

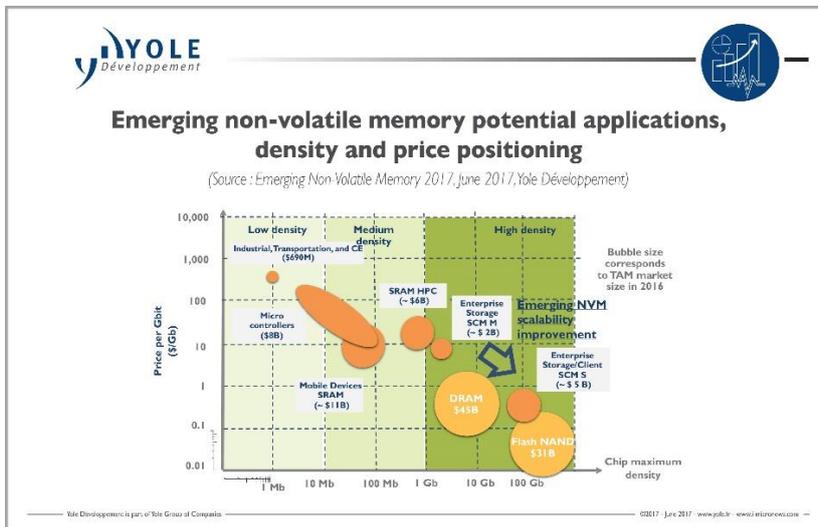


## FOR IMMEDIATE RELEASE:

### Is the emerging non-volatile memory (NVM) market ready for take-off?

Emerging Non-Volatile Memory 2017 report – June 2017 – Yole Développement

**LYON, France – 22 June 2017:** “The introduction of products by big players, the emergence of new SCM<sup>1</sup> applications and the entry of the top 5 logic foundries will drive the market,” announces **Santosh Kumar, Senior Technology & Market Analyst at Yole Développement (Yole).**



The “More than Moore” market research & strategy consulting company, Yole releases this week the [Emerging Non-Volatile Memory report, 2017 edition](#). Under this update, the company presents an overview of the semiconductor memory market and a deep understanding of the emerging NVM applications. Forecasts of each market segment and detailed analysis of each NVM

technologies are detailed in this report. Yole’s analysts are also showing the competitive landscape with recent acquisitions, fundings and latest company news. The emerging NVM report proposes a relevant description of the supply chain with the positioning of each company per technology and applications...

Yole identified favorable market conditions for the adoption of emerging NVM. What are these conditions? What is the market growth expected by Yole’s team? Which market segments are driving the market evolution?... Yole invites you to discover an overview of the emerging NVM industry.

The key emerging non-volatile technologies like PCM<sup>2</sup>, MRAM<sup>3</sup> and RRAM<sup>4</sup> have long development histories. Yet, their adoption remains restricted to niche markets due to various factors. Available products have limited density, and the introduction of high-density products by

<sup>1</sup> SCM : Storage Class Memory

<sup>2</sup> PCM : Phase-Change Memory

<sup>3</sup> MRAM : Magnetoresistive Random Access Memory

<sup>4</sup> RRAM : Resistive Random Access Memory

emerging NVM pioneers has been delayed. There are manufacturing challenges due to the introduction of new materials and process steps. Meanwhile, mainstream memory technologies are continuously improving in terms of density and cost. Finally, there has been an absence of a killer application that would challenge DRAM<sup>5</sup> and NAND flash memory.

However, favorable factors are today emerging that that will propel the emerging NVM business onto a rapid growth trajectory. Yole's analysts list:

- The appearance of new SCM business segment. This is an additional memory hierarchy in system architectures between working memory and data storage. Its aim is to reduce latency by increasing system speed. It will support and co-exist with DRAM and NAND.
- Big players like Intel introducing PCM-based 3D XPoint memory to the market in 2017 for SCM applications. And Micron will introduce a 3D XPoint memory product by the end of 2017.
- Investors are still upbeat about the emerging NVM business, as evidenced by more than US\$100 million funding in 2016.
- Big foundries like TSMC, Samsung, GlobalFoundries, UMC and SMIC are entering the emerging NVM memory business. *"They will introduce MRAM and RRAM technology for embedded MCUs in the 2018/2019 timeframe"*, explains Santosh Kumar from Yole. And he adds: *"Emerging NVM is a good opportunity for foundries to significantly grow their memory business, as it is CMOS compatible technology."*

The market for emerging NVM will grow at a 106% CAGR<sup>6</sup> between 2016 and 2022 to reach around US\$3.9 billion by 2022. The new SCM hierarchy and embedded MCUs will drive this.

*"Creating a new memory category is a sea-change that will require numerous hardware and software developments by all memory ecosystem players"*, comments **Yann de Charentenay, Technology & Market Analyst at Yole**. SCM will be adopted in enterprise storage and client applications, and later in mobile. The introduction of XPoint memory product by Intel in early 2017, targeting the SCM application, is the game changer...

Yann de Charentenay from Yole will attend [Leti's Memory Workshop](#) titled, *Memory of the Future From Market to Concept* with a dedicated presentation: *"Emerging Non-Volatile Memory (NVM) Technologies & Markets"* taking place on May 17. [More information on i-micronews.com, trade shows section.](#)

A detailed description of this report is available on [i-micronews.com, manufacturing reports section.](#)

<sup>5</sup> DRAM : Dynamic Random Access Memory

<sup>6</sup> CAGR : Compound Annual Growth Rate



### About [Emerging Non-Volatile Memory 2017 report](#)

Introduction of products by big players, emergence of new Storage Class Memory (SCM) applications and entry of the top five logic foundries will drive the market. – This report has been performed by Yole Développement (Yole) part of Yole Group of Companies.

#### Companies cited in the report:

4DS, A\*STAR, Adesto, Aeroflex, Altis, Apple, Atmel, Avalanche, Buffalo, CEA Leti, Cisco, CNE, Crocus, Crossbar, Cypress, Dell, Ebay, EMC, Evaderis, Everspin, Facebook, Freescale, Fujitsu, Fusion IO, Fujian Jinhua Integrated Circuit Co., Ltd, Gemalto, Giesecke & Devrient, GlobalFoundries, Google, Hefei Chang Xin, H-Grace, HLMC, Honeywell, HP, Huawei, IBM, Imec, Infineon, Innovative Silicon, Intel, ITRI, Knowm, Lenovo, Macronix, Maxim, Mediatek, Microchip, Micron-Elpid a, Morpho, Nantero, Nanya, National Tsing Hua University, NEC, NetApp, Nike, Nokia, Numonyx, NXP, Oberthur, Panasonic, Qualcomm, Quantum, Rambus - Unity, Renesas, Samsung, Sandisk, Seagate, SGI, Sino King Technology, SK Hynix, Skyera, Smart Modular Technologies, SMIC, Sony, Spansion, Spin Transfer Technology, Spreadtrum, STMicroelectronics, Stanford University, STEC, Sun, Symetrix, TDK, Tezzaron, TMS, Tohoku University, Toshiba, Towerjazz, TPSCO, Tsinghua Unigroup, TSMC, UMC, Violin Memory, Weebit, Western Digital, Winbond, XMC, Yangtze River Storage Technology and many more

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**Santosh Kumar** works as a Senior Technology & Market Research Analyst at Yole Développement, the «More than Moore» market research and strategy consulting company. He is involved in the market, technology, and strategic analysis of microelectronic assembly and packaging technologies. He received a bachelor's degree and a master's degree in Engineering from the Indian Institute of Technology (IIT) Roorkee and the University of Seoul, respectively. He has published more than 40 papers in peer-reviewed journals and has obtained two patents. He has presented and given talks at numerous conferences and technical symposiums.

**Yann de Charentenay** has worked for Yole Développement, the «More than Moore» strategy consulting and market research company, in the field of MEMS, materials and compound semiconductors since 2003. He has contributed to more than 60 marketing and technological analyses.



#### About Yole Développement – [www.yole.fr](http://www.yole.fr)

Founded in 1998, Yole Développement has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole Développement group has expanded to include more than 50 collaborators worldwide covering MEMS, Compound Semiconductors, RF Electronics, Solid-State Lighting, Displays, Image Sensors, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.

The “More than Moore” company Yole, along with its partners System Plus Consulting, PISEO, Blumorpho and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business.

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