

***Now Available!***

---

# CONTRACT MANUFACTURING OPPORTUNITIES IN PRINTED ELECTRONICS

***2013 Edition***

**A Comprehensive Study on the Worldwide Market for  
Contract Manufacturing of Printed Electronics**

## Report Highlights

- **Printed Electronics Technology Analysis**
  - ◆ **Printer Manufacturing Equipment Market Size**
  - ◆ **Electronic Material and Thin Film Market Size**
- **Worldwide Printed Electronics Market Analysis, 2012**
  - ◆ **Leading Products and Applications**
  - ◆ **Analysis by 10 Industry Segments**
  - ◆ **Functional Commercial Products**
- **Worldwide Printed Electronics Market Forecasts, 2012–2017**
  - ◆ **10 Industry Segments**
  - ◆ **40 Leading Market Applications**
- **Company Profiles (185 Printed Electronics Firms)**
  - ◆ **Equipment Companies/Suppliers**
  - ◆ **Materials Companies/Suppliers**
  - ◆ **Solution/Integration Companies/Suppliers**

**New Venture Research Corp.**

337 Clay St., Suite 101  
Nevada City, CA 95959  
Tel: (408) 244-1100

**A Technology Market Research Company**

kwilliams@newventureresearch.com  
www.newventureresearch.com  
Fax: (408) 864-2138

# Contract Manufacturing Opportunities in Printed Electronics - 2013

## Synopsis

The worldwide **printed electronics (PE)** market has been over-hyped and inaccurately forecast for over a decade. Yet PE still holds much potential and is now starting to show promise and commercialization. **New Venture Research (NVR)** has been following this emerging market for the last five years and the contract electronic manufacturing services market for more than 20 years. As a result of our extensive industry contacts and recent field interviews in PE, **NVR** is in a position to put a realistic stake in the ground with regard to the leading PE market applications and their potential for future growth.

This latest report - ***Contract Manufacturing Opportunities in Printed Electronics - 2013 Edition*** — is a comprehensive market analysis of emerging PE technologies and applications, and leverages our in-depth database of contract electronics manufacturing services (EMS) suppliers and markets built up over the past two decades. EMS suppliers are the best positioned to capitalize on the most promising PE opportunities, of which we have identified over 40 leading application areas. This report analyzes the highest potential products by end customer that stand to win out over traditional semiconductor and material technologies. This is because PE is creating a standalone market of its own as well as displacing some traditional semiconductor electronics. Certain market applications have clear economic and commercial advantages over the next five years (the only period that can be reasonably forecast).

**Chapter 3** begins with a technical analysis of the most popular material technologies including organic and inorganic thin film transistors and other forms of printable circuits. The chapter moves on to discuss the various kinds of equipment that are used to print and layer these thin films, especially ink jet and screen printer technology which are used for the majority of PE applications today. A summary of the total equipment market by revenue is provided for 2012. The section concludes with an examination of substrates and the field of e-paper and related displays.

**Chapter 4** explores and analyzes the PE market for conductive inks and thin films. Currently, the vast majority of conductive materials are composed of silver flake along with corresponding dielectrics for insulation. Other materials such as carbon/graphene, copper, gold, platinum, and carbon nanotube/silver/copper nanowire are explored. A table of all the worldwide conductive inks is summarized in terms of revenue for 2012 along with a table of conductive inks by industry segment.

**Chapter 5** identifies and explores the leading product applications for PE products among ten industry segments and in context with the entire contract manufacturing market. Leading product applications are analyzed for both traditional electronics assembly and advanced PE manufacturing production.

**Chapter 6** forecasts the future for PE products for 40 different product applications, contrasting the highest potential PE products against traditional semiconductor electronics. All PE product applications are summarized in this chapter, including a ranking of the strongest markets in descending order of growth. The highest growth markets are projected to expand over 125% CAGR, while others are as low as only 5% CAGR, from 2012-2017. Overall, the market for PE products will triple over the next five years, reaching nearly \$10 billion in assembly revenue value by 2017.

**Chapter 7** analyzes the leading PE companies and suppliers in three ways – equipment manufacturers, advanced materials/thin film providers, and solution/integration companies that develop technical solutions or can successfully integrate one or more PE technologies. In all, 185 PE companies are profiled in this report and are organized according to category.

***Contract Manufacturing Opportunities in Printed Electronics - 2013 Edition*** is the product of hundreds of hours of research and sells for \$2495 with a single-user license (additional licenses are \$250, corporate licensing is \$1000). This report is available in PDF format only and is delivered by email. An Excel spreadsheet of all data and tables is available for an additional \$750.

## About the Author

**Randall Sherman** is the principal analyst and president of New Venture Research Corp., a technology market research and business consulting firm focused on the EMS and OEM electronics manufacturing industries. Mr. Sherman has more than 25 years' experience in technology and business research. He began his career as a telecom network design engineer and he holds an undergraduate degree in Astrophysics. He also holds two master's degrees – an MSEE from the University of Colorado and an MBA from the Edinburgh School of Business. Before NVR, he held senior positions at various market research firms including Creative Strategies, Frost and Sullivan, and BIS Strategic Decisions.

# Contract Manufacturing Opportunities in Printed Electronics - 2013

## Table of Contents/Figures

### Chapter 1: Introduction

- Objectives
- Organization
- Methodology

### Chapter 2: Executive Summary

- EMS Market and Forecast
- PE Industry Market Forecast
- PE Market Application Forecast

### Chapter 3: PE Technology Analysis

- Organic and Thin Film Technology
  - Organic Transistors
  - Polymer Electronics
  - Inorganic Materials and Composites
  - Inorganic Transistors
  - Printable Electronics
- PE Manufacturing Equipment
  - Flexography
  - Gravure
  - Inkjet
  - Off-set Lithography
  - Screen printing
  - Substrates
  - E-Paper and Displays

### Chapter 4: PE Materials Market, 2012

- Conductive Inks
- Conductive Films
- Microcapsules
- Organic/inorganic transistors, polymers, et al
- Nanoparticles

### Chapter 5: PE Market Applications, 2012

- The Worldwide Contract Manufacturing Services Market
- Consumer Electronics
- Displays and Lighting
  - Technical Issues
  - Display Applications
  - Non-Emissive Displays
- Medical
- Packaging
  - Technical Issues
  - Packaging/Label Applications
- Photovoltaic's (PV)
  - Technical Issues
  - PV Market Applications
- Printed Circuit Boards (PCBs)
- Radio Frequency Identification (RFID)
  - Technical Issues
  - RFID Market Applications
- Textiles/Clothing
- Transportation
- Other
- PE Market Summary

### Chapter 6: PE Market Forecasts

- Worldwide Contract Manufacturing Services Market, 2011-2016
- PE for Consumer Electronics, 2012-2017
- PE for Displays and Lighting, 2012-2017
- PE for Medical Products, 2012-2017
- PE for Packaging, 2012-2017
- PE for Photovoltaics, 2012-2017
- PE for PCBs, 2012-2017
- PE for RFID, 2012-2017
- PE for Textiles/Clothing, 2012-2017
- PE for Transportation, 2012-2017
- PE for Other General Applications, 2012-2017
- PE Market Forecast Summary, 2012-2017
- PE Leading Applications in Descending Order of Growth, 2012-2017

### List of Figures

- Figure 3-1 Throughput vs. Resolution for Different Printing Processes
- Figure 3-2 - Flexographic Print Technology
- Figure 3-3 - Gravure Print Technology
- Figure 3-4 - Inkjet Print Technology
- Figure 3-5 – Industrial Inkjet Printer Applications for Printed Electronics
- Figure 3-6 – Offset Lithography Print Technology
- Figure 3-7 – Screen Printing Technology
- Figure 3-8 – Summary of PE Screen Printer Technology Applications, 2012
- Figure 5-1 PE Manufacturing Supply Chain, 2012
- Figure 5-2 Examples of PE Applications for Consumer Electronics, 2012
- Figure 5-3 – Examples of Flexible Electrophoretic and OLED PE Displays, 2012
- Figure 5-4 – Examples of Medical PE Sensor Applications, 2012
- Figure 5-5 – Examples of PE Packaging Applications, 2012
- Figure 5-6 – Examples of PE PV Applications, 2012
- Figure 5-7 – Examples of PE for PCB Applications, 2012
- Figure 5-8 – Examples of PE for RFID Applications, 2012
- Figure 5-9 – Examples of PE for Textile/Clothing Applications, 2012
- Figure 5-10 – Examples of PE for Transportation Applications, 2012
- Figure 5-11 – Example of PE for Other Applications, 2012

# Contract Manufacturing Opportunities in Printed Electronics- 2013

## List of PE Companies Profiled

### Equipment Companies

Agfa-Gevaert  
AIXTRON AG  
Applied Materials  
Canon  
CERADROP  
Conductive Inkjet Tech.  
Dainippon Screen Printing  
DEK Printing Machines  
Dialog Semiconductor  
FUJIFILM Dimatix  
Fuji Xerox Co.  
Goss International Americas  
Haiku Tech  
Hewlett Packard  
Hisense  
Johnson Laminating & Coat  
Kammann Machines  
KIWO  
Konica Minolta  
Landa Corporation  
MacDermid Printing  
MAN Roland  
Mark Andy, Inc.  
Merck Millipore  
Midori Mark Co., Ltd.  
MuTracx  
NovaCentrix  
NXT PLC  
Ohio Gravure Technologies  
PixDro BV  
Preco, Inc.  
Printcolor Screen Ltd.  
Printtechnologies  
Roth & Rau  
Schreiner PrinTronics  
Seiko Epson  
SiPix Imaging, Inc.  
SonoPlot  
Speedline Technologies  
ST Microelectronics  
Sung An Machinery  
Taiyo Ink Mfg. Co., Ltd.  
Thieme GmbH & Co.  
Tokyo Electron, Ltd.  
Toppa Printing Co.  
UniJet  
Universal Display Corporation  
Veeco Instruments  
Xaar  
Xerox Corporation

### Materials Companies

3M  
Advanced Nano Products  
Agfa-Orgacon  
Applied Nanotech  
Asahi Glass Co.  
Asahi Kasei  
BASF  
Beneq  
Blue Nano  
Cabot  
Cambrios  
Carestream Advanced  
Materials  
Cima Nanotech  
Corning  
Creative Materials  
Dai Nippon Printing  
DayStar Technologies  
Delta Optoelectronics  
Dow Chemical  
DuPont Microcircuit Mat.  
Eastman Kodak  
Electric Vinyl, Inc.  
Electronic Paper and Tech.  
elumin8  
Ercon  
Ferro Corp.  
FUJIFILM Holdings Corp.  
Fujikura  
Gwent Group  
H. C. Starck  
Heliatek GmbH  
Henkel  
Heraeus  
Hitachi Chemical  
Indium Corporation  
Infineon Technologies  
Inktec  
Int'l Solar Elect. Tech.  
Intrinsiq Materials  
Kimoto  
Konarka Technologies  
Kovio  
LG Philips LCD Co., Ltd.  
Liquid X Printed Metals  
Litrex  
Luminous Media, Ltd.  
MEMC Electronic Materials

### Materials Companies (cont.)

Microvision, Inc.  
Mirwec Films  
Nanogap  
NanoInk, Inc.  
NanoMas Technology  
Nissan Chemical Ind.  
Novaled AG  
Novalia  
Optomec  
ORFID  
OrganicID  
Ormecon GmbH  
OSRAM GmbH  
Plextronics  
PolyIC GmbH & Co. KG  
Poly-Ink  
QUALCOMM MEMS  
Samsung Electronics  
Soligie  
SouthWest  
NanoTechnologies  
Sumitomo Chemical  
Sun Chemical  
Toshiba Mobile Display  
ToyoChem  
ULANO  
Unidym, Inc.  
Vitrex Polymer  
Vorbeck Materials

### Solution/Integration Companies

Add-Vision  
Ascend Solar  
AVANCIS  
Aveso  
Blue Spark  
Bosch Solar  
Calyxo  
Cambridge Display  
Canadian Solar  
China Sunenergy  
Cymbet  
Durel

### Solution/Integration Companies (cont.)

E Ink  
eMagin  
Energy Conversion Devices  
Enfucell  
EV Group  
Evonik  
Excellatron  
First Solar  
Flexcell  
Front Edge  
Frontier Industrial Technology  
Fuji Electric  
G24 Innovations  
Global Solar Energy  
GSI Technologies  
Imprint Energy  
Infinite Power Solutions  
Innovalight  
ISORG  
Kaneka  
KSW Microtec  
Liquavista  
Memtron Input Components  
Nanosolar  
NRG Solar  
Ormet Circuits, Inc.  
PARC  
Parelec  
PChem  
Plastic Logic  
Power Paper, Ltd.  
PragmatIC Printing  
ReneSola, Ltd.  
Semprius  
Sensormatic  
Sharp Corporation  
Si-Cal  
SMARTRAC  
Solarmer  
Solar Frontier  
Solexant  
Solicores  
Sontor GmbH  
Sumation Co., Ltd.  
T-Ink, Inc.  
Terepac  
Thin Film Electronics

# Contract Manufacturing Opportunities in Printed Electronics- 2013

## List of Tables

Table 3-1 – Summary of US Industrial Printers by Application and Technology, 2011  
 Table 3-2 – Summary of PE Print Technologies by Performance Feature, 2012  
 Table 4-1 Worldwide PE Materials Market by Product, 2012  
 Table 4-2 - Worldwide PE Conductive Inks Market by Application, 2012  
 Table 5-1 Worldwide Electronics Assembly Market by Manufacturing Supplier, 2006-2011  
 Table 5-2 Worldwide Electronics Assembly Market by Supplier and Market Segment, 2011  
 Table 5-3 Worldwide Electronics Assembly Market by Supplier and Geographic Region, 2011  
 Table 5-4 - Potential Applications for PE Electrophoretic and OLED Displays, 2012  
 Table 5-6 Examples of Intelligent Packaging Under Development  
 Table 5-7 - Worldwide Packaging Market by Industry, 2012  
 Table 5-8 Worldwide Packaging Market by Material, 2012  
 Table 5-9 Worldwide PV Module Assembly Market, 2012  
 Table 5-10 Worldwide PE Assembly Market by Application, 2012  
 Table 6-1 Worldwide Electronics Assembly Market by Manufacturing Supplier, 2011-2016  
 Table 6-2 Worldwide Electronics Assembly Market by Supplier and Market Segment, 2011-2016  
 Table 6-3 Worldwide Appliance Assembly Market by Leading Supplier and Region (\$M), 2011

Table 6-4 Worldwide PE Appliance Assembly Market by Application (\$M), 2012-2017  
 Table 6-5 Worldwide PE Display and Lighting Assembly Market by Application (\$M), 2012-2017  
 Table 6-6 Worldwide Medical Assembly Market by Leading Supplier and Region (\$M), 2011  
 Table 6-7 Worldwide PE Medical Assembly Market by Application (\$M), 2012-2017  
 Table 6-8 Worldwide PE Packaging Assembly Market by Application (\$M), 2012-2017  
 Table 6-9 Worldwide PV Assembly Market by Leading Supplier and Manufacturing Region (\$M), 2011  
 Table 6-10 Worldwide PV Assembly Market for PE by Application (\$M), 2012-2017  
 Table 6-11 Worldwide PCB Assembly Market for PE by Application (\$M), 2012-2017  
 Table 6-12 Worldwide RFID Market by Component (\$B), 2012  
 Table 6-13 Worldwide RFID Assembly Market for PE by Application (\$M), 2012-2017  
 Table 6-14 Worldwide Textile Assembly Market for PE by Application (\$M), 2012-2017  
 Table 6-15 Worldwide Transportation Assembly Market for PE by Application (\$M), 2012-2017  
 Table 6-16 Worldwide Other Assembly Markets for PE by Application (\$M), 2012-2017  
 Table 6-17 Worldwide PE Market by Industry Segment (\$M), 2012-2017  
 Table 6-18 - Worldwide PE Assembly Market by Application (\$M), 2012-2017  
 Table 6-19 - Worldwide PE Assembly Market by Application Leading CAGR (\$M), 2012-2017

Published January 2013 - 287 Pages

## Order Form

### Payment Method

Check in the amount of \$ \_\_\_\_\_ is enclosed.

Invoice per P.O. # \_\_\_\_\_

Please charge: Visa MasterCard American Express

Card # \_\_\_\_\_ Exp. \_\_\_\_\_

Name On Card \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Telephone \_\_\_\_\_

Fax \_\_\_\_\_

E-mail \_\_\_\_\_

**Contract Manufacturing Opportunities in Printed Electronics, 2013 Edition (single user license - PDF)**

**\$2495**

**Add Extra Single User License (\$250 each) or Corporate License (\$1,000)**

**Returns:** No return privileges. **International Orders:** Must be prepaid, please contact us for payment arrangements.

### New Venture Research Corp.

337 Clay St., Suite 101

Nevada City, CA 95959

Tel: (408) 244-1100 Fax: (408) 864-2138

www.newventureresearch.com; kwilliams@newventureresearch.com

Subtotal

Add Excel Spreadsheet of all tables (\$750)

**TOTAL**