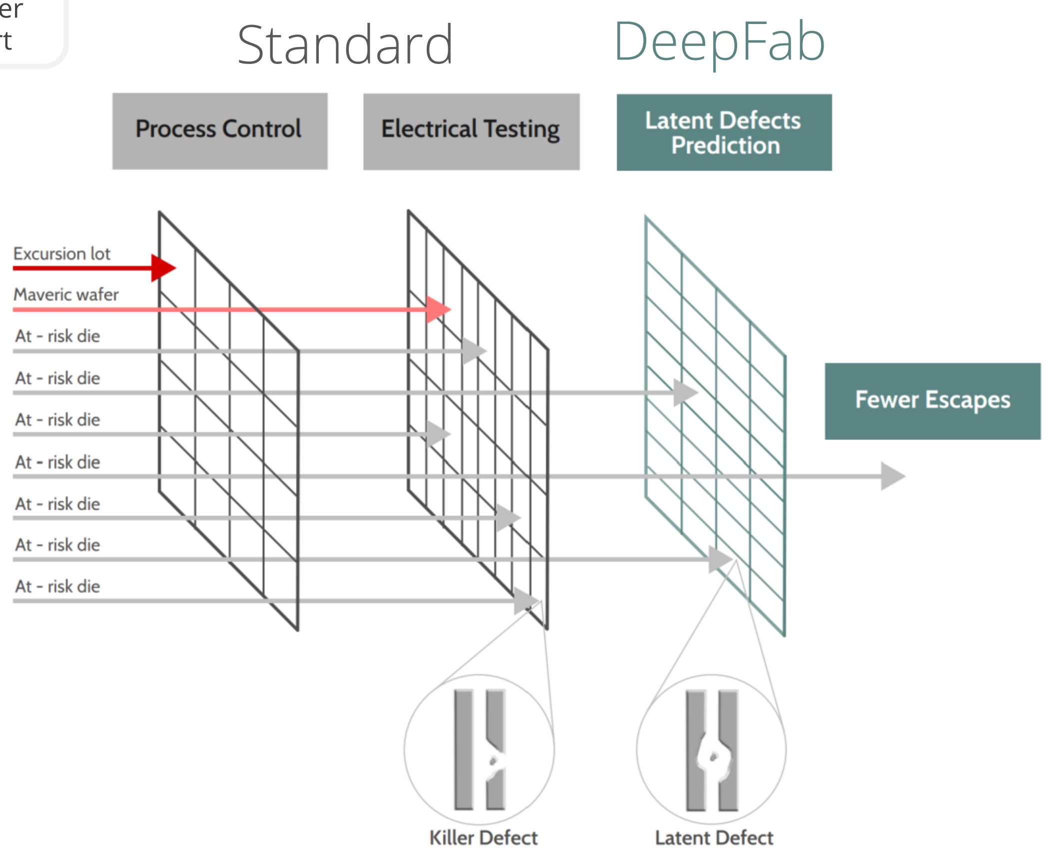
Semiconductor manufacturing flow



Data

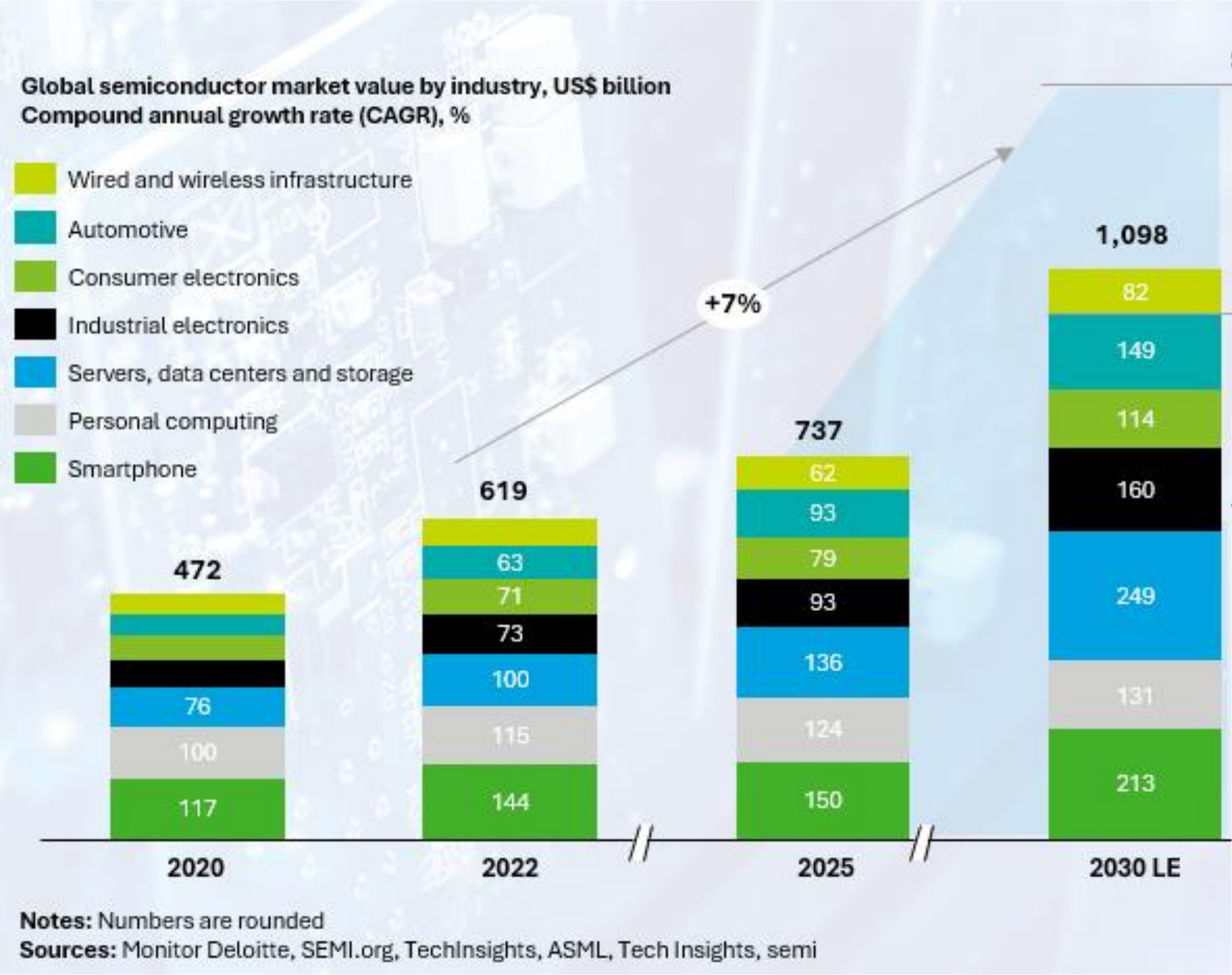
Quality & Reliability Assurance



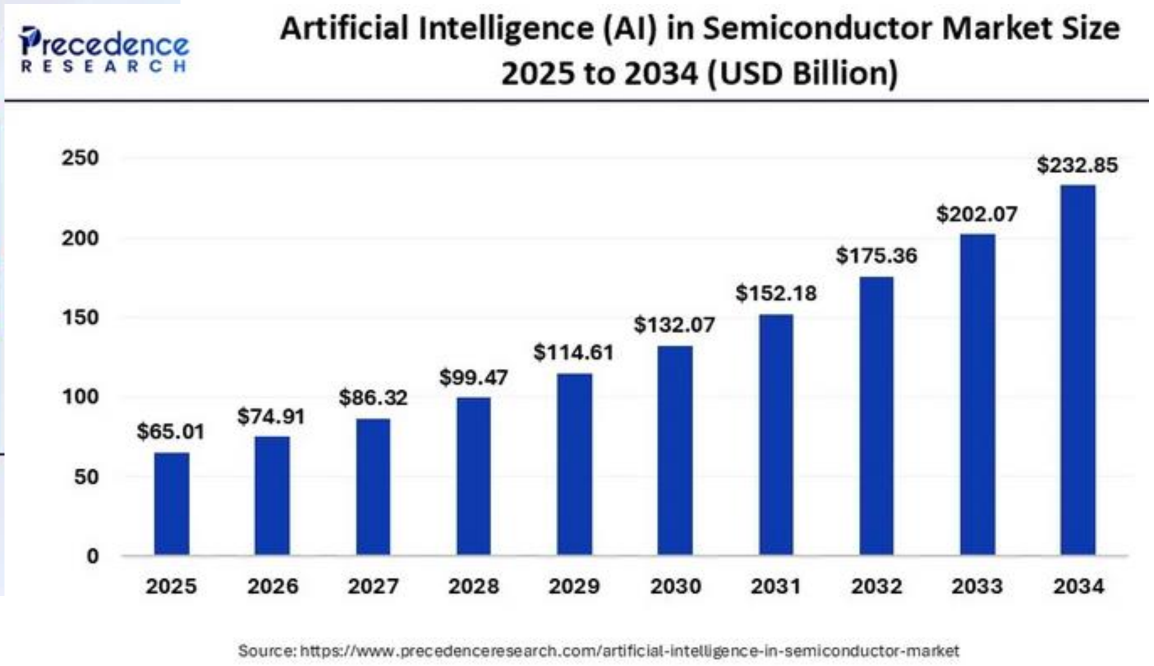
- **DeepFab technology** enables automated decision-making, early defect screening, and supports process optimization.
- Designed to operate with **fab-native data**, no additional equipment required.

onsemi & inference technologies

# Global AI (semiconductor) market accelerators

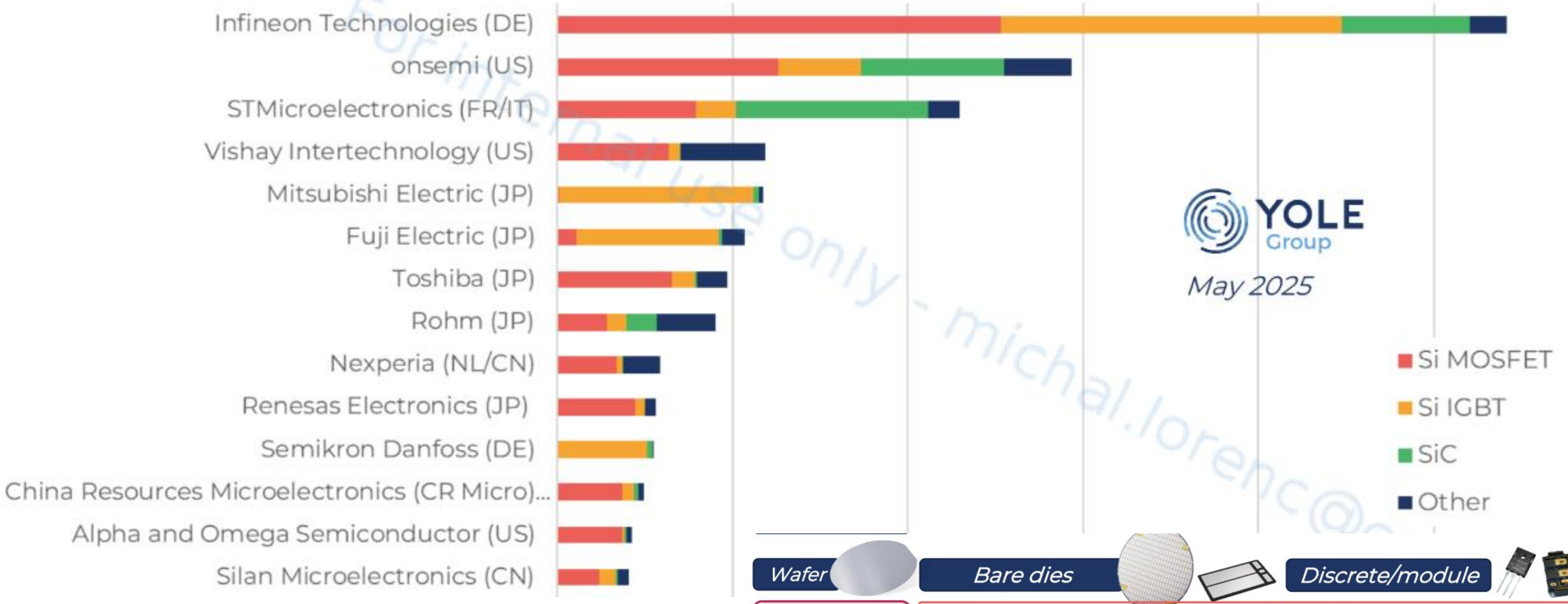

**Global semiconductor market value by industry, US$ billion**
**Compound annual growth rate (CAGR), %**

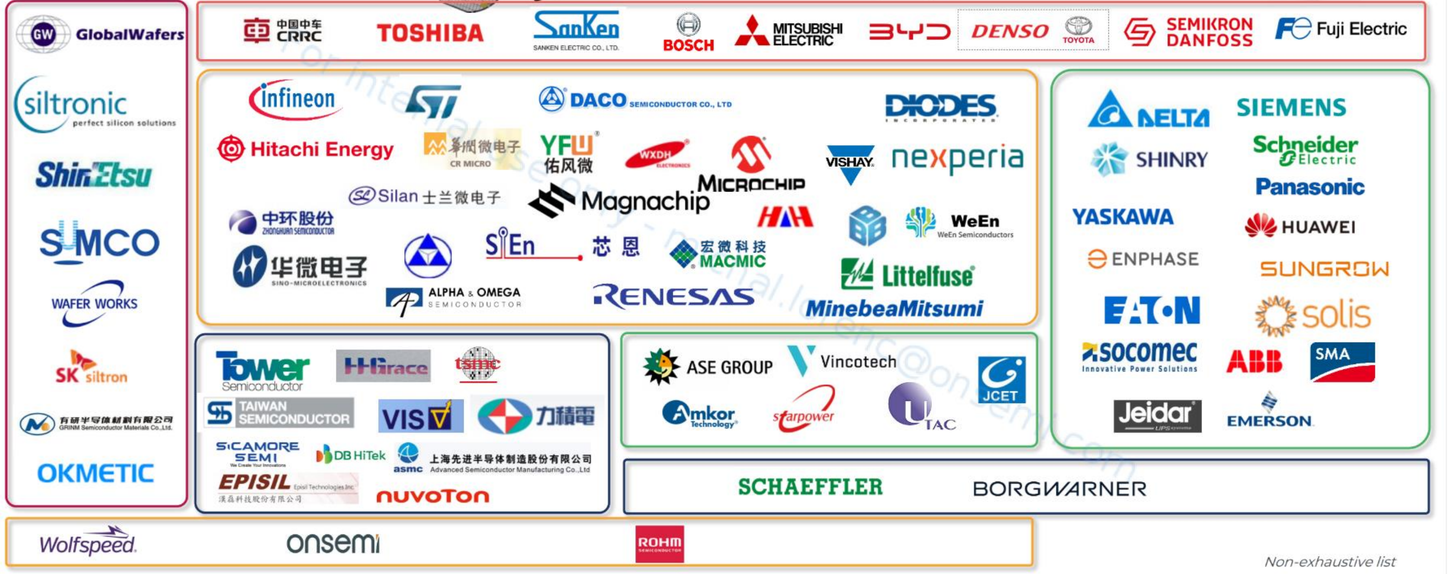
**Notes:** Numbers are rounded
**Sources:** Monitor Deloitte, SEMI.org, TechInsights, ASML, Tech Insights, semi


Artificial Intelligence (AI) in Semiconductor Market Size 2025 to 2034 (USD Billion)

Source: https://www.precedenceresearch.com/artificial-intelligence-in-semiconductor-market

# Power semiconductors





Power SiC 2025 / Power Electronics 2025
(Yole Repors)

# SiC/GaN Power Solution

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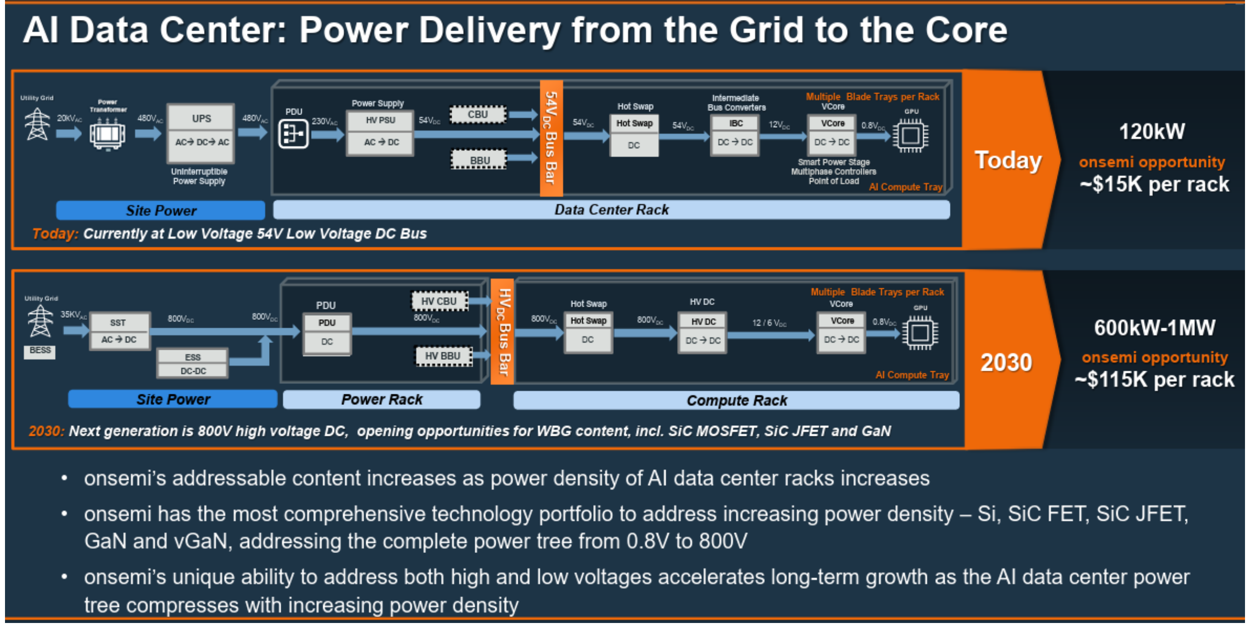
## Power of the Portfolio Driving onsemi Growth

| | | |
|---|---|---|
| AI Data Center[1] | $12.2B | 40% CAGR |
| Energy Infrastructure[2] | $9.6B | 19% CAGR |
| Factory Automation[2] | $11.3B | 7% CAGR |
| Electric Vehicles[2] | $26.3B | 13% CAGR |
| Advanced Safety[2] | $3.7B | 11% CAGR |
| EV Charging[2] | $0.7B | 14% CAGR |

$64B TAM by 2029

onsemi, **Roznov p.R.**

**From powder to power**



## AI Data Center: Power Delivery from the Grid to the Core

*Today: Currently at Low Voltage 54V Low Voltage DC Bus*

Today

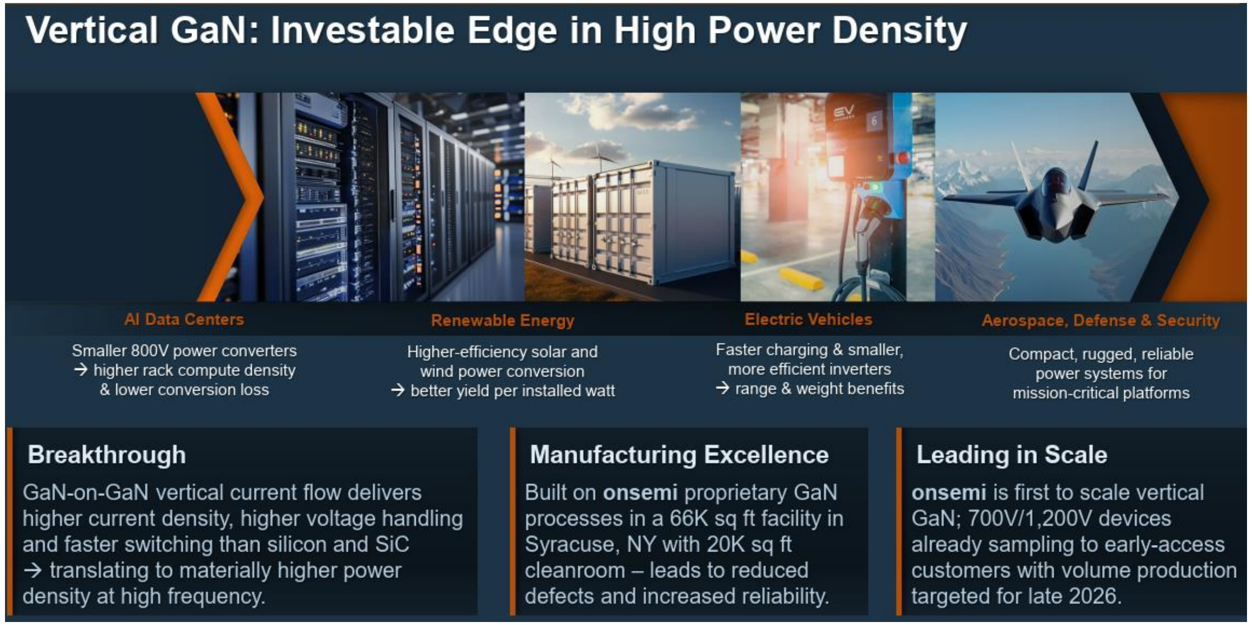
120kW
onsemi opportunity
~$15K per rack

*2030: Next generation is 800V high voltage DC, opening opportunities for WBG content, incl. SiC MOSFET, SiC JFET and GaN*

2030

600kW-1MW
onsemi opportunity
~$115K per rack

- onsemi's addressable content increases as power density of AI data center racks increases
- onsemi has the most comprehensive technology portfolio to address increasing power density – Si, SiC FET, SiC JFET, GaN and vGaN, addressing the complete power tree from 0.8V to 800V
- onsemi's unique ability to address both high and low voltages accelerates long-term growth as the AI data center power tree compresses with increasing power density



## Vertical GaN: Investable Edge in High Power Density

| AI Data Centers | Renewable Energy | Electric Vehicles | Aerospace, Defense & Security |
|---|---|---|---|
| Smaller 800V power converters → higher rack compute density & lower conversion loss | Higher-efficiency solar and wind power conversion → better yield per installed watt | Faster charging & smaller, more efficient inverters → range & weight benefits | Compact, rugged, reliable power systems for mission-critical platforms |

### Breakthrough

GaN-on-GaN vertical current flow delivers higher current density, higher voltage handling and faster switching than silicon and SiC → translating to materially higher power density at high frequency.

### Manufacturing Excellence

Built on **onsemi** proprietary GaN processes in a 66K sq ft facility in Syracuse, NY with 20K sq ft cleanroom – leads to reduced defects and increased reliability.

### Leading in Scale

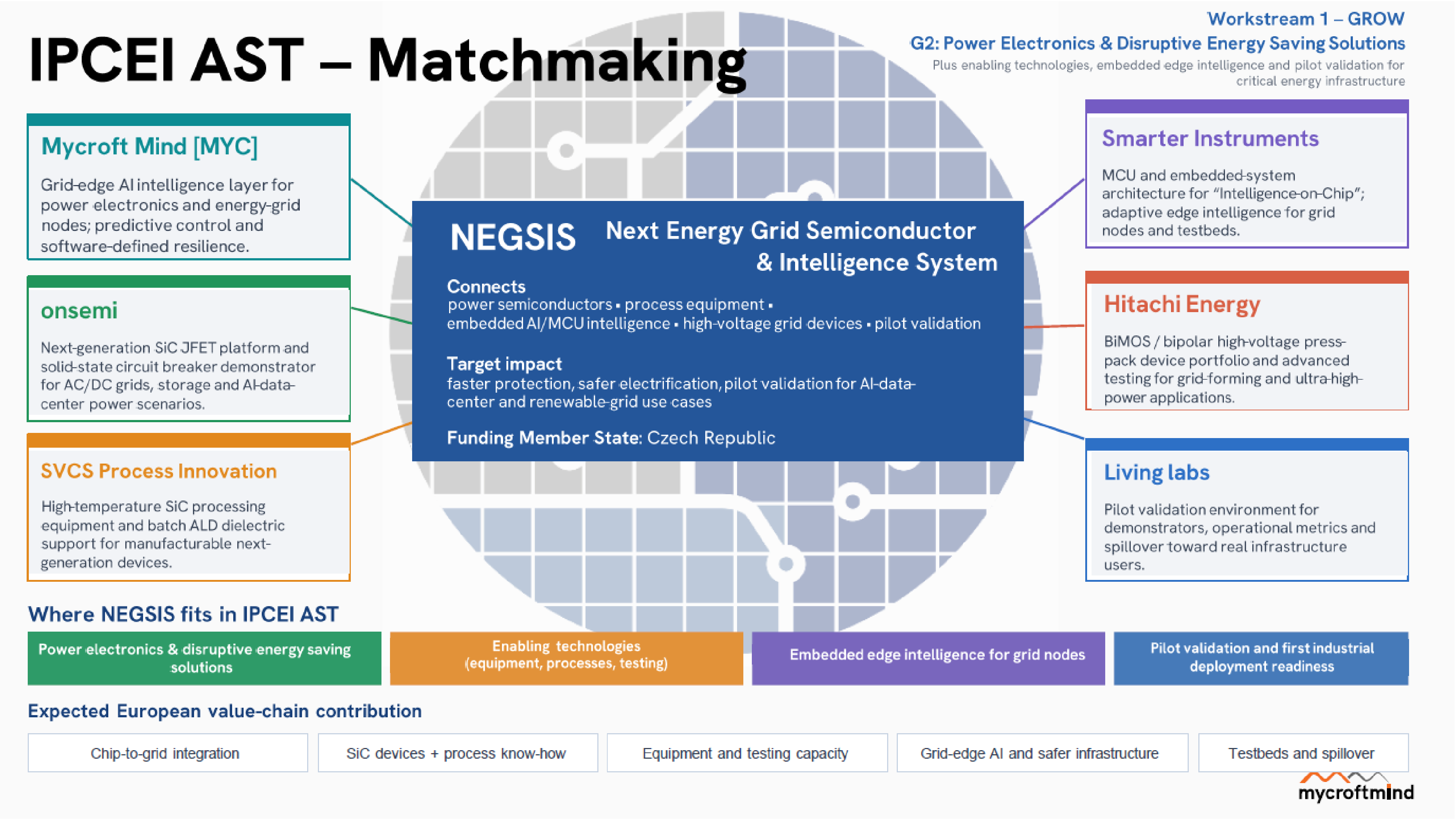
**onsemi** is first to scale vertical GaN; 700V/1,200V devices already sampling to early-access customers with volume production targeted for late 2026.

# IPCEI AST

- Important Projects of Common European Interest on Advanced Semiconductor Technology
- NEGSIS: Next Energy Grid Semiconductor & Intelligence System

**Main focus areas**:

- AI chips and accelerators
- Chiplets, heterogeneous integration, advanced packaging
- Photonic integrated circuits
- Disruptive sensors for automation
- Secure communication
- **Disruptive power electronics and energy savings solutions**
- Cross-cutting enabling technologies



## IPCEI AST – Matchmaking

Workstream 1 – GROW

G2: Power Electronics & Disruptive Energy Saving Solutions

Plus enabling technologies, embedded edge intelligence and pilot validation for critical energy infrastructure

**Mycroft Mind [MYC]**

Grid-edge AI intelligence layer for power electronics and energy-grid nodes; predictive control and software-defined resilience.

**onsemi**

Next-generation SiC JFET platform and solid-state circuit breaker demonstrator for AC/DC grids, storage and AI-data-center power scenarios.

**SVCS Process Innovation**

High-temperature SiC processing equipment and batch ALD dielectric support for manufacturable next-generation devices.

**NEGSIS** Next Energy Grid Semiconductor & Intelligence System

**Connects**
power semiconductors ▪ process equipment ▪ embedded AI/MCU intelligence ▪ high-voltage grid devices ▪ pilot validation

**Target impact**
faster protection, safer electrification, pilot validation for AI-data-center and renewable-grid use cases

**Funding Member State**: Czech Republic

**Smarter Instruments**

MCU and embedded-system architecture for “Intelligence-on-Chip”; adaptive edge intelligence for grid nodes and testbeds.

**Hitachi Energy**

BiMOS / bipolar high-voltage press-pack device portfolio and advanced testing for grid-forming and ultra-high-power applications.

**Living labs**

Pilot validation environment for demonstrators, operational metrics and spillover toward real infrastructure users.

**Where NEGSIS fits in IPCEI AST**

| Power electronics & disruptive energy saving solutions | Enabling technologies (equipment, processes, testing) | Embedded edge intelligence for grid nodes | Pilot validation and first industrial deployment readiness |
|---|---|---|---|

**Expected European value-chain contribution**

| Chip-to-grid integration | SiC devices + process know-how | Equipment and testing capacity | Grid-edge AI and safer infrastructure | Testbeds and spillover |
|---|---|---|---|---|

mycroftmind

# NEGSIS Living-Lab (micro-grid)

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AST IPCEI (2026-32)

Smarter Instruments

mycroftmind

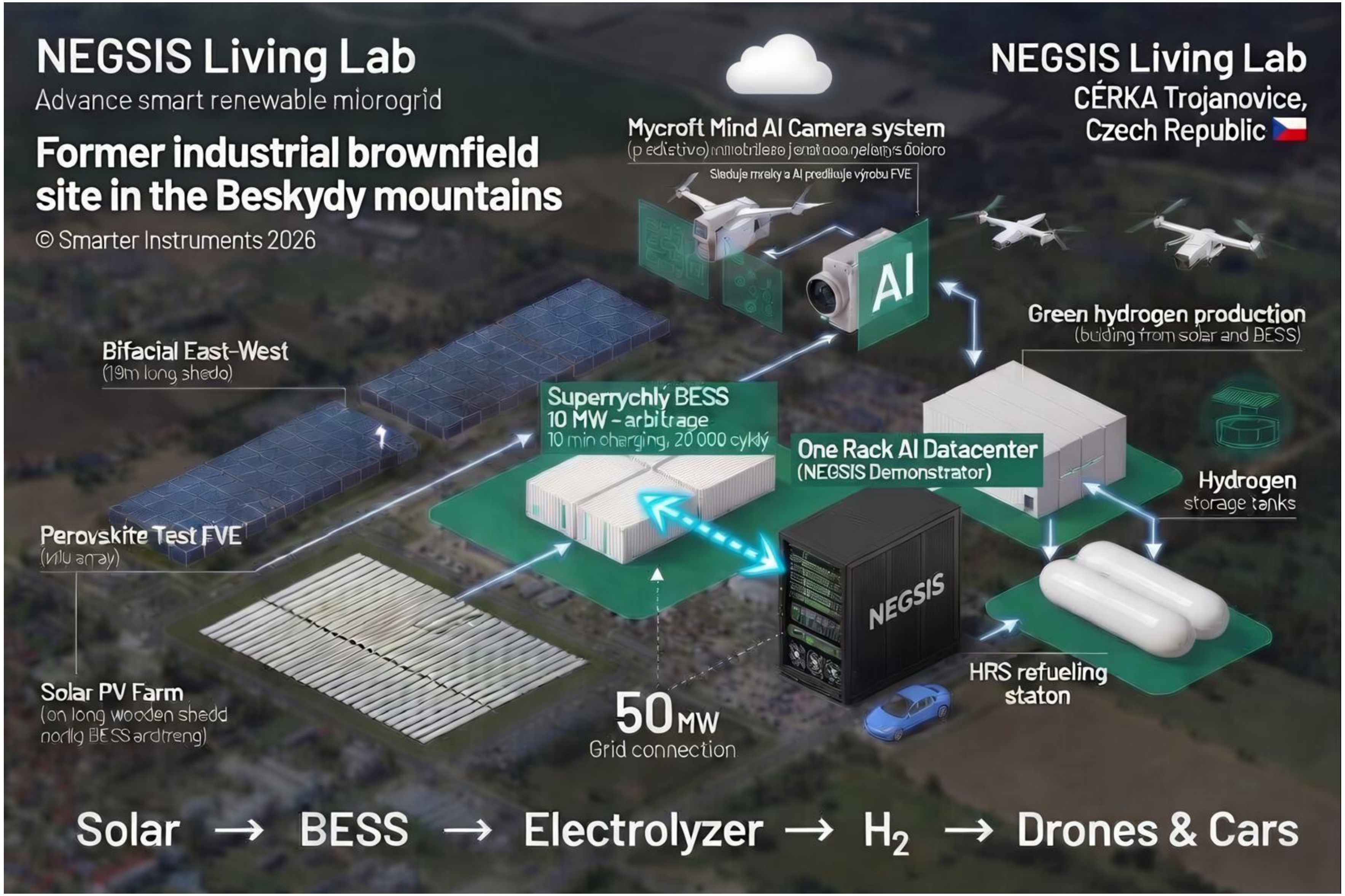
onsemi

Hitachi Energy

EP ROŽNOV ČLEN ČEZ ESCO

SVCS

Access/projects:
BOSCH
NOKIA
STELLAR NUCLEAR



CÉRKA

Obec TROJANOVICE

ESL ČLEN ČEZ ESCO

VŠB TECHNICKÁ UNIVERZITA OSTRAVA

OSTRAVSKÁ UNIVERZITA

Univerzita Tomáše Bati ve Zlíně

SLEZSKÁ UNIVERZITA V OPAVĚ

MENDELU

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

# Welcome to the Czech Semiconductor Centre

We help **companies, students and experts** navigate across the field of the semiconductor industry. We are **guides** and **experienced navigators** on the path to successful economic, career or technological breakthroughs.

**CzechSemiconductor Centre**

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**Wide Bandgap Semiconductors**
(e.g. SiC) for power electronics including novel semiconductor structures

**RISC-V-EDA**
deployment, demonstration, differentiation, customization, use cases (AI/ML, security, automotive), Cheri memory architecture

**Analytic tools**
(design, verification, prototyping), management of quality and efficiency in chip manufacturing

**Artificial Intelligence**
in semiconductor manufacturing processes and applications such as cyber security, biomedical and space chips, transition from automation to autonomy, smart sensors

**Adaptive, self-learning and low-power AI**
– basis for autonomous systems), for applications such as next-generation IoT and energy grids, aerospace and automotive, customized chips

https://czechsemiconductorcentre.cz/

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Cérka Design Forum: navrhujeme budoucnost regionu

**BLOK DESIGN BUDOUCNOSTI**
**TROJANOVICE, 22. 5. 2026**

CÉRKA

https://www.cerkabeskydy.cz/2026/03/09/cerka-design-forum-navrhujeme-budoucnost-regionu/
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