昇陽半導體法說會

Q4. 2022

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- Information as to those factors that could cause actual results to vary can be found in PSI's Annual or Quarterly Report filed with Taiwan Stock Exchange Corporation (TWSE) and such other documents as PSI may file with, or submit to the TWSE from time to time.

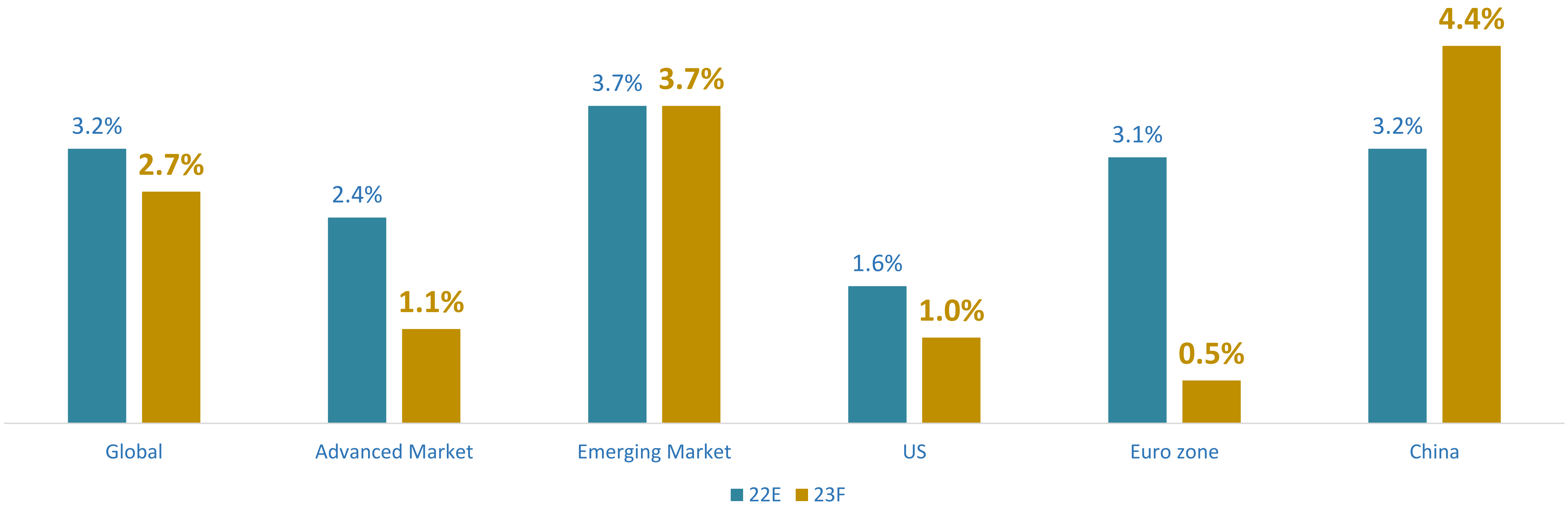
- Except as required by law, we undertake no obligation to update any forward-looking statement, whether as a result of new information, future events, or otherwise.

- The numbers of the presentation are prepared under IFRS.

Industry Overview

經濟成長率預估

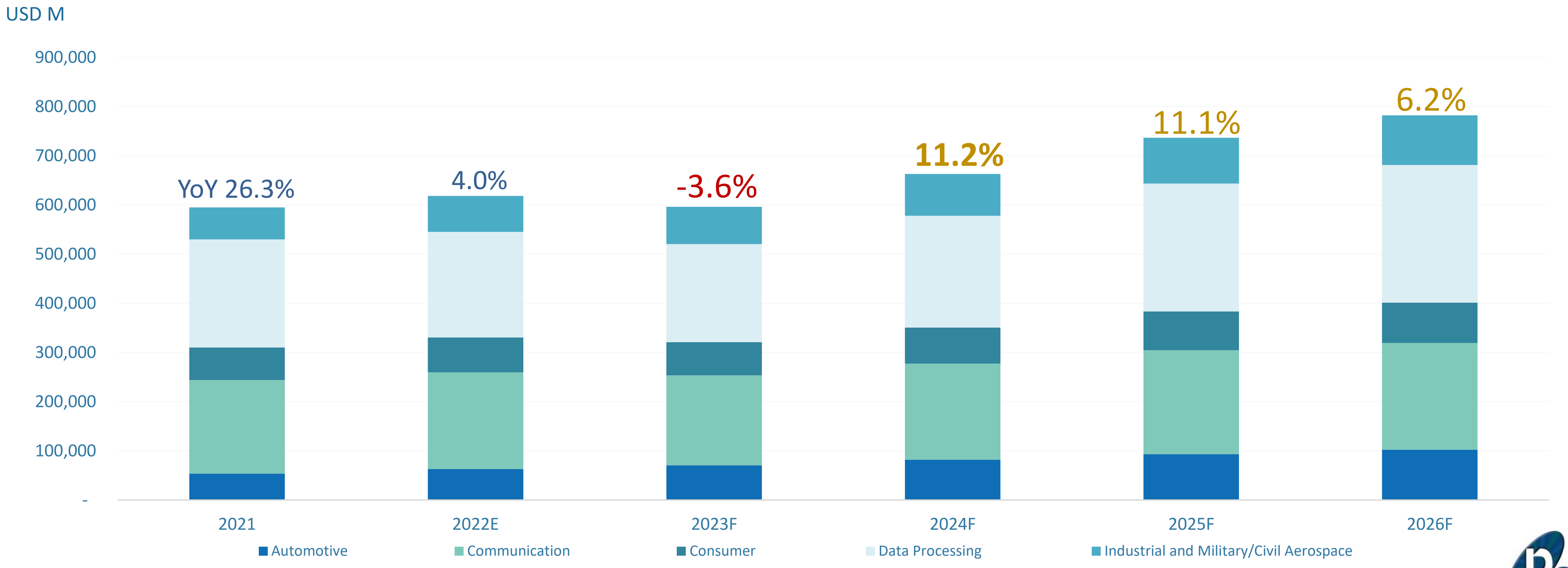
- 由於俄烏戰爭、中國的封鎖措施以及應對價格上漲的緊縮財政政策，世界經濟正面臨再次下滑的風險



Source: IMF Oct. 2022

半導體銷售預估

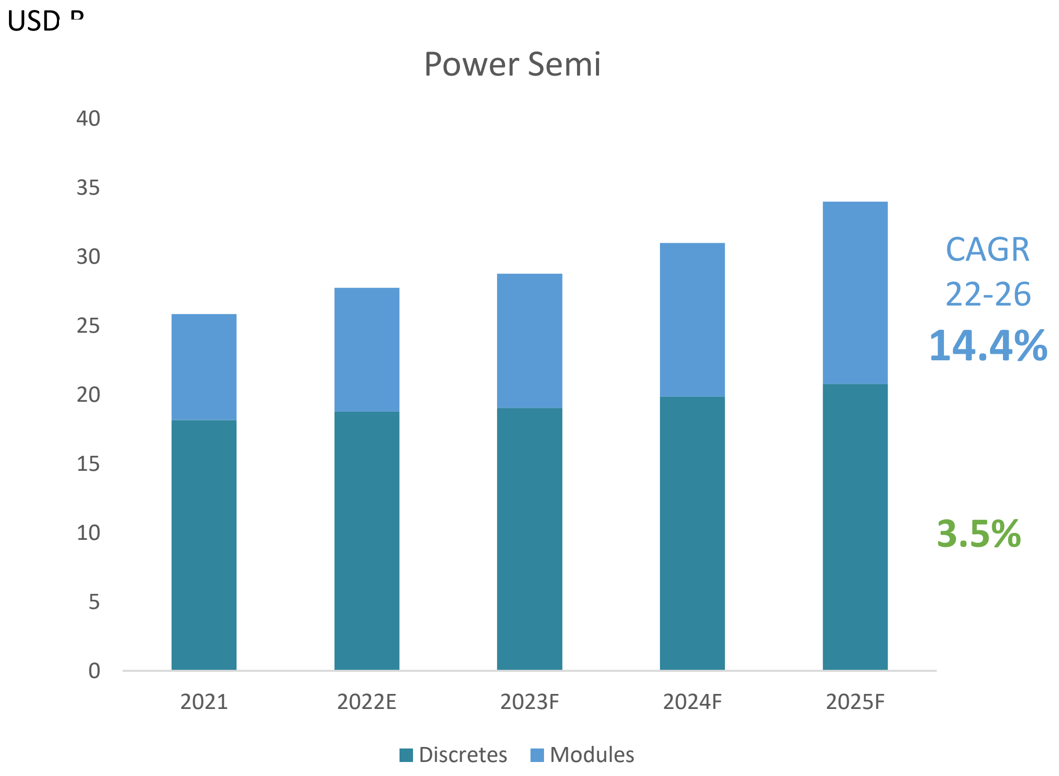
- 各應用中以車用半導體成長最快速，2021-2026 年的複合成長率達13.4%，其中又以高速運算和功率元件最為突出。

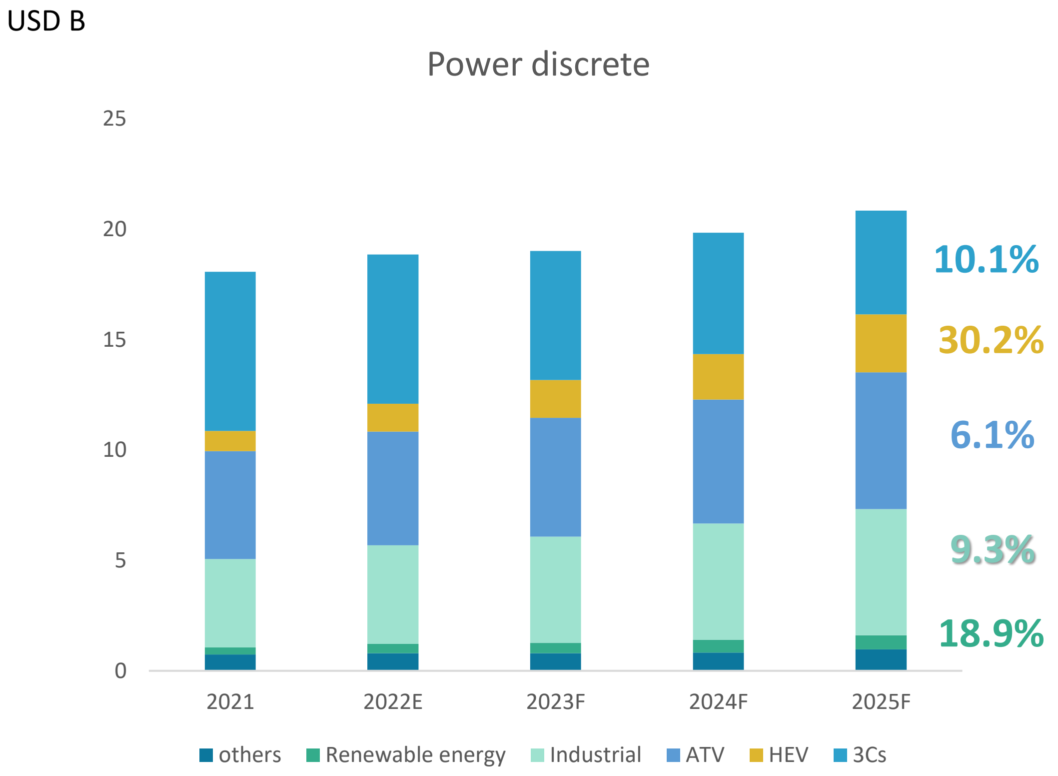


Source: Gartner Q3. 2022

功率半導體銷售預估

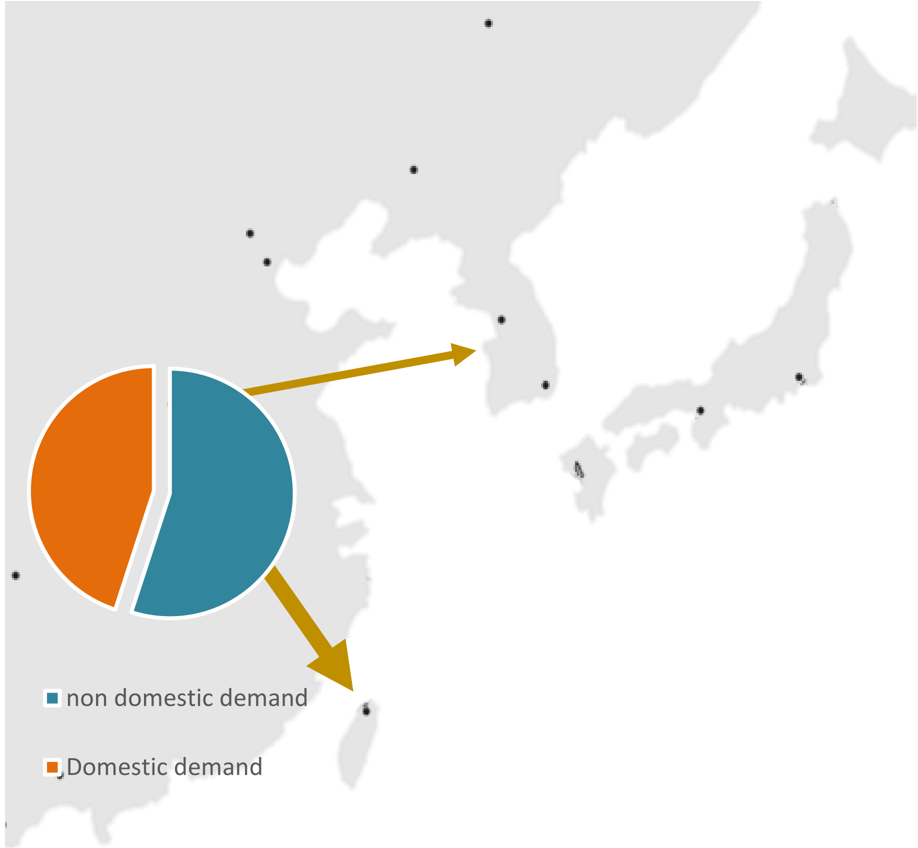
- 新能源是功率半導體的主要成長動能





Source: IEK 2022

受惠於BIS限制令



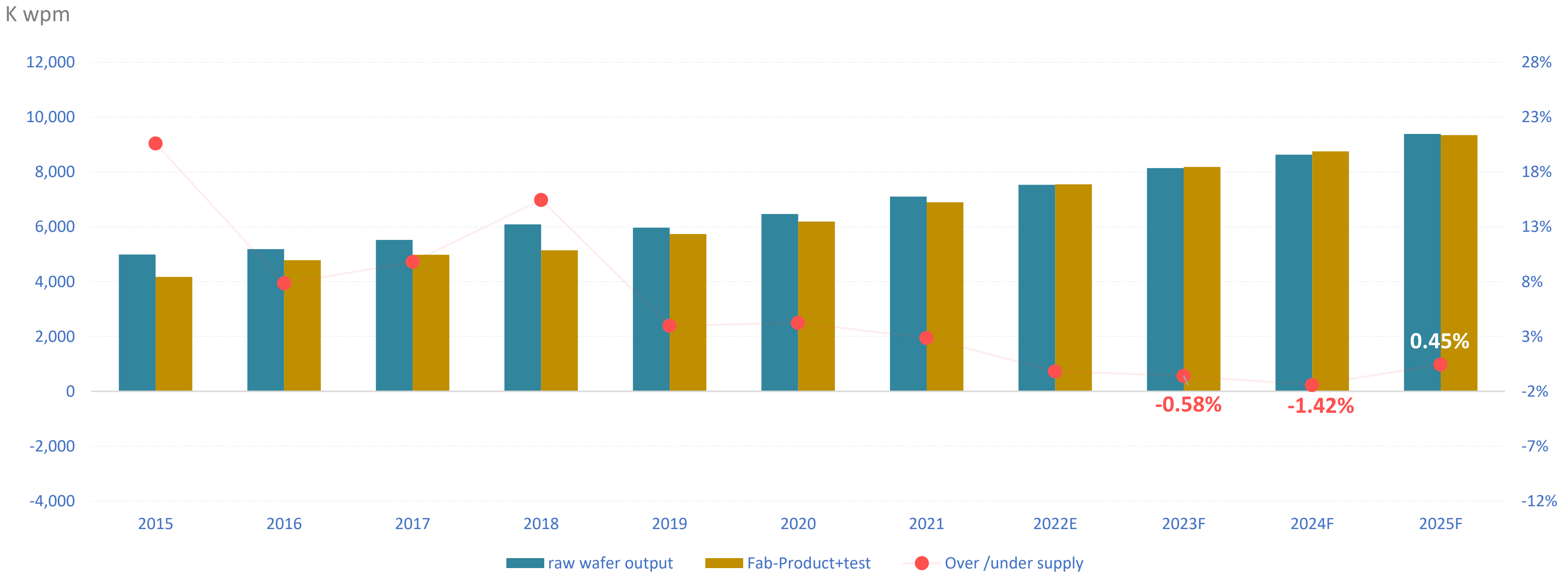
- 一個世界，兩個系統
- 非中國境內需求正在轉移到台灣和韓國
- 邏輯IC、電源IC和功率元件

Beyond Reclaim

矽晶圓預估

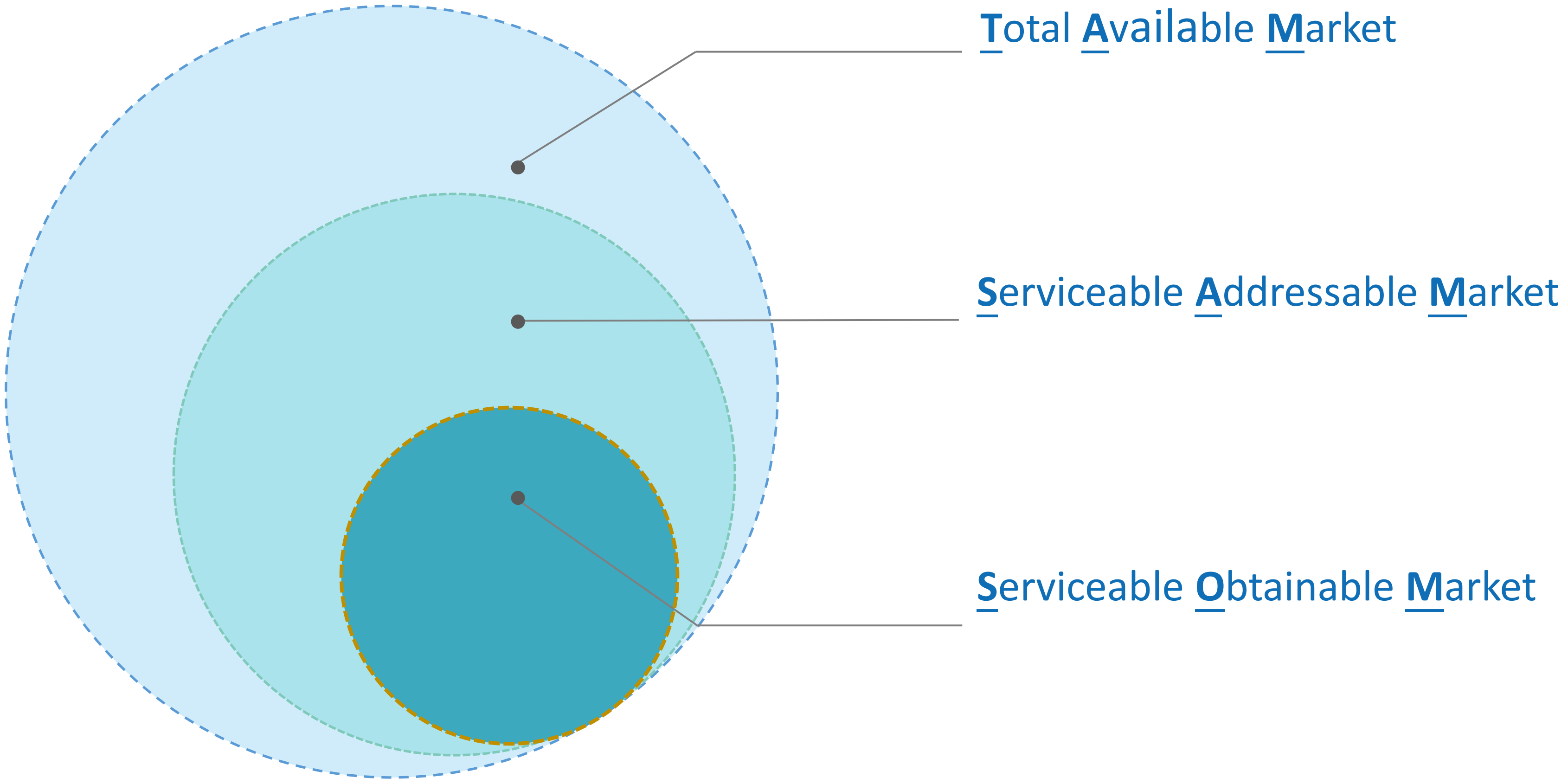
- 晶圓製造商將專注於製造產品晶圓，即使如此仍然只能勉強滿足代工廠和IDM的需求。
- 低個位數意味著測試晶圓仍然短缺，**23F: > 47.3Kwpm, 24F: > 122.5Kwpm**

12” wafer demand & supply

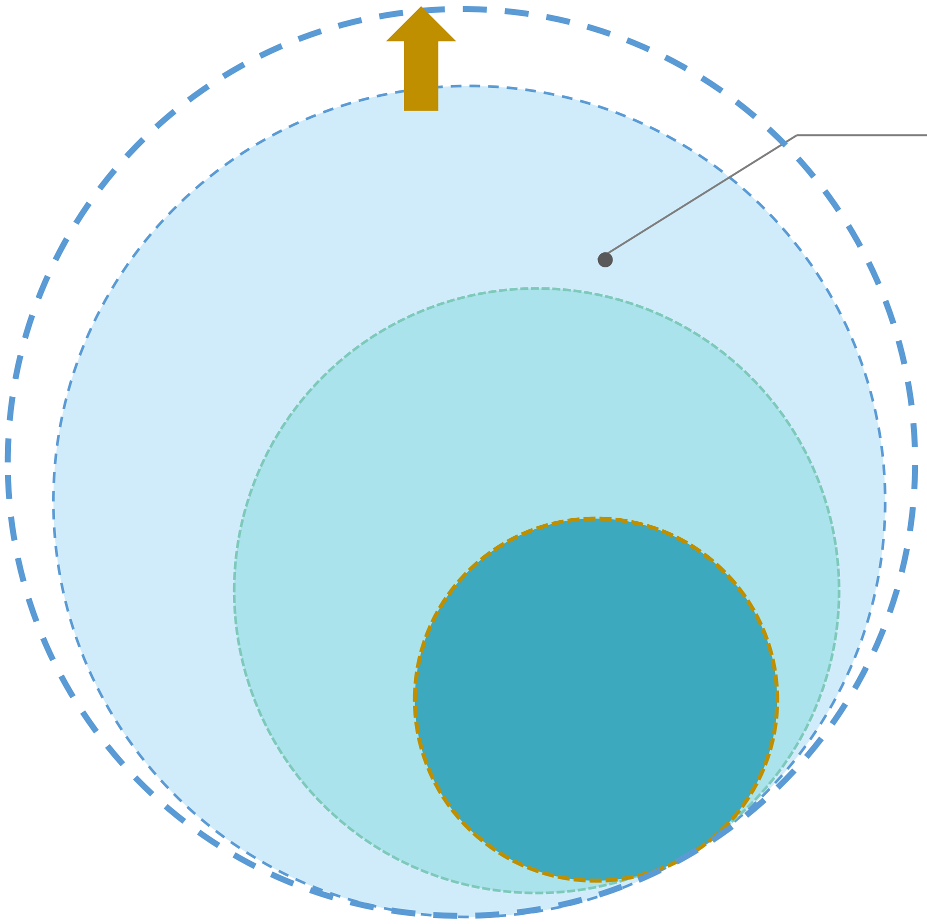


Source: Gartner, Semi.org, Nov. 2022

測試晶圓: TAM SAM SOM



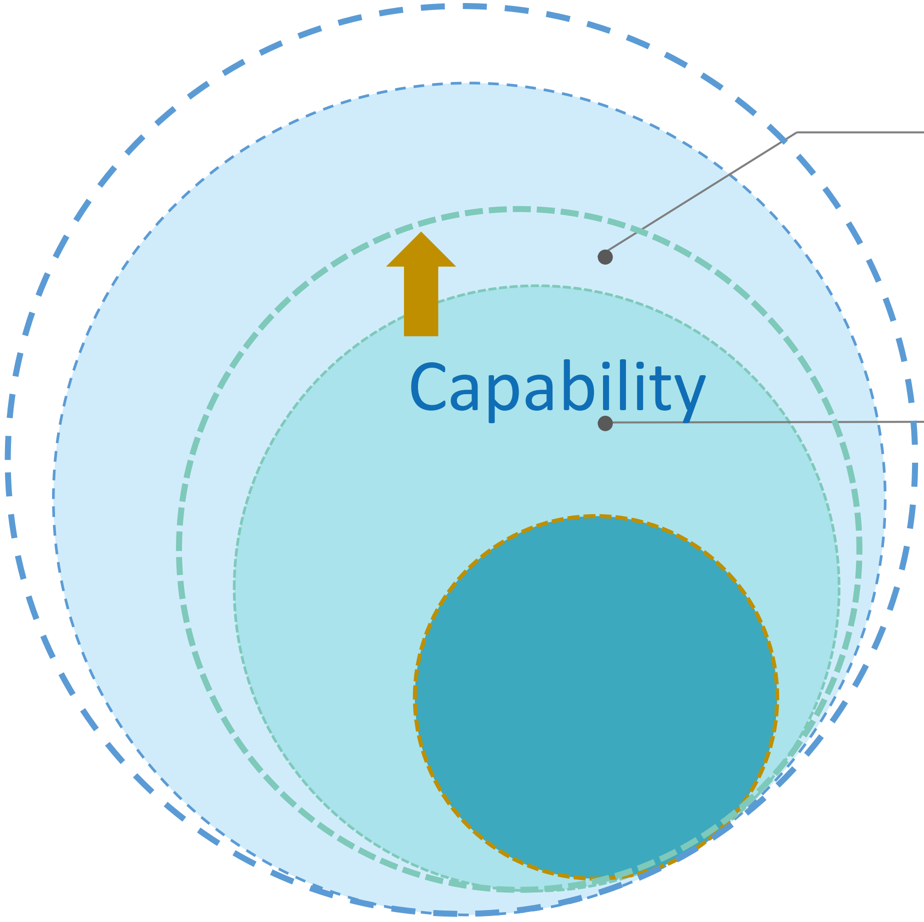
測試晶圓總市場持續成長



Total **A**vailable **M**arket

- 高速運算: Automotive, AI, Sever, Datacenter

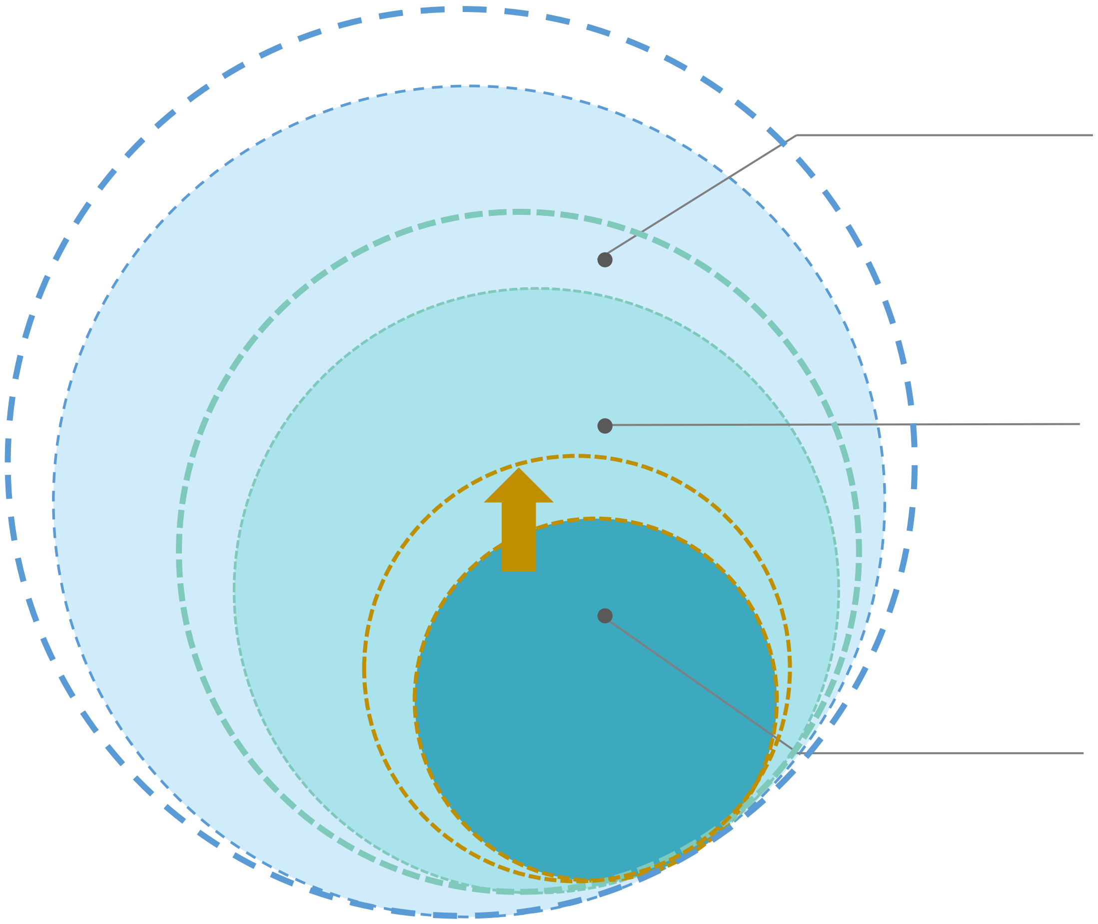
測試晶圓可服務市場增加



Total **A**vailable **M**arket
- 高速運算: Automotive, AI, Sever, Datacenter

Serviceable **A**ddressable **M**arket
- **技術革新**: Power via; 3nm, 2nm, and beyond
- **異質整合**: CIS BSI, 2.5D Si interposer

測試晶圓可獲得市場增加



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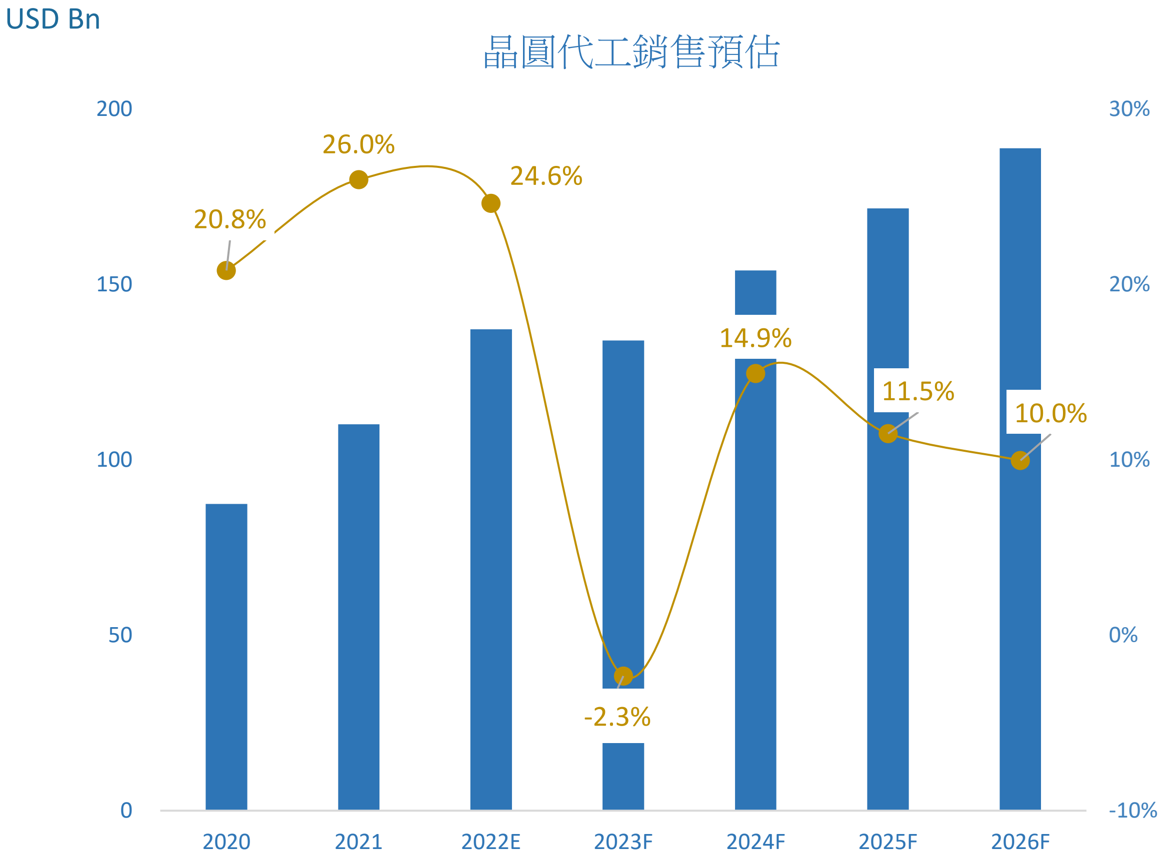
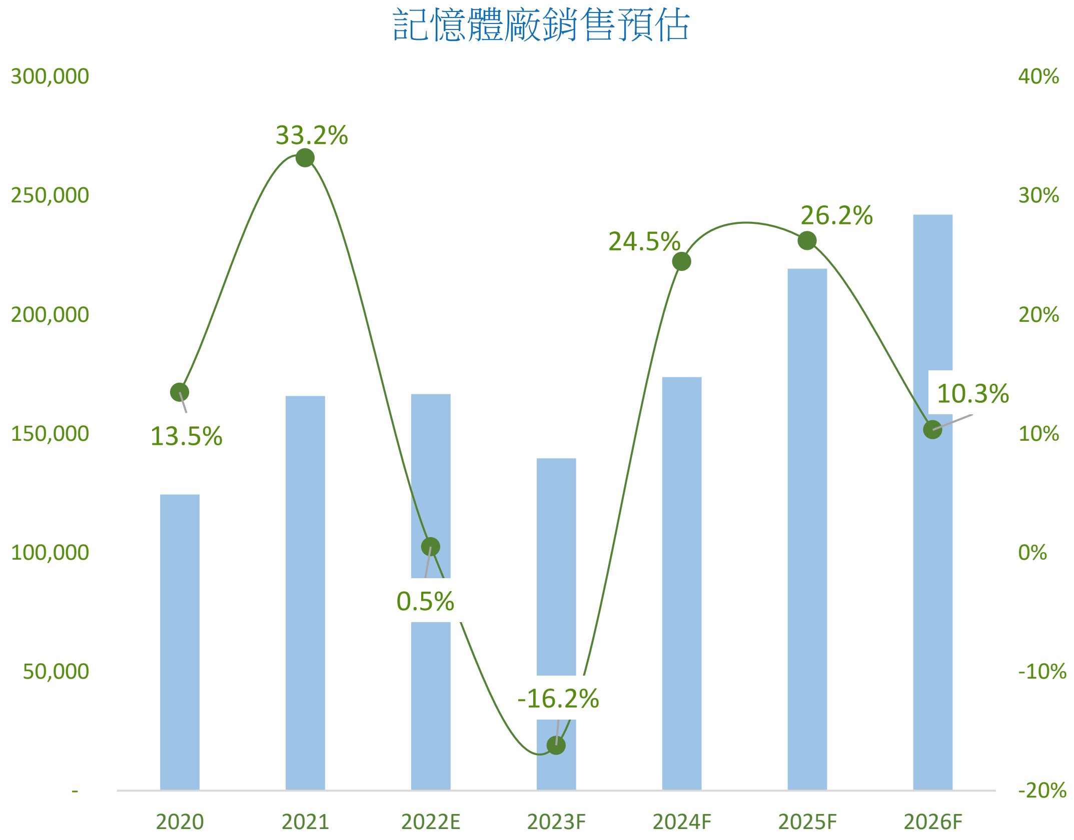
- **異質整合**: CIS BSI, 2.5D Si interposer

Serviceable **O**btainable **M**arket
- 市占率提升

總市場持續增加

- 整體晶圓代工銷售 2021-2026 複合成長率為 11.4%; 記憶體廠為 7.9%
- Tier-1 晶圓代工廠的成長將大於市場成長率，中長期複合成長率為 15-20%



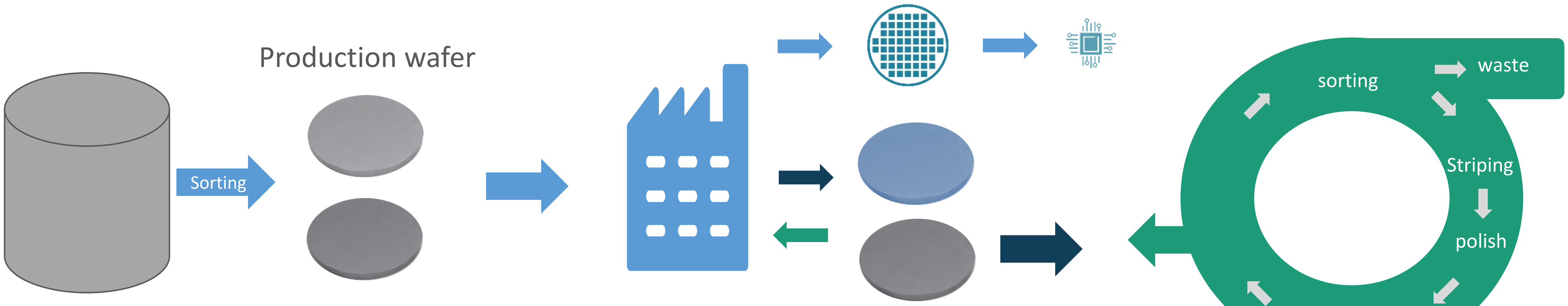


Source: Gartner, IC insights, Digitimes research, Oct. 2022

昇陽半導體可服務市場增加

矽晶圓循環

Production wafer



Ingot

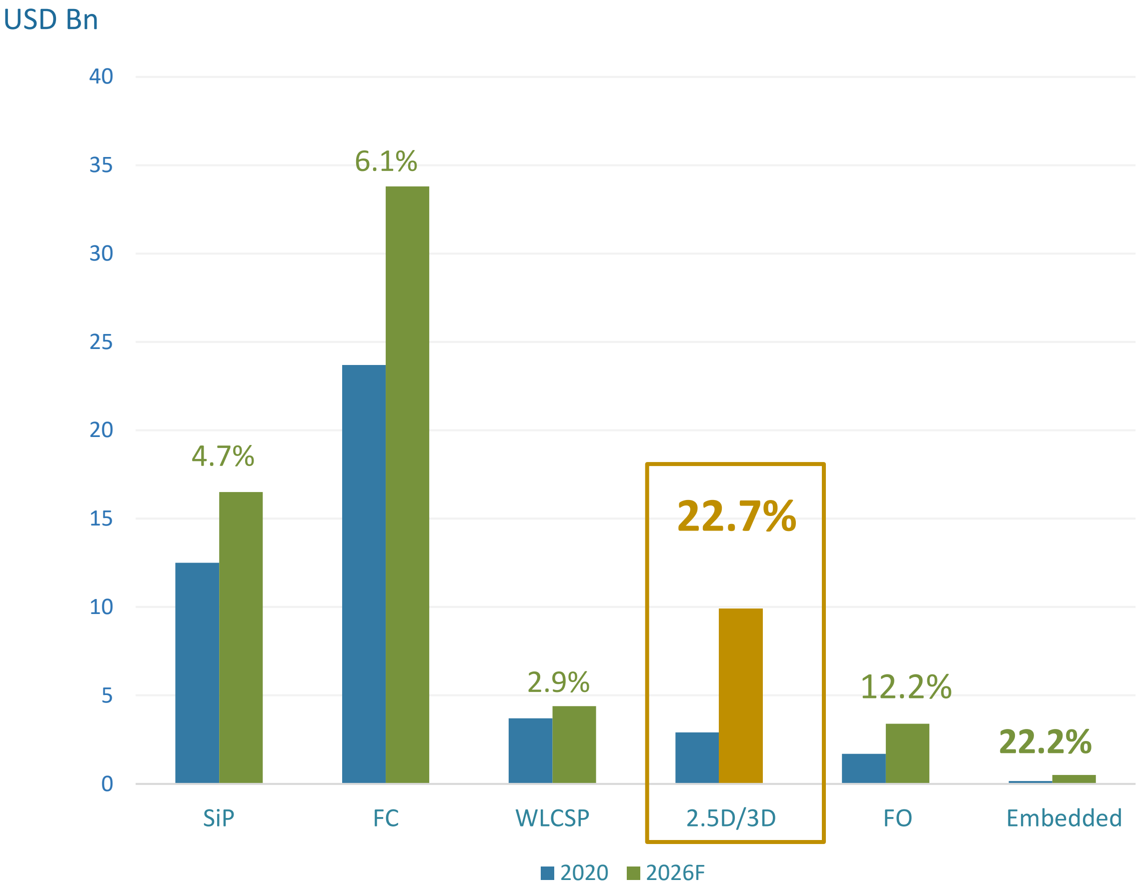
Test wafer
- **Si interposer**
- **Carrier wafer**
- **Monitor wafer**

Foundry &

Adv. Assembly
- **2.5D packaging**
- **CIS BSI**

Reclaim wafer

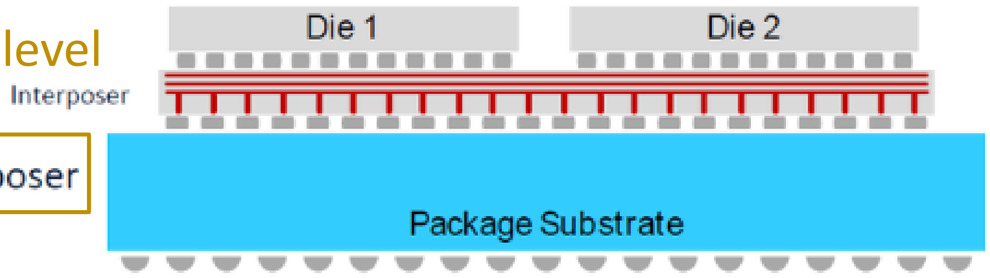
先進封裝複合成長率2020-2026年: 22.7%



- Good density of die- interposer connections
- Good density of die-die interconnects

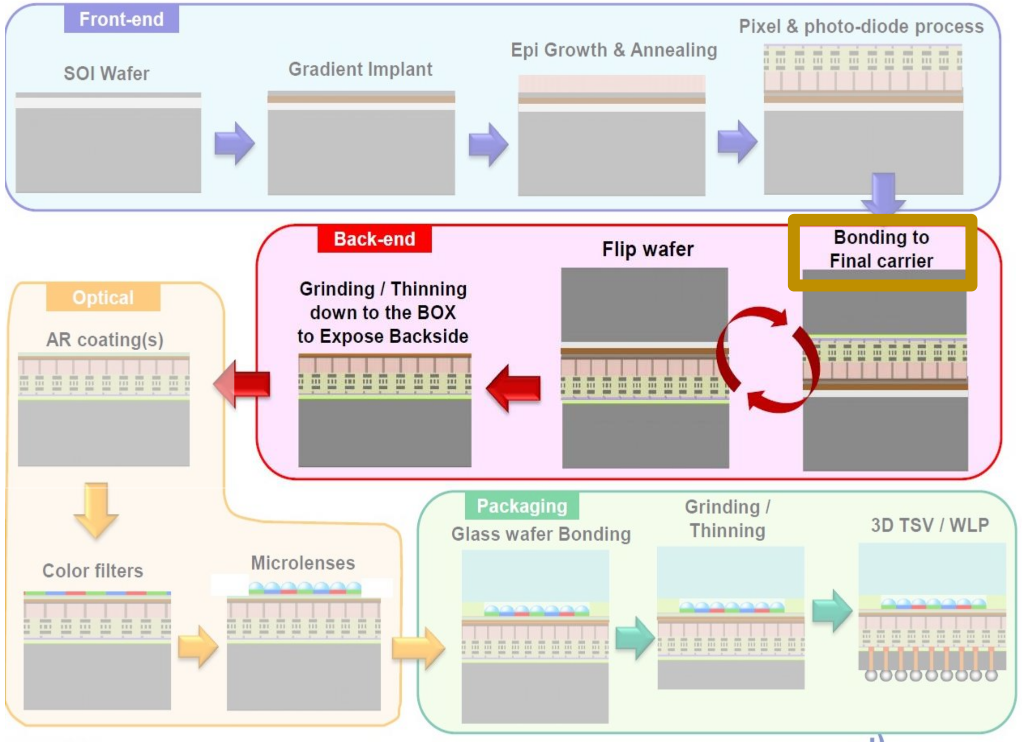
Test wafer level

Silicon Interposer

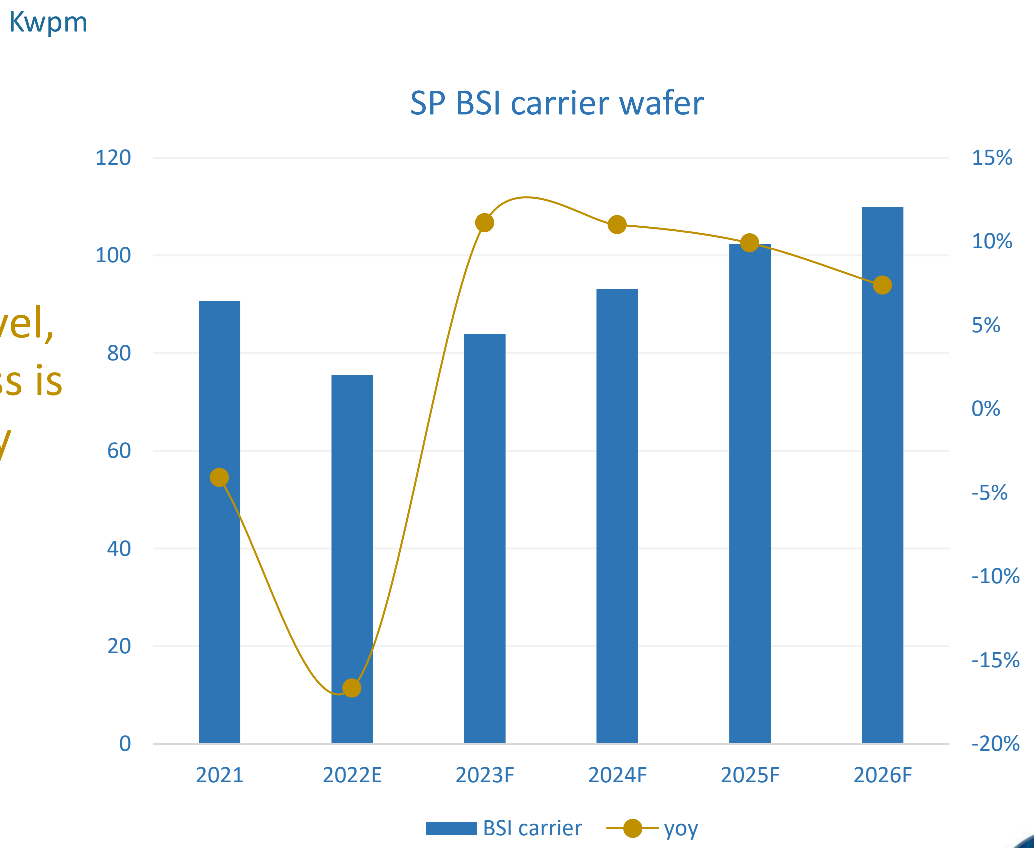


Source: Yole, Digitimes research, Intel, IMEC

CIS 背面製程需要使用等量的測試晶圓



Test wafer level, global flatness is major priority



Source: Sumco ,Yole, Statista

2022年世界自動化程度最高的wafering廠

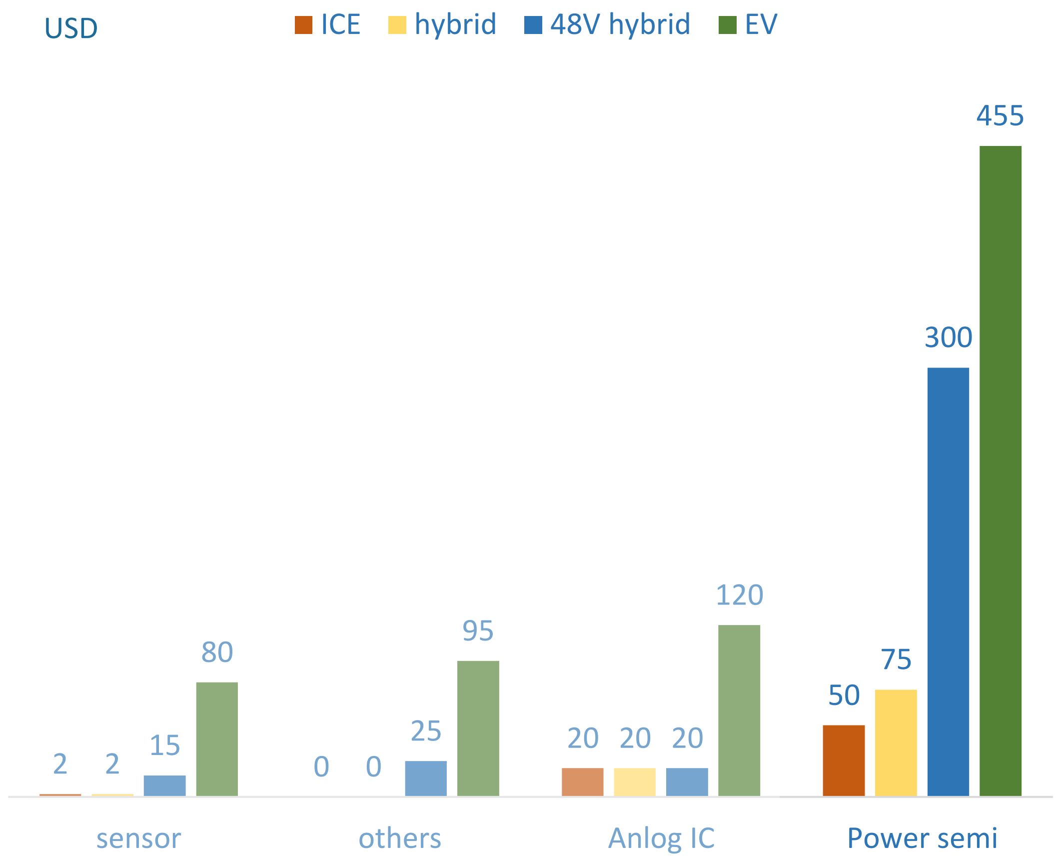
- <u>2022年11月，月產出達到6萬片</u>
- 自動化以及綠色製造的工業4.0工廠
- 全新的構造和營運模式，做為未來擴產的標準
- 以良好的技術、品質和成本，擴大測試晶圓版圖

Picture: PSI

Power Efficiency

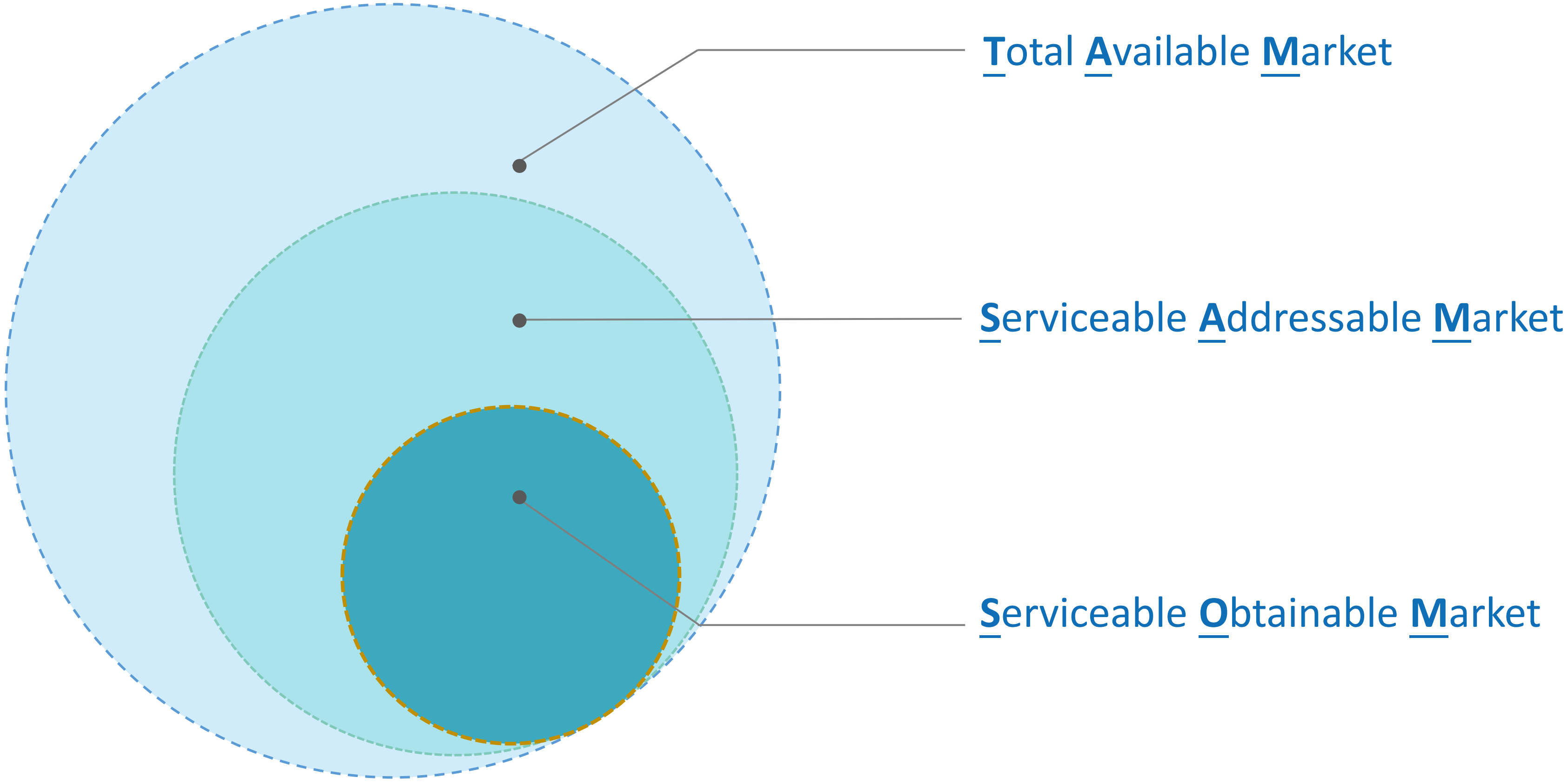
電動車:半導體的成長動能

<u>160-284</u> MOSFETs & **<u>48</u>** IGBTs Per Car

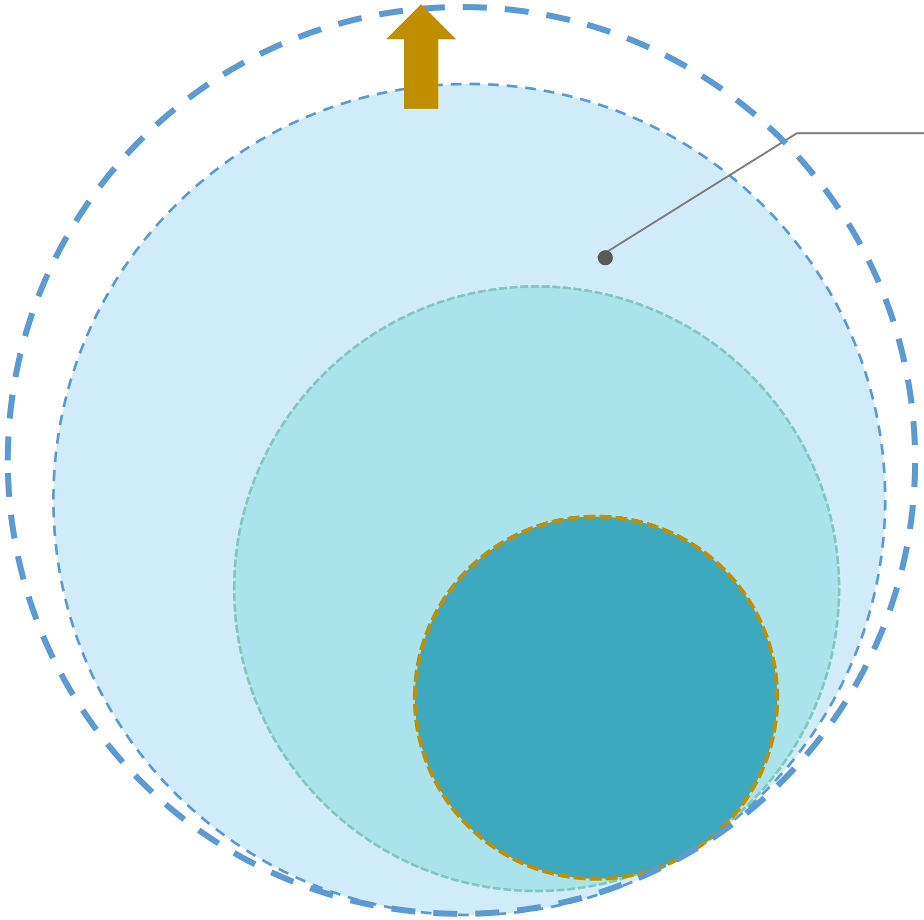


Source: Zodiac consulting, Infineon

薄化: TAM SAM SOM

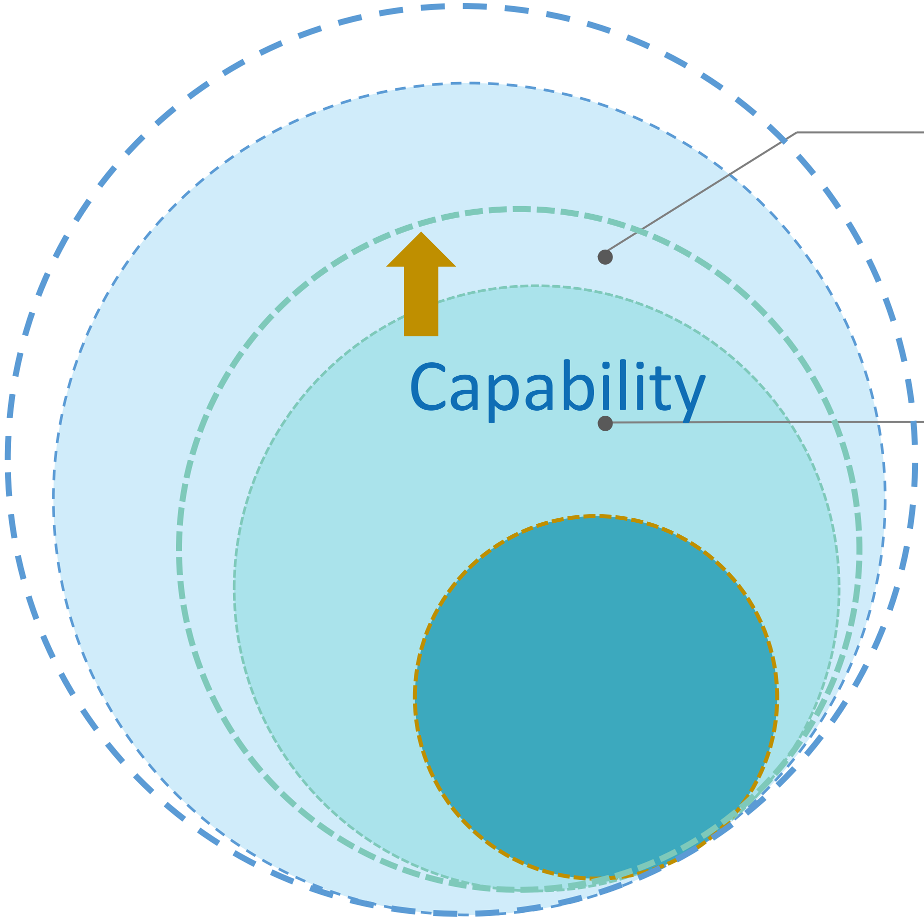


薄化總市場持續成長



Total Available Market
- 電動車，智能車

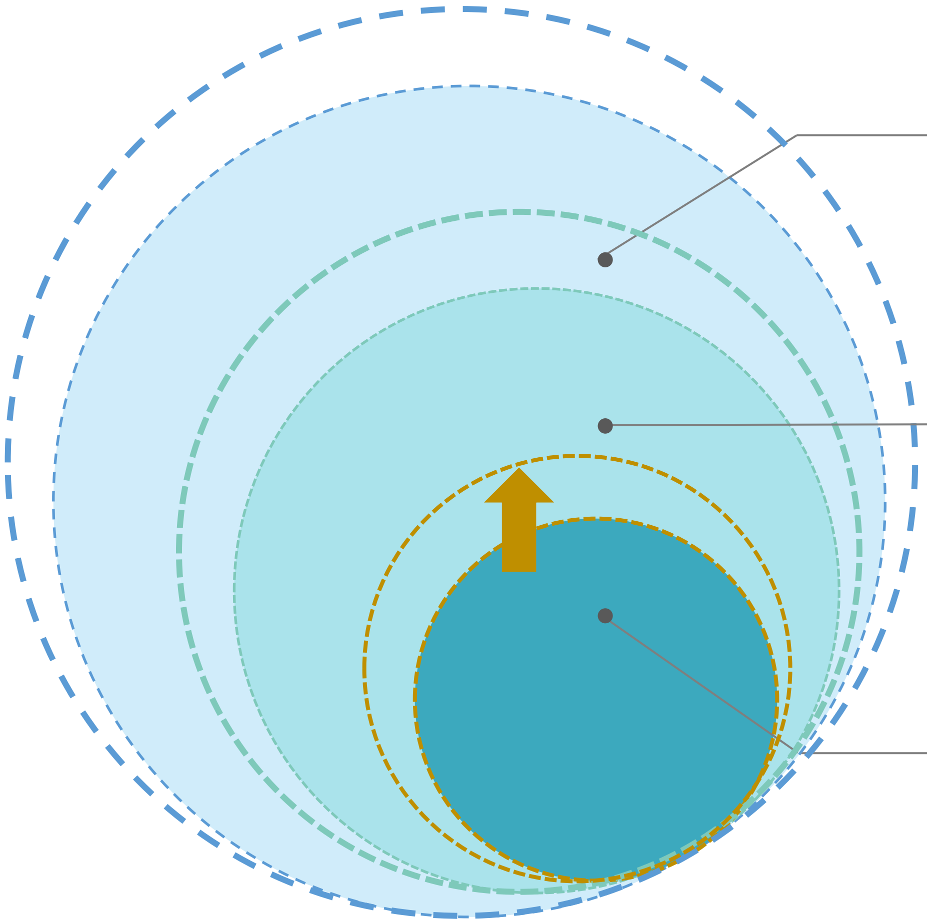
薄化可服務市場增加



Total **A**vailable **M**arket
- 電動車，智能車

Serviceable **A**ddressable **M**arket
- 符合車規等級的薄化製程
- 中段製程完整方案: FSM, BGBM, CP, Carrier bound

薄化可獲得市場增加



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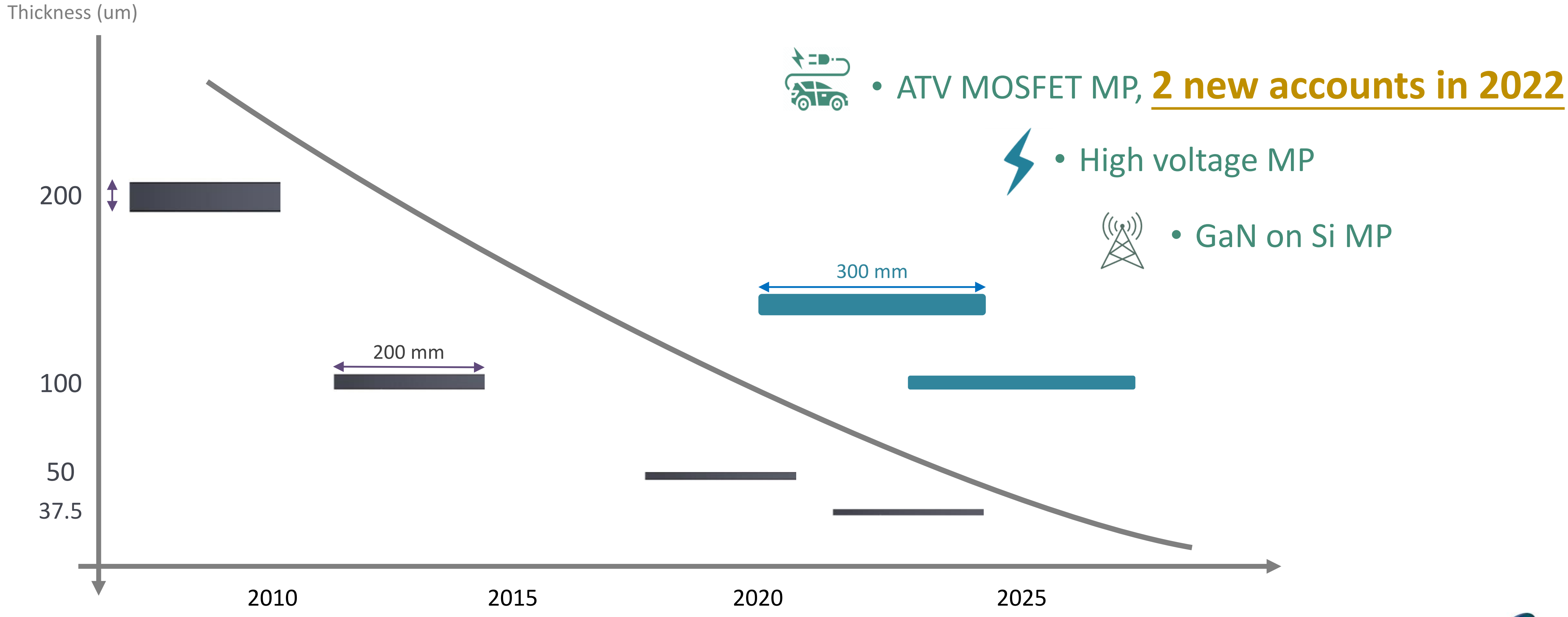
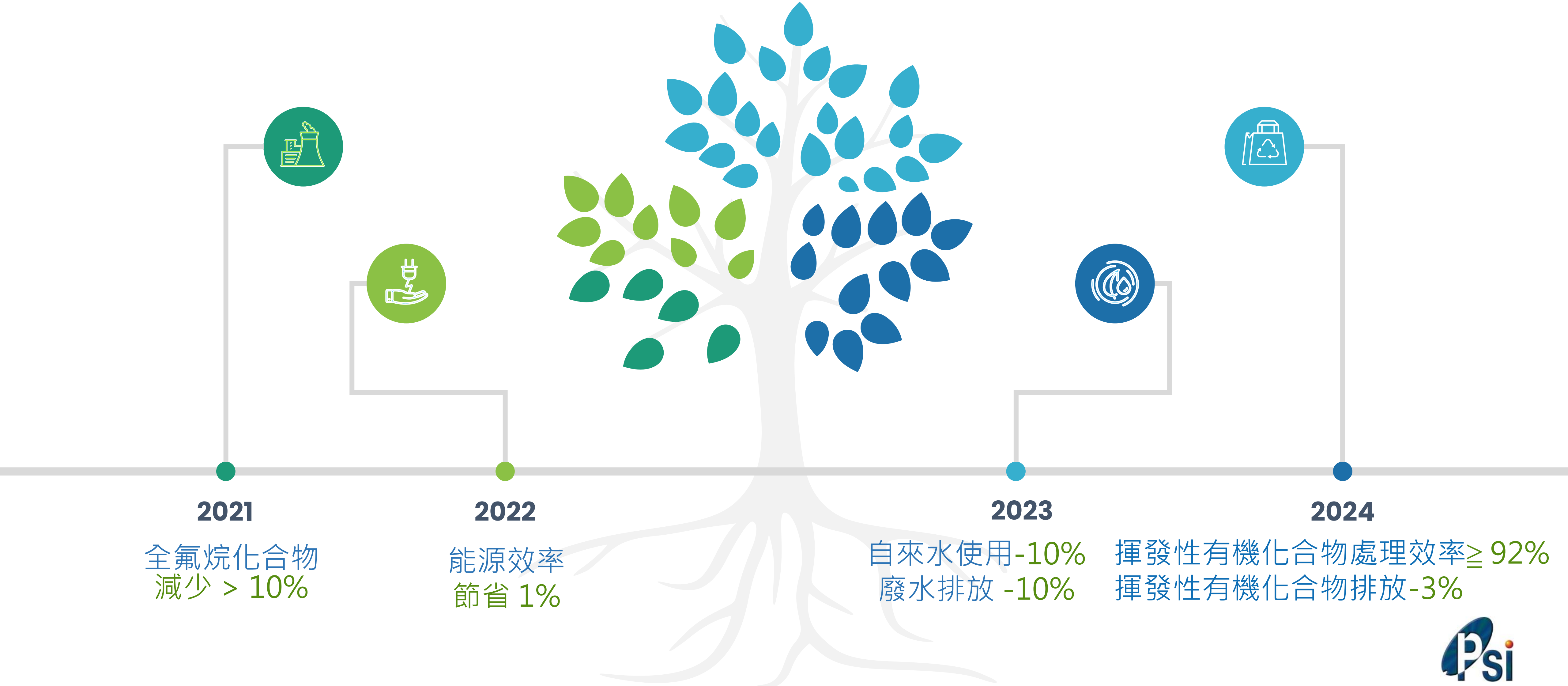
Serviceable **O**btainable **M**arket
- 受惠於BIS限制令

薄化發展藍圖



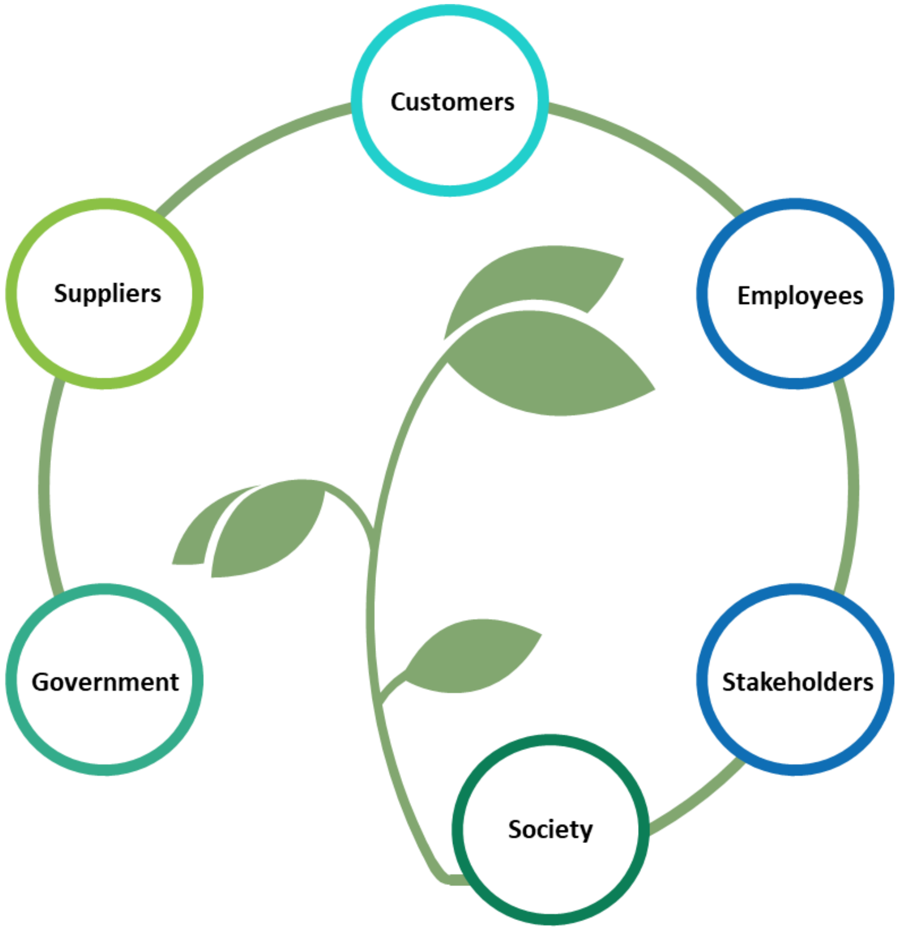
Source: Psi, image_ shutterlock

綠色生產目標


2021
全氟烷化合物
減少 > 10%
2022
能源效率
節省 1%
2023
自來水使用-10%
廢水排放 -10%
2024
揮發性有機化合物處理效率≧ 92%
揮發性有機化合物排放-3%

結論

- PSI持續努力成為符合ESG標準的供應鏈合作夥伴。
- **全新的再生晶圓廠如我們所說的進入量產，2023年再生和測試晶圓的擴展計劃不變。**
- **與我們說的一致，薄化2022年持續逐季成長;薄化與景氣連動較高。**
- 半導體在1H23遭遇挑戰；在最好的狀況下，預計從2H23恢復成長。



PSI is A Rising Company