

# PROGRESS FOR FUTURE GROWTH

# MID LONG TERM BUSINESS PLAN FY2017 $\sim$ FY2022

May 19, 2017



# **Competitive Advantage and Core Technology**



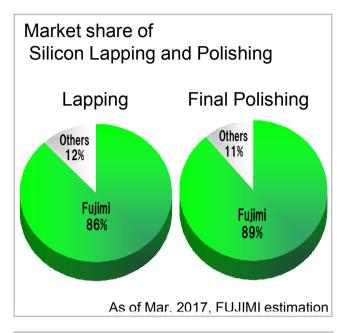
1	Strong market position in the semiconductor substrate processing segment providing superior quality materials				
2	Advanced and unique technologies providing solutions for surface processing requirements				
3	Strong R&D commitment to maintain long-term competitiveness				
4	Financial strength supporting aggressive R&D investment				
5	Strategically placed world-wide manufacturing and technology sites near major customers				

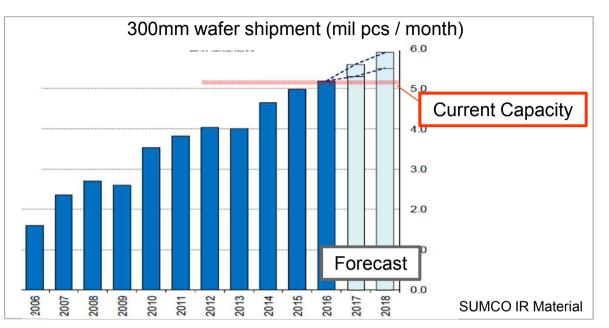
Source : "MEDIUM & LONG TERM BUSINESS PLAN" issued on November 8, 2016

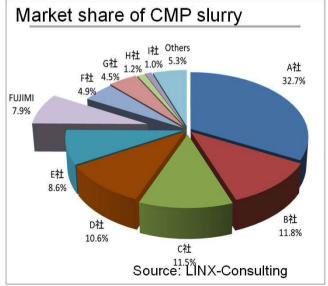
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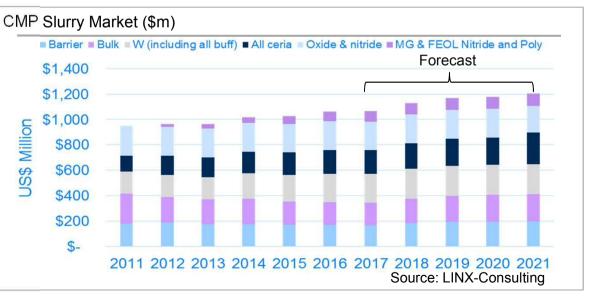
Strong market position in the semiconductor substrate processing segment providing superior quality materials







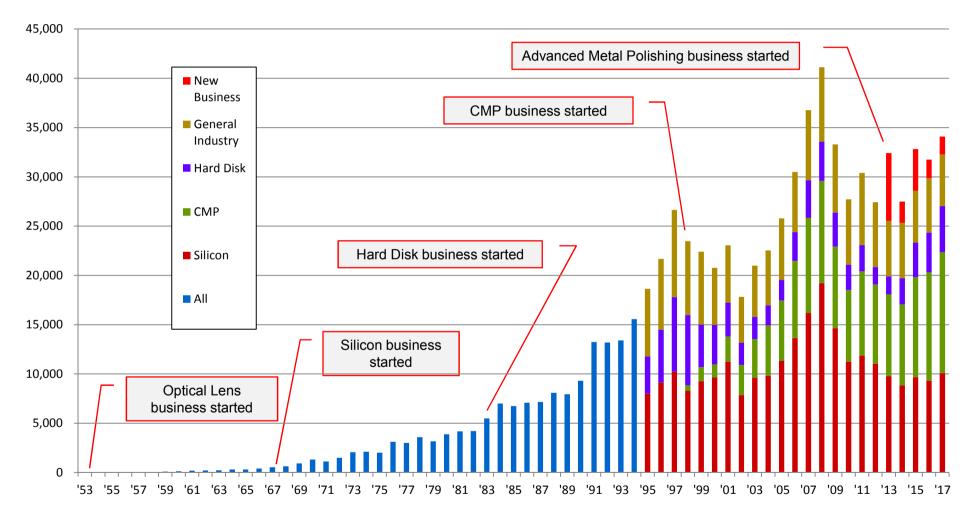




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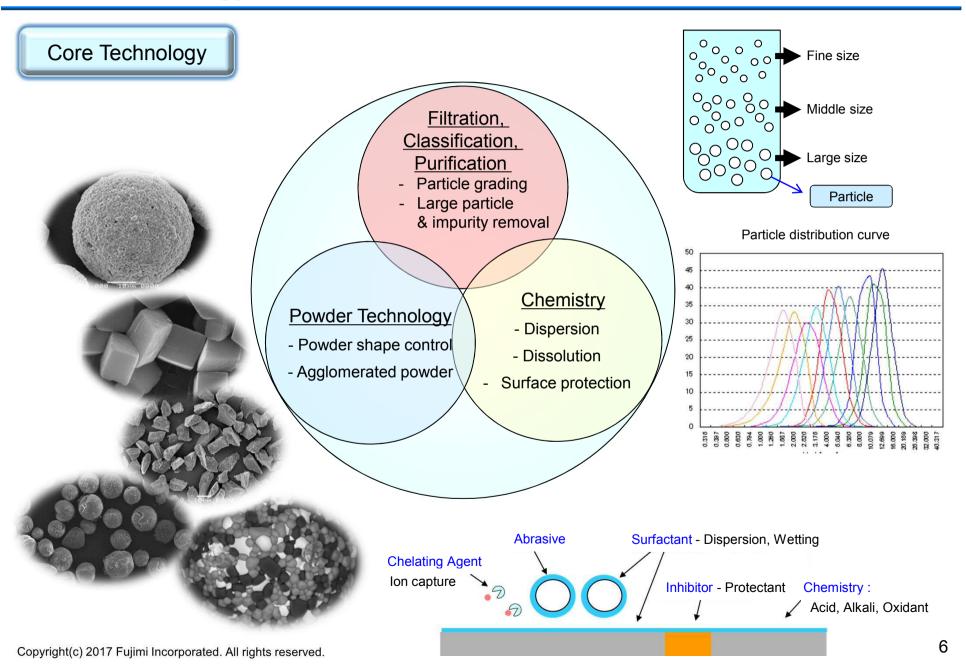


Millions of Yen



# Core Technology – TRF : Technology Platform

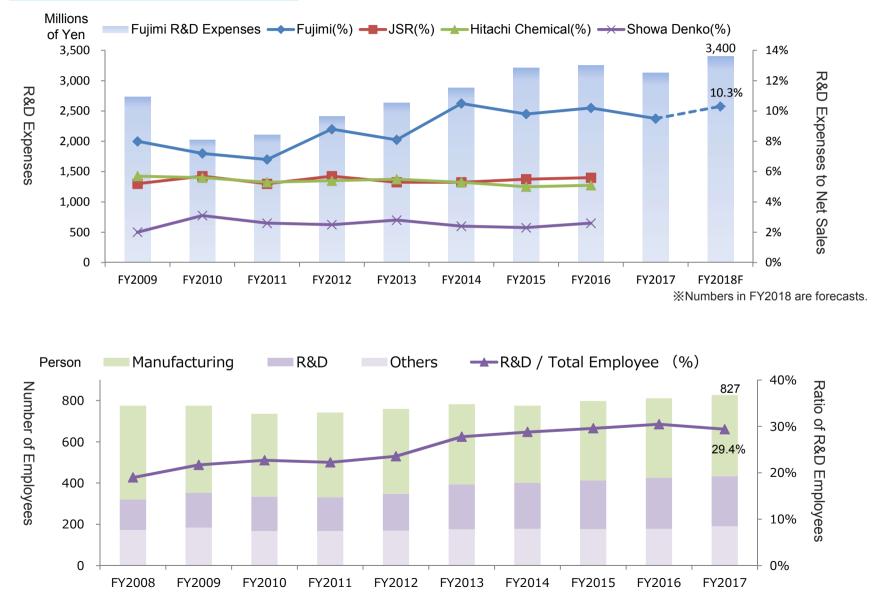






### Ratio of R&D Expenses to Net Sales

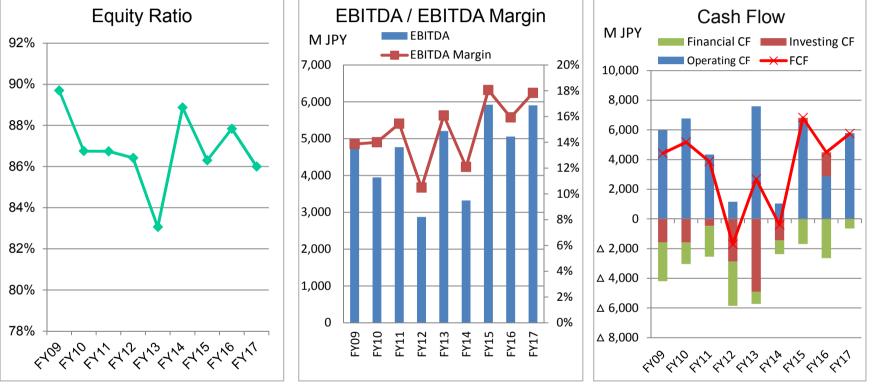
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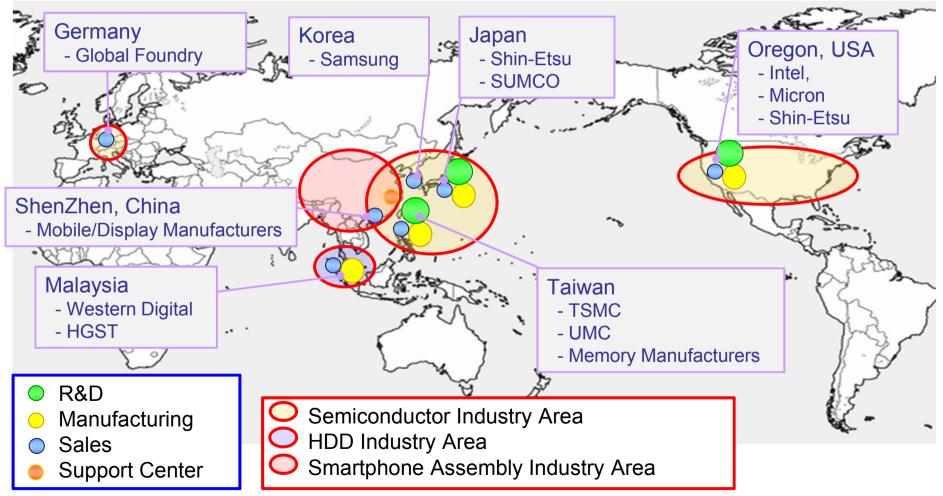


FUJIMI has no interest-bearing debt





A strong presence in Asia Pacific to better serve customers. Approximately 80 percent of revenue, fixed assets and employees are in Asia.





# Strategy for Growth



### In Red : On-going as new business and new application

Business Unit		Туре	Application	
Silicon Wafer		Polish	Silicon Wafers, GaN Wafers, SiC Wafers	
СМР		Polish	CMP Process of Semiconductor Devices	
Hard Disk		Polish	Alminum Disks and Glass Disks for HDDs	<b>O</b> OO
Specialty Materials	GI*	Polish	LT/LN, Plastic Lenses, Optical Lenses, Grinding Wheels, Coated Abrasives, Quartz Resonators, Quartz Oscillators, Glasses, Photo Masks	
		Non- Polish	Functional Materials (Insulators, Catalyst Careers, Filler Materials), Blast Materials	X X
Thermal Spray		Non- Polish	SPE*, Steels, Boilers, Paper Producing, Aircrafts, 3D Printing, Blast Materials, Filler Materials	
New Business		Polish	Mobile Displays, Sapphire Wafers for LEDs	
ATRC*		Non- Polish	SiC/SiC Composite Materials, Heat Dissipation Sheets, Next Generation Power Devices, etc.	

GI\*: General Industry ATRC\*: Advanced Technology Research Center SPE\*: Semiconductor Production Equipment Copyright(c) 2017 Fujimi Incorporated. All rights reserved.



- Re-acknowledge Fujimi's Business Domain 1.
  - Expand "Powder & Surface" field as Fujimi's business domain
  - Conversion from abrasive manufacture to "Powder & Surface" company

Key words : "Powder & Surface", Surface Processing Solution

- 2. Expand new applications and search for new businesses opportunities
  - Short to medium term : Expand existing businesses and search for new business opportunities
  - Medium term : Develop Non-polish applications and businesses
  - Long term : Incubate new business themes in the 10 year time range
- Aggressive R&D investment and cooperation with other companies 3.
  - Expand existing businesses and invest medium and long term growth
  - Enhance material design capability
- Aggressively seek alliances with other companies, as well as merger & acquisition opportunities Copyright(c) 2017 Fujimi Incorporated. All rights reserved.



- ✓ Existing Business : Expand new application and business opportunities
  - Silicon Wafer : Take next generation semiconductor applications
  - CMP : Take beyond 5nm semiconductor applications
  - Specialty Materials : Expand applications in powder field
  - Thermal Spray Materials : Expand business areas with complex

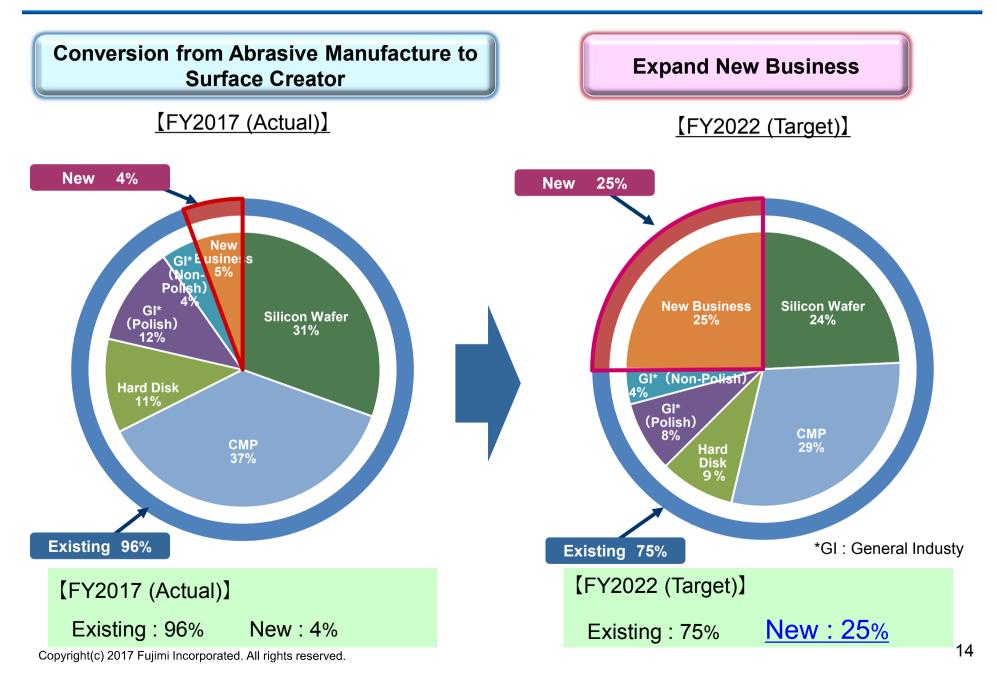
# technologies

- ✓ New Business : Search for new business opportunities
  - Complex shape polish rather than planar polish,

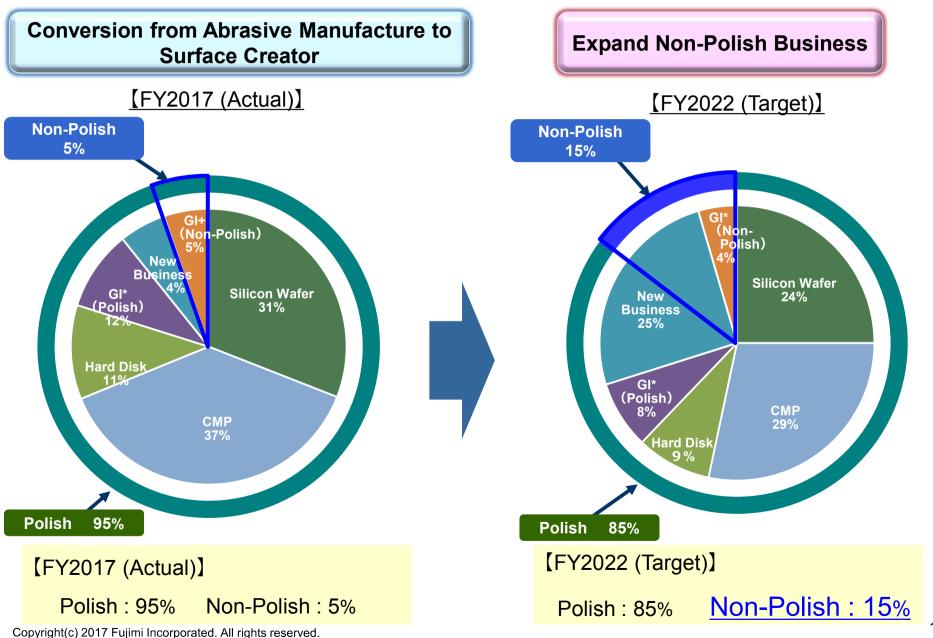
New polish method, Providing solution

- ✓ ATRC\* : Search for new business fields of "Powder & Surface"
  - Search for new business fields of "Powder & Surface" applications
  - Increase investments in venture companies (ex. CVC)
  - Aggressively seek alliances with other companies (ex. M&A)



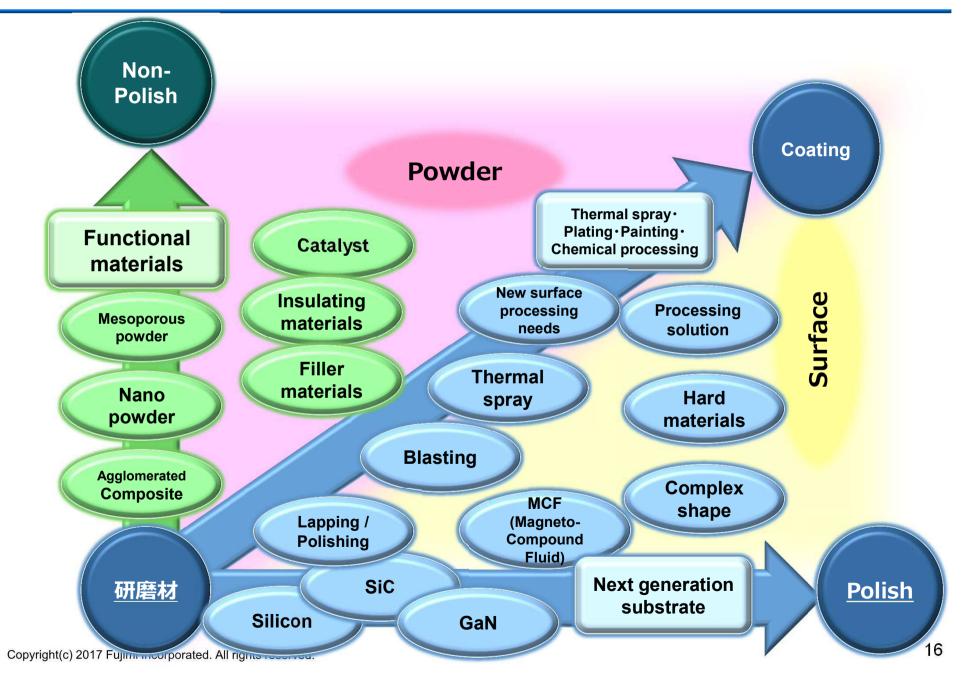






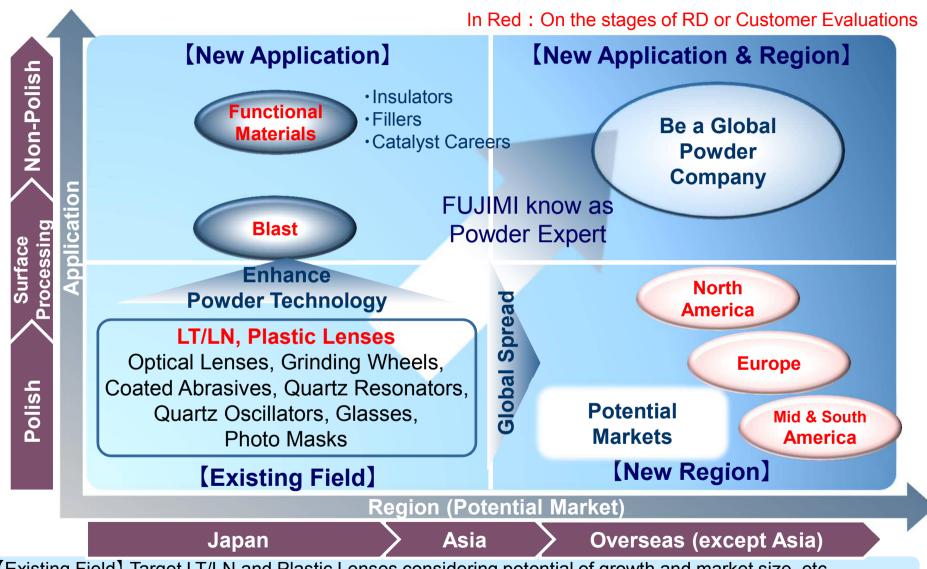
# Conversion from Abrasive Manufacture to "Powder & Surface" Company





# Specialty Materials Business Unit in General Industry (Polish) New Business Strategy



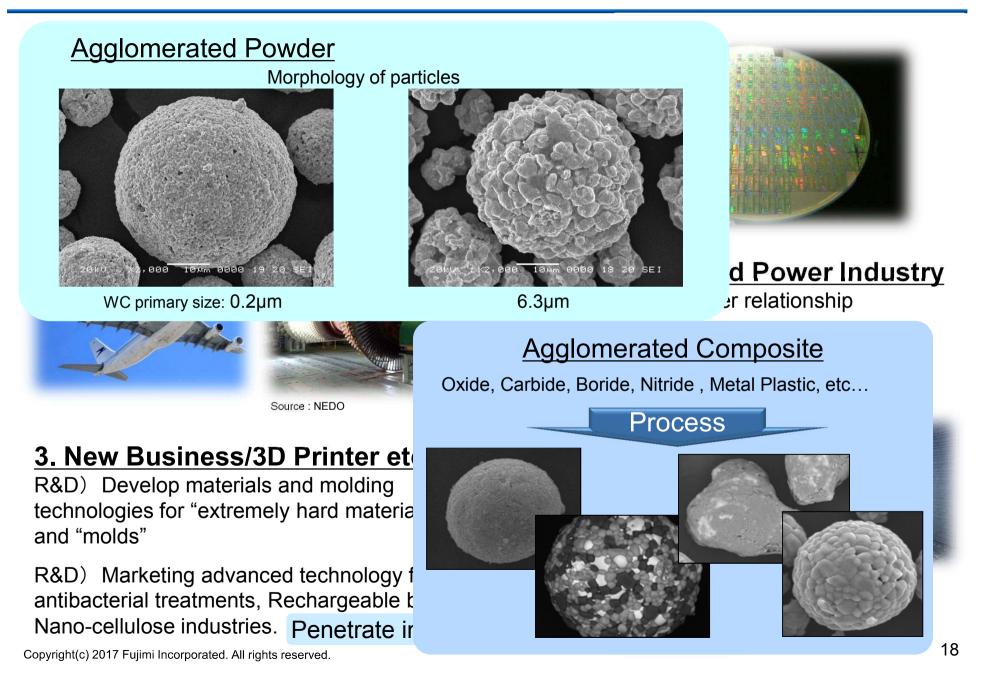


[Existing Field] Target LT/LN and Plastic Lenses considering potential of growth and market size, etc.

[New Application] Target Blast and Functional Materials considering synergy with FUJIMI's powder technology

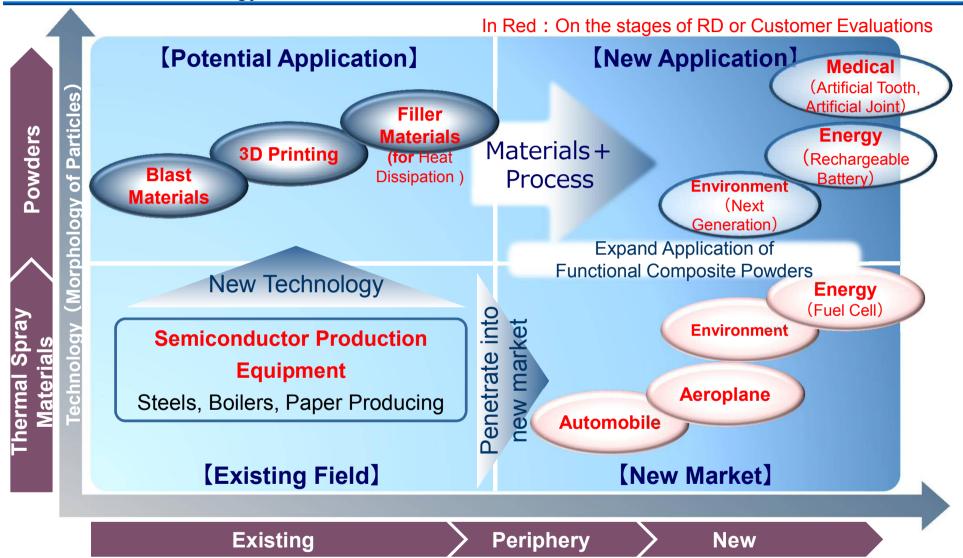
[New Region] Target potential markets





# Thermal Spray Business Unit in General Industry (Non-Polish) New Business Strategy

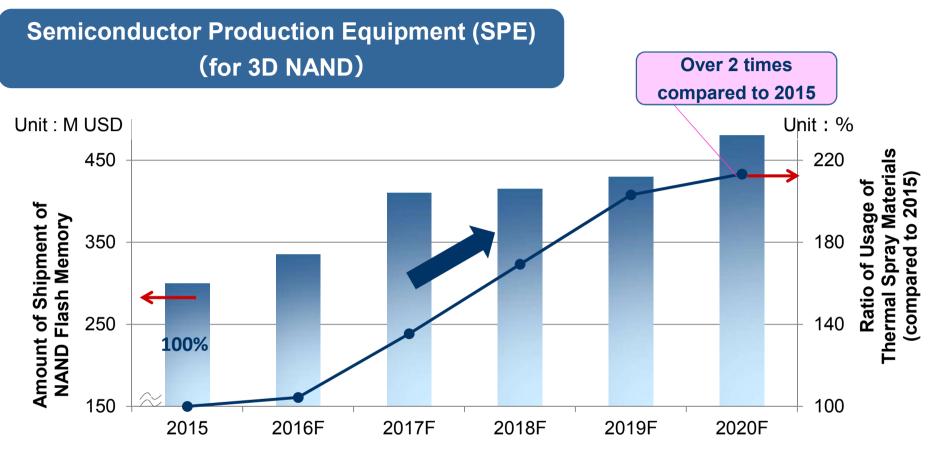




Thermal spray BU aggressively penetrates into powder markets and growing markets\* and expands our market share by building the unique technology of composite powders.

\*Growing markets are defined as the market which Fujimi can enjoy the first mover advantage by using own technology. Copyright(c) 2017 Fujimi Incorporated. All rights reserved. Thermal Spray Business Unit in General Industry (Non-Polish) Market Topic : Semiconductor Production Equipment





Source : Market Forecast of 3D NAND Flash Memory (Gartner Dec.16), Usage Forecast of Fujimi's Thermal Spray Materials relating to SPE for 3D NAND (Fujimi)

- Demands of multilayer etching equipment is increasing due to 3D NAND business boosting.
- Growth is expected for Fujimi's thermal spray materials used for etching equipment.



A center for creating and reporting on next-generation manufacturing technologies

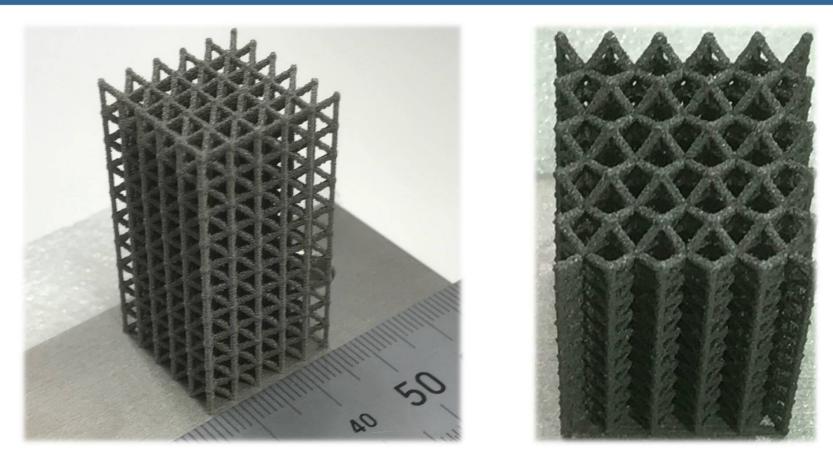
# **Knowledge Hub Aichi**



Theme	Company
<ul> <li>Development of innovative direct manufacturing process for mold and its industrialization</li> </ul>	Fujimi Incorporated
<ul> <li>Development of manufacturing process automation system for airplane engine</li> </ul>	Maxis Engineering
<ul> <li>Development of security control systems to reduce traffic accidents</li> </ul>	KICTEC
<ul> <li>Development of hydrogen generator and replenishment equipment for fork lift</li> </ul>	Hiroshima
<ul> <li>Development of micro LED for power saving and endurance display</li> </ul>	Toyota Gosei
<ul> <li>Investigation of ceramic transformation to enhance competitiveness in ceramic industry</li> </ul>	- Maruwai Advanced Ceramics L.P.
<ul> <li>Innovation of airplane manufacturing process to reduce cost and weight of airplane</li> </ul>	<ul><li>Mitsubishi Heavy Industries</li><li>Boeing</li></ul>
	2



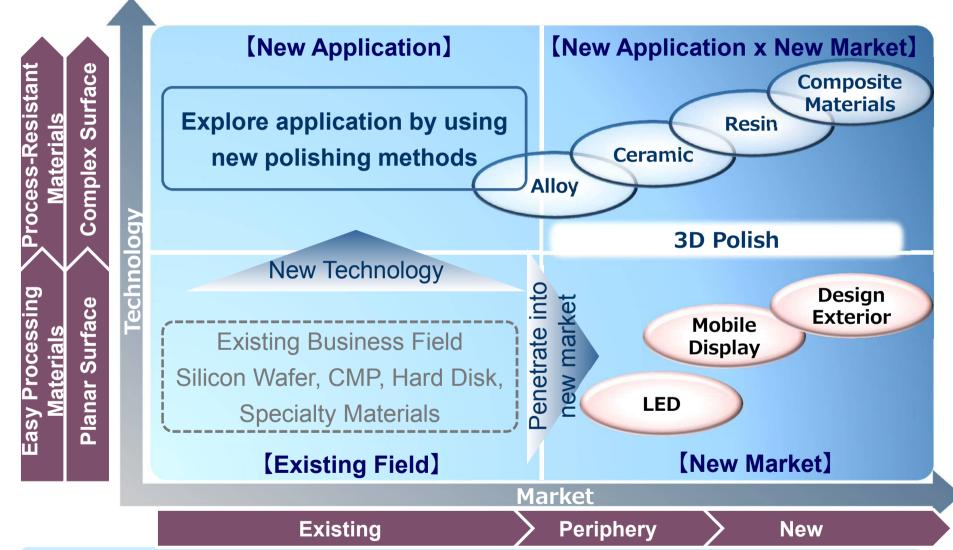
# Lattice Structure Made of Cemented Carbide



- Lattice can make the structure lighter and stronger.
- Above lattice structure was built by 3D printing technology. First 3D structure data converted into 2D data and then cemented carbides were deposited layer by layer.

# New Business BU in General Industry (Polish) New Business Strategy





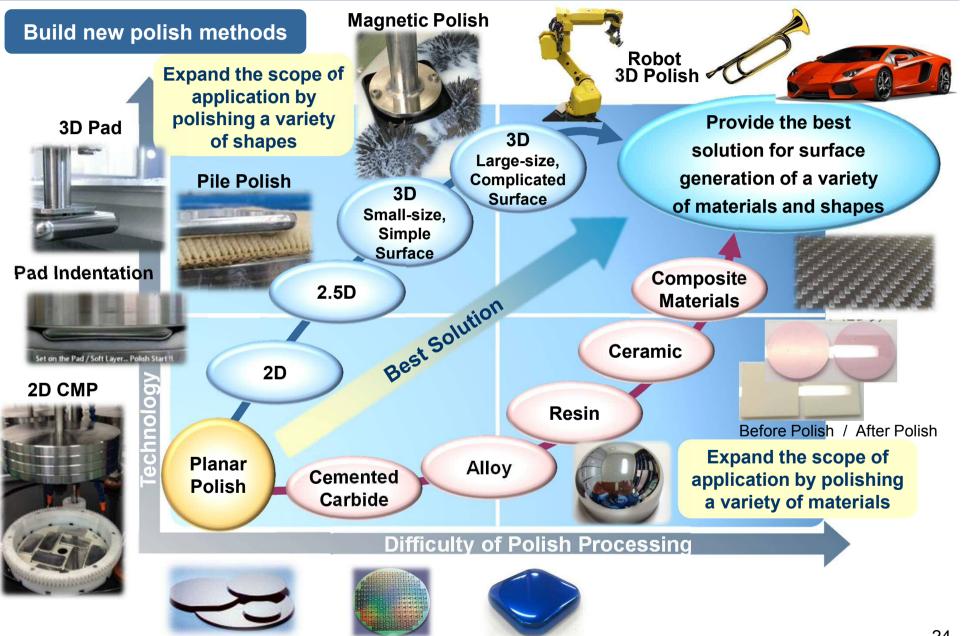
[Market axis] Target Mobile Display, LED, Design and Exterior, etc.

[Technology axis] Expand new business fields mainly by developing polish technology for Process-

Resistant Materials (Alloy and 3D Polish)

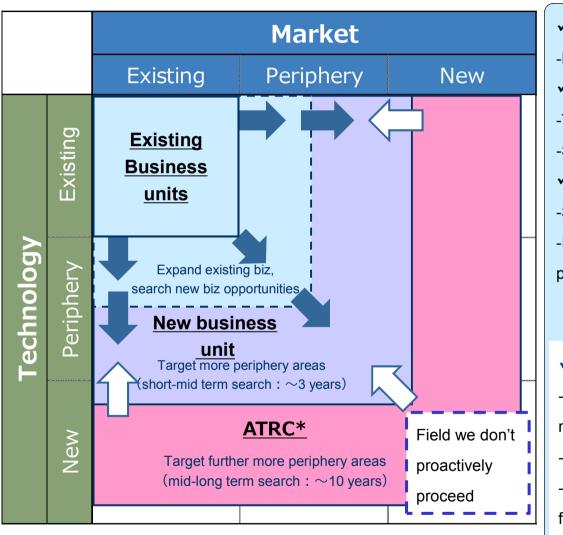
# New Business BU in General Industry (Polish) Technology Roadmap







# Domain of existing business units, new business unit and ATRC\*

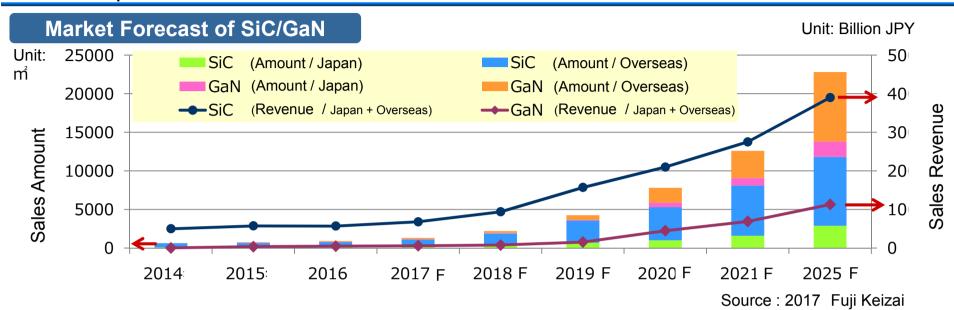


\*ATRC : Advanced Technology Research Center

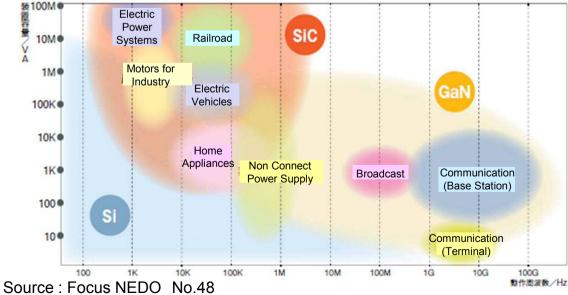
Activity in existing business units  $\checkmark$ -Expand existing biz and search new biz opportunities ✓ Activity in new business unit -Target more periphery areas rather than existing biz -Search new biz in short and medium term perspective Activity in ATRC\*  $\checkmark$ -Search new biz in medium and long term perspective -Incubate new biz projects and gives biz units the project feedbacks. ✓ Growth strategy -Existing biz units expand existing biz and search new biz opportunities -New biz unit penetrate into more periphery areas. -ATRC gives biz units the project feedbacks from further more periphery areas.

# Advanced Technology Research Center (Non-Polish) Market Topic : Power Semiconductor Devices





### Segmentation of Power Semiconductor Devices Si/SiC/GaN



Fujimi focus on and penetrate into power semiconductor devices estimated to be applied to electric vehicles, motors for industry, electric power systems and communications, etc.



ATRC has launched joint development on SiC/SiC composite material, which is one of "Ceramic Matrix Composites (CMC)", for next generation airplane engines

Partner of the joint development : Tatsuya Hinoki, Associate professor of The Institute of Advanced Energy, Kyoto University

### [Background]

- Technology competitions aiming at the development of next generation airplane engines having longer cruising distance while reducing its weight and energy consumption with low production cost are being intensified, under such a situation that the global aviation industry is expected to expand approximate 2 times in the next 20 years.
- Although the reduction of the energy consumption can be achieved by the increase of the operation temperature, it has already reached the upper limit durable temperature of metal-alloys available to-date. Developments of higher thermally durable CMC materials are strongly required in order to improve the performance of airplane engines further.
- Developments of light weight CMC materials are highly expected for the reduction of energy consumption, since current thermally durable metal-alloys have high specific gravity which are inversely proportional to weight.





Photo on the Left : Shroud made of CMC for "LEAP" engine Photo on the right : Blade made of CMC

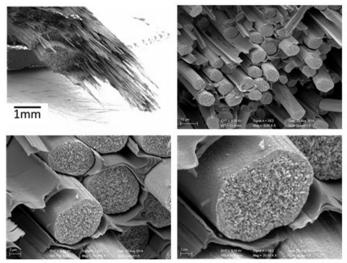
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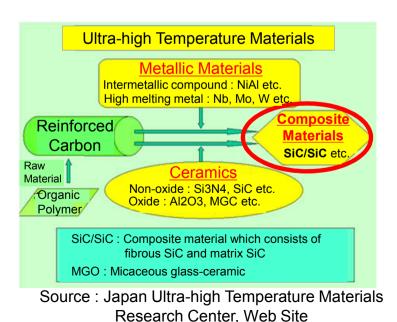
Engine of Airplane Source : GE Reports



- Tatsuya Hinoki, Associate professor of The Institute of Advanced Energy, Kyoto University has been developing CMC materials.
- Prof. Hinoki assumes that a "SiC/SiC composite" which consists of fibrous SiC and matrix SiC is a key material to realize the reduction of weight and energy consumption for the next generation airplane engines.
- Fujimi believes that it has an ability to develop SiC/SiC composite materials suitable for airplane engine based on many years experience in supplying fine SiC powder as polishing abrasives to semiconductor industry
- Fujimi has HQ and RD center in Aichi- and Gifu-prefectures, which have been designated as "Special Zone to Create Asia No.1 Aerospace Industrial Cluster" by Japanese government, which could leverage our new business development.



Source : 76<sup>th</sup> Marunouchi Seminar, Kyoto Univ,. Copyright(c) 2017 Fujimi Incorporated. All rights reserved.

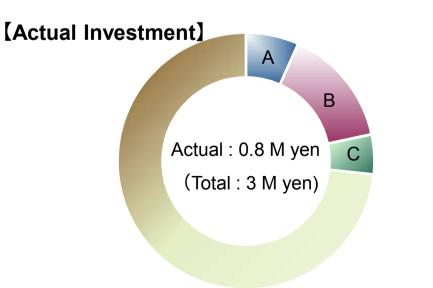




Status of CVC Investment						
Com pany	Business Content	Technology	Reasons of Investments			
A	Manufacturing Machines	Separation Technology	<ul> <li>Enhance superior separation technology and spread new markets</li> <li>Apply the technology to Fujimi's manufacturing and RD processes</li> <li>Raise the quality of products</li> </ul>			
В	Manufacturing Next Generation Power Devices	Deposition Technology	<ul> <li>Early entry into next generation power devices market</li> <li>Develop mass production process corresponding B company's needs</li> </ul>			
С	Manufacturing Filters	Separation Technology	<ul> <li>Enhance nano level filitration technology and spread new markets</li> <li>Apply the technology to Fujimi's manufacturing and RD processes</li> <li>Raise the quality of products</li> </ul>			

# [CVC Fund Outline]

Fund Name	Phoenix Investment Limited Partnership
Fund Administrator	Future Venture Capital Co., Ltd. (FVC)
Establishment Date	25 <sup>th</sup> Nov. 2015
Operation Term	Until 31th Dec. 2024
Total Amount of Investment	300 million yen Fujimi:297M yen (99%) FVC: 3M yen (1%)





# FUJIMI INCORPORATED