Semiconductor Sector Service Bureau

National Innovation Centre
4 Cornwallis Street
Eveleigh NSW 2015

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National Reconstruction Fund Taskforce
Department of Industry, Science and Resources
CANBERRA ACT 2600

RE: National Reconstruction Fund: consultation paper

To whom it may concern,

The Semiconductor Sector Service Bureau (S3B) supports Australia's design, production and use of semiconductors by enabling access to supply chain capabilities, intelligence, expertise and talent. S3B was established in July 2022 with funding from the NSW Government to enhance the capability, workforce, market connectedness and competitiveness of the NSW and Australian semiconductor sector. S3B is hosted as an unincorporated joint venture between University of Sydney (USyd), Macquarie University (MQ) and UNSW Sydney (UNSW). Partnering with the CSIRO, the Australian National Fabrication Facility (ANFF) and with participants from across the Australian semiconductor industry, the entire consortium represents a globally networked, cross-functional grouping that spans the entire semiconductor value chain. The S3B will work at the nexus between industry, universities and government and will build connectivity and collaboration throughout the sector to support commercial impact.

Semiconductors are an ultimate "enabling" capability. Advances in semiconductor products and technologies drive advances in all seven of the identified focus areas, as well as many other areas. For example:

- advances in power semiconductors enable more efficient wind turbines, extend the range of electric vehicles, reduce energy consumption in electric trains and appliances, and reduce losses in electric power generation and distribution.
- advances in semiconductor sensor technology enable new types of medical devices, enhance remote sensing and scanning for mineral exploration and agriculture management, and enable more effective pollution detection and management.
- advanced semiconductors enhance defence capabilities for detection (including active and passive radar) and communications.
- enabling capabilities, such as AI, quantum and robotics, rely fundamentally on semiconductor products and technologies, including sensors, processing units and memories, materials and manufacturing technologies.

As such, it is essential that Australia develop its semiconductor capabilities, not simply to replicate capabilities available overseas, but to enable the development of new semiconductor products and technologies that drive progress in ways that directly benefit Australia and further its interests. Achieving this outcome will require Australia to establish domestic semiconductor design and manufacturing capabilities, supporting R&D and prototype, pilot and production manufacturing of semiconductor technologies and products.

Investment needs and opportunities

Investment in any on-shore semiconductor manufacturing capability will need to consider both the strategic dimension, enabling security of supply, and the economic dimension, driving growth in economic activity. Strategically there is the opportunity to invest in domestic manufacturing capability to produce critical components with the goal of incorporating more Australian content in end products. Additionally, consideration should be given to existing industry strengths, such as the development of compound semiconductor materials and design capability in areas such as RF and wireless. This will quickly enable Australia to build a role as an influencer in global markets - not just as a consumer, but as a producer. Economically, development of custom semiconductors will deliver competitive advantage to Australian systems companies. Development of customised solutions for companies such as Advanced Navigation, developers of industry leading navigation systems, will support them to deliver more functionality at lower cost.

Large scale investment in semiconductor manufacturing capabilities is typically not an attractive investment for institutional investors. This is due to the long payback periods combined with the lack of extended track record and experience such as those in mining, agriculture and banking. Therefore, there is a critical role for government to provide and encourage capital investment to establish semiconductor manufacturing facilities that will significantly reduce the risk of investments both in Australian semiconductor companies and in Australian systems companies that rely on semiconductors. This can be achieved by offering secure, local and accessible advanced semiconductor manufacturing capabilities. Additional incentives, such as offering attractive manufacturing rates for Australian customers could also be considered.

Lowering barriers to access of design and fabrication services both domestically and internationally (e.g. for leading edge/high volume technologies) would assist companies to innovate and grow. For local businesses that currently rely on sourcing off-the-shelf solutions, this would provide a competitive advantage by enabling customisation of semiconductor components optimised for their products to better meet market needs. For example, customised radio semiconductor modules could significantly reduce the size, weight and cost of satellite communications systems, reducing the overall cost of deployment.

A strong value proposition for international investment in semiconductor capability in Australia needs to be crafted. As Australia is removed from major global consumer markets, this value proposition would need to consider strategic factors in addition to economic ones. The government could encourage local investors to coinvest with international investors by reducing investment risk through capital support and guarantee, tax credits and export/import duty relief.

Complementary reforms

A skilled workforce is required to support any domestic capability. Addressing the negative trend in enrolments into electronic engineering courses, and graduates leaving education with relevant design skills, is imperative. There is a role for government and national research infrastructure to play in coordinating teaching programs and associated design capability access for training and research purposes. Ongoing and sustained investment in international training programs in Taiwan, Singapore, Europe and Canada, have had demonstrated impacts in the growth of their domestic industries. For example, Canada's National Design Network (CNDN) run by CMC Microsystems for over 30 years, saw over 600 highly qualified personnel move to industry in 2021. In addition, CMC supported 14 start-ups and saw the licencing of 50 technologies. Similar efforts are required in Australia to boost the production of skilled workers to support the growth and expansion of the domestic semiconductor industry.

Building a sustainable talent pipeline will take time. Short term policy settings around visas can assist in Australia gaining talented individuals with experience in the global semiconductor sector. For companies interested in relocating to Australia, policy settings should also address accommodating individuals in roles not covered by highly skilled/GTI programs.

Conclusion

In summary, S3B supports the high level aims of the NRF and notes investment in semiconductors as an underpinning capability that will impact all of the priority areas identified in the consultation paper.

Regards,

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Director
S3B