



Electronics & Semicon

Electronics Industry Roadmap

Updated as of 21 September 2023

OVERALL STRATEGIES

Facilities and Services

- Establishment of Electronics Product Inclusive Innovation Center (EPIIC)
- Establishment of Center for Integrated Circuits and Devices Research (CIDR)
- Establishment of Wafer Fabrication Laboratory

Human Resources

- Conduct of joint graduate-level programs in IC design
- Integration of IC design in CHED curriculum
- Nationwide training to achieve critical mass of IC design engineers
- Creation of DOST-PCIEERD Electronics / IC Design Board

R&D Technologies

Semiconductor Manufacturing Services (SMS):

- Development of microcontroller with power management and energy harvesting
- Application of machine learning in IC layouting
- Development of new classes of electronics which are printed, reconfigurable, self-healing, batteryless, flexible, paper-based, radiation-hardened, liquid, transient, edible, and epidermal
- Advancement in memory technologies: development of DRAM, Flash, and prototypical and emerging nonvolatile memory (NVM) devices
- Advancement in logic technologies: (1) adoption of device architectures for CMOS devices; (2) development of novel architectures for Beyond-CMOS
- Development of Beyond-CMOS devices for More-than-Moore (MtM) applications including PUFs and RNGs

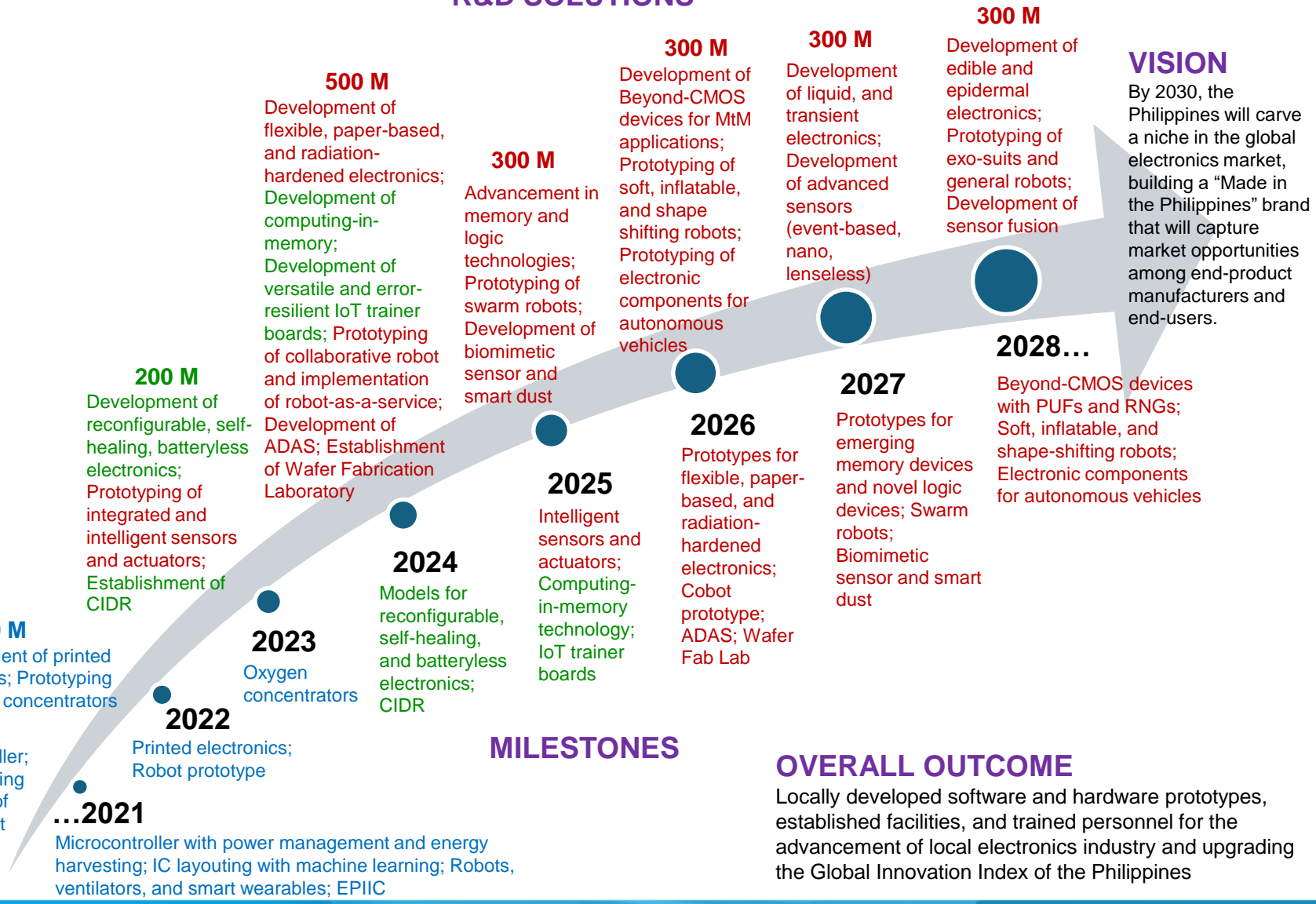
Electronics Manufacturing Services (EMS):

- Prototyping of robots including collaborative, swarm, soft, inflatable, shape shifting, exo-suits, and general robots, and implementation of robot-as-a-service
- Prototyping of ventilators and oxygen concentrators
- Development of smart wearables
- Development of versatile and error-resilient IoT trainer boards
- Development of advanced driver assistance systems (ADAS)
- Prototyping of electronic components for autonomous vehicles
- Prototyping of integrated and intelligent actuators and sensors which are biosensing, biophotonic, chemical, optoelectronics, mechanical, thermal, micromechanics, magnetics, chemometrics, and microarray
- Development of advanced sensors including biomimetic, smart dust, hyperspectral, event-based, nano, lenseless, and sensor fusion

S&T Policies

- Develop policies, standards, and incentives for local electronics industry

R&D SOLUTIONS



VISION

By 2030, the Philippines will carve a niche in the global electronics market, building a "Made in the Philippines" brand that will capture market opportunities among end-product manufacturers and end-users.

MILESTONES

OVERALL OUTCOME

Locally developed software and hardware prototypes, established facilities, and trained personnel for the advancement of local electronics industry and upgrading the Global Innovation Index of the Philippines



List of Electronics and Semicon Projects (for the whole duration of the roadmap)

R&D Technologies	Project Title	Budget Allocation ('000)							Status
		2022	2023	2024	2025	2026	2027	2028	
Electronics	Helmet-Integrated Medium-Range IR Thermal Scanner								Completed in 2021 (PCIEERD-GIA)
	Design, Development, and Testing of 10 units of Low-cost Ventilators based on DOST-PCIEERD specifications								Completed in 2021 (PCIEERD-GIA)
	“EPDC as Platform for Innovation and Collaboration (EPIC) Project 1: Electronics Product Development Center (EPDC) Upgrade and Operation								Completed in 2021 (PCIEERD-GIA)
	EPDC as Platform for Innovation and Collaboration (EPIC) Project 2: Electronics Product Inclusive Innovation Center (EPIIC)								Completed in 2021 (PCIEERD-GIA)
	BRAVE: Bomb Removal Automated Vehicle								Completed (PCIEERD-GIA)



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		2022	2023	2024	2025	2026	2027	2028	
Electronics	CIDR Project 1. Energy-Efficient RF Front-end Architectures for Large-Scale Sensor Networks	23,892,619.32	10,883,372.20	12,114,125.08					Ongoing (DOST-GIA)
	CIDR Project 2. Model-Driven Co-Design of MEMS-Based Sensors and Interface Circuits	23,811,474.68	10,811,474.68	11,475,226.12					Ongoing (DOST-GIA)
	CIDR Project 3. Energy Efficient Machine Learning Hardware Co-design	19,058,483.00	13,359,355.68	7,259,355.68					Ongoing (DOST-GIA)
	CIDR Project 4. Energy Harvesting for Battery-less IoT Device Operation	28,774,100.80	7,624,100.80	7,624,100.80					Ongoing (DOST-GIA)
	FUTURE-LAB: Fault-Tolerant and User-Friendly Trainer Board for Upcoming Research and Engineering Education Lab Kit Integrating Emerging Technologies		2,675,015.00						Ongoing (PCIEERD-GIA)
	[CRADLE] Project IOT-POD: Development of an IoT Printed Circuit Board and Online Dashboard for SIoT and IIoT		3,307,614.40	1,692,385.60					Ongoing (DOST-GIA)
	Design and Development of a 16-nm FinFET CMOS Multifunctional Computing-in-Memory (CiM) Architecture using a Non-Volatile One-Time Programmable Read-Only Memory (OTPROM) for Advanced AI Applications				26,037,042.91	16,127,986.78			Ongoing (DOST-GIA)

