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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**
 - ◆ **Electronic Materials**

- **Printed Electronics Market Analysis, 2012**
 - ◆ **Leading Products and Applications**
 - ◆ **Analysis by 10 Industry Segments**

- **Printed Electronics Market Forecasts, 2012–2017**
 - ◆ **Forecasts for the 40 Top Market Applications**

- **Company Profiles (185 Leading Firms)**
 - ◆ **Equipment Suppliers**
 - ◆ **Materials Suppliers**
 - ◆ **Solution/Integration Suppliers**

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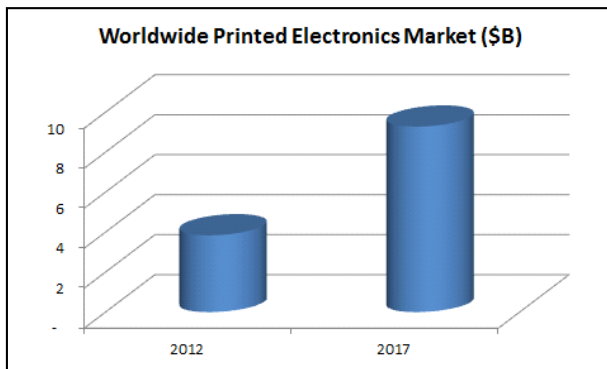
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Contract Manufacturing Opportunities in Printed Electronics - 2013

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 (EMS) market for more than 20 years. As a result of recent field research, **NVR** believes that PE will be a significant new opportunity for EMS companies given the technological developments that are now emerging.

The worldwide PE market is still embryonic in size but is expected to almost triple over the next five years as illustrated in the figure below.



This latest report, **Contract Manufacturing Opportunities in Printed Electronics - 2013 Edition**, is a comprehensive market analysis of emerging PE technologies by application, and leverages our in-depth database of contract electronics manufacturing services (EMS) suppliers with assemblies developed over the past two decades. EMS suppliers are in the best position to capitalize on these dynamic PE market opportunities, of which we have identified over 40 leading applications. PE has emerged into a standalone market of its own with clear economic and commercial advantages over traditional semiconductor electronics.

The most promising market applications are summarized below in descending order of growth over the next five years (the only period that technology can be reasonably forecast).

<u>Leading PE Applications</u>	<u>5-Year CAGR</u>
Transportation wiring replacement	126.6%
Transportation heating elements	110.6%
Appliance memory/logic/sensor/batteries	93.1%
Food/beverage packaging	83.7%
Beauty products packaging	82.9%
Photovoltaic emerging thin films	81.2%
Smart clothing heating and sensing	69.9%
Pharmaceutical smart packaging	45.3%
Transportation panels/modules control	42.9%
RFID memory/sensors/battery control	27.4%
Smart batteries/capacitors	25.6%
Blood glucose, EKG, EEC testers	21.1%

Chapter 3 analyzes the most popular organic and inorganic thin films being commercialized today. A discussion of the best kinds of PE manufacturing equipment such as screen and inkjet printers is also explored.

Chapter 4 analyzes the PE materials market which is mainly composed of silver flake, but also includes copper, gold, nanowires and other insulating dielectrics.

Chapter 5 discusses the leading PE product applications for 2012, with special focus on the emerging opportunity for volume contract manufacturing.

Chapter 6 forecasts the future market for 40 different PE product applications by volume and growth rate.

Chapter 7 analyzes the leading 185 PE companies by three categories – equipment manufacturers, advanced materials/thin film providers, and solution/integration firms.

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.

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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

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