

Figure 1: Power SiC patent landscape

	Planar SiC MOSFET	Trench SiC MOSFET	SiC SBD	SiC Power Module
Key IP players with steady or increasing patenting active	General Electric	Denso Corporation Fuji Electric	Mitsubishi Electric	Hitachi
Key IP players with lower patenting activity since 2015	CREE/Wolfspeed Fuji Electric	CREE/Wolfspeed	CREE/Wolfspeed Panasonic	Mitsubishi Electric
IP Challengers		Toyota Motor Toyota CRDL Rohm	Fuji Electric Sumitomo Electric	Rohm CREE/Wolfspeed
IP new entrants	Hestia Power Century Goldray CRRC Times Electric SGCC UESTC	Century Goldray UESTC SGCC	Shenzhen BASiC Semiconductor Beijing Yandong Microelectronic Century Goldray Semiconductor SGCC	Danfoss Silicon Power Tyco Tianrun Semiconductor, Yangzhou Guoyang Electronic Wancheng Electric Vehicle Operation

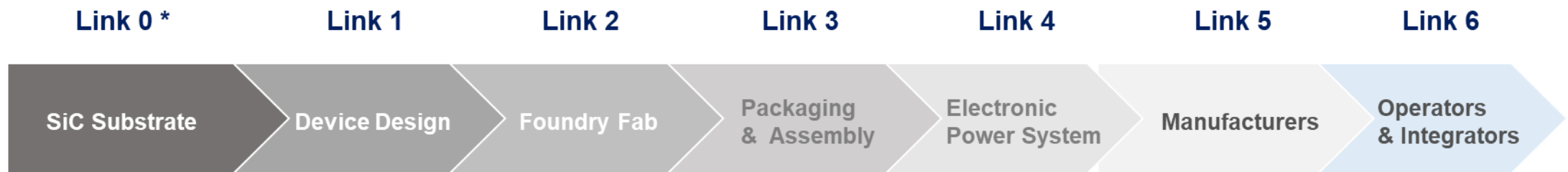
Note: Yellow arrows indicate IP collaboration between General Electric and Denso Corporation/Fuji Electric, and R&D collaboration between General Electric and Danfoss Silicon Power.

Source: Power SiC: MOSFETs, SBD and Modules 2019- Patent Landscape Analysis 2019, Knowmade

Figure 3: Foundry Fab facilities of Episil, Taiwan

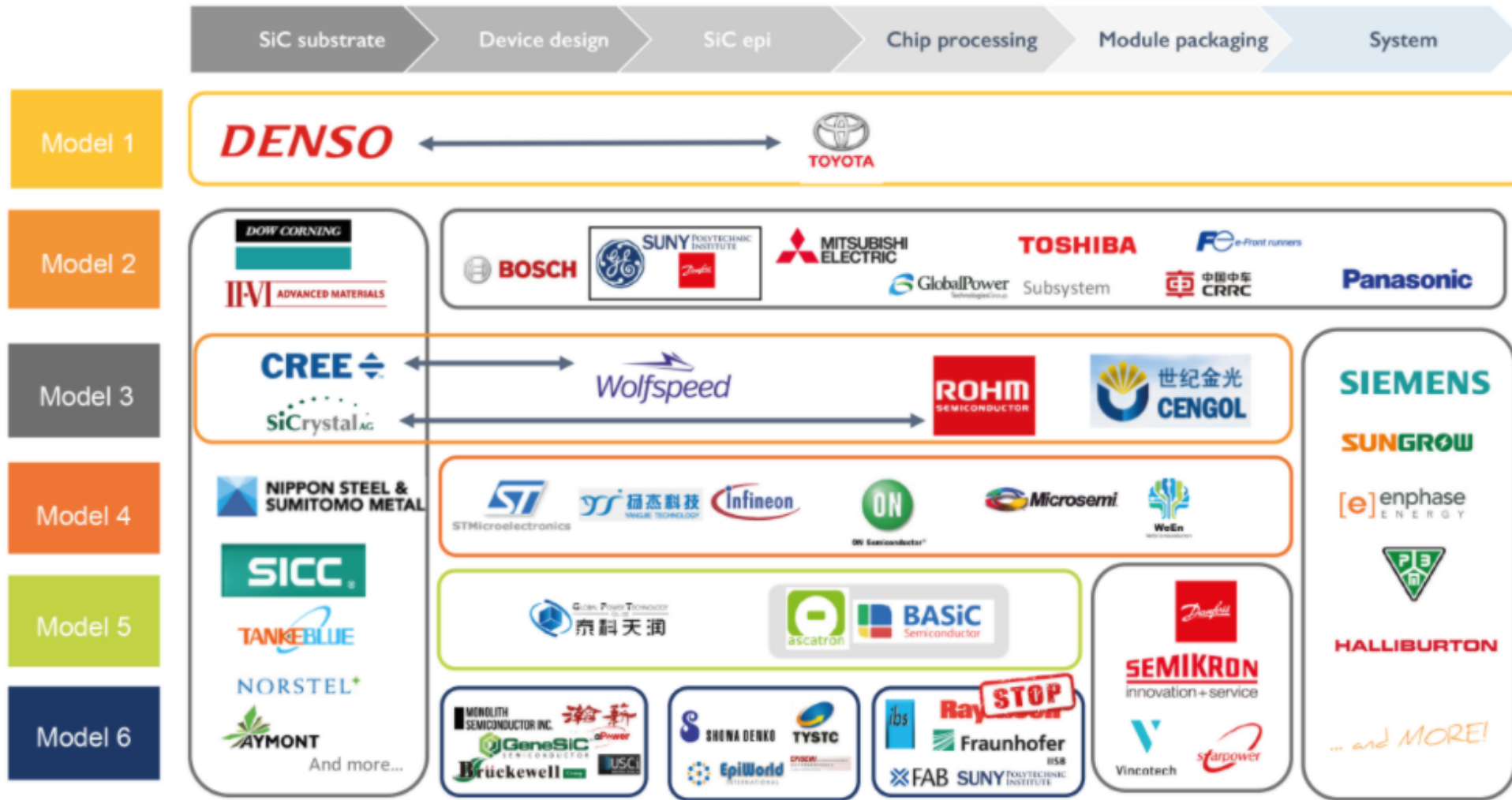


Figure 2: Synchronised SiC Value Chain



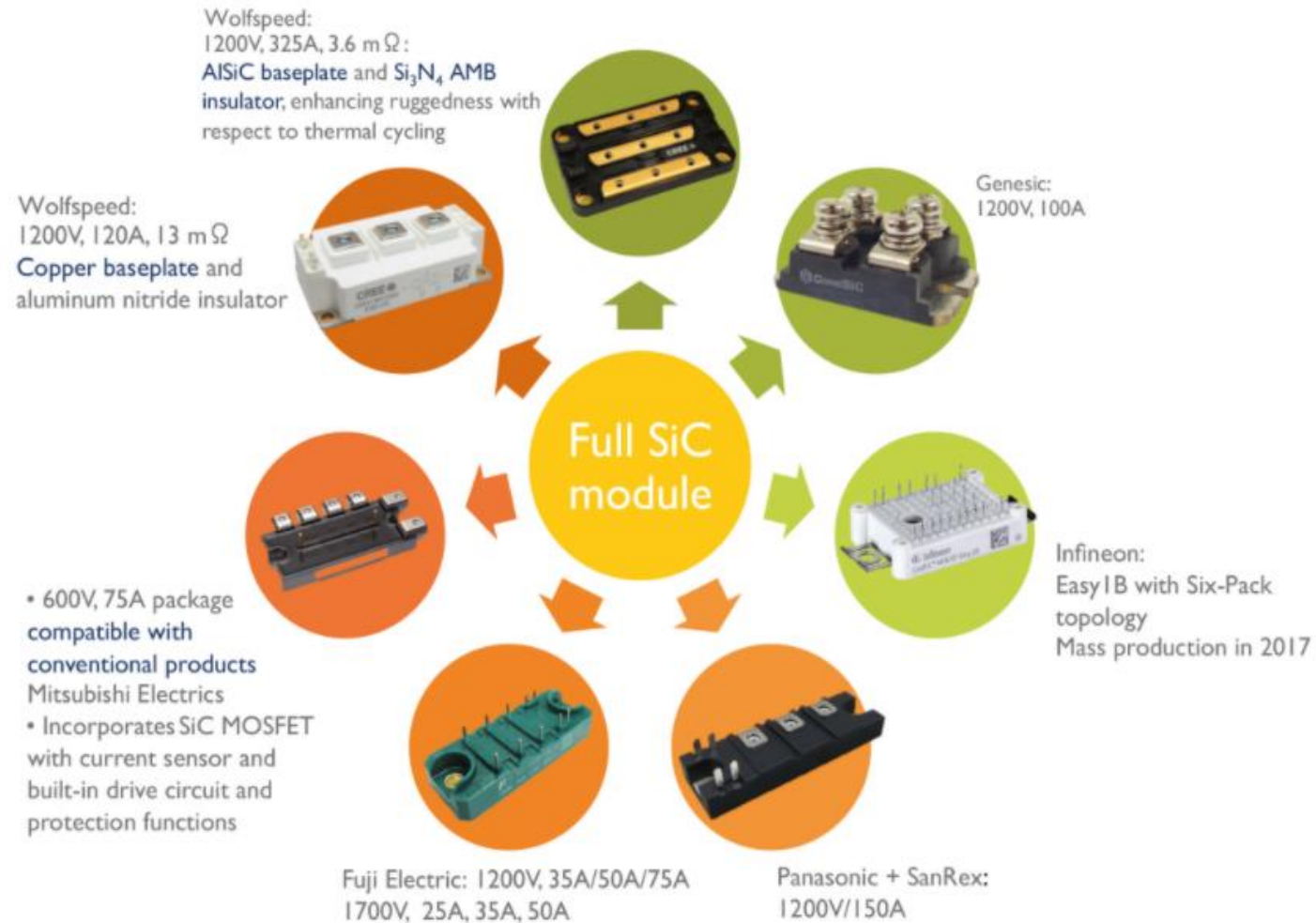
*Link 0: SiC Substrates are predominantly based in the USA, and India has no current capability on availability and technology. This Link is therefore not included in the scope of SiC Ecosystem.

Figure 4: SiC diode Product Chart



Non exhaustive list / All business models are detailed and analysed in the report

Figure 5: Full SiC Module Examples.



Source: Power SiC: Material Devices, Modules and Applications Report, Yole Development, 2017

Figure 6: Wolfspeed's Gen3 SiC MOSFETs enabling efficiency in four key areas

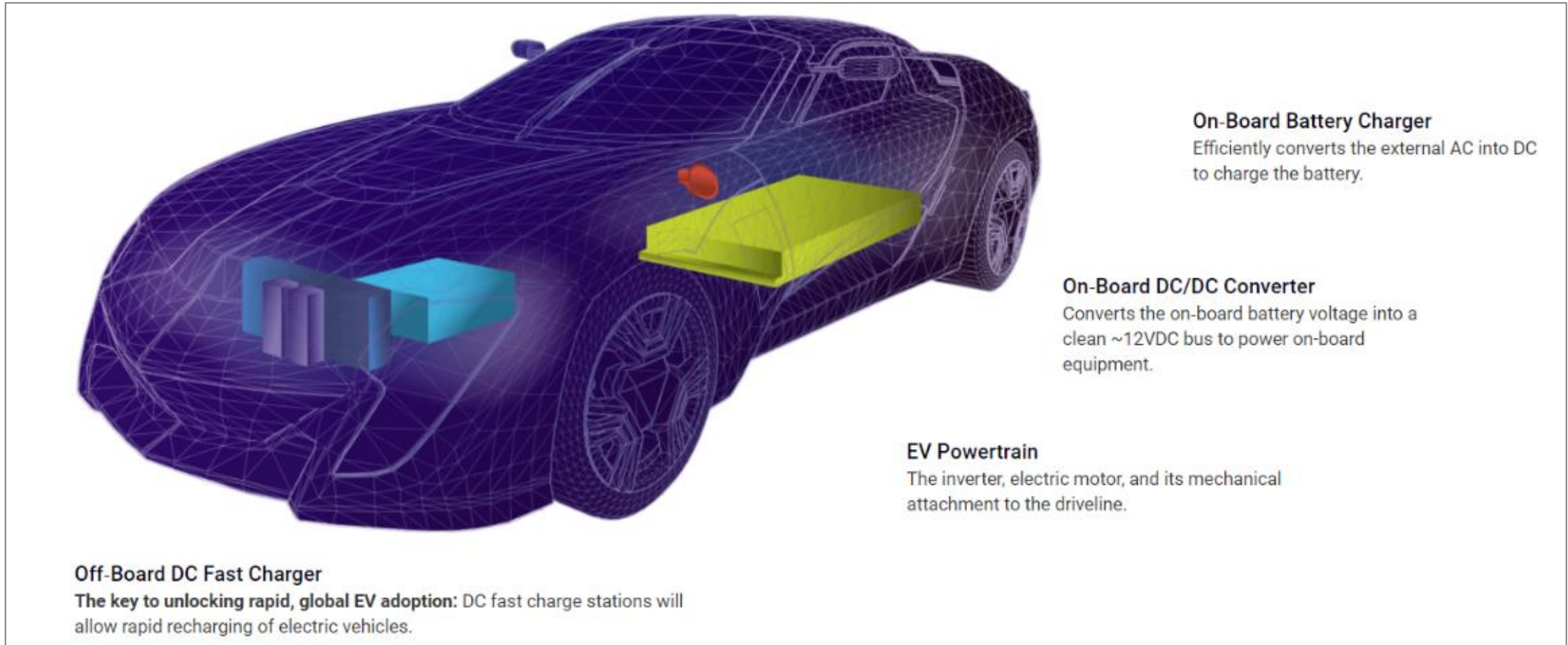


Figure 7: Zero Emission Venture (ZEV), Taiwan – Electric Vehicle operator



Figure 8: Proterra E- Bus, USA, Silicon Carbide driven Electric Bus (IPTS)



Figure 9: Silicon Carbide (SiC) – Route from Taiwan to India

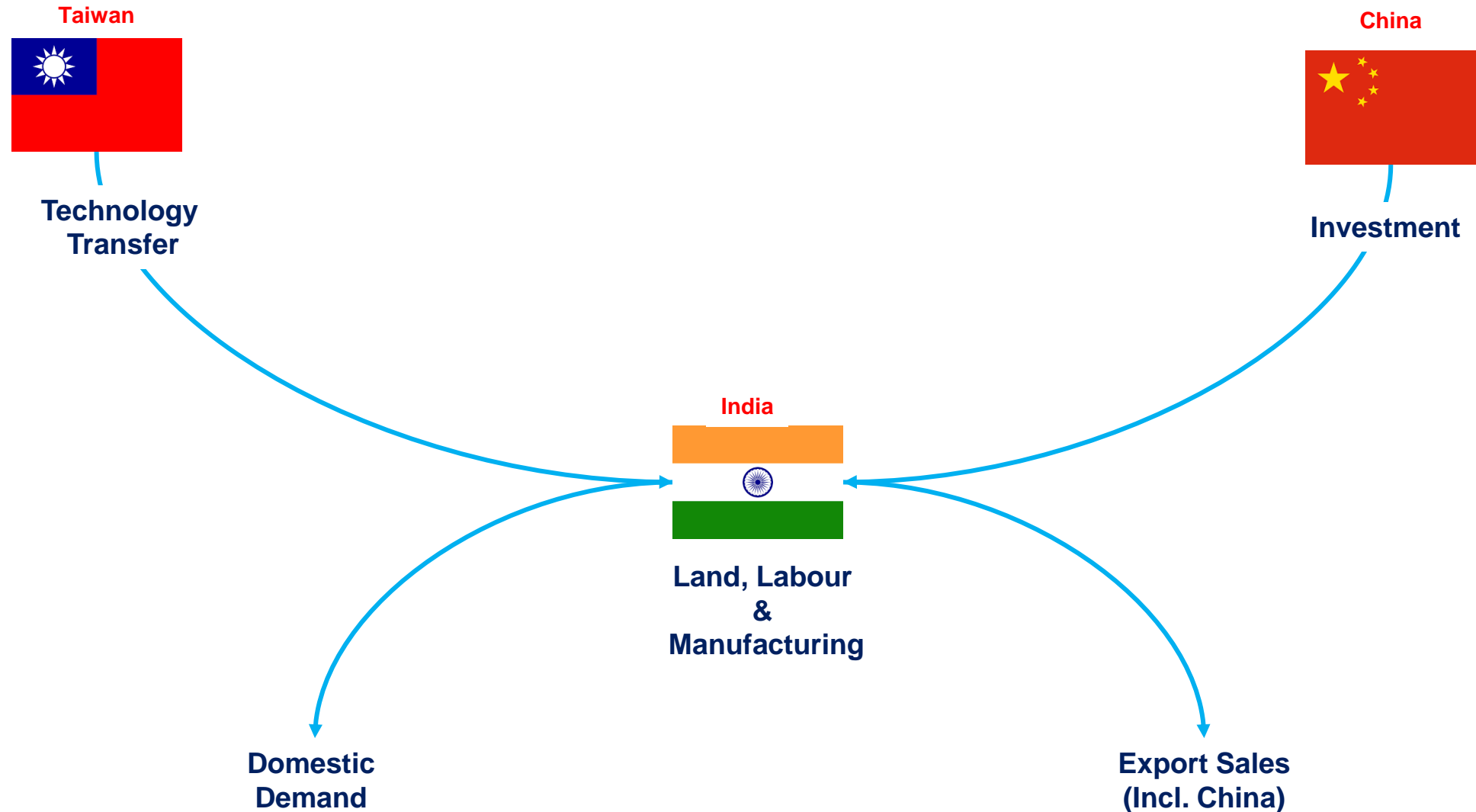


Figure 10: Roadmap for operationalising the SiC Value chain

