ICOS
International Cooperation On Semiconductors

DECISION
ETUDES & CONSEIL

The electronics value-chain in an evolving geopolitics landscape

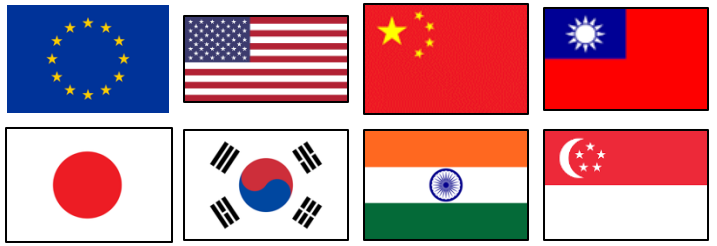
06.2025

Economic analysis within the ICOS project – 2023/2024

ICOS International Cooperation On Semiconductors

Comparative Analysis of Semiconductor Ecosystems Worldwide, 2024

Ecosystems of 8 countries



- Market (by segment)
- Production (across the value-chain)
- trade
- Investments
- Policy strategies (chips acts)
- Strengths & dependencies
- Roadmap for cooperation (confidential)

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Economic analysis within the ICOS project – 2025

Report “Monitoring Semiconductor Value Chains: Implications for International Cooperation”

- To be published in July 2025
- Goal: To monitor key factors affecting cooperations since 2024:
  - Geopolitical shifts and trade dynamics
  - Deployment of investment plans along the value chain
  - Evolution of the European talent gap

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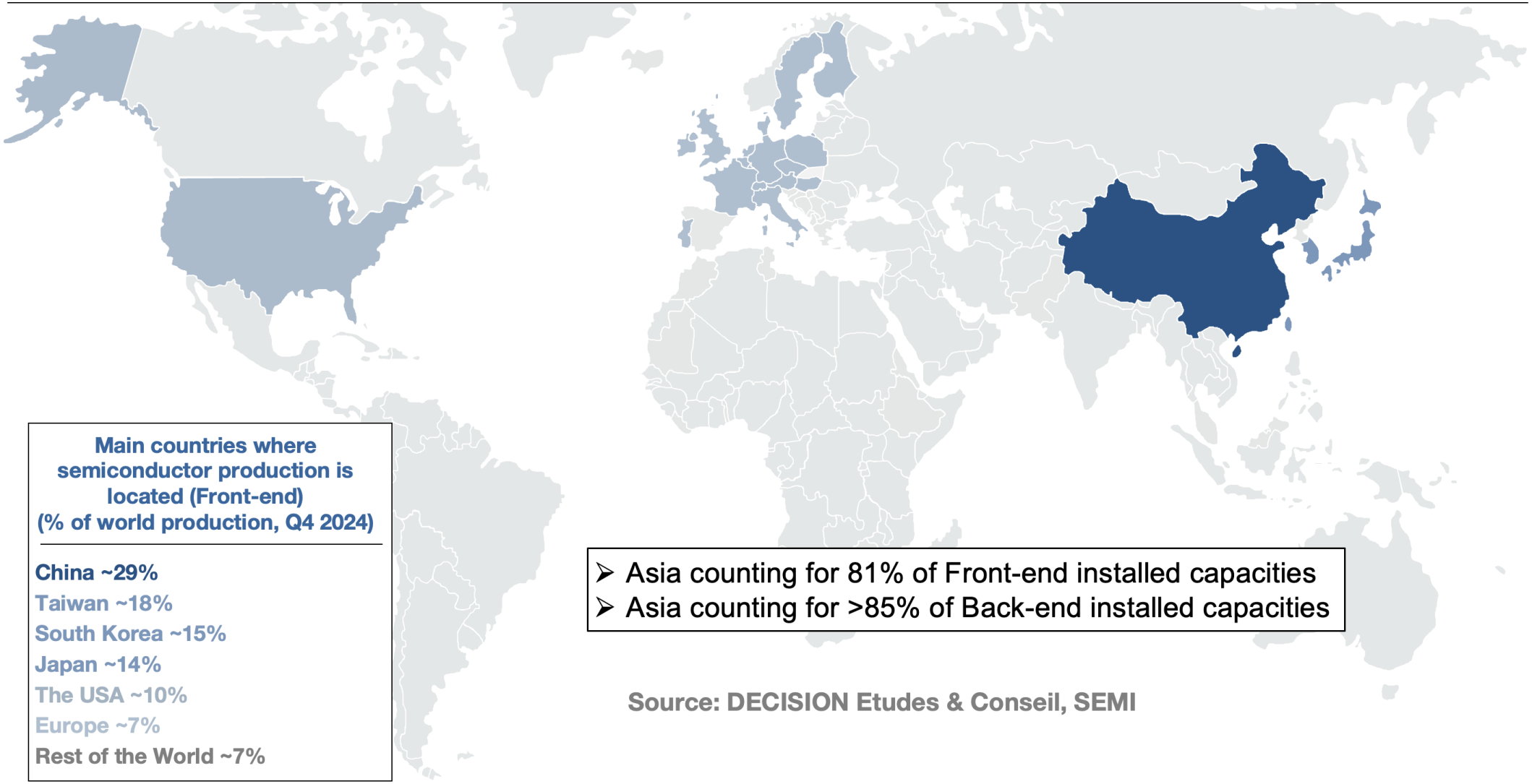
1. The globalized semiconductor value-chain: State of play in 2025
2. 1990s - 2020s: A shifting Geopolitical Environment
3. Semiconductor: China's Rise and U.S. Industrial Policy Tools Aimed at Containment
4. Status of trade in semiconductor in this changing environment

(1)

Overview of the Semiconductor Industry

The World's Most Globalized Sector

Semiconductor front-end manufacturing installed capacities



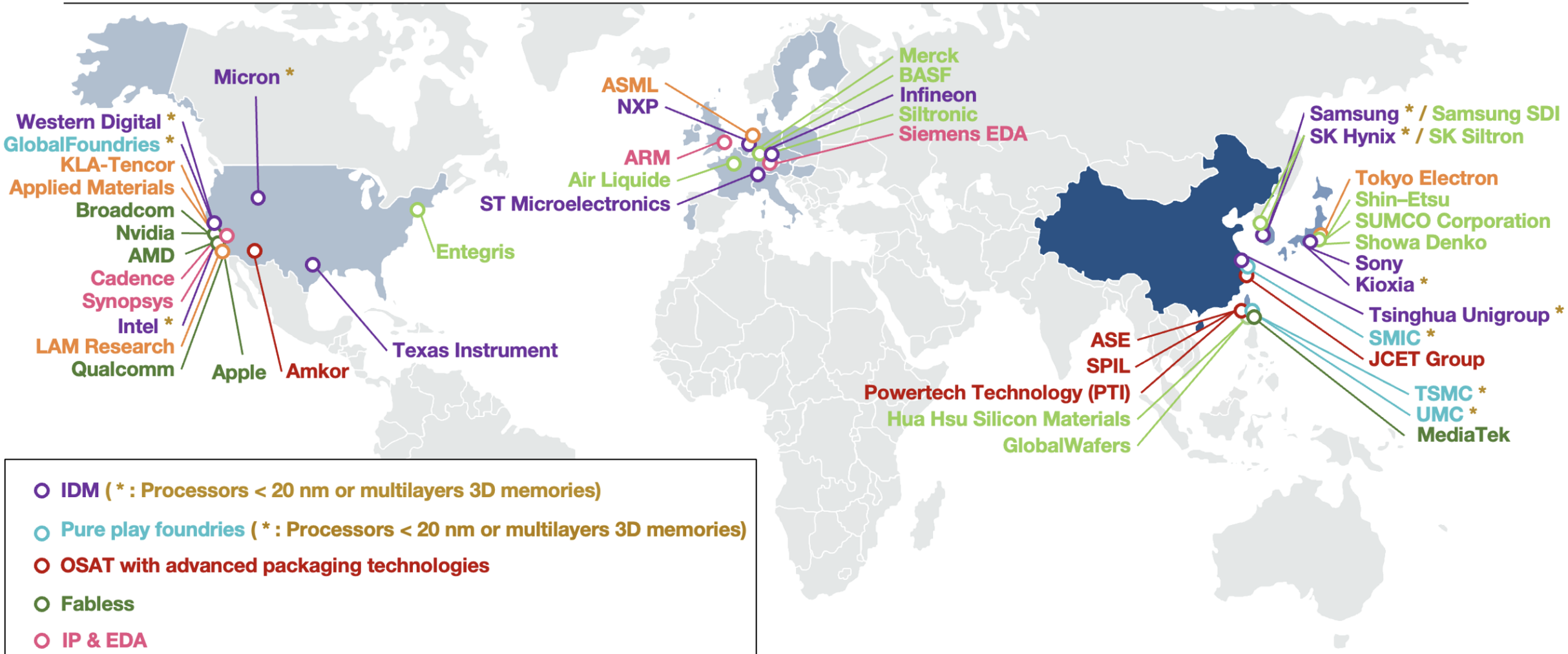
Main countries where semiconductor production is located (Front-end) (% of world production, Q4 2024)

- China ~29%
- Taiwan ~18%
- South Korea ~15%
- Japan ~14%
- The USA ~10%
- Europe ~7%
- Rest of the World ~7%

- Asia counting for 81% of Front-end installed capacities
- Asia counting for >85% of Back-end installed capacities

Source: DECISION Etudes & Conseil, SEMI

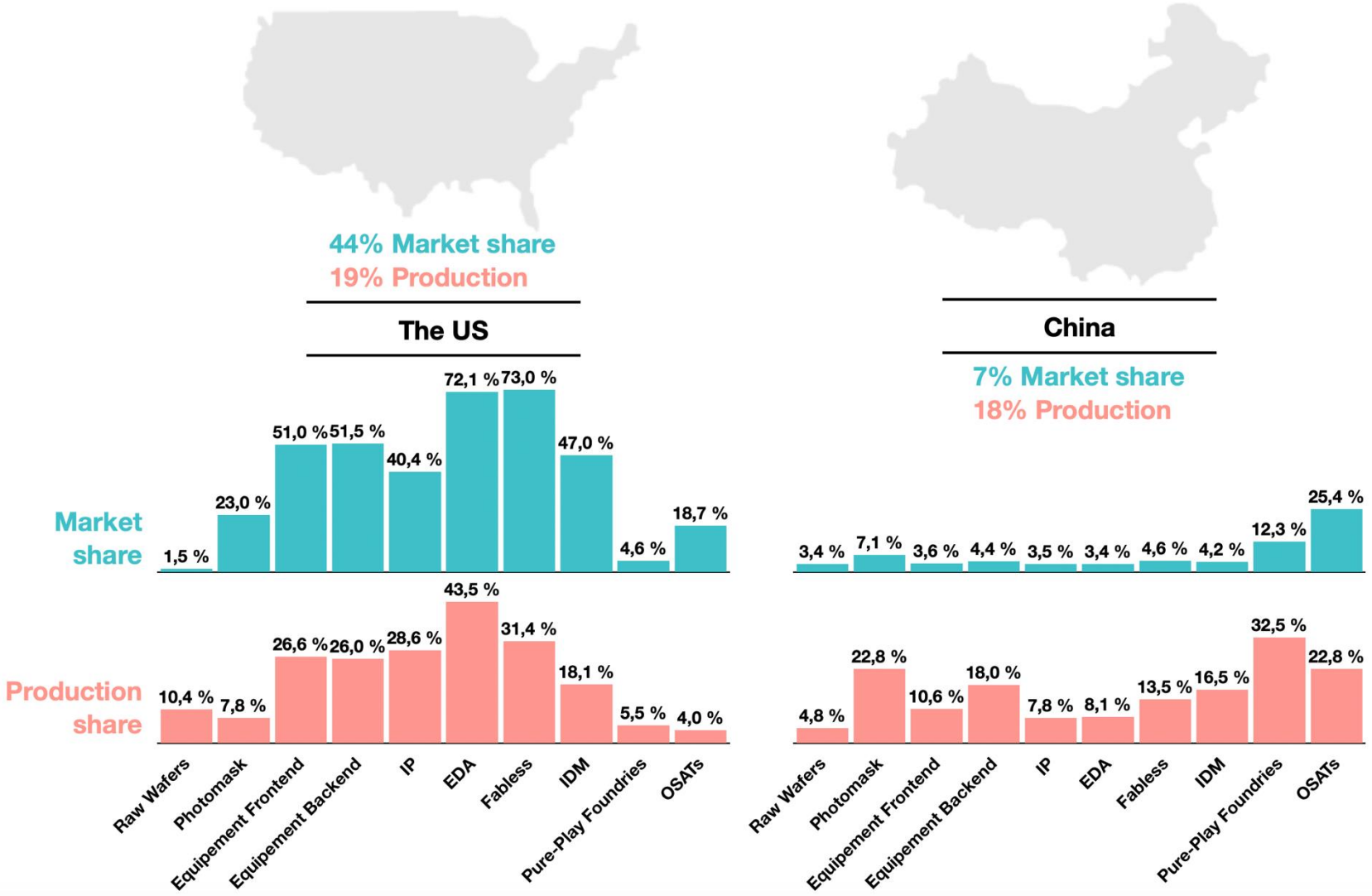
Semiconductor Landscape in 2024



- IDM (* : Processors < 20 nm or multilayers 3D memories)
- Pure play foundries (* : Processors < 20 nm or multilayers 3D memories)
- OSAT with advanced packaging technologies
- Fabless
- IP & EDA
- Equipment
- Materials providers

Source: DECISION Etudes & Conseil, SEMI

Positioning of the EU compared to other global countries in the global semiconductor value chain in terms of market share and production share



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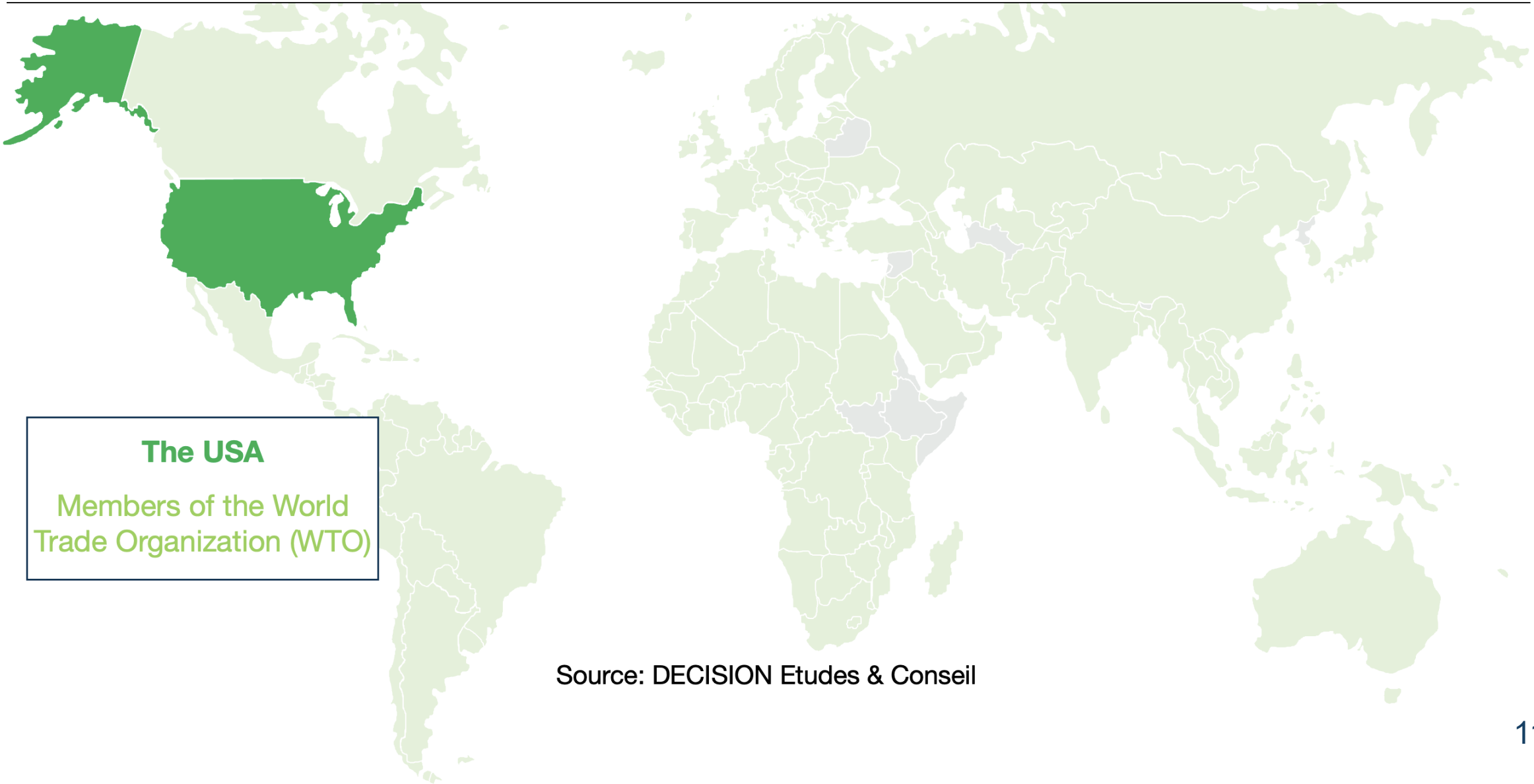
1990s – 2020s

A shifting Geopolitical Environment

27 years of globalization in a unipolar World (1991-2018)

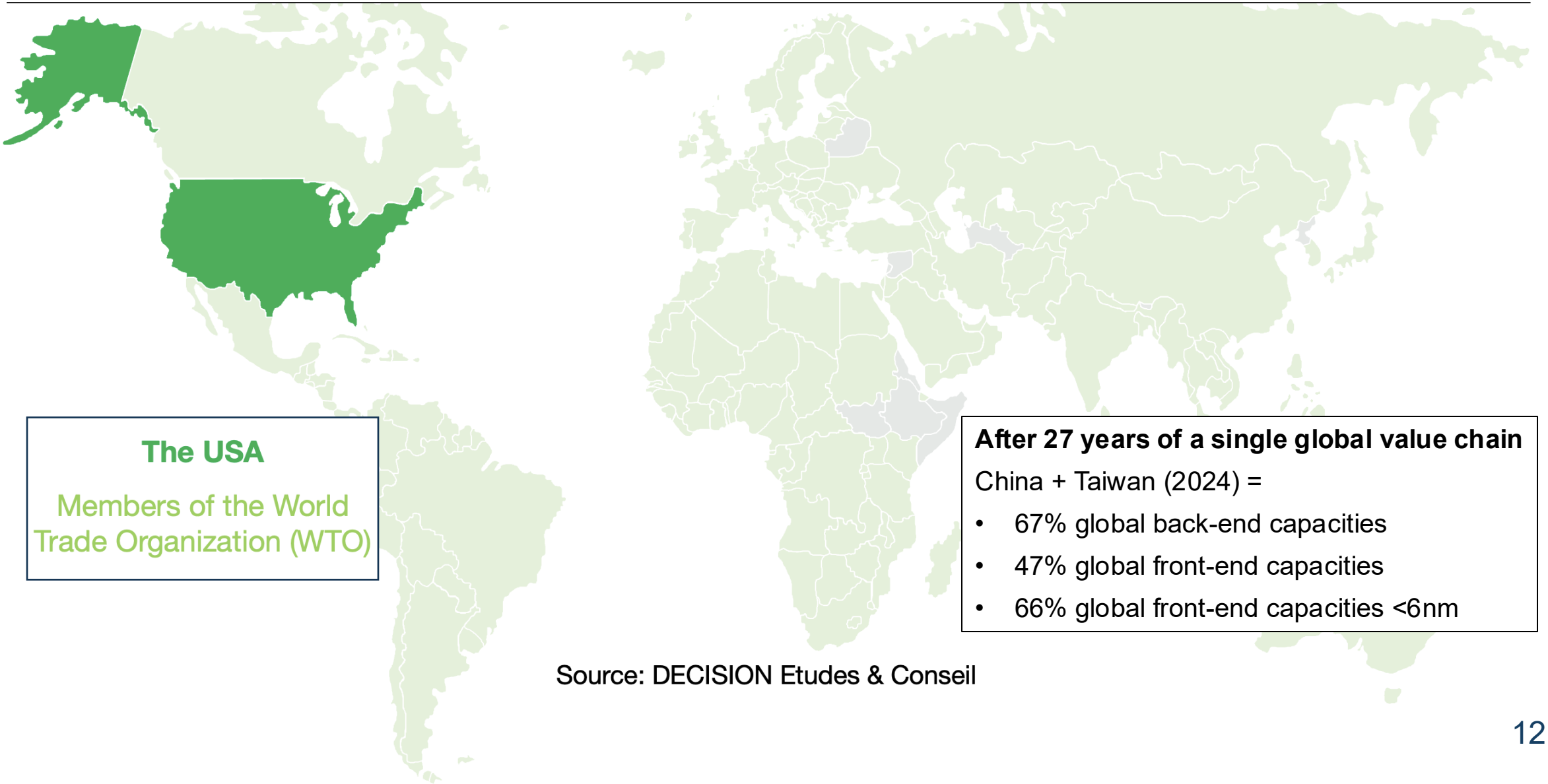


The USA

Members of the World Trade Organization (WTO)

Source: DECISION Etudes & Conseil

27 years of globalization in a unipolar World (1991-2018)



The USA

Members of the World Trade Organization (WTO)

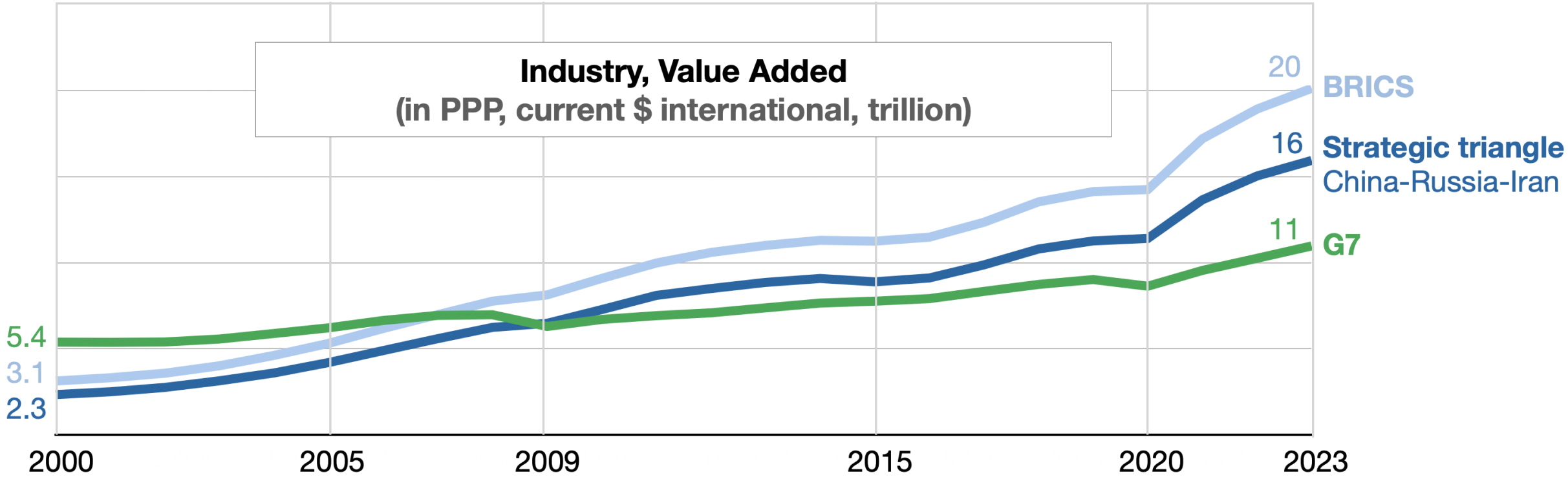
After 27 years of a single global value chain

China + Taiwan (2024) =

- 67% global back-end capacities
- 47% global front-end capacities
- 66% global front-end capacities <6nm

Source: DECISION Etudes & Conseil

The Road to Multipolarity (2000-2023)



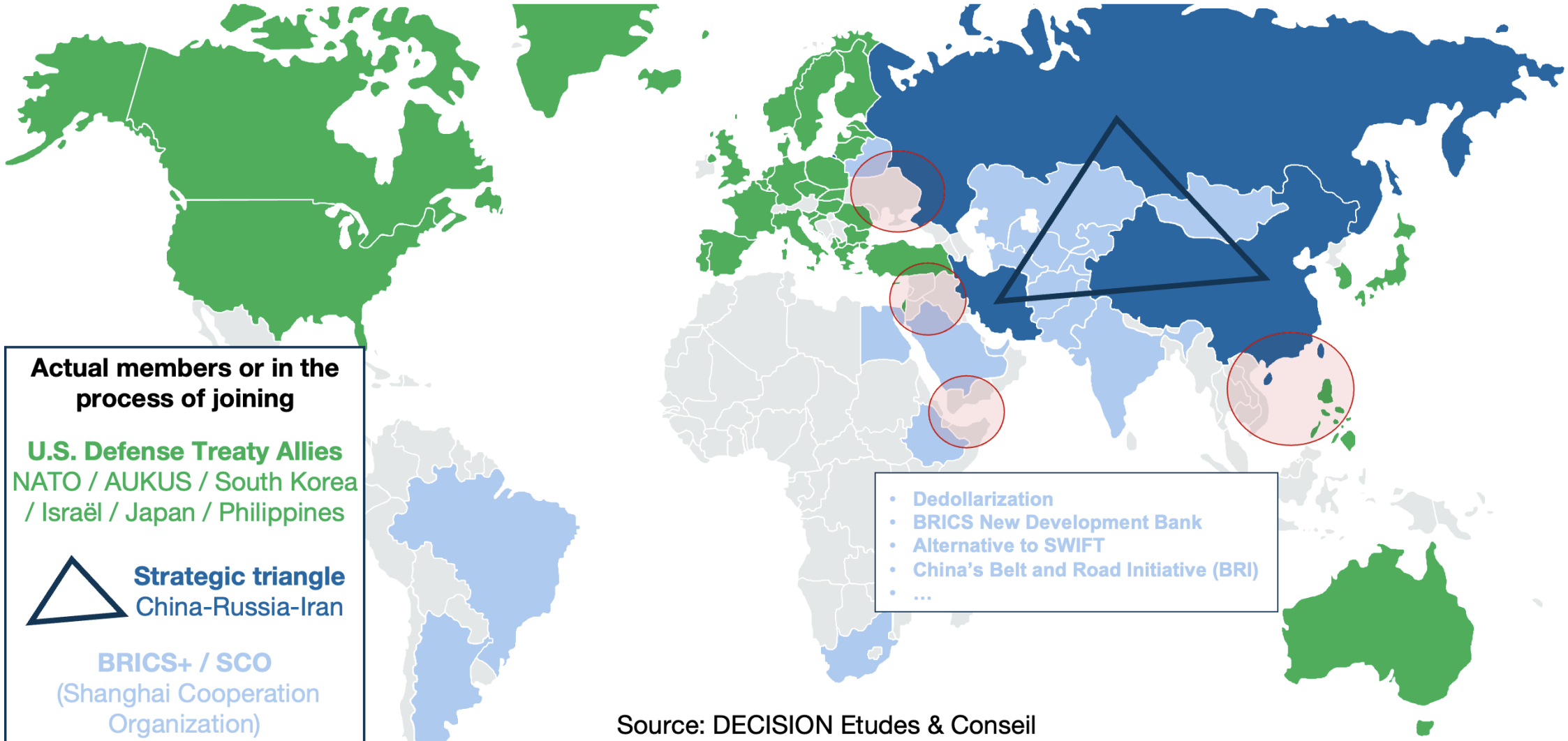
1 **2001**
Creation of the Shanghai Cooperation Organization

2 **2014**
Annexation of Crimea by Russia
New Development Bank of the BRICS

3 **2019**
U.S. Blockade of the
WTO Appellate Body

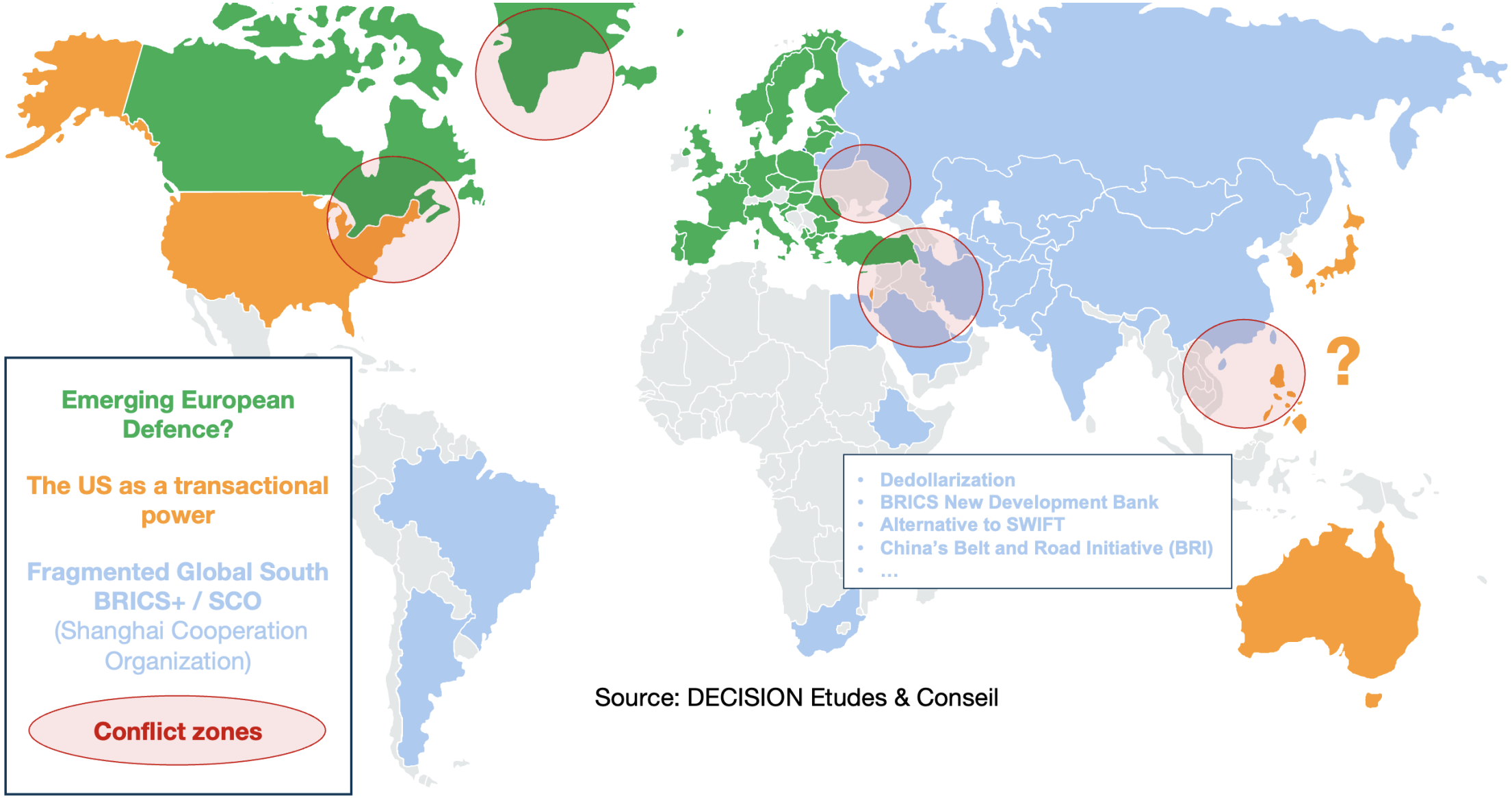
(2018-2024)

Towards a logic of blocks? The West versus the Rest?



Source: DECISION Etudes & Conseil

Since 2025 – A World of Fragmentation & Multipolarity



Source: DECISION Etudes & Conseil

- **Export control, export bans, tariffs…**
- For 5-10 years, companies start implementing **local-for-local manufacturing strategies**
  - At least for the U.S. and Chinese markets
  - Often for each country
- **U.S. relocating manufacturing outside Taiwan to weaken its Silicon shield** (US Chips act, ITSI, OECD, tariffs…)
  - Taiwan silicon shield will remain at least up to 2035
  - China & Taiwan could re-unify somewhere between 2040-2060?
- **Towards at least 2 value-chains (US versus Chinese)**

(3)

Semiconductor

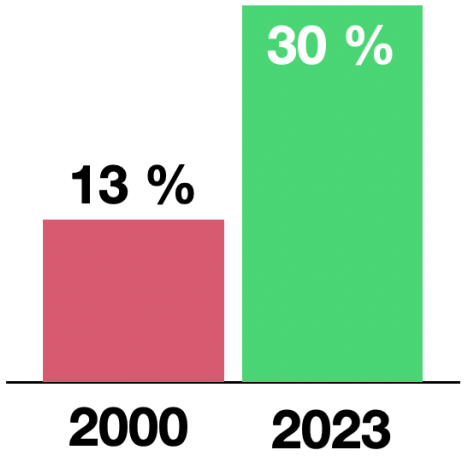
The rise of China…

…and US attempts to contains China's rise

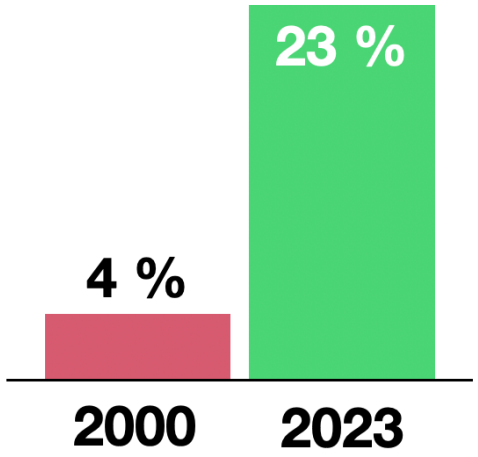
Semiconductor: The rise of China

In **2015**, China published its plan "**Made in China 2025**" where it officially announce for the first time its willingness to master the complete value chain of semiconductor.

Semiconductor market China % World



Installed capacity of semiconductor (Front-end) China % World



Across the entire semiconductor value chain in 2022

Sources: DECISION Etudes & Conseil, WSTS, SEMI

(5)

Status of trade in semiconductor

in this changing environment

Status of trade in semiconductor in this changing environment

- **Global trade** flattening since 2024
- **Semiconductor trade** flattening since 2024
  - **US-China trade** declining since 2018
  - **EU-China trade** growing above the average since 2015
- **+€10B EU trade balance along the semiconductor value-chain**
  - -€10B for semiconductor products
  - +€20B for equipment & tools
- **Main EU trading** partners (accounting for 70% of EU semiconductor trade)

1. China
2. The USA
3. Taiwan
4. Malaysia (strong EU back-end manufacturing base)
5. South Korea
6. Japan

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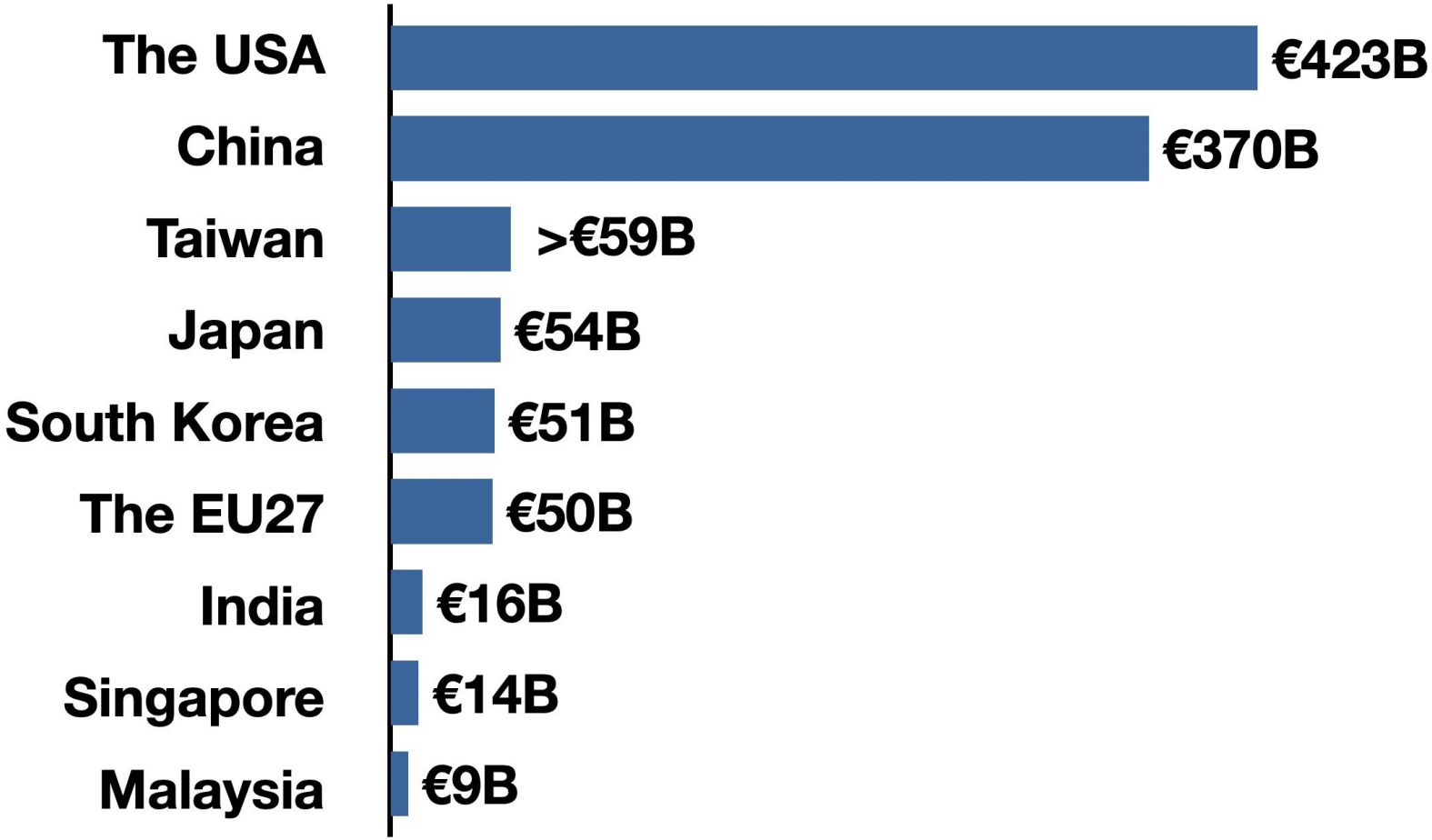
  - Evolution of the European talent gap

Confirmed Semiconductor Investments Along the Value Chain Exceeding €1 Billion by Country/Region – May 2025



Source: DECISION Etudes & Conseil, May 2025 (China estimated)

Confirmed Semiconductor Investments Along the Value Chain Exceeding €1 Billion by Country/Region – May 2025

Investment from global leaders in advanced processing

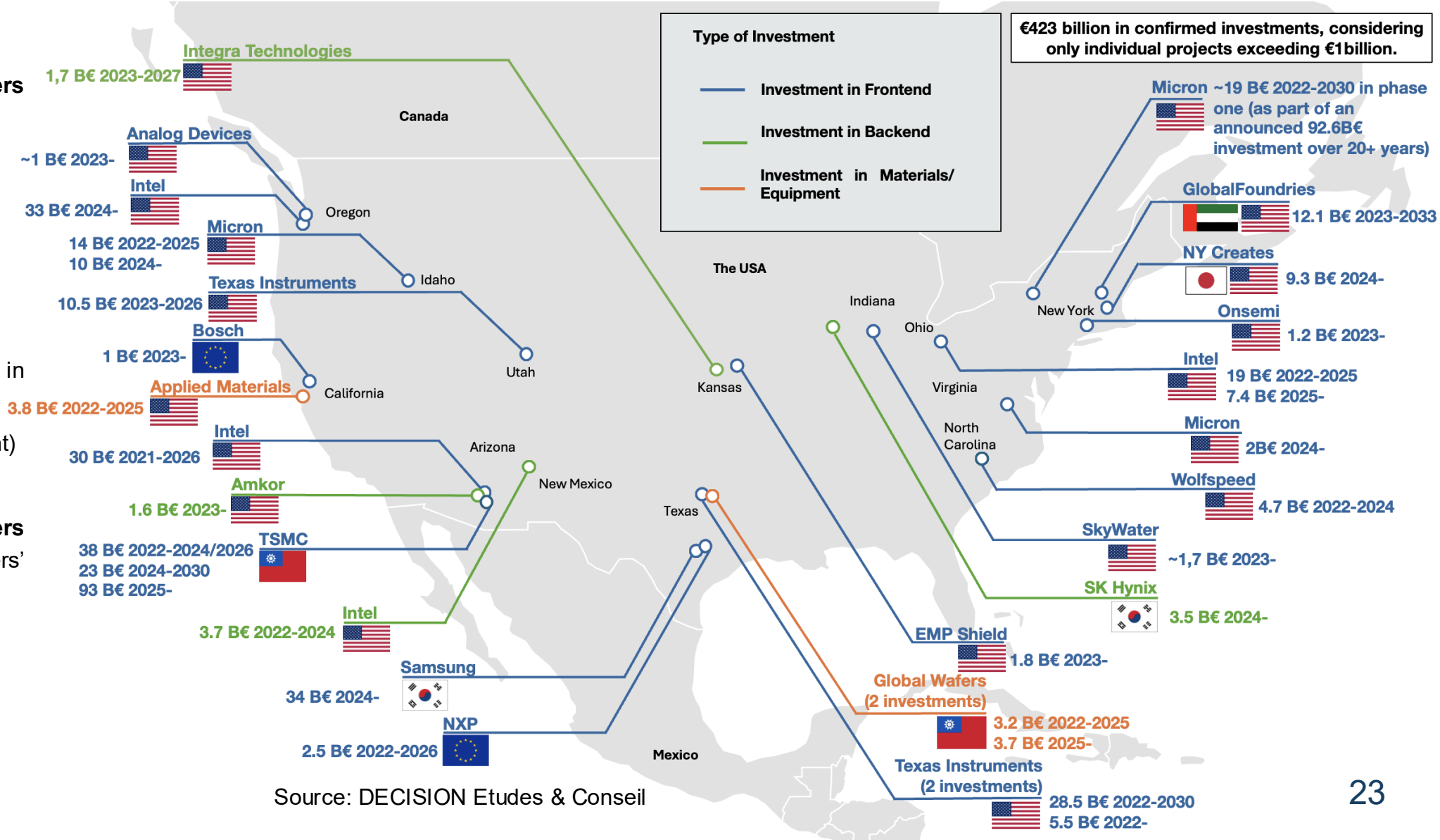
- **TSMC**: €154B
- **Intel**: €89B
- **Samsung**: €34B

Nvidia

- Up to $500 billion investment in U.S. 2026-2030

  (April 14, 2025, announcement)

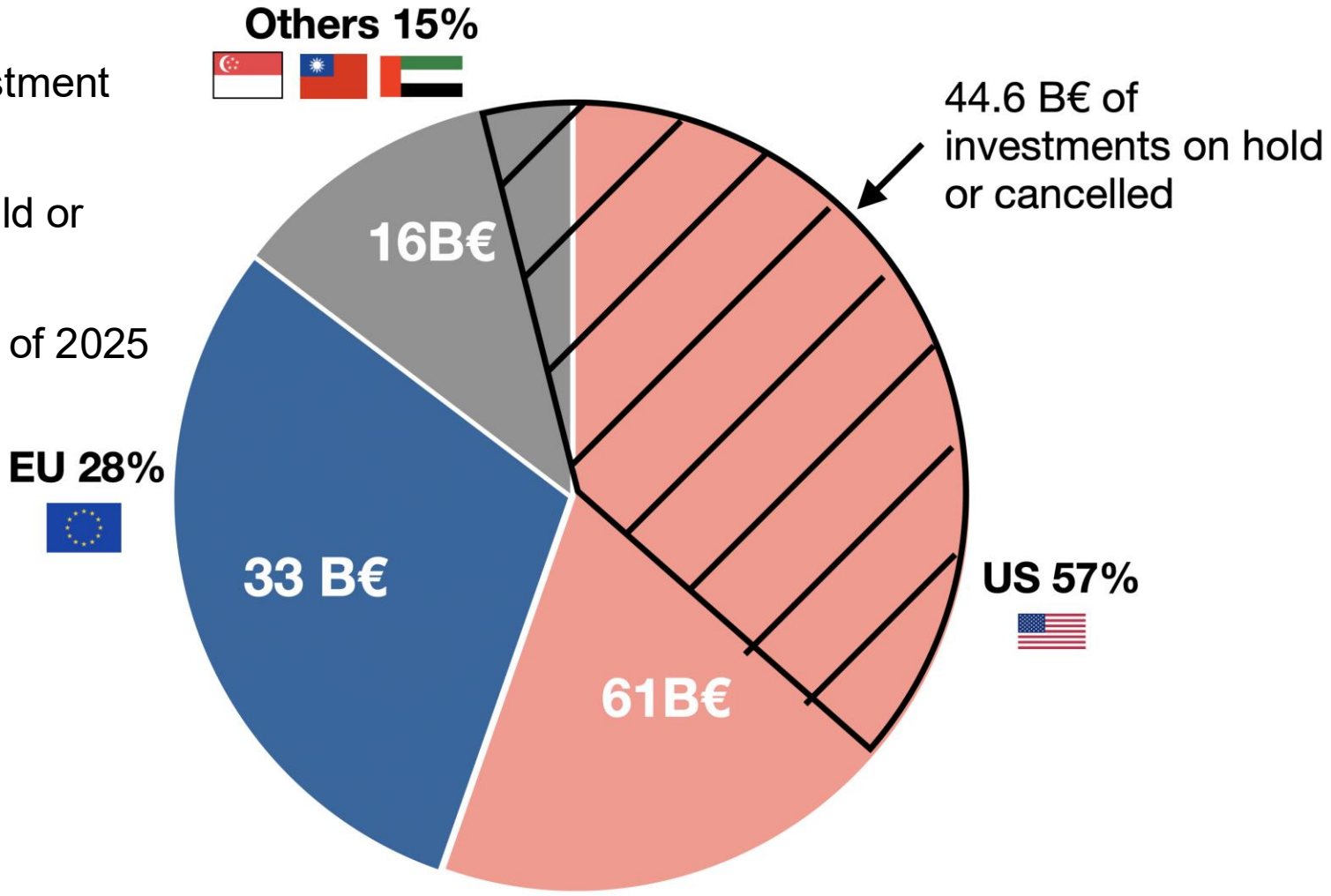
US Dependency in Raw Wafers addressed through Global Wafers' Investment.



Source: DECISION Etudes & Conseil

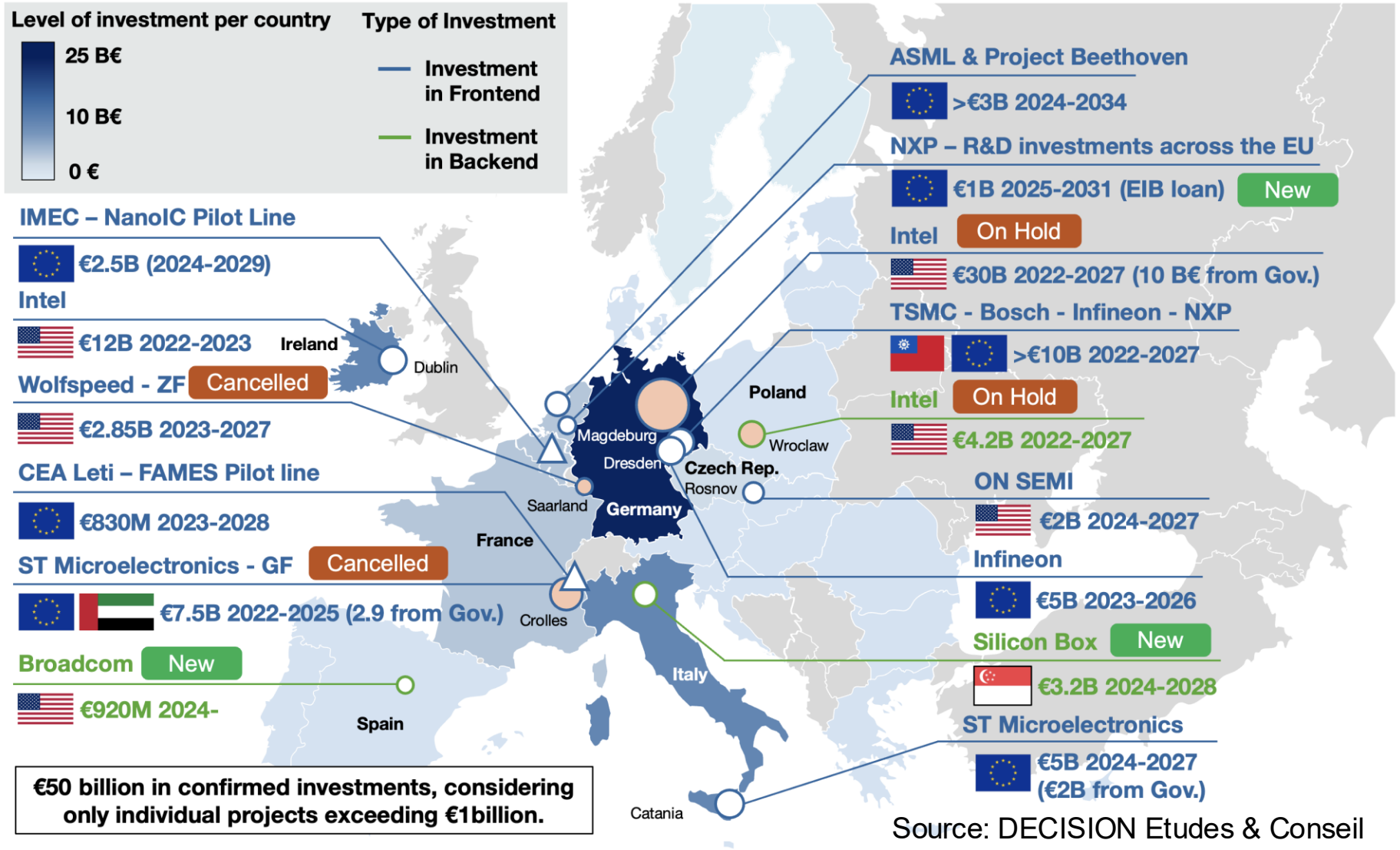
EU Chips Act – Investment Overview

- €106B in public and private investment was planned as of early 2024
- €44.6B has since been put on hold or cancelled
- €63B in confirmed investment as of 2025



Source: DECISION Etudes & Conseil

EU Chips Act - Key investments in the EU (>1B€) in 2025



€50 billion in confirmed investments, considering only individual projects exceeding €1billion.

Source: DECISION Etudes & Conseil

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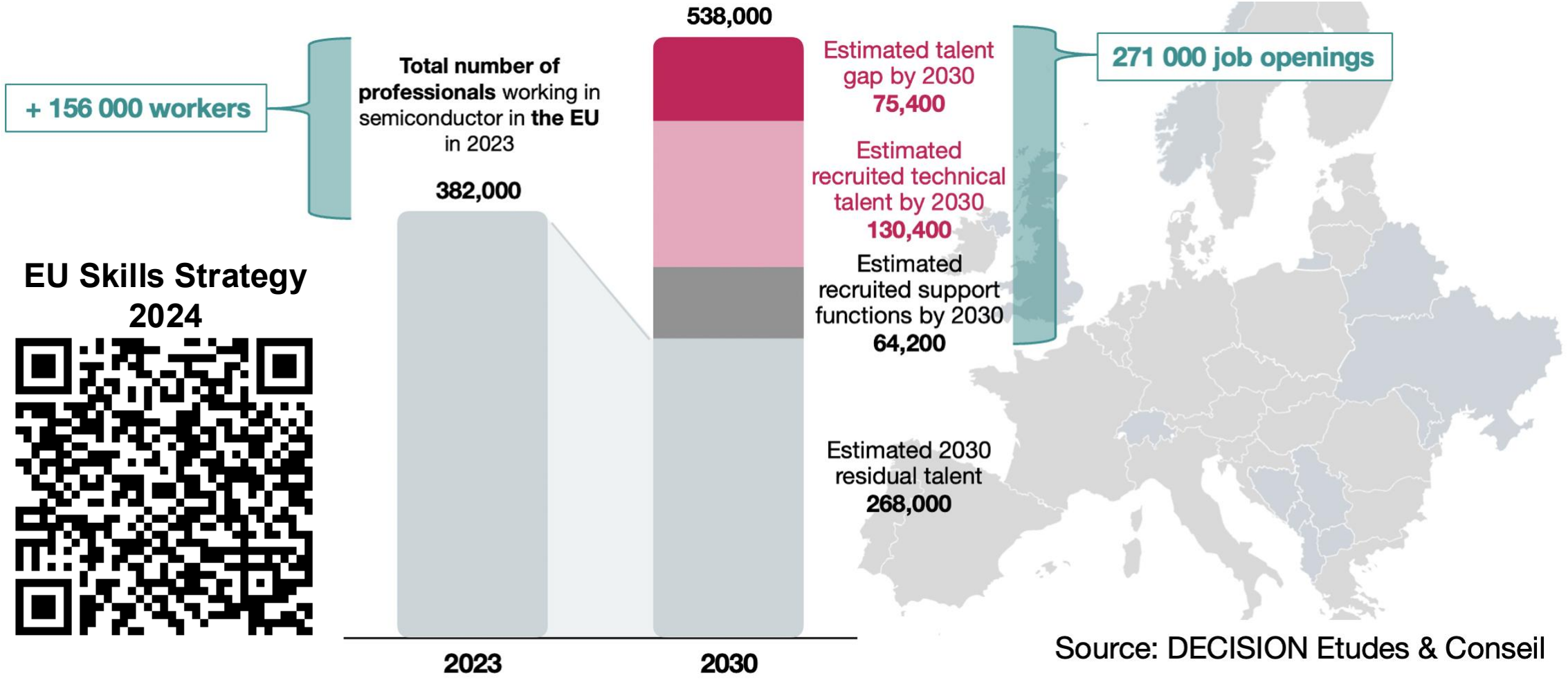
  - **Evolution of the European talent gap**

EU semiconductor talent gap (2024-2030), October 2024



Source: DECISION Etudes & Conseil

EU semiconductor talent gap

2022

- **Chips shortage & subsidies race – EU target of 20% production share by 2030**
- Talent gap: 350,000 workers lacking by 2030 (PwC)

2024

- **Realistic investments forecasts by 2030**
- Talent gap: 75,400 workers lacking by 2030 (DECISION) => 12,600 per year across the EU

2025

- **€45B investments cancelled or delayed + downcycle of the European market (-8% 2024)**
- At least -7000 employees needed
- Talent gap: 56,000 workers lacking by 2030 (DECISION) => 9,300 per year across EU

The European Talent Gap Remains a Structural Challenge

- In parallel to the difficult European market situation…
- The shortage of skills talent remains in the EU, particularly acute in specific clusters:
  - Need new targeted Masters:' programmes (electrical engineering, design…)
  - Need to build new carrier pipes for electrical engineering teachers in specific universities
  - Lack of student interest in targeted countries (e.g., France, Italy…)
  - …

Opportunities for cooperation

- Realistic investments forecasts by 2030

Opportunities for cooperation

1) **Exchange of PhD students and researchers with third countries on topics of mutual interest**

   - Japan, South Korea, Singapore, Taiwan…

2) **India** and **Southeast Asia** are the two regions with the greatest surplus of graduates in semiconductor-related fields.

3) Within the EU27, **Spain, Romania, Greece, Bulgaria, and Croatia** have the largest surplus of electrical engineering graduates relative to the current size of their national semiconductor ecosystems.

4) In the EU's immediate neighborhood, **Turkey** and **Morocco** also show a significant surplus of electrical engineering graduates compared to the scale of their semiconductor sectors.

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