

Presentation of the Power devices action.

General proposal

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Organization of Power devices action

- **Bring together several non competing companies interested to analyze the materials and equipment markets linked to the new power devices (IGBT, VMOS, thyristor, integrated power devices ...)**
- **Make a complete and in-depth description of this area and provide specific answers to the participants of this action**
- **Schedule :**
 - **Starting point : at the signature of the contract**
 - **Final synthesis : after 6 months**
- **Have 5 companies involved, suppliers of this industry**
- **Share the cost between the different companies : budget per company of 25 kEuro.**

General objectives, common to each company

- Describe the applications and markets for the period 2004-2010 of power devices components
- Analyze the industrial food chain of this fields : material manufactures, components manufacturers, capital equipment manufacturers
- Describe the materials and equipment markets 2004-2010
- Analyze and describe the technologies for the manufacturing of power devices components (major bottlenecks, major achievements ...) :
 - Highlight the innovations under development or implementation for the manufacturing of power devices
 - New process in front end and back-end
 - New needs linked to equipment and materials : deep RIE, double side aligners, Si, SOI, SiC, engineered substrates ...
- Description of the major companies and major research labs involved in this field

Specific objectives for each company

- **Specific objectives for each company :**
 - **Answer specific technical, marketing and commercial questions linked to the development of the power devices business**

Areas covered

- **Discrete devices :**

- IGBT : Fairchild, ON Semiconductor, Infineon, IR, Toshiba, STM ..
- Bipolar transistors : Rohm, Philips, Microsemi, GenSemi, Vishay, Hitachi ...
- Mosfet, Tyristor, VMOS...

- **Power IC :**

- Power amplifier : TI, STM, National SC, Analog Devices, Philips, Toshiba, Rhom, ON, Maxim, Linear Technologies, Fairchild, Hitachi, NEC, Mitsubishi, Motorola
- Comparator, voltage regulator ...

Description of the common work to be done

- **Description of the industrial food chain :**
 - **Wafer manufacturers** : who is producing what (Si, SiC and SOI), type of products, development stage, production level today and in the future, major characteristics of the process (if available)
 - **Materials and capital equipment manufacturers** : major world manufacturers for the major process steps for the different power devices, characteristics of the activity and of the offer
 - **Components manufacturers** : who is producing what, type of products for which applications, development stage, production level today and in the future, major characteristics of the process (technology, cost, yield ... if available)

Description of the common work to be done (2)

- **Analyze and describe the specific technologies for the manufacturing of power devices :**
 - **Process steps for the manufacturing of each of the different power devices**
 - **Major bottlenecks**
 - **Major achievements**
 - **Major R&D organizations on a world basis**
 - **Technology roadmap for the different products and process**
 - **Who is developing what ?**
 - **Wafer diameter evolution**
 - **Competing technologies/materials per applications (Si, SOI, SiC ...) and situation of the materials competition per components**

Description of the common work to be done (3)

- **Analyze and describe the equipment and materials markets for the manufacturing of power devices :**
 - **Materials markets :**
 - Silicon
 - SOI, Thick SOI and Multi-level SOI
 - SiC
 - Engineered substrates
 - **Specific new equipment markets linked to the manufacturing of power devices :**
 - Deep RIE
 - Wafer bonders
 - Double side mask aligners
 - ...

Description of the common work to be done (4)

- **Define a segmentation for the power devices applications**
- **Specific analysis per segment/application :**
 - **Market size in volume (number of pieces) and value (M\$) for 2003 and projection for 2008**
 - **Specificities of the segment in term of technology (need of epitaxy, thermal treatment ...)**
 - **Wafer diameter and characteristics (quality ...)**
 - **Competing situation of the materials/components on this application**
 - **Roadmap of products**
 - **Price roadmap for the devices**
 - **Description of industrial players in each segment**

Description of the common work to be done (4)

- **Description of all industrial players involved in the power devices business in Europe, North America and Asia (standard profile of Yole)**
- **Description of the major R&D labs**
- **Typical profile : (see next slide)**

Company profile

- **Company name and address**
- **Key managers and/or contacts**
- **Company Overview, market and customers, agreements and Alliances**
- **Financial data**
 - **Investors**
 - **Sales**
 - **Number of employees**
- **Main Products, main Technologies**
- **Manufacturing Facilities:**
 - **Activity of the plant**
 - **Status of the plant**
 - **Total Investment**
 - **Type of material**
 - **Wafer size (mm)**
 - **Clean room size (m²), clean room class**
 - **Production capacity (wpw)**
 - **Staff involved in production**

Specific work for each company involved

- **To be defined for each company**
- **Can include :**
 - **Specific market analysis for a specific material, equipment, service ...**
 - **Specific analysis of a company (customer or competitor) with an enhanced profile**
 - **...**

Schedule

- **Starting point : at the signature of the contract**
 - Analysis of the company offers (for each company involved in this action)
 - Definition of the different review meetings
 - Specific objectives, timing ...
 - Definition of the companies to be met and why
 - Definition of the information gathering tools : presentation of your company, interview guide
- **Final synthesis : After 6 months**
- **Several meetings will be set-up, approximately every 7 weeks, with each company in order to make the status of the search of information, get feed back on the results ...**
- **Final synthesis in 2 rounds in order to take care of important new questions.**

Methodology

- **Direct contact with each targeted company (face-to-face meeting) with the different persons important for our analysis :**
 - R&D manager, purchasing manager, fab manager, marketing manager ...
 - Several contact per company is feasible due to the different companies involved in this action
 - Several meetings in a company is feasible in order to analyze different points
 - Contacts with key technical and marketing experts
- **Approximately 50 to 70 companies will be met, chosen at the beginning of the action and regularly updated**
- **Presence at the main conferences and exhibitions**
- **More generally analysis of the literature, web, scientific publications ...**

Methodology (2)

- **Strong interaction with each company is key to the success (meeting every 7 weeks)**
- **Synthesis made in common (general segmentation of the power devices market)**
- **Specific analysis made for each company with the team of Yole and the team of the company :**
 - **Marketing analysis**
 - **Synthesis of the action for the company**
 - **Proposal of actions**
- **Key persons of YOLE Développement :**
 - **P. Roussel, responsible of the semiconductor equipment markets**
 - **JC Eloy, director**

Budget

- **Budget per company : 25.000,00 Euro**
- **This budget includes :**
 - **Time spend on the global and specific analysis**
 - **Travel expenses and cost linked to the gathering of the information**
- **Yole Développement will be able to reuse part of the information for communication purpose**
- **This information will be validated by the participant before publication**

Other possible actions

- **Specific actions could be planned, depending of the willingness of each organization involved :**
 - **Common meetings in order to exchange information between the companies involved in the Power Devices action**
 - **Specific customer focus meeting with different companies involved in the Power Devices action**
 - **...**
- **This will be determined during the action**

General conditions

- **Term of payment (to be defined with each company) :**
 - **30% at the beginning of the action**
 - **40% after 2 months**
 - **30% at the end of the action**
- **An NDA agreement will be signed between Yole Développement and each customer in order to keep the confidentiality of the exchanges**

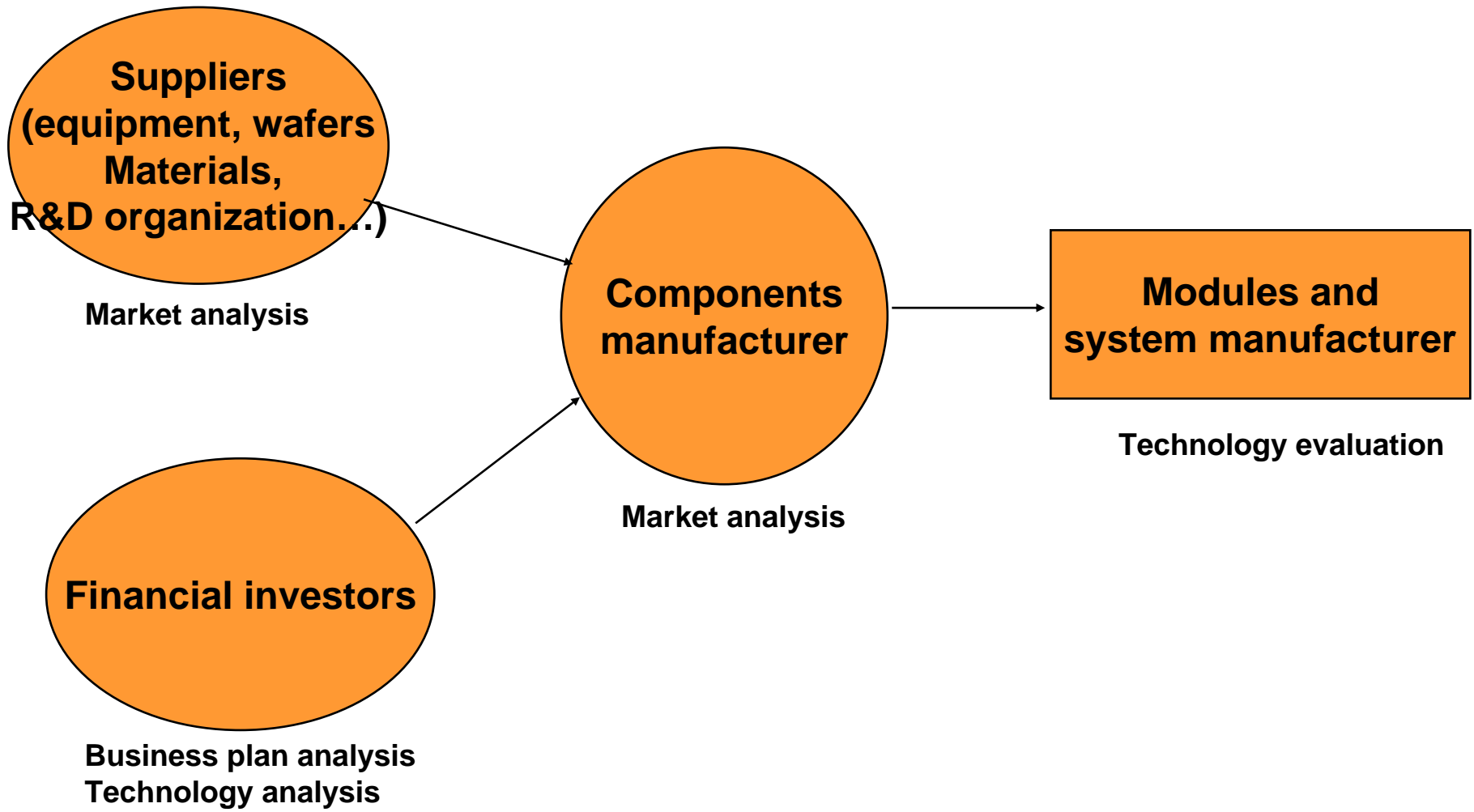
Presentation of Yole Développement

Presentation of Yole Développement

- Yole Développement is a market research and strategy consulting company, created in 1998.
- We are involved in the following fields:
 - MEMS fields, strategy and market research, **World leader**
 - Compound semiconductor business (SiC, GaN and thick SOI), **First European marketing consulting company**
 - Optics and optoelectronics
 - Instrumentation for life science
 - Nanomaterials and linked equipment
 - Energy related areas
- Yole Développement has 18 consultants, with both technical and marketing/management background, working worldwide
- We have different activities :
 - **Custom strategic and market research analysis**
 - **Edition of reports**
 - **Edition of a monthly newsletter :**



Typology of our customers



Lines of services for custom analysis

- **Strategic and marketing analysis :**
 - Strategic analysis
 - Identification of new applications and markets, set-up of market segmentation
 - Proposal of actions and marketing plan
 - Scenario analysis
- **Technology strategies**
 - Analysis of technical areas and definition of technology strategy
 - Define and find the right partners
 - Scenario analysis
- **Specific services for investors :**
 - Evaluation and analysis of business plan
 - Evaluation of production infrastructure
 - Expertise and due diligence before M&A
 - Company, market and technology expertise
 - Strategy, marketing and technical due diligence
- **Realisation of multi-customer analysis**

Added value of Yole Développement

- **Development of specific methodologies in order to analyse and evaluate markets linked to new technologies**
- **In-depth industrial and technical knowledge of the different fields of specialties of Yole Développement**
- **Global contact network:**
 - **Participation to all major events**
 - **Contact data base of 45,000+ names**

A specific offer : multi-customer actions

- **Bring together 5 to 7 companies interested to analyze a specific field :**
 - **Materials manufacturers**
 - **Equipment manufacturers**
 - **Device manufacturers**
 - **R&D organizations**
- **Make a complete and in-depth description of this area and provide specific answers to the participants of this action :**
 - **General analysis common to each partner**
 - **Key specific questions defined by each partner**
- **Schedule :**
 - **Starting point : at the signature of the contract**
 - **Final synthesis : after 5/6 months**
- **Share the cost between the different companies : budget per company 25 kEuros.**

New multi-customer analysis on the way

- **World MEMS equipment markets 2005**
- **Microreaction technologies**
- **Nano imprint lithography**
- **New technologies for power devices**
- **3rd generation photovoltaic solar cells**
- **Advanced packaging**

- **Compound semiconductor fields :**
 - **Thick SOI : status of the markets and new developments**
 - **GaN : from devices to equipment and material markets**
 - **InP : from devices to equipment and material markets**
 - **AlN : from devices to equipment and material markets**
 - **SiC : from devices to equipment and material markets**

Major device manufacturers customer of Yole Développement

- **Europe** : Sensoror, QinetiQ, Bosch, Unaxis, Thalès, SMB, AMIC, Infineon, Colibrys, Tronic's, Silex, STM, Philips, Varioptic, Modulight, VTI ...
- **North America** : Micralyne, Honeywell, Endevco, Freescale, HP, TI, Qualcomm, Knowles, Microfabrica ...
- **Asia** : Denso, Samsung, DNS, Canon, Panasonic, Nozomi Photonics, Sony, Sharp, Toshiba ...
- **R&D organizations** : CEA/Leti, CNRS, FhG, INSERM, IMEC, Université de Franche Comté, University of Strathclyde, INEX, IEMN, Sandia, Itri ...

Major customers in the equipment and material fields

- **Equipment** : AMAT, ASML, Steag Hamatech, Jenoptik, EVGroup, STS, Sysmelec, Isméca, Mirae, Datacon, Mesatronic, Ebara, Applied MST, Xsil, Altatech, Riber, Ebara, TEL, Ultratech, Lam research ...
- **Wafer manufacturers** : Soitec, Umicore, Lumilog, Tracit Technologies, Okmetic, Tocera, Sixon, InPact, Bridgestone ...
- **Materials and chemical materials producers** : Schott, Ablestik, Dow Corning, Honeywell, Xenocs ...

Other Yole Développement offers

- **Edition of reports describing specific markets and technologies :**
 - MEMS reports
 - Compound semiconductor reports
 - Microfluidics and biochip reports
- **Edition of a monthly newsletter, Micronews**
 - 10 000 subscribers, 30 000 readers
 - More than 3% growth per month
 - Worldwide coverage
 - Key magazine of the industry
- **Edition of a MEMS executive newsletter :**
 - 18 issues per year
 - Analysis of what is happening behind the scene
 - Comments on the major MEMS industry events every 3 weeks

For more information ...

Take a look at our web site

www.yole.fr

You can register on line for free issues of Micronews

Save the date :

**Yole Développement is part of the organisation of
Transducers 2007 in Lyon (10th to 14th of June 2007)**

