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OFF THE CHARTS

Presenting key aspects of India at a turning point

# Semiconductor

# Silicon Wafers to Smart Devices

# The Building Blocks of Modern Technology

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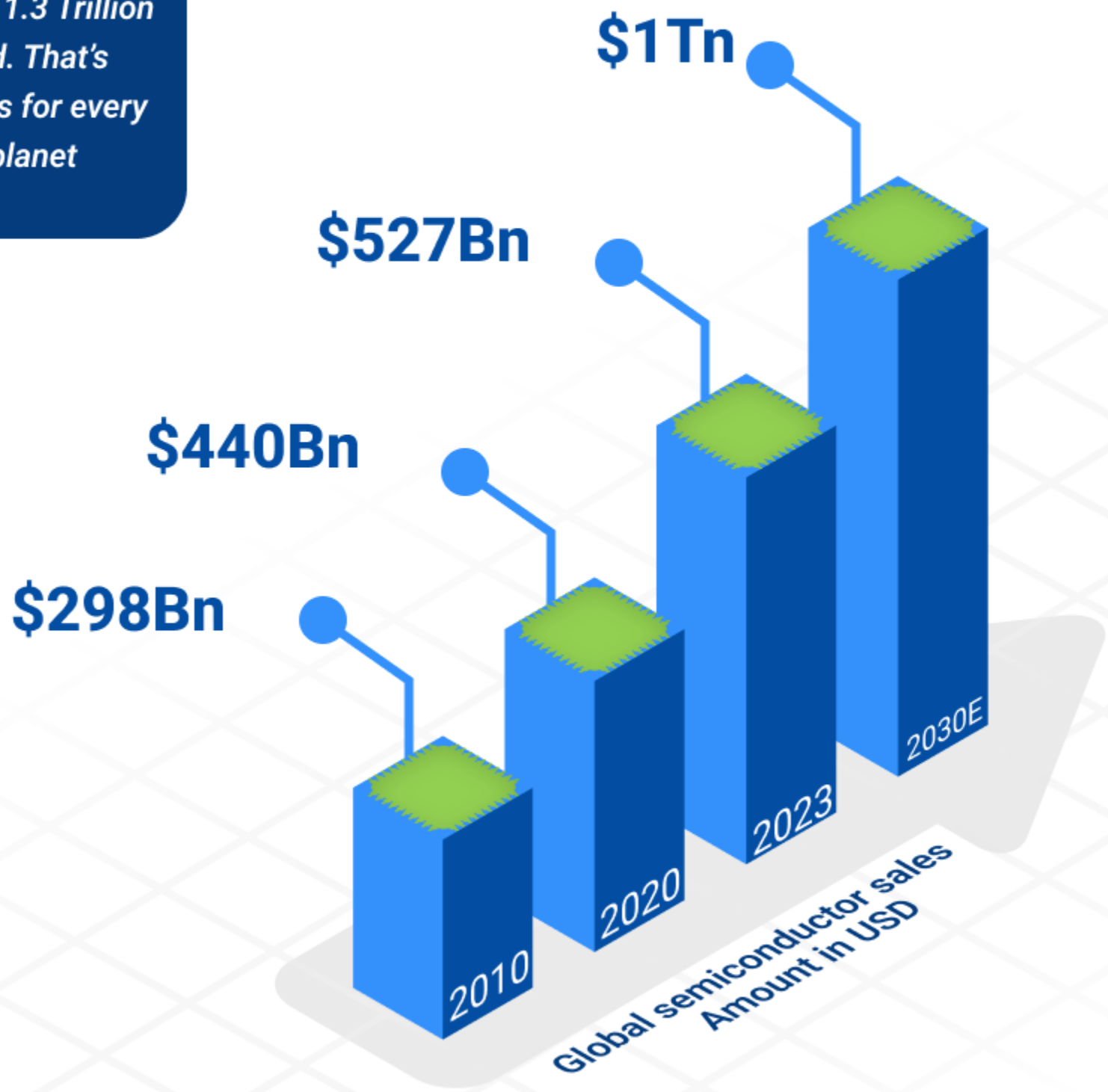
*In 2022, nearly 1.3 Trillion chips were sold. That's about 163 chips for every person on the planet*

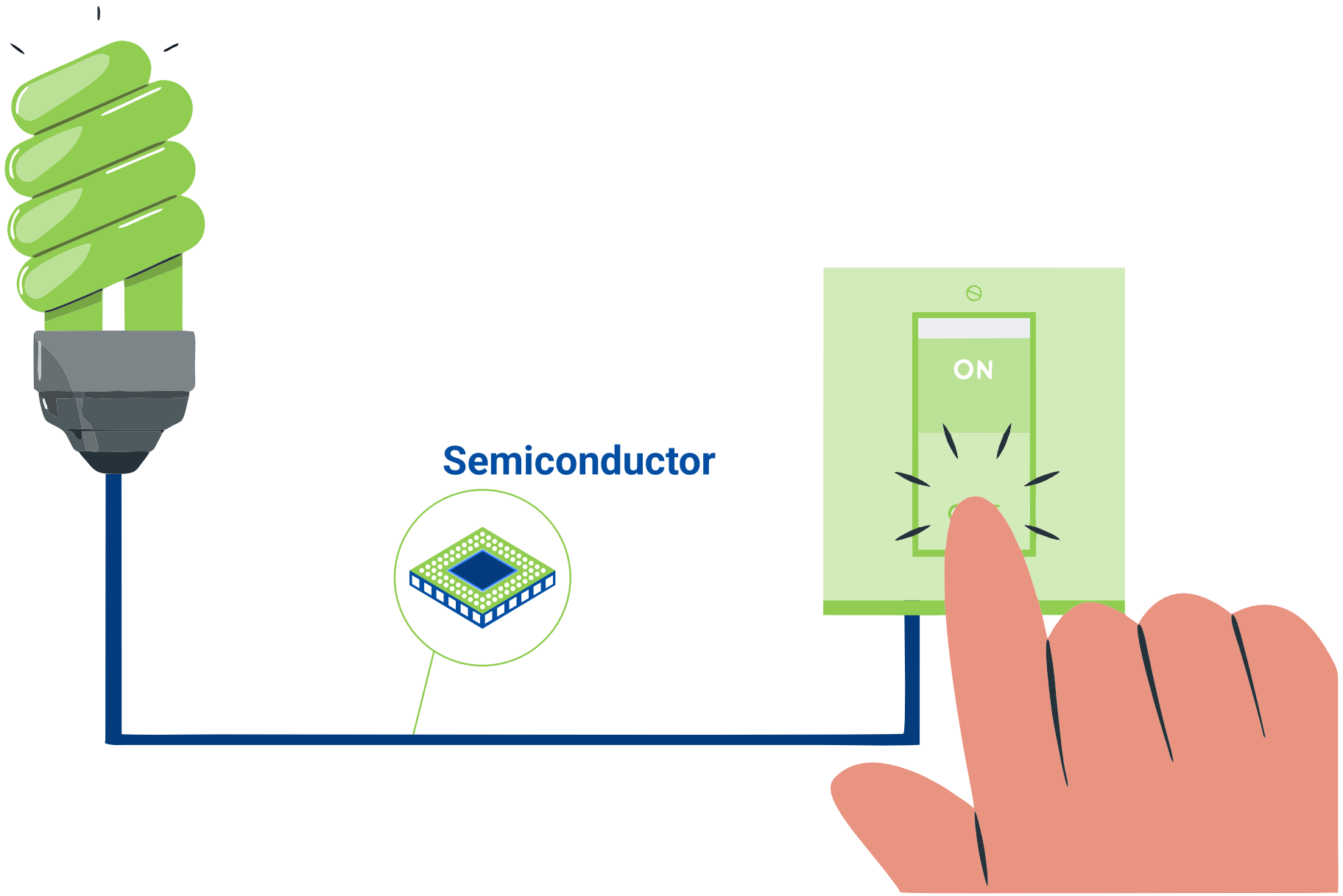



Note: E = Estimate

Source : Semiconductor Industry Association, Mckinsey, The World Semiconductor Trade Statistics (WSTS)

# What is a Semiconductor?

Semiconductors are similar to how switches and dials control the flow of water or electricity in physical systems, **semiconductors can turn electrical signals "on" and "off" or amplify them depending on their design and the applied voltage**.



# 4th most traded product

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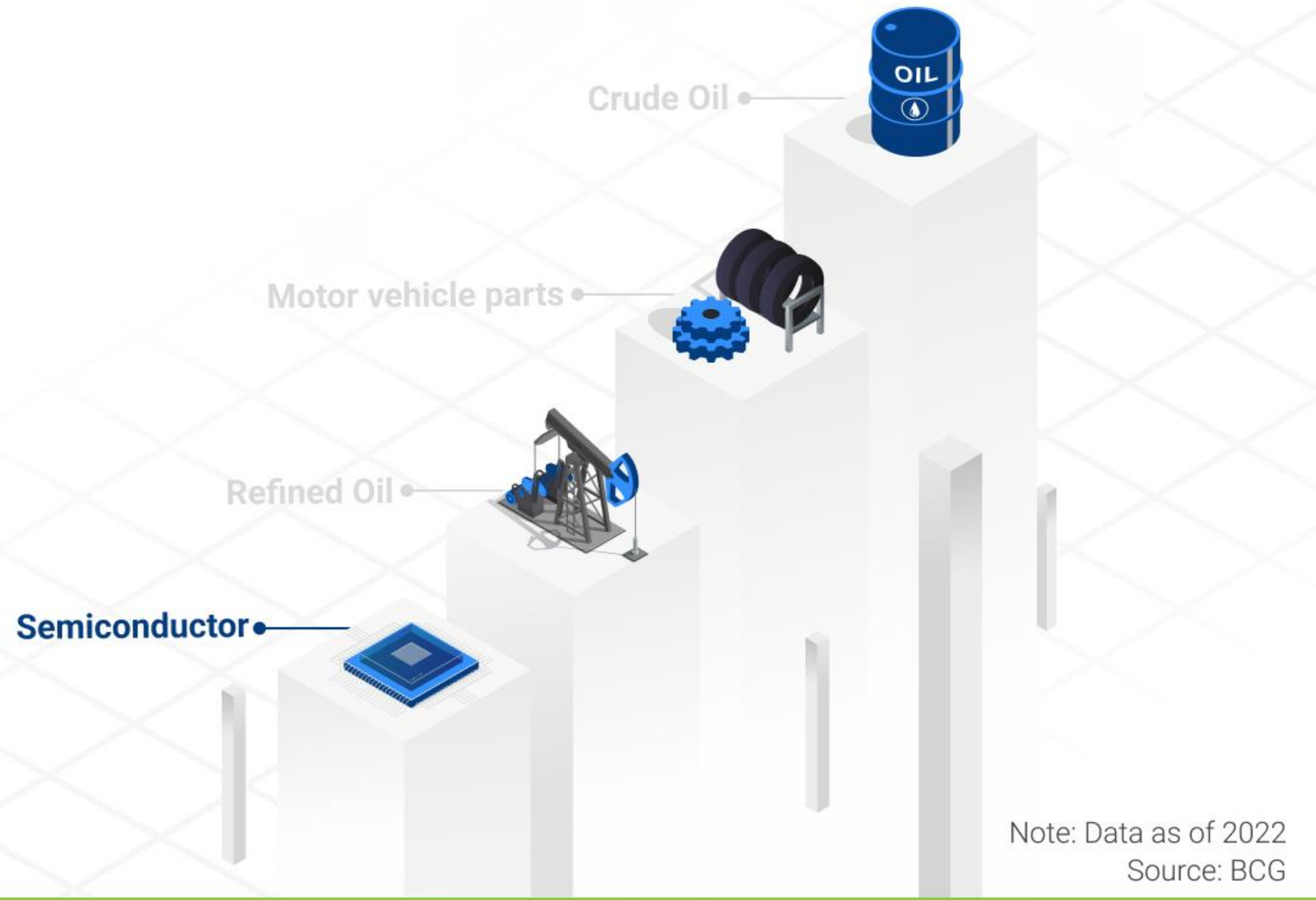
Semiconductors are the fourth-most traded product in the world after crude oil, motor vehicle parts, and refined oil.




Note: Data as of 2022
Source: BCG

# Semiconductor Market

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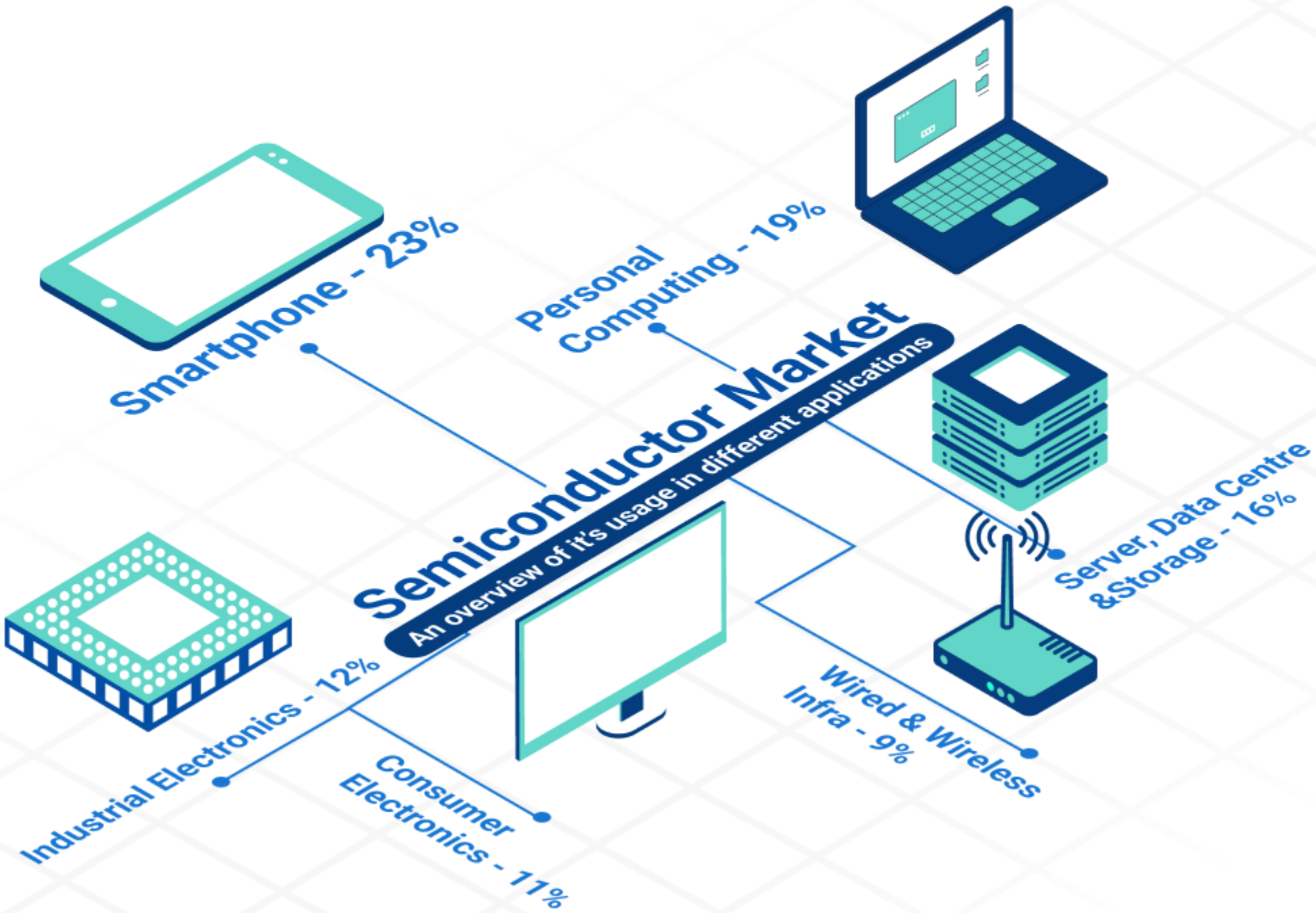
Worldwide industry sales were **$526.8Bn** in 2023. By 2025, smartphones are poised to lead in the semiconductor industry, focusing on image sensors and AI processors.




Source : Semiconductor Industry Association, Statista

Note: "%" represents the semiconductor market share based on various use cases

# Semiconductor Value Chain of a Smartphone (1/3)

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The semiconductor value chain is **truly global** and relies on the specialized capabilities of different geographic areas.

## Design

**Blueprint stage (US, Europe, Japan)**

Translating ideas into detailed blueprints, specifying how the chip should function and be built. It's like drawing a complex map for the following steps.

## Materials

**The Building Blocks (US, Europe, Japan)**

Refining pure silicon (think sand!), along with specialised chemicals and gases, ensuring they meet the exacting standards for chip production.

Note: Countries are only major and illustrative ones and not exhaustive

# Semiconductor Value Chain of a Smartphone (2/3)

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The semiconductor value chain is **truly global** and relies on the specialized capabilities of different geographic areas.

## Equipment

### The Tools of the Trade (US, Europe, Japan)

Specialized machines carving intricate patterns on the silicon

Here, factories called "fabs" use the designed blueprints & specialized equipment to physically build the chip on silicon wafers, placing transistors and connections with incredible detail.

## Fabrication

### Building the Chip (Taiwan, South Korea, China)

Note: Countries are only major and illustrative ones and not exhaustive

# Semiconductor Value Chain of a Smartphone (3/3)

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The semiconductor value chain is **truly global** and relies on the specialized capabilities of different geographic areas.

## Assembling & Testing

### Putting the Pieces Together (China, Southeast Asia)


This stage involves carefully packaging the individual chips and testing their functionality.

## Distribution & Sales

### Reaching the World (Global)

Distributors and manufacturers of electronics and others buy the finished chips and integrate them into various devices, from smartphones to cars.

Note: Countries are only major and illustrative ones and not exhaustive

# Semiconductor Giants

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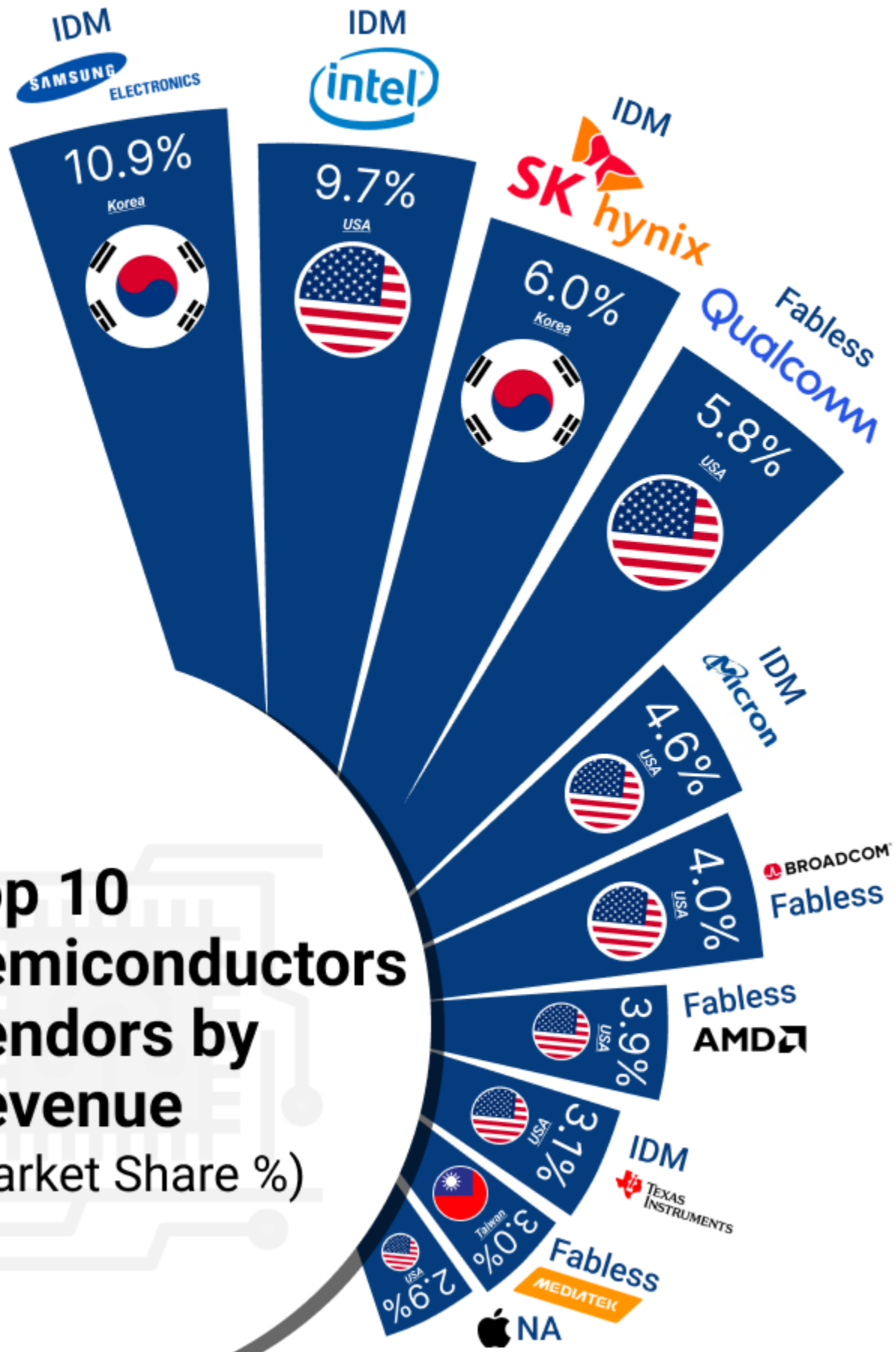


## Top 10 Semiconductors Vendors by Revenue
(Market Share %)

Fabless : Fabless firms that focus purely on design

IDM (Integrated device manufacturers) that are involved in most production stages

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Source : Gartner (2023)

# Design in India, Design for the World!

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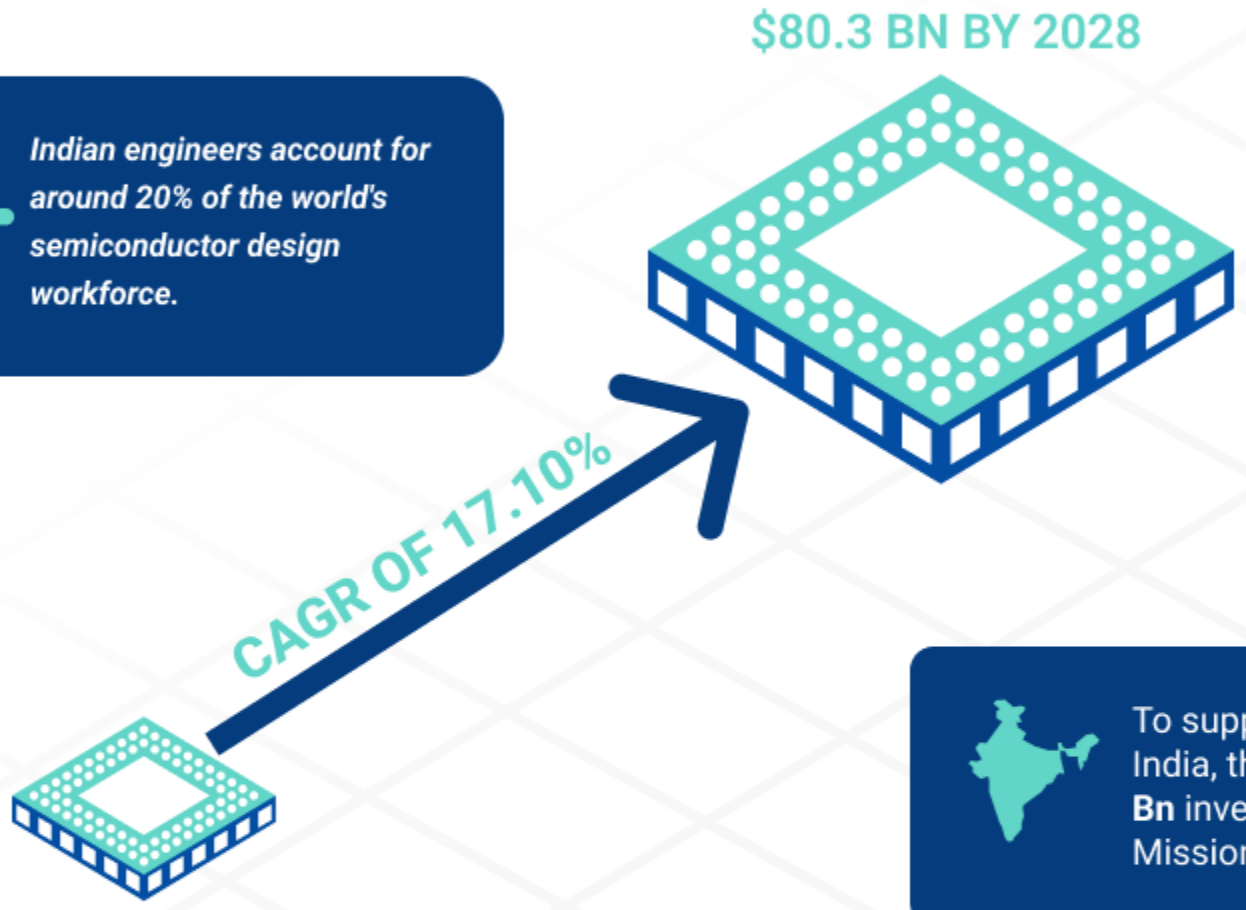
The Indian semiconductor market was valued at **$23.2 Bn** and is projected to reach **$80.3 Bn** by 2028, growing at a CAGR of **17.10%**




*Indian engineers account for around 20% of the world's semiconductor design workforce.*

India continues to see a surge in FDI in the electronics sector, reaching **$6.7 billion** in 2021-22.

To support semiconductor R&D in India, the MeitY has announced a **$10 Bn** investment in India Semiconductor Mission.

Government also invited applications under **Design Linked Incentive (DLI) Scheme** from 100 domestic companies, startups & MSMEs, with an aim to create semiconductor chip design ecosystem in India

ISMC Analog Fab plans to invest **$3 billion** in Karnataka, and several other players are exploring opportunities.

Note: MeitY: Ministry of Electronics and IT

Source : Invest India

# Disclaimer

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And don't forget to **follow**

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We believe in the power of us

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