Even as technologies become more advanced, competition is intensifying. Amid this change in the environment, early adoption and speed are more crucial now than ever to R&D activities. The Tokyo Electron Group is enhancing its exploration of new technologies through industrial academic collaboration, utilizing such consortia to accelerate development of equipment and processes, in addition to our own R&D activities.

Targeting the Frontiers of Semiconductor Production Technology

Tokyo Electron is continuing the perpetual quest for miniaturization, the main pillar supporting the value of semiconductors.

In the field of microfabrication technologies, we have developed unique double patterning technologies, for example, a silicon oxide film that forms at room temperature, enabling ultra-microfabrication that exceeds the resolution limit of exposure tools.

We are also supporting the miniaturization and high performance of transistors by developing high-k CVD systems with mass productivity, MOCVD technologies, and silicon fabrication and various other film deposition technologies for the era of three-dimensional transistors.

Another technology that is the focus of much attention is 3D chip stacking technology. In this area, Tokyo Electron is preparing for the advent of the age of stacked-chip technology by developing proprietary technologies such as a High speed Through-Silicon-Via etching system, low-temperature dielectric film deposition, and metal deposition system.

Tackling Environmental and Energy Issues

The entire Tokyo Electron Group is working together to address global environment- and energy-related issues.

First are our efforts in the field of photovoltaic cell production equipment. We are leveraging vacuum, plasma, and spin coating technologies acquired through our experience in semiconductor and FPD manufacturing equipment to develop high-productivity equipment for manufacturing thin-film silicon photovoltaic cells, the mainstream format in use today.

We are also actively engaged in R&D of photovoltaic cell production equipment that use compound and organic semiconductors, with a view to enhancing the efficiency and lowering the costs of photovoltaic cells.

Second are our contributions to energy conservation. In the field of power electronics, silicon carbide semiconductors are expected to usher in a major, once-in-decades innovation. We have developed epitaxial growth equipment that is crucial to the production of these new, high-potential semiconductors. This equipment boasts the highest performance in terms of epitaxial film quality and productivity of any in the world.

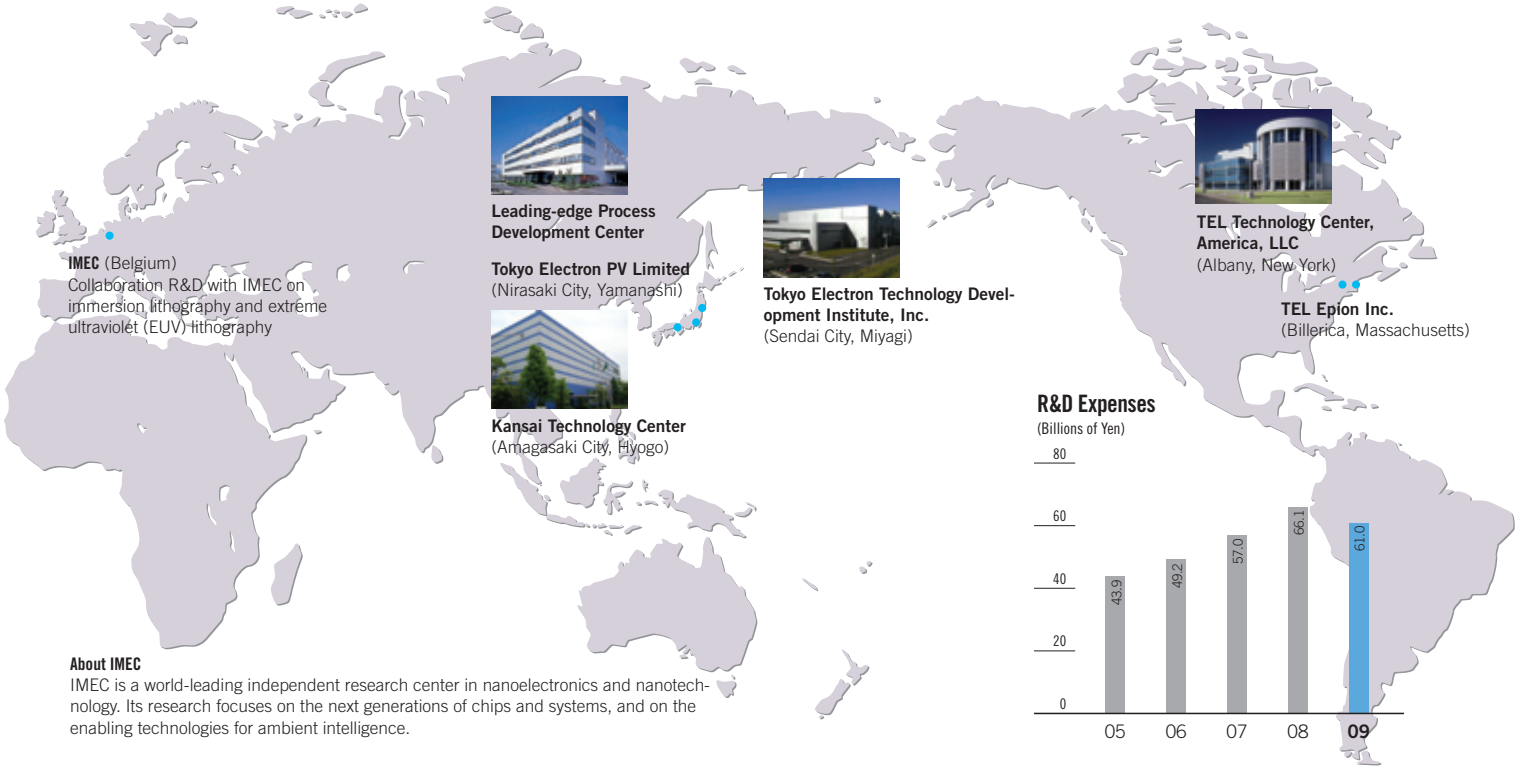
Unearthing the World's Most Promising Technologies

Technological development increasingly requires open innovation. Tokyo Electron participates in research programs at Japanese universities and

Tokyo Electron's R&D Framework (As of June 2009)

Product development in existing SPE and FPD business units	
Tokyo Electron AT Limited	Etch system, CVD system, FPD Etch/ash system
Tokyo Electron Kyushu Limited	Coater/developer, Cleaning system, FPD Coater/developer
Tokyo Electron Tohoku Limited	Thermal processing system
Tokyo Electron TS Limited	Wafer prober
Tokyo Electron Software Technologies Limited	Software technology
Timbre Technologies, Inc.	Integrated metrology
R&D for new and advanced technologies	
Tokyo Electron Technology Development Center	Research and development
Tokyo Electron Leading-edge Process Development Center	Process development
Tokyo Electron Technology Development Institute, Inc.	RLSA plasma technology
Tokyo Electron PV Limited	Thin-film silicon PV cell plasma CVD technology
TEL Technology Center, America, LLC	Process development
TEL Epion Inc.	Gas cluster ion beam technology
Identification of promising technologies	
TEL Venture Capital, Inc.	

R&D Locations



About IMEC
IMEC is a world-leading independent research center in nanoelectronics and nanotechnology. Its research focuses on the next generations of chips and systems, and on the enabling technologies for ambient intelligence.

R&D Expenses

overseas to discover outstanding research, and actively conducts domestic and international joint research on promising technologies.

The Group has also established TEL Venture Capital, Inc., a Silicon Valley-based company that works to uncover promising technologies. Investments and joint research are already underway at a number of companies.

Promoting More Efficient R&D Via Consortia Participation

In order to improve the efficiency of R&D, it is important to match industrial "needs" with the "seeds" of innovation. Consortia offer a promising venue for equipment manufacturers to learn about needs at the forefront of industry, and to generate synergy effects between devices and processes.

In Japan, Tokyo Electron participates in the MIRAI Project, while overseas the Company participates in the International SEMATECH project in the United States and the Albany NanoTech project promoted by the New York State government, as well as collaborating with IMEC in Belgium. These consortia allow the Company to come into contact with global semiconductor industry needs and refine Tokyo Electron's products through evaluation of equipment by other participating parties.