

**Electronics Day
Nurember, 4th May 2011**

**Printed Electronics,
A new champion for Green Electronics ?**

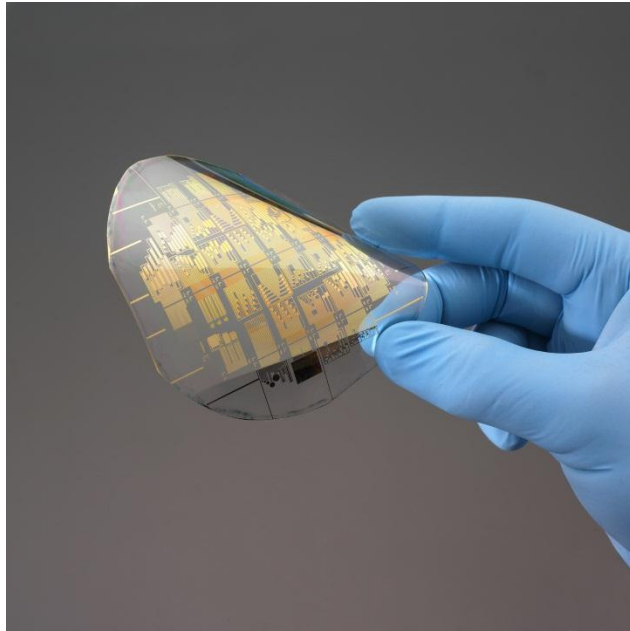


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Outline

- **Company introduction**
- **Printed & Organic Electronics market & technology overview**
- **Organic photonic sensors applications & markets**



ISORG, the pionner company of organic photonics

- ISORG : acronym de Image Sensor ORGanic
- Based in Grenoble (France)
- Created in May 2010 by three founders with track record in high-tech industry
- Spin-off of the CEA Grenoble Nanomaterials Laboratory
- ISORG transforms plastic and glass into smart surfaces
- ISORG is the pionner company for high performance and large area photo detectors and image sensors in printed and organic electronics



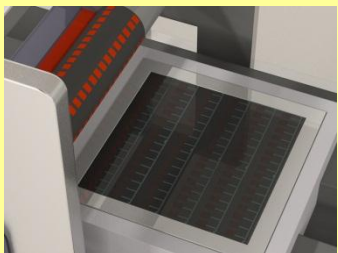
Moving from R&D to products & markets



Materials : Organic Chemistry Industry



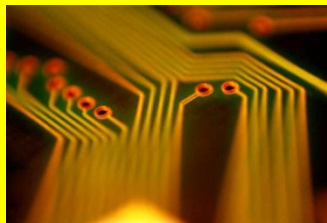
R&D partner : CEA-LITEN Lab



Printing Equipment Suppliers



Business Development



Device Design & Application



Industrial production



Consumer Electronics



Industrial



Device Integration








OEMs



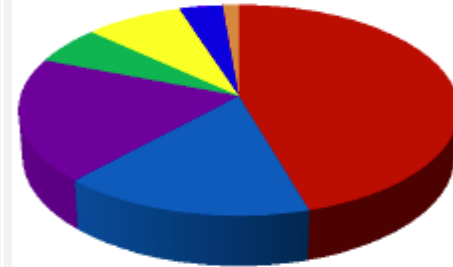
Photo and organic electronics, already a significant market

The market for printed & potentially Printed Electronics in 2011: **\$2.2 Billion**

BUT most are not printed and are on glass today

-  OLED Displays \$1 Billion. Vacuum processed on glass. Mainly Cellphones.
-  Photovoltaics \$360 million. Includes only CIGS, OPV, DSSC Most are CIGS – vacuum processed on glass
-  Other inks: \$420 million. RFID tag antennas, membrane circuits, bus bars etc. Excludes ESD/RF Shielding
-  Sensors: \$130 million. Glucose test strips, ECG sensors, touch screens
-  E-paper displays \$180 million. E-readers
-  Inorganic AC Electroluminescent displays \$80 million. Signage, Promotional items, Consumer electronics
-  Others \$30 million. Printed Batteries, Logic, Memory, Electrochromic displays...

Not Printed

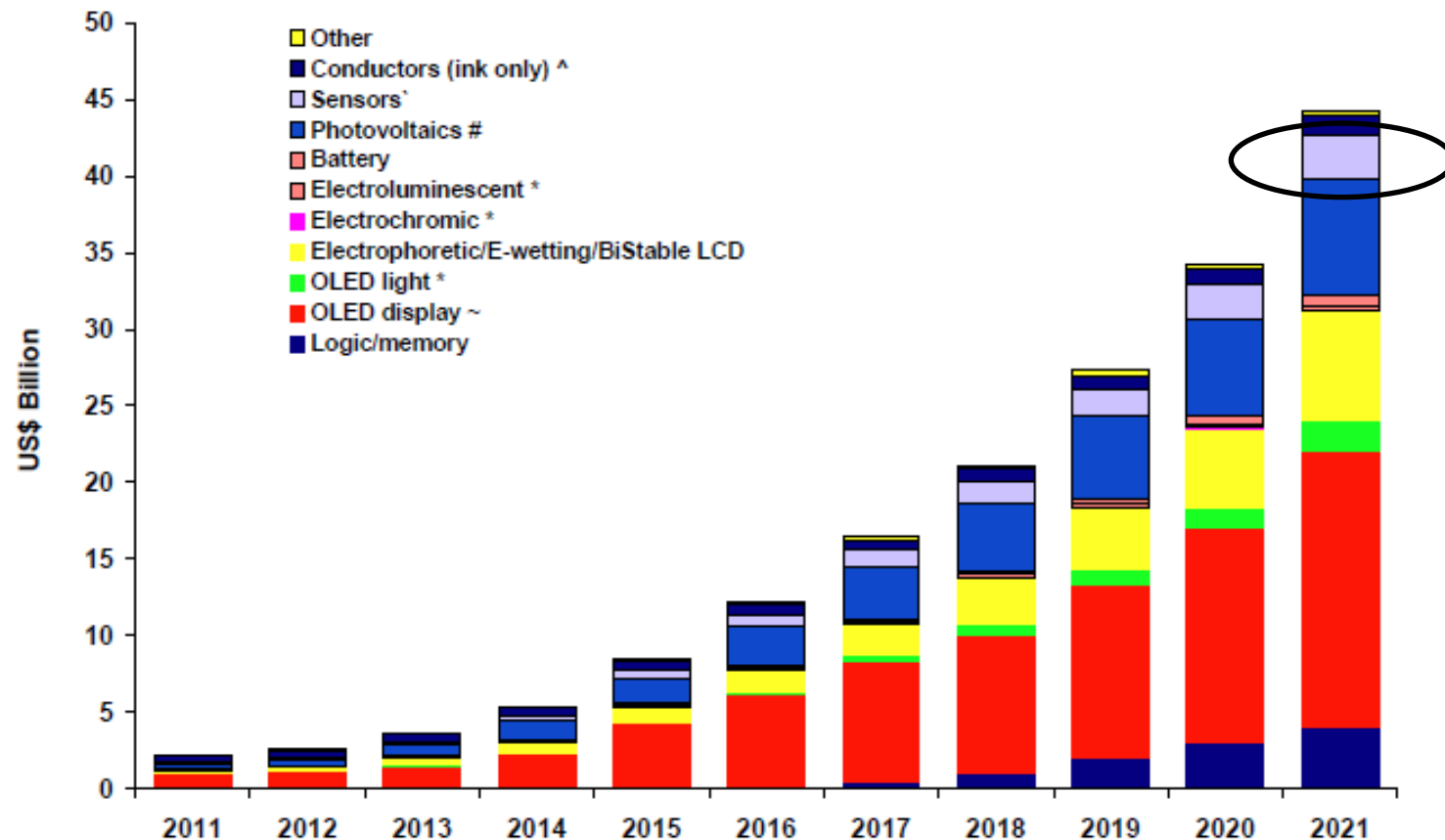


Mostly Printed

Source : IDTechEx

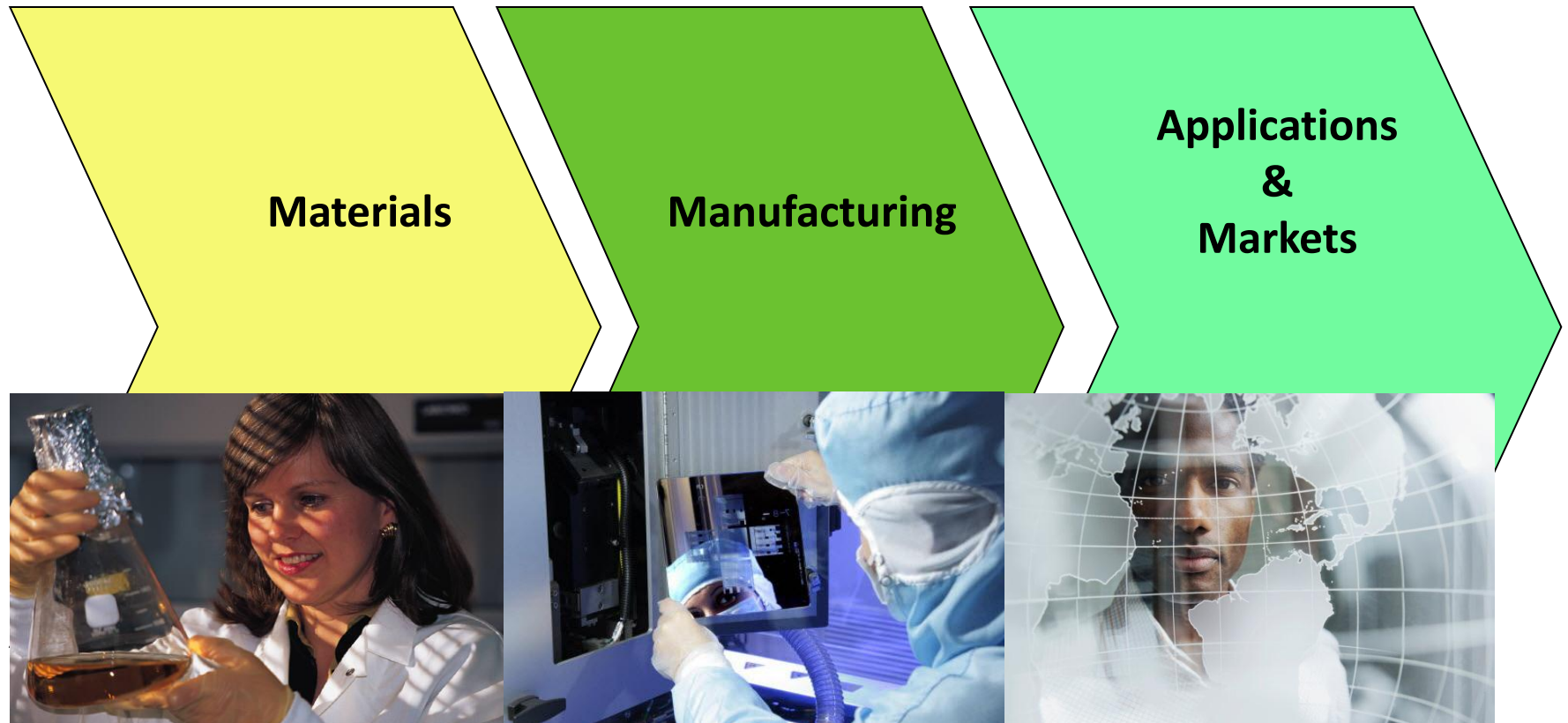
A booming market

IDTechEx 2011-2021 Forecast



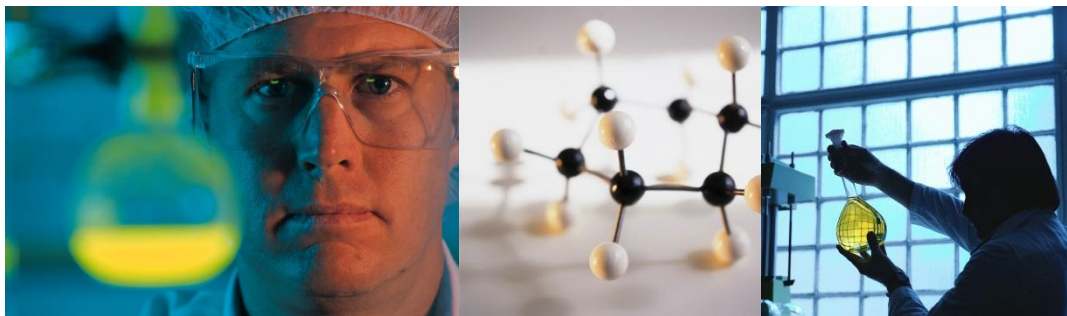
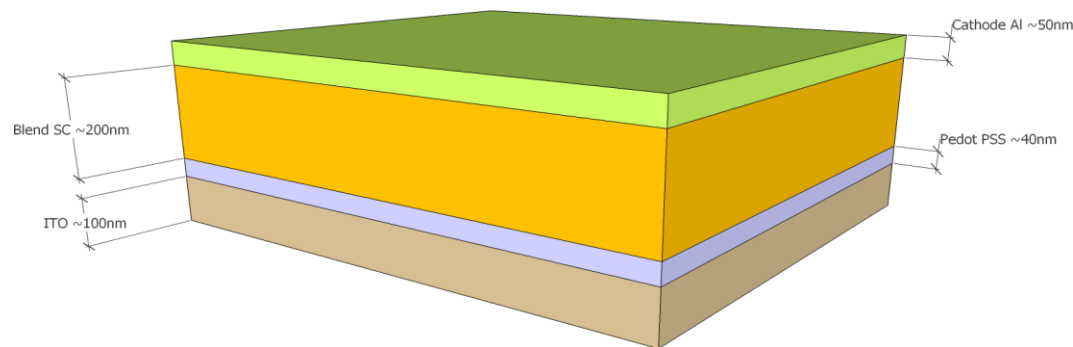
A new champion for a green electronics ?

- Sustainability all along the value chain



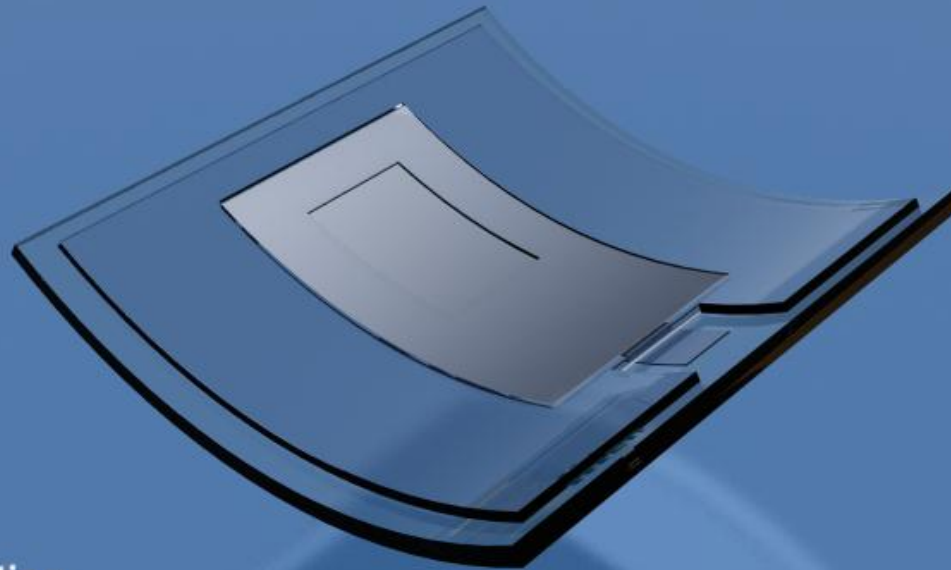
Organic electronics

- Solution processable conductor and semi-conductor materials from organic chemistry industry
- Non toxic materials
- Recyclable materials
- Very small quantities (1g/m²), 10 – 100nm thickness layers
- Plastic and glass substrates



Organic photo detector

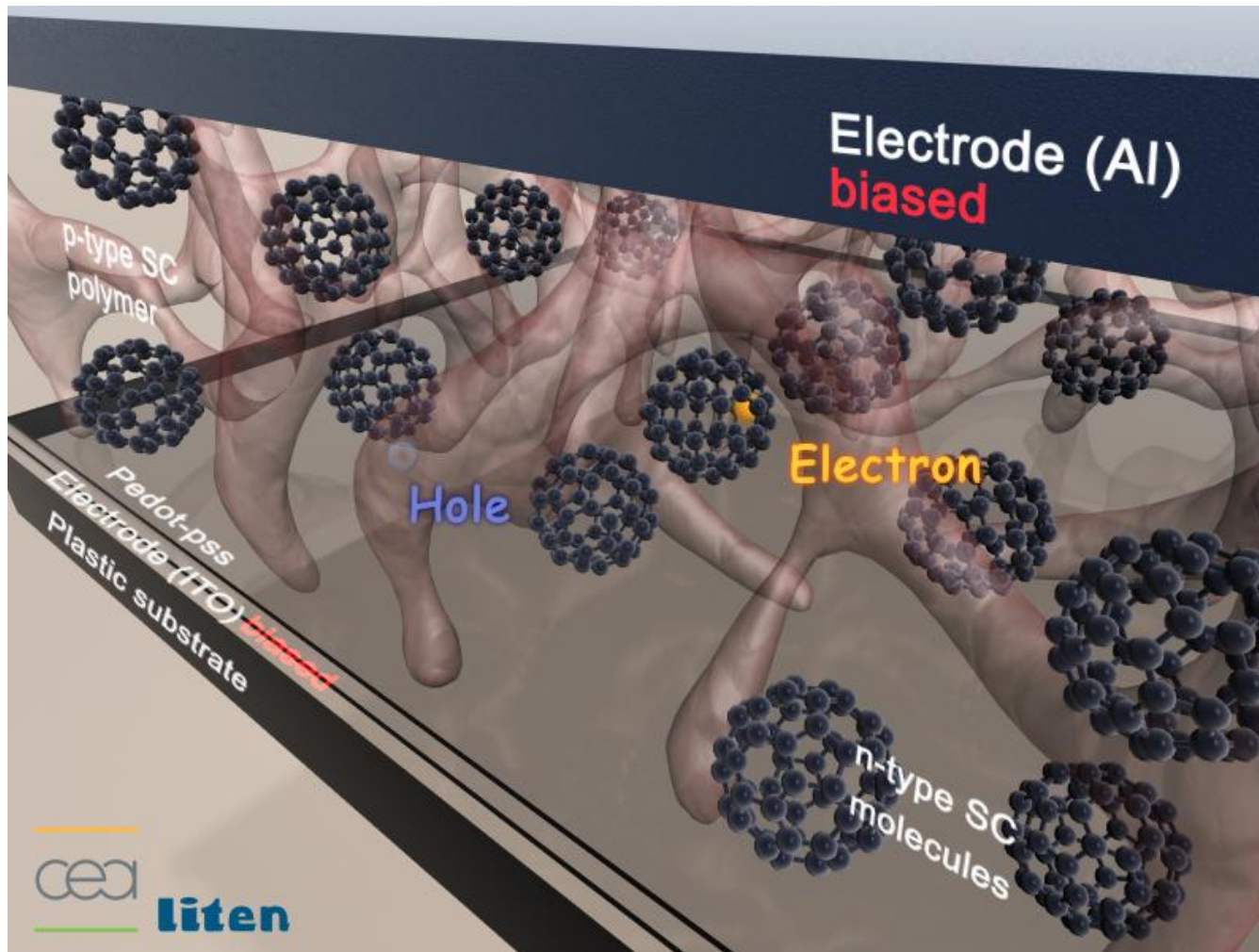
Organic photodiode : structure



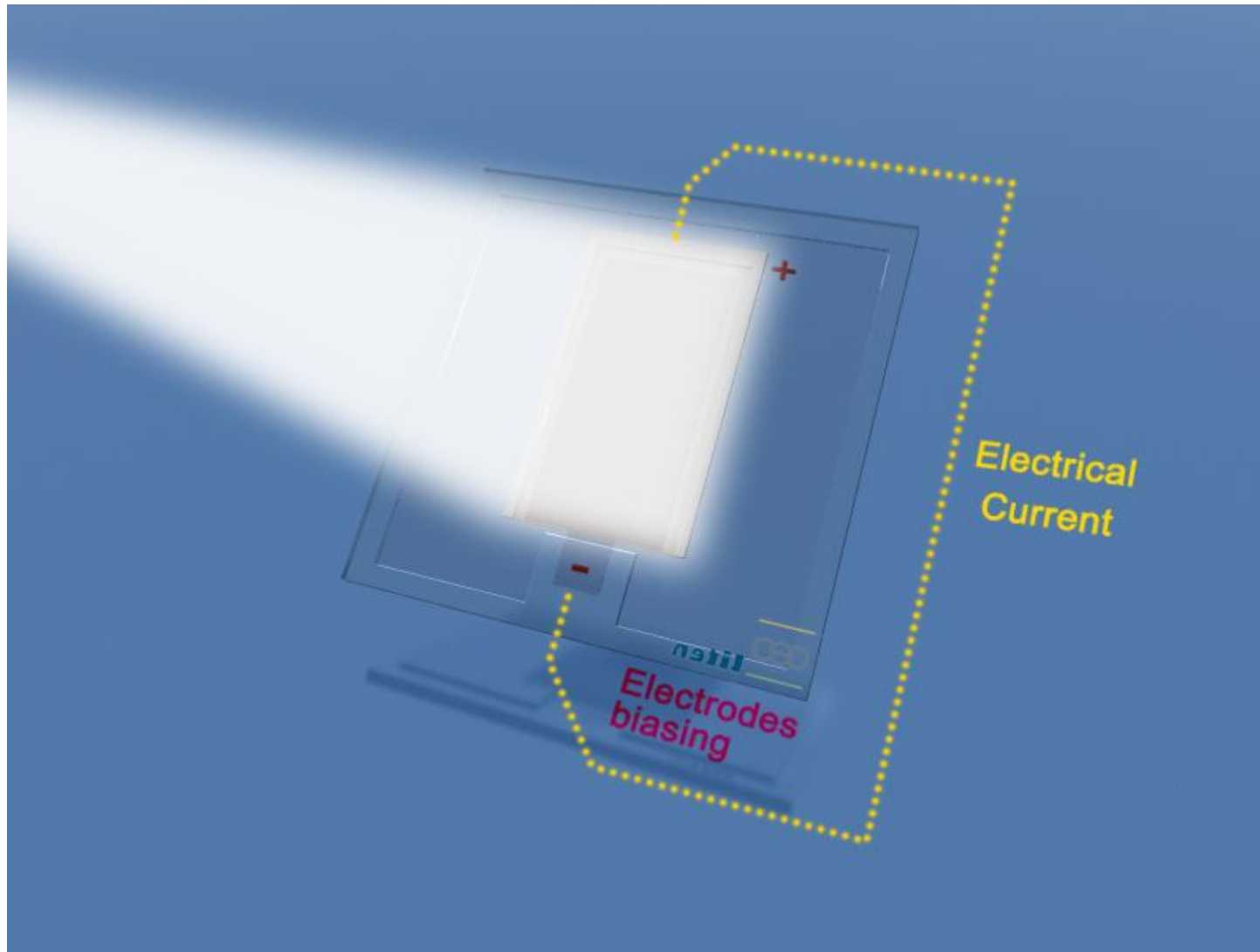
Passivation
Electrode (Al)
Organic active layers
Pedot-pss
Electrode (ITO)
Plastic substrate

Organic photo detector

- Bulk heterojunction : blend of semiconductor materials

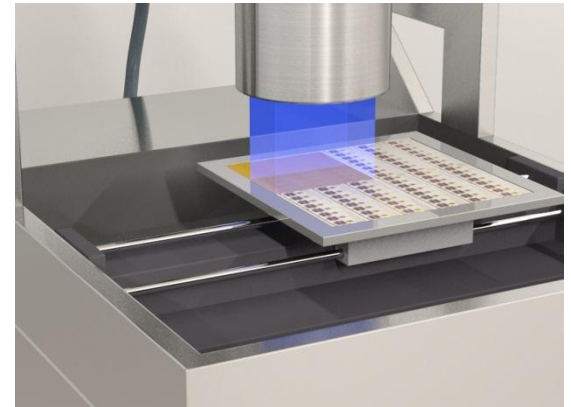
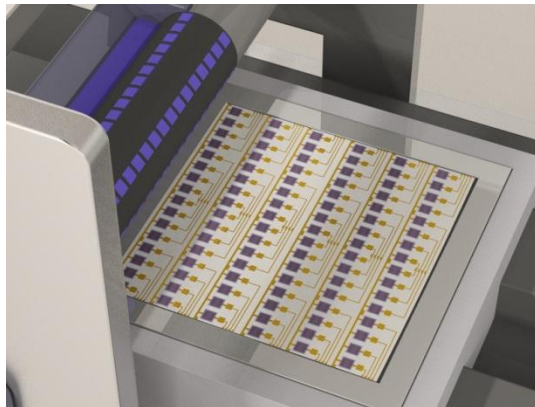
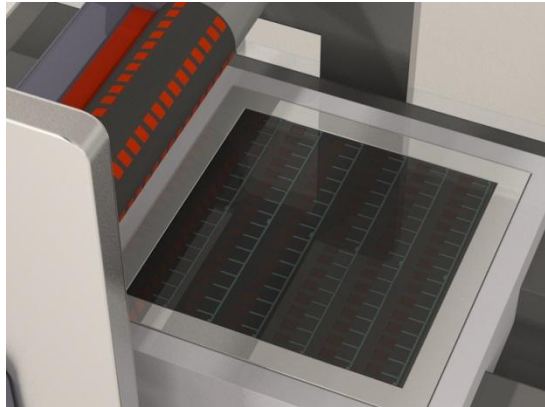


Organic photo detector



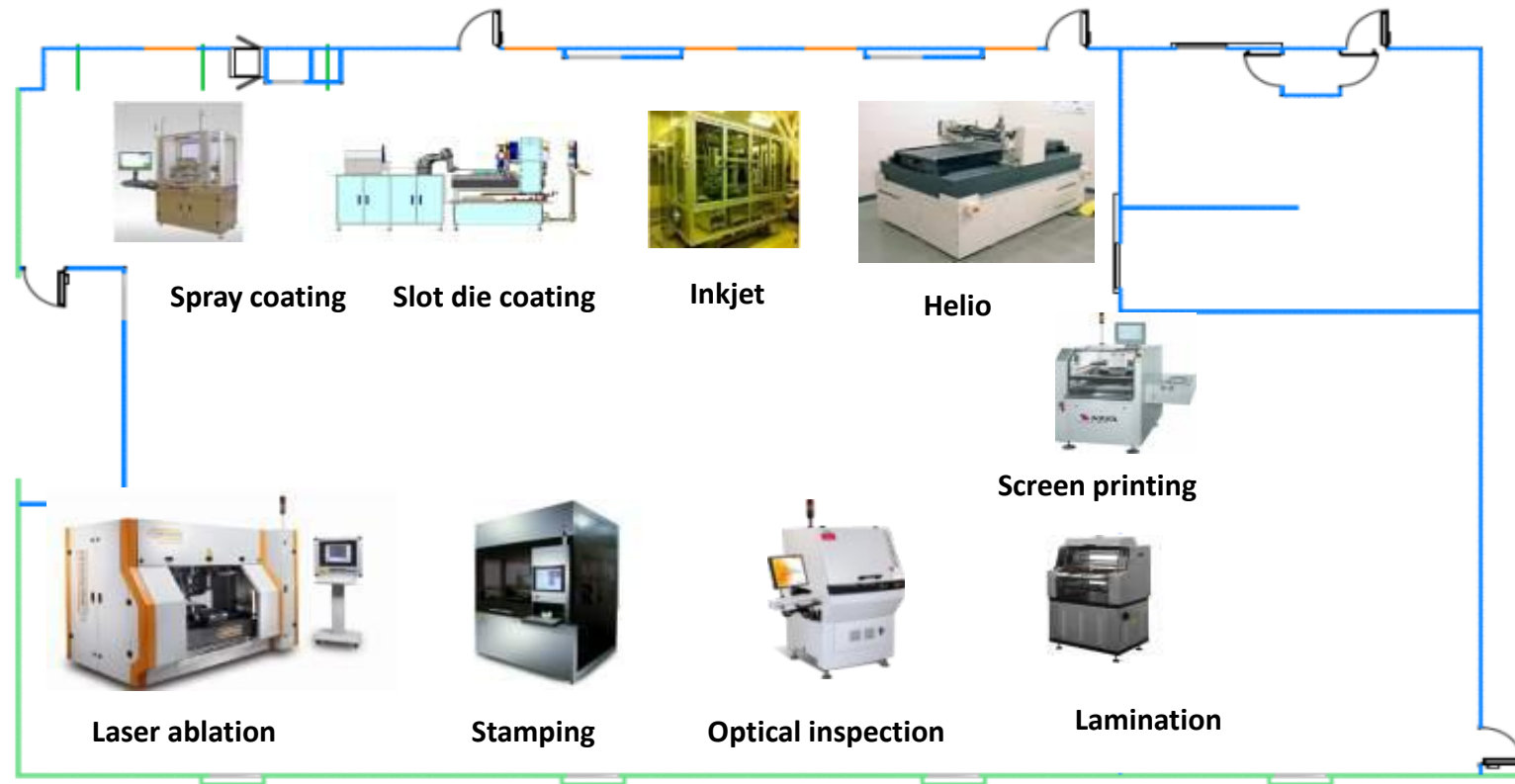
Printed electronics

- High throughput and large area printing and patterning equipments
Typically, inkjet, screen-printing, flexo
- Mainly additive process, a few steps of process
- Air and temperature ambient manufacturing process solutions selected by ISORG
- Low CO2 footprint facilities, 10 000 clean room



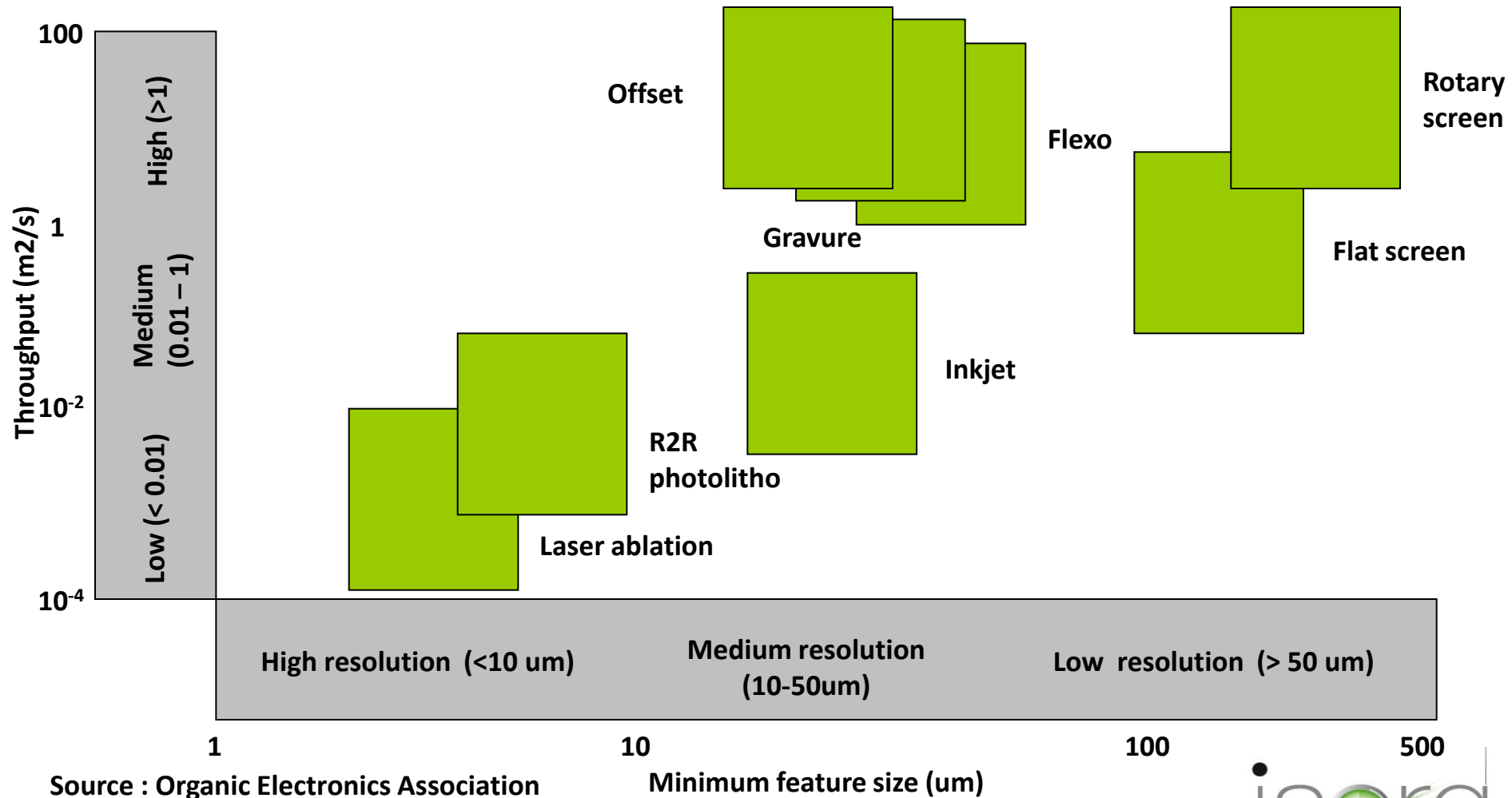
Printed electronics

- 400m2 Grenoble PIC TIC pilot line for printed electronics



Printed electronics, large area patterning

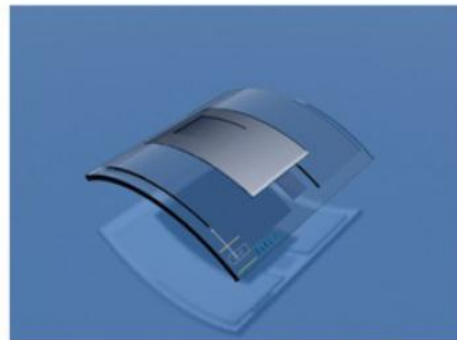
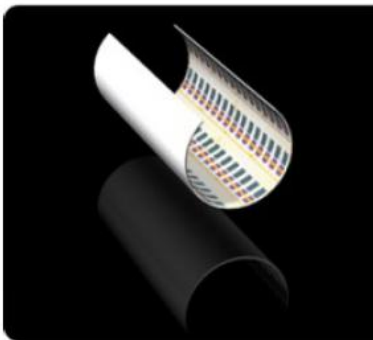
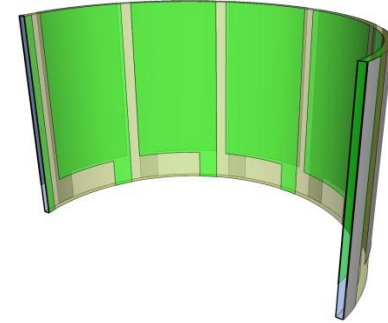
- Smallest feature size typically 20-100µm depending on throughput, substrate and ink



Source : Organic Electronics Association

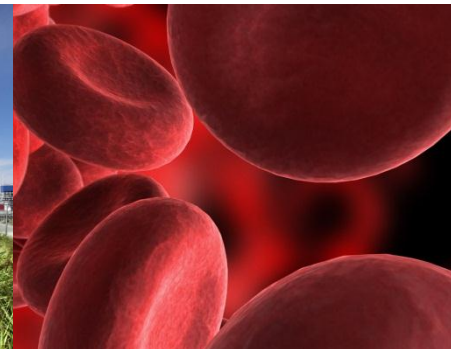
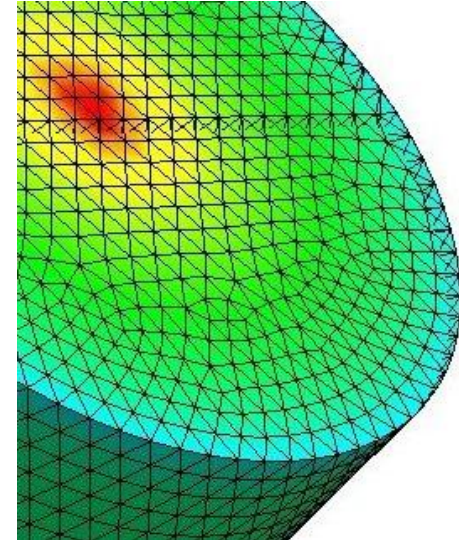
A new class of electronics for innovative product design

- Plastic and glass substrates
- Flexible
- Thin
- Transparent
- Capability of specific sensor design (form factor / shape)
- Enabling new and exciting innovative functionalities for a large range of markets not possible with traditional electronics



Serving a greener world

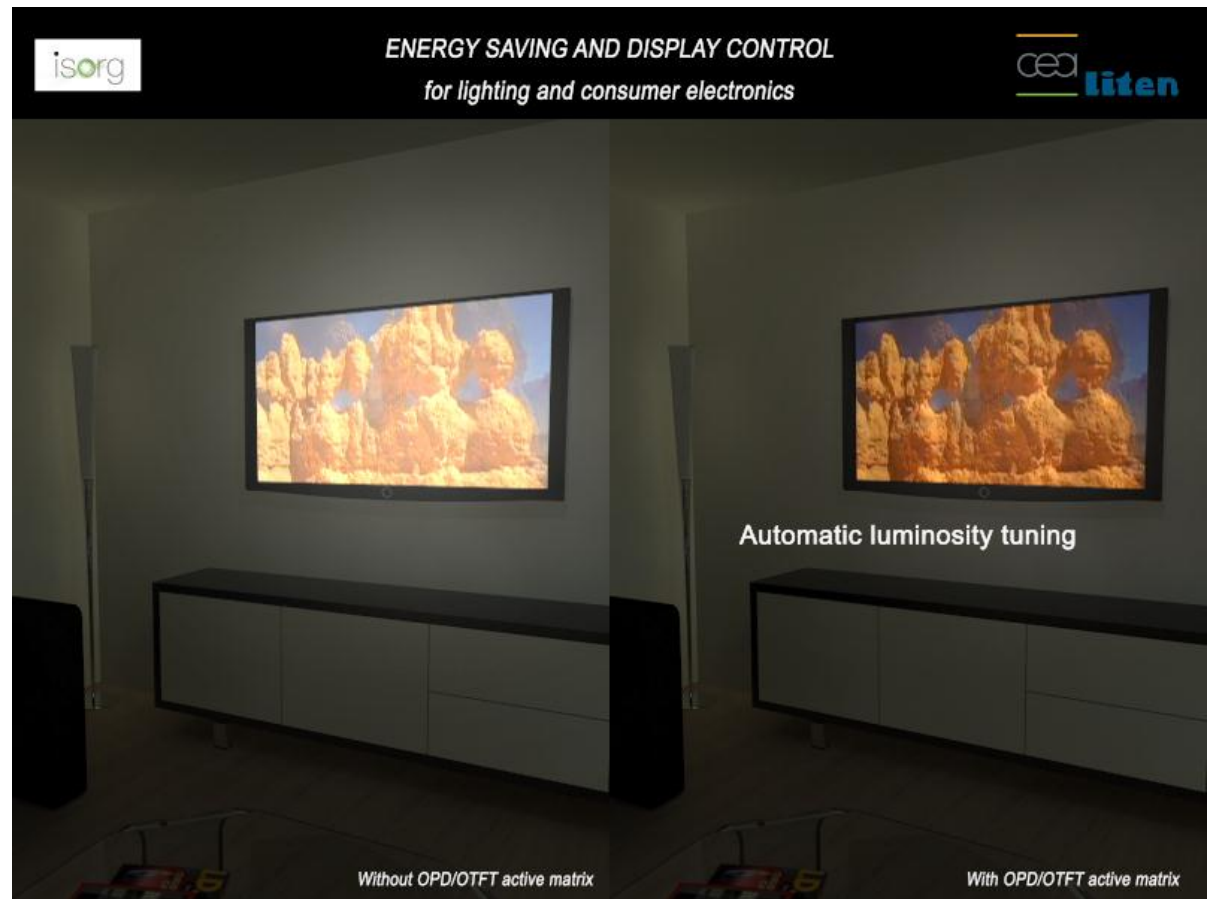
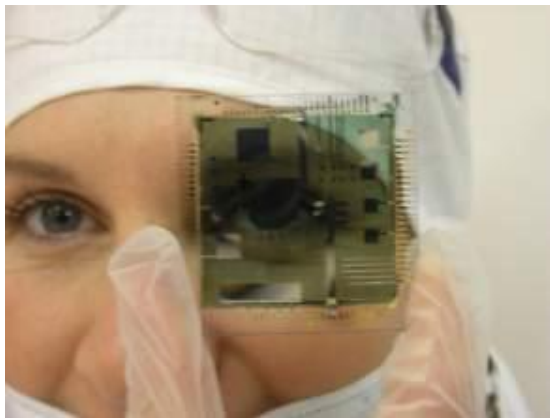
- Optical sensors for industrial process control and fluid monitoring (water, gas)
- Reduced material consumption
- Improved product quality
- New product development and services
- Pharmacy & Biotech industry
- Water management industry
- Energy industry
- Food industry
- Semiconductor & display industry



source : istockphoto

Energy saving for consumer electronics

- Optical sensors for ambient light monitoring
- Consumer electronics displays
- Smart lighting



Thank you for your attention !

