

# Capital Market Days 2011

## August 23 - 24

Oerlikon Advanced Technologies  
Andreas R. Dill

August 24, 2011



**1** Did you know?

**2** Technological Leadership

**3** Markets & Customers

**4** Operational Excellence

**5** Tactics & Financials

**6** Summary

# Did you know?

## Solaris



Highest productivity tool for crystalline photovoltaics and other clean tech applications

## Cell Phones



Most cell phones see, hear or transmit through thin films produced with Oerlikon technology

## Harddisks



Today 50% of all read/write heads for hard disks use Oerlikon thin film technology

# Did you know?

Play Station



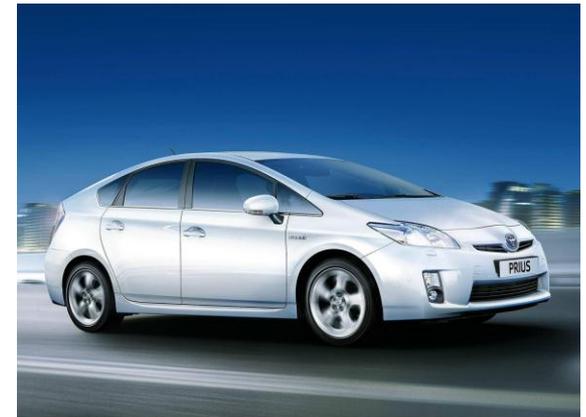
More than 80% of all microprocessors work with Oerlikon technology.

Solar Modules



Leading manufacturers use Oerlikon Systems for high volume production of crystalline solar cells.

Energy saving



Energy efficient hybrid cars and power supplies for any electrical appliance depend on power devices manufactured with Oerlikon high volume production technology

- 1 Did you know?
- 2 Technological Leadership
- 3 Markets & Customers
- 4 Operational Excellence
- 5 Tactics & Financials
- 6 Summary

# Oerlikon Advanced Technologies operates in three main markets and serves as R&D incubator for the Oerlikon Group

## Semiconductors



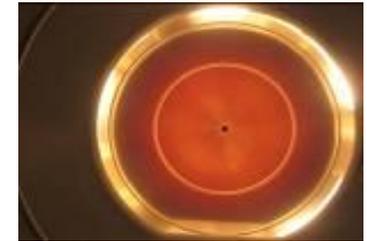
## Optical Disc



## Advanced Nanotechnology



## R&D Incubator for Oerlikon



### Products

- Clusterline 200/300
- LLS

- Sprinter, Swivel, CubeStar

- Solaris

- R&D Pilots and Demonstrators

### Applications

- Adv/3D Packaging
- Thin Wafer and Multi-Level Metal
- LED lighting
- TFH, MEMS, NEMS
- Compound Semi

- Blu-Ray Media
- All DVD formats

- Photovoltaics
- Touch Panels
- Thermoelectric generators

- Energy conversion
- Energy storage
- Energy efficiency management

### Strategy

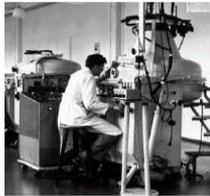
- Differentiation with superior technology in selected markets

- Focus on Blu-Ray Recordable

- Clean Technology

- Incubator

# Core competence in and proven 50+ year track record of creating new businesses by industrializing thin film coating applications



R&D facility focused on thin film coatings established in Balzers, Lichtenstein



First sales of optical disc (CD) metallizers in early 1980s



Focus area on Semiconductors established in late 1980s

**oerlikon**  
systems



Focus area on industrialization of nanotechnologies launched



Hexagon for Advanced Packaging

1946

1950s

1970s

1980s

1994

2005

2008

2009

2011

Balzers Coating emerges based on coating services business model



Merger with Leybold AG - selected Balzers businesses divested

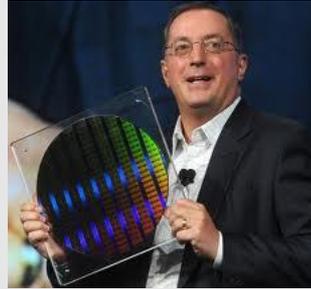
Establishment of new business based on thin-film photovoltaics



**oerlikon**  
solar

**oerlikon**  
balzers

## Advanced Packaging



High productivity processes meet the highest reliability requirements for the last process step on the wafer level

## Energy Efficiency Management

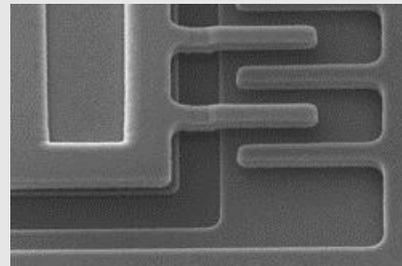
## Power Devices LEDs



Best in class temperature management for stressfree metallization films on wafers thinner than 100µm without carrier  
Best Cost of Ownership tools for various process steps in LED manufacturing

## Energy Efficiency Management

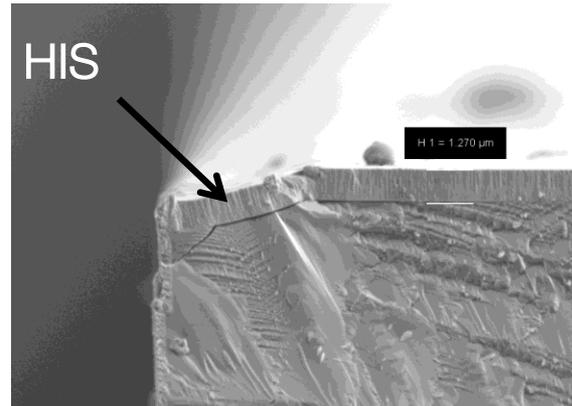
## Micro Electro Mechanical Systems



Superior material performance data for high volume production (e.g. 1,5x the piezoelectric deformation factor than any other process)

## Highly Ionized Sputtering source

- Best performing PVD films for hard coatings (denser, thinner, longer lifetime)
- 3 dimensional coatings of nano structures for Semiconductor applications



## PECVD Technology for Solar

- PECVD is the key technology for Thin Film Solar applications
- R&D reactor improvements with increased rate
- 3 dimensional coatings of nano structures for Semiconductor applications like Advanced Packaging (3D)



# Hexagon for Advanced Packaging Market

Semiconductor equipment to significantly outperform on performance and price

## Highest Productivity

- Integration of best existing high throughput (Solaris), high film performance concepts, and components (sources, wafer chucks)
- Highest maintenance free production time
- Reduced footprint, improved availability and throughput

## Lowest risk for customers

- Main process components used in previous platform
- Production proved indexer type handling concept
- Minimum process requalification

## Lead time reduction

- Meets requirements of shorter investment cycles
- Reduced installation and production ramp up time

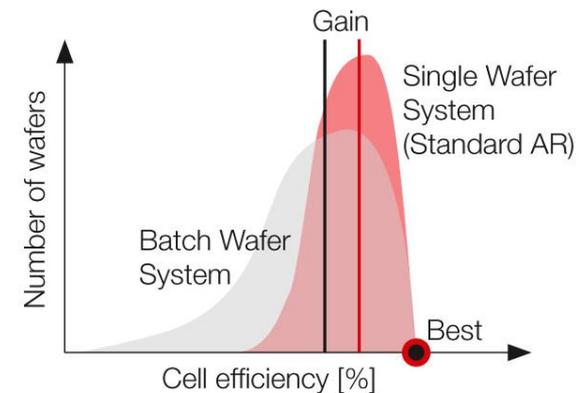
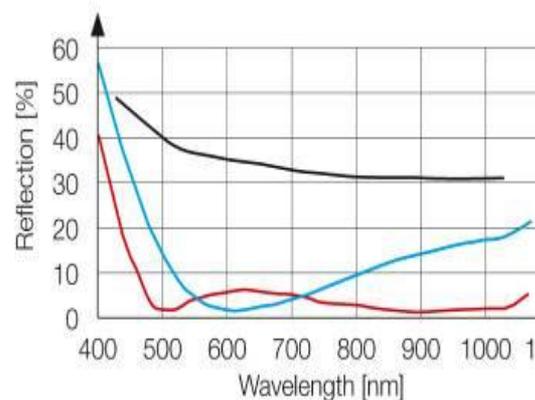
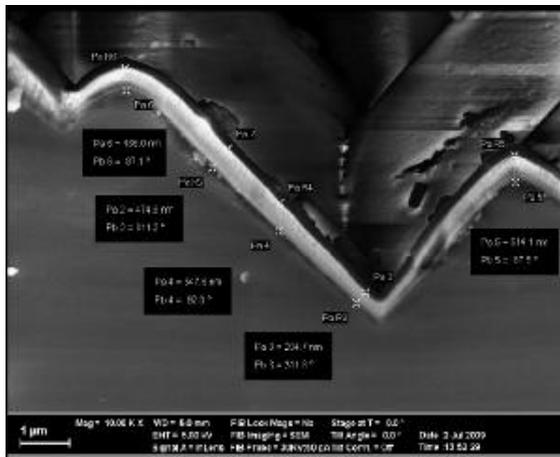
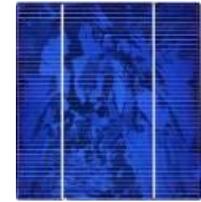
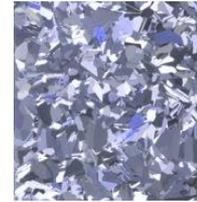
## Ready for the future

- Next generation products already qualified



# Technological leadership in crystalline PV: PVD for Antireflective Coatings

- Single and Multi Crystalline Substrates
- Solaris for antireflective coating with PVD
- This layer serves to limit reflection of incident light and maximize that which enters the device itself
- Surface defects on the wafer itself are also passivated by the hydrogen involved in the film growth process

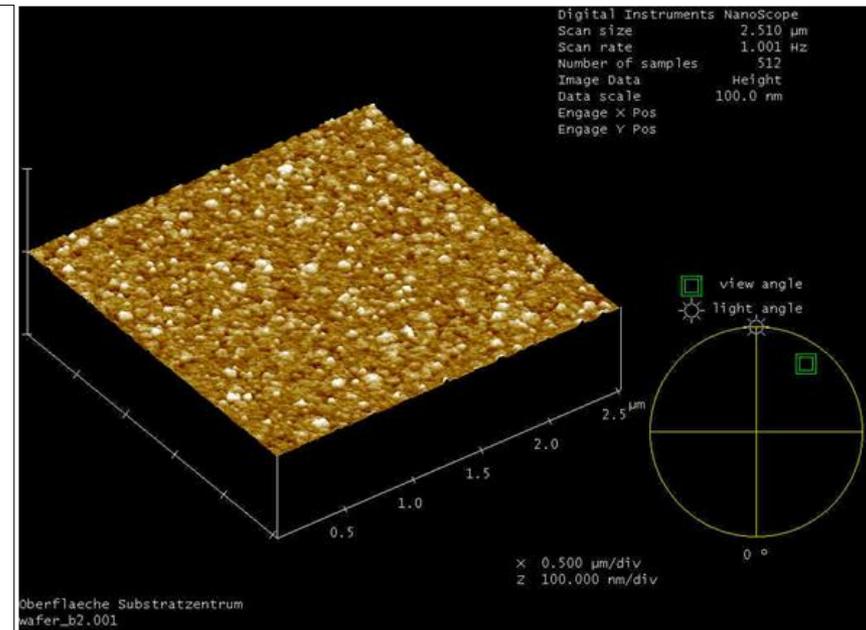
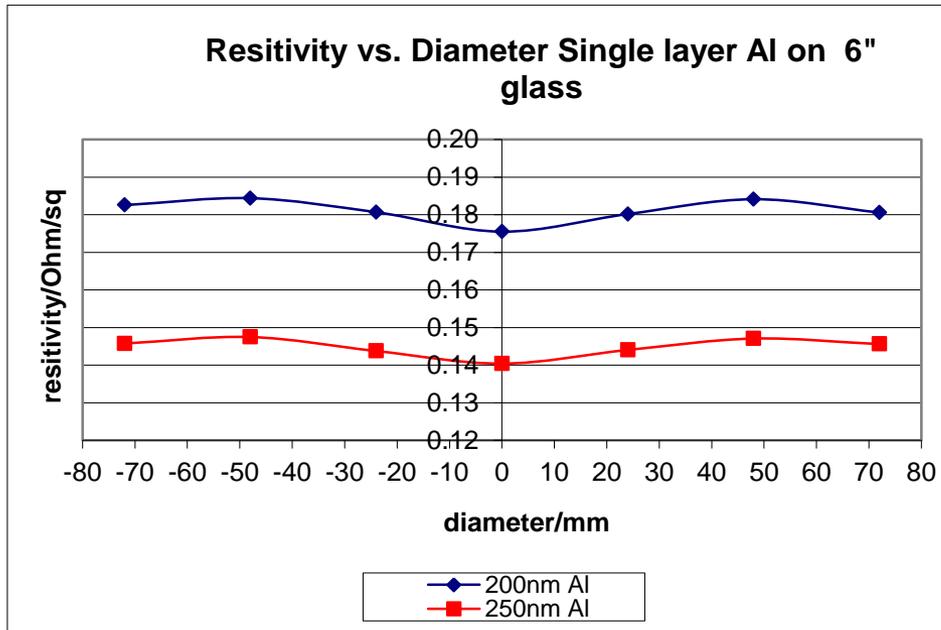


Improvement of cell efficiency by layer stacking

# Technological leadership in crystalline PV: Higher Efficiency Cells

## High flexibility for advanced cell concepts

- ITO layers for Hetero Junction Cells
- Backside metallization
- Metal-wrap-through (MWT) and Emitter-wrap-through (EWT)



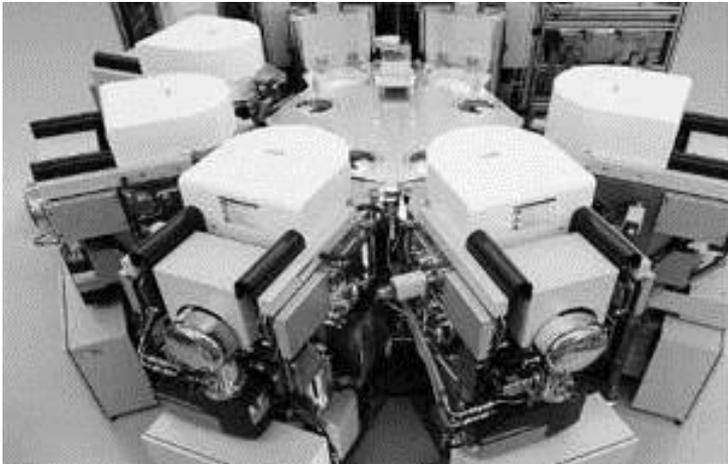
Excellent homogenous ITO layer w/o spikes

# Agenda

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- 3 Markets & Customers**
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# Key products and applications Semiconductor

## Key Semi Products / Systems



CLUSTERLINE Platform (CLN 200, CLN 300)



LLS EVO II

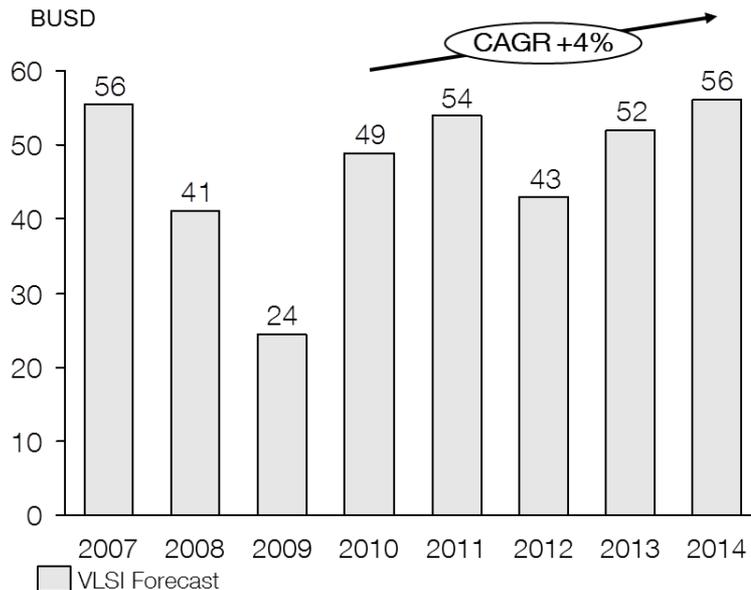
## Application examples

Segment	Application
Compound Semiconductors	 <ul style="list-style-type: none"> <li>▪ Solid State Lighting</li> <li>▪ LED, Laser</li> </ul>
Compound Semiconductors / Advanced packaging	 <ul style="list-style-type: none"> <li>▪ SAW-, BAW filter</li> <li>▪ Wireless Appl.</li> </ul>
Thin Film Head MEMS	 <ul style="list-style-type: none"> <li>▪ Thin Film Heads in HDD</li> </ul>
Advanced packaging	 <ul style="list-style-type: none"> <li>▪ Microprocessors, memory</li> </ul>
Thin Wafer and Multi-level Metallization / MEMS	 <ul style="list-style-type: none"> <li>▪ Power Devices</li> <li>▪ Sensors and Actuators</li> </ul>

## Semiconductor Equipment Market

## Strong Position in

Industry Indicator: Equipment Market VLSI (June 2011)



- Device stacking (3D) will push the Advanced Packaging market volume to USD 1bn by 2016
- Energy Efficiency: Oerlikon has a very strong position with key manufacturers for Power devices and LED's
- Information and data exchange and personal computing storage capacity requirements ensure solid growth in the harddisk market

# Customers served in Semiconductors

## Advanced Packaging



ASE INC.  
KAOHSIUNG



Never stop thinking



## Thin Wafer and Multi-Level Metallization



numonyx™



founded by Philips



Never stop thinking

## Thin Film Head MEMS



## Compound Semiconductors



# BD Recordable: Manufactured on Systems Metallizers

All major brands rely on Systems Sprinter to produce the critical layer stack

**Panasonic**

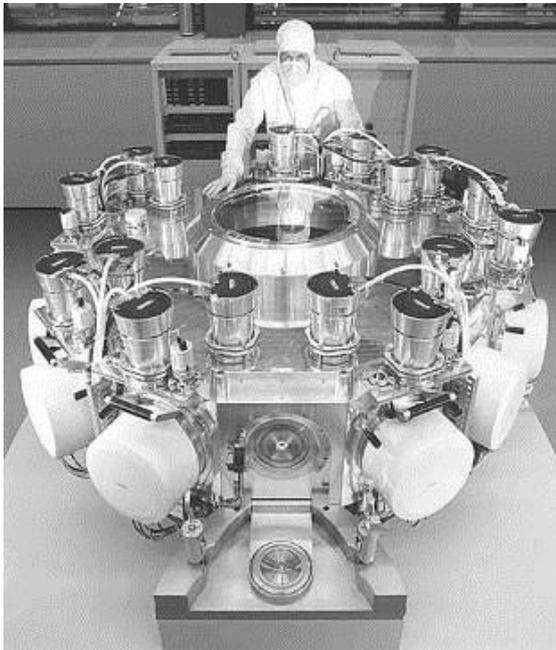
**TDK**

**SONY**

**Verbatim®**

**PHILIPS**  
sense and simplicity

**JVC**

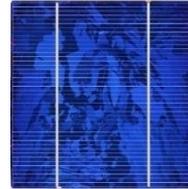


**SPRINTER**

# Advanced Nanotechnology as building block for innovations

## Energy Conversion

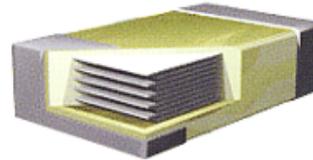
- Solar cells
- Thermoelectric generators
- Energy Harvesting



## Energy Storage

- Thin Film Batteries
- Fuel cells \*
- Micro fuel cells \*

\* under evaluation



## Energy Efficiency Management

- Touch screens
- OLED, SSL
- MEMS / NEMS
- Micro Sensors



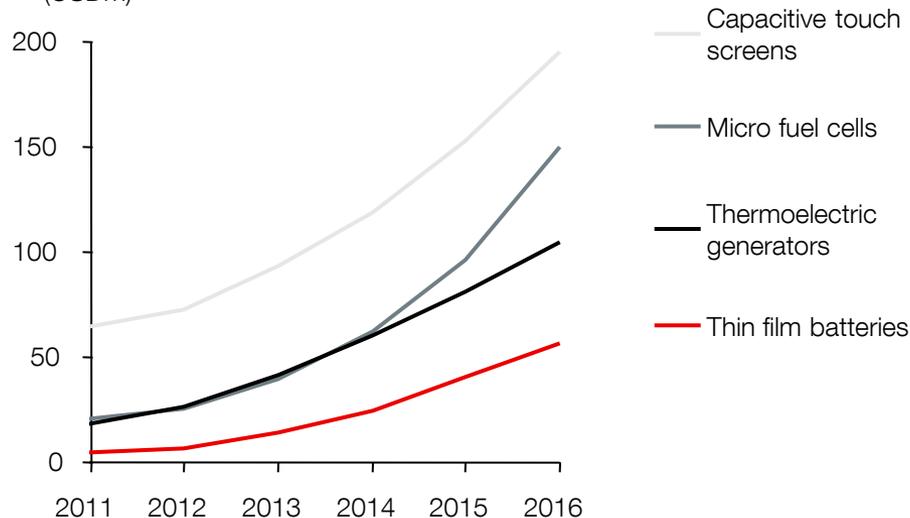
Solaris



# Growth drivers: Clean energy and technology leadership

## Advanced Nanotechnology Equipment Demand

Equipment Market  
Forecast  
(USDm)



### Sources:

- Capacitive Touch Panels: iSupply
- Micro Fuel Cells: EET
- Thermoelectric Generators: O-Flex
- Thin Film Batteries: ST Microelectronics

## Comments

- Three main drivers are behind the increasing demand for clean and small/lightweight energy:  
(1) increasing environmental awareness of energy consumers,  
(2) government subsidization of clean energy solutions, and  
(3) a trend toward smaller and more independent energy supplies for hand-held and other mobile electronics
- Consumer electronics and energy companies face intense competition, making operational excellence and energy efficiency a must

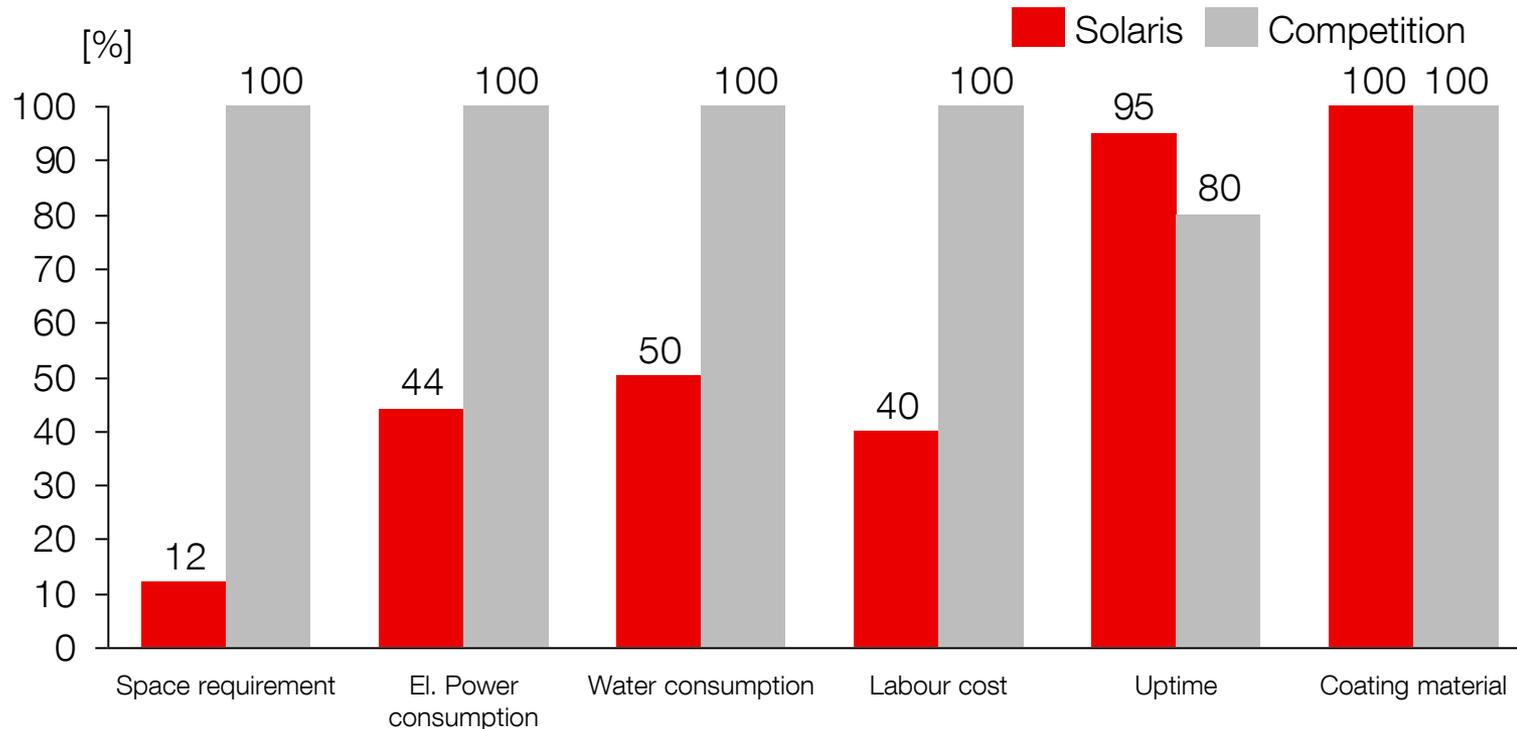
# Solaris for crystalline photovoltaics

Silane-free PVD process solution  
for crystalline solar cell manufacturing



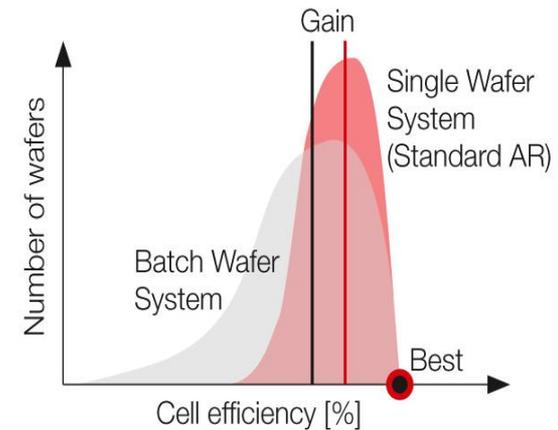
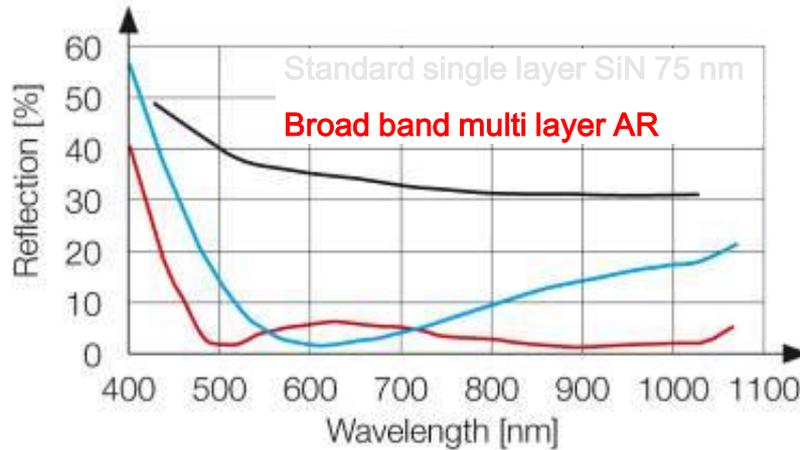
- Lowest Cost of Ownership (CoO)
- Processes: Anti-reflective-coating (ARC) / Passivation / Back Side coating, transparent conductive coating (ITO)
- Higher cell efficiency possible due to multilayer capability
- Easy automation and flexible production
- Lowest maintenance and efficient operation
- Silane-free

# Solaris for crystalline photovoltaics



## Lowest Cost of Ownership and highest yield

- > 95% Uptime / scheduled preventive maintenance less than 60 min/week
- > 99% Yield
- 80% less footprint required
- 50% less energy consumption
- Productivity: 1200 wafers/hour



## Increased cell efficiency and process stability

- Multi-layer broadband coatings increase cell efficiencies
- + - 2% layer uniformity within one wafer, 2.5% wafer to wafer
- Smallest spread between average and best cell efficiencies
- Better process reproducibility as compared to batch due to single wafer process

# Video Solaris



Best Supplier Award from world's largest Advanced Packaging foundry ASE (2009 and 2010)



- Awarded exclusively to 1 supplier each year for overall support and technology achievements.
- 2<sup>nd</sup> year ASE has established this award

VLSI 5 Star Award (2009 and 2010)



- Awarded to only 11 companies in 2010 (Dec 1, 2010)
- CoO, Quality, performance, technical leadership and overall customer satisfaction

VLSI 10 Best Award Number One Position



- High Build Quality
- Field engineering support
- Product performance
- Commitment to meeting customer's needs

Best PV Tool Solar Industry Award 2010



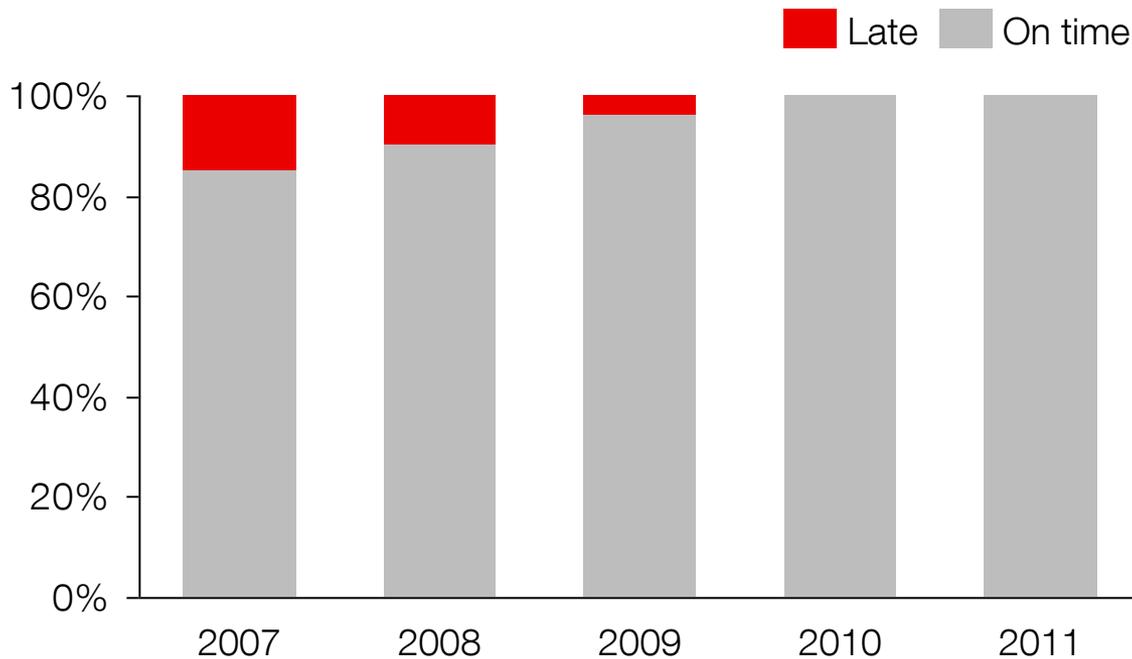
- Winner was selected by entire PV industry (vote by users, analysts and editors)
- 40% lead over runner-up

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# Business Excellence

## OTD to Customers



- All year-to-date System deliveries on-time as promised to the customer
- Last late system delivery was in April 2009

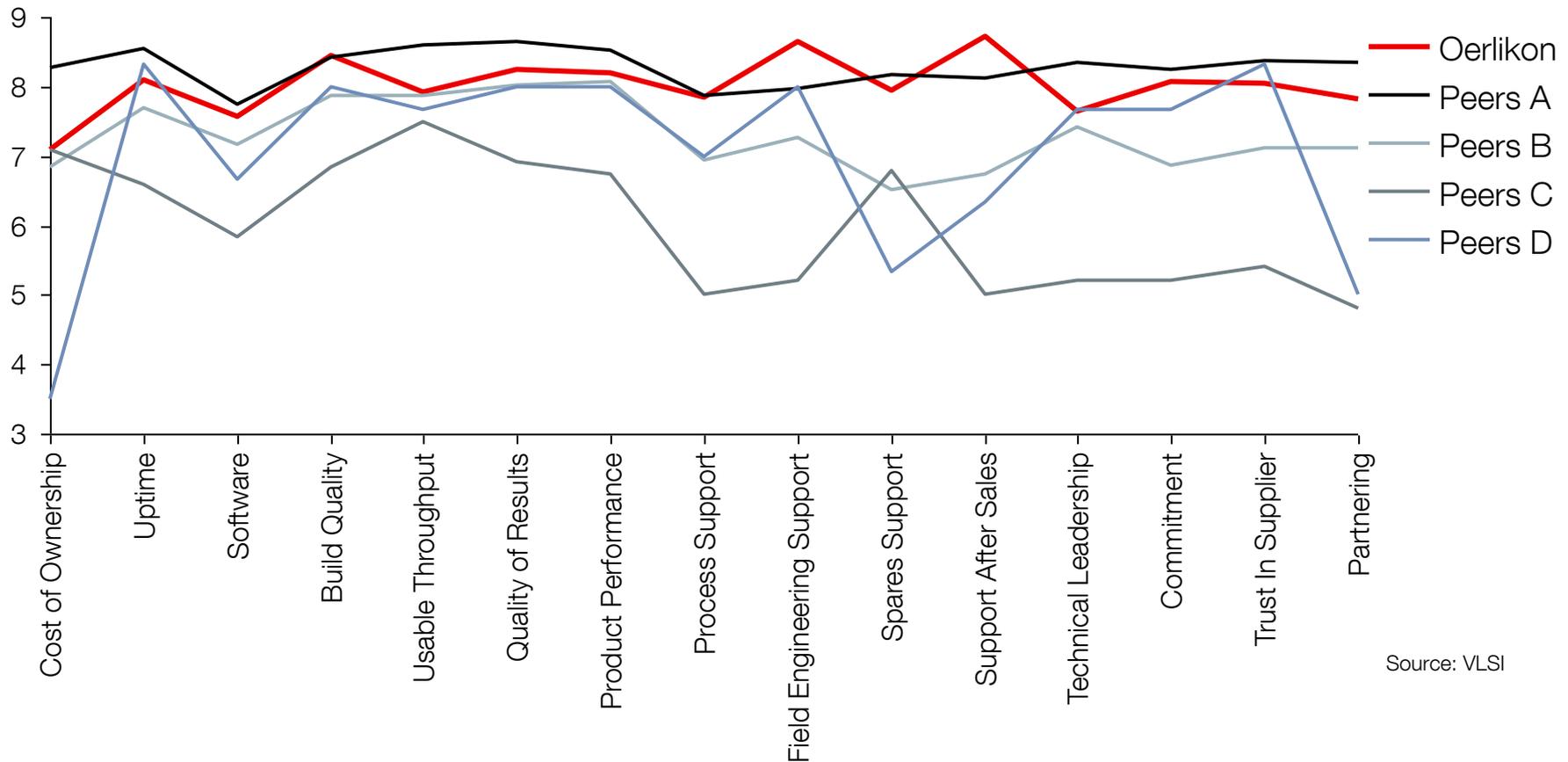
Installed processes:

- Weekly cross-functional planning meetings for projects and retrofits
- Weekly detailed task tracking meetings for all critical projects

# Business Excellence

## Peer Comparison – Quality Leader among main competitors

Customer Satisfaction for Deposition Equipment



Source: VLSI

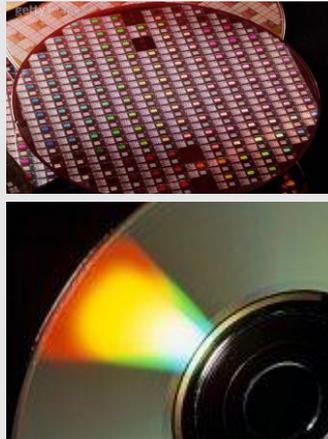
- Oerlikon: best in class in build quality, process support, field engineering and after-sales support
- No. 1 or No. 2 position in all major criteria

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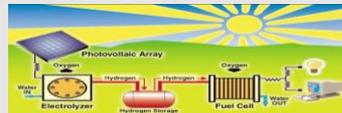
# Tactics for Semiconductor, Optical Disc and Advanced Nanotechnologies

## Semiconductor & Optical Disc



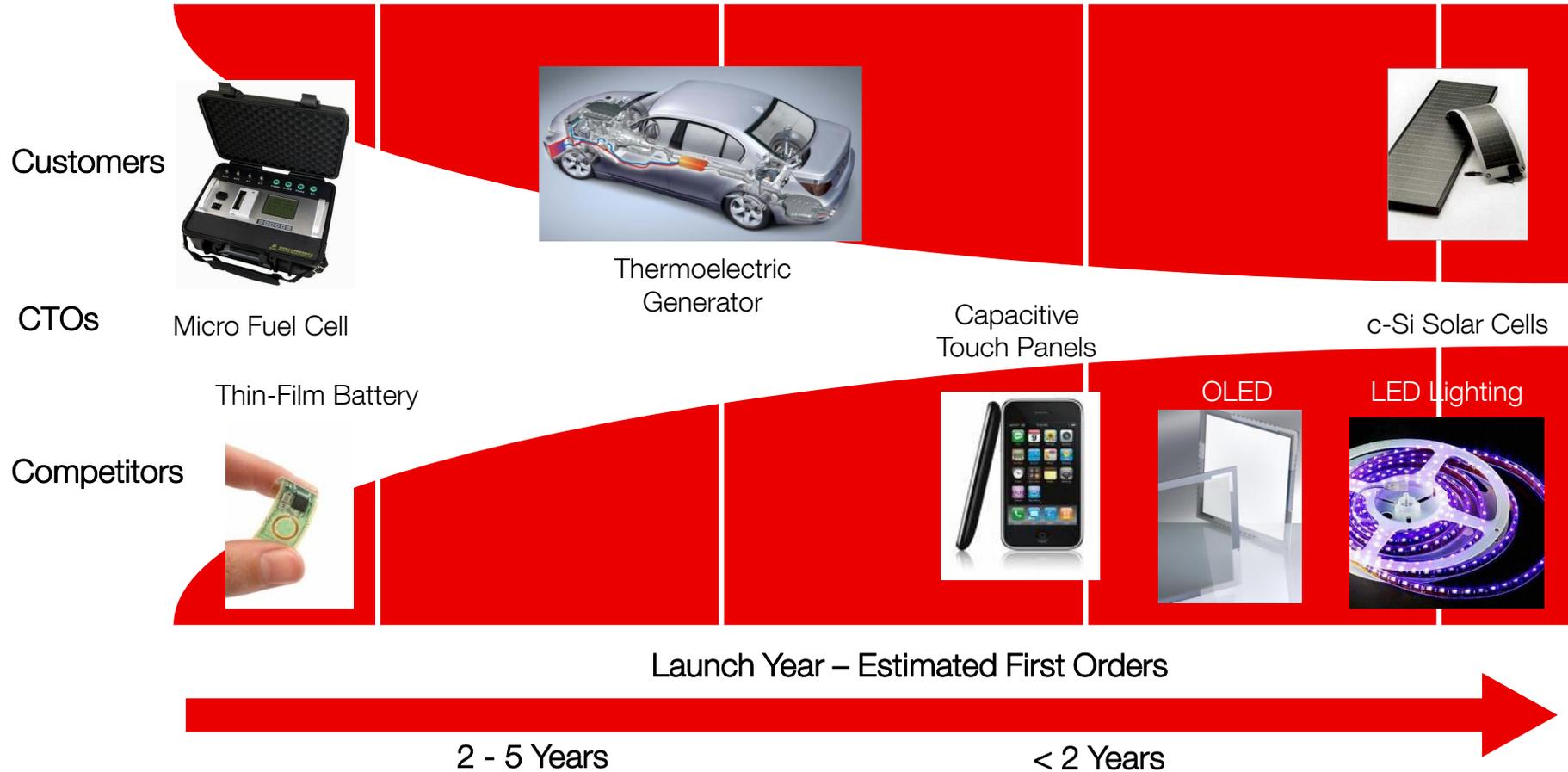
- Lean efficient organization
- Cost reduction and operational excellence
- Focus – less is more
- Strategic project selection

## Advanced Nanotechnologies

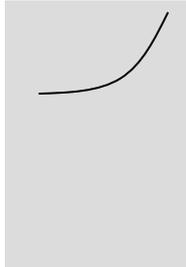
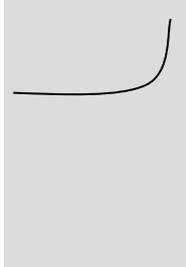
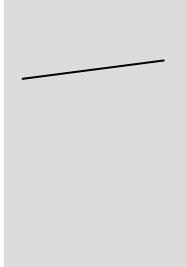


- New markets – existing customers
- New customers
- Focus – less is more
- High volume, licensing or contract R+D

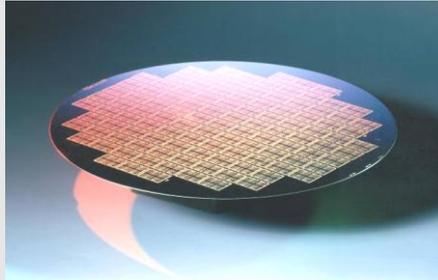
# Strong technology pipeline lays foundation for next success stories in selected high growth markets



# Accelerate Advanced Nanotechnology innovations

Market Application	Device Market	Equipment Market	5 Year Trend
<p><b>Energy Conversion</b></p> <ul style="list-style-type: none"> <li>▪ Solar cells</li> <li>▪ Thermoelectric generators</li> <li>▪ Energy Harvesting</li> </ul>	20-100 BUS\$	10-20 BUS\$	
<p><b>Energy Storage</b></p> <ul style="list-style-type: none"> <li>▪ Thin Film Batteries</li> <li>▪ Fuel cells</li> <li>▪ Micro fuel cells</li> </ul>	1-3 BUS\$	0-2 BUS\$	
<p><b>Energy Efficiency Management</b></p> <ul style="list-style-type: none"> <li>▪ Touch screens</li> <li>▪ OLED, SSL</li> <li>▪ MEMS / NEMS</li> <li>▪ Micro Sensors</li> </ul>	1-10 BUS\$	1-3 BUS\$	

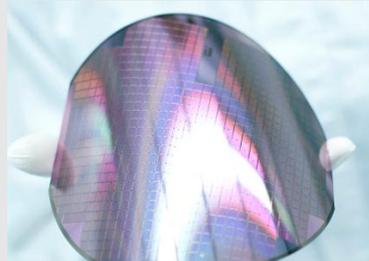
## Advanced Packaging – 3D



Market leader and technology enabler for next generation products with the highest productivity solutions

## Energy Efficiency Management

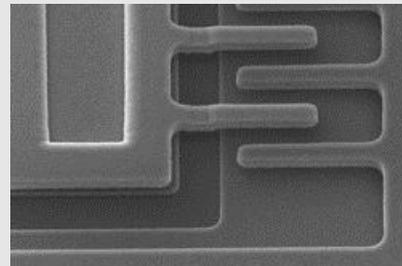
### Power Devices LEDs



The only company which processes ultra thin wafers without carrier  
Provides all types of contact and barrier materials for LED with extension plan of this application

## Energy Efficiency Management

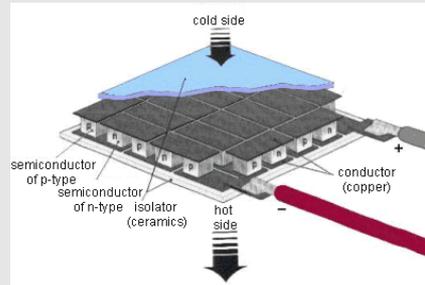
### Micro Electro Mechanical Systems



Expand extensive process portfolio (metals, oxides, nitrides, magnetic, piezo, compounds) for all different kinds of sensors, actuators and energy harvesting devices

## Energy Conversion

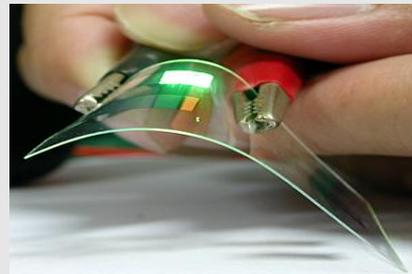
### Thermoelectric Generator



Conversion of waste heat into electricity; Thin Film technology enables commercially viable manufacturing

## Energy Storage

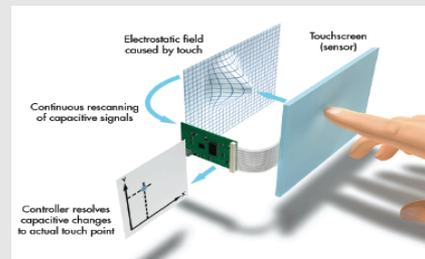
### ThinFilm Battery



Smart Cards, high-end RFID tags, autonomous sensors, medical implant require higher number of charge cycles. Cost effective manufacturing of thin film lithium batteries with LLS

## Energy Efficiency Management

### Capacitive Touch Screens

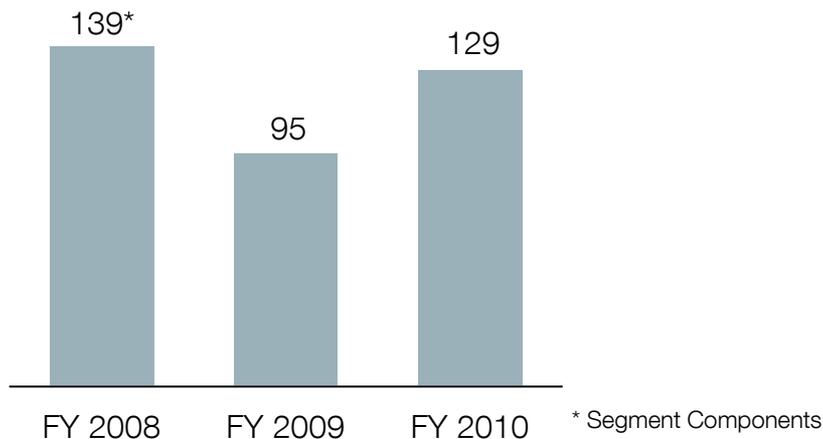
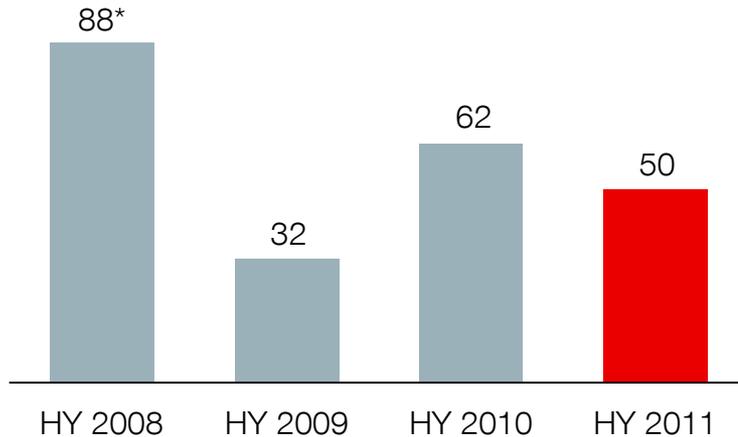


New generation of small form factor touch screens for intelligent mobility devices; highest productivity with lowest Cost of Ownership with Solaris

# Order Intake negatively impacted by sharp decline in Optical Disk market (Blu-ray)

## Oerlikon Advanced Technologies Order Intake 2008 – HY 2011

in CHF m

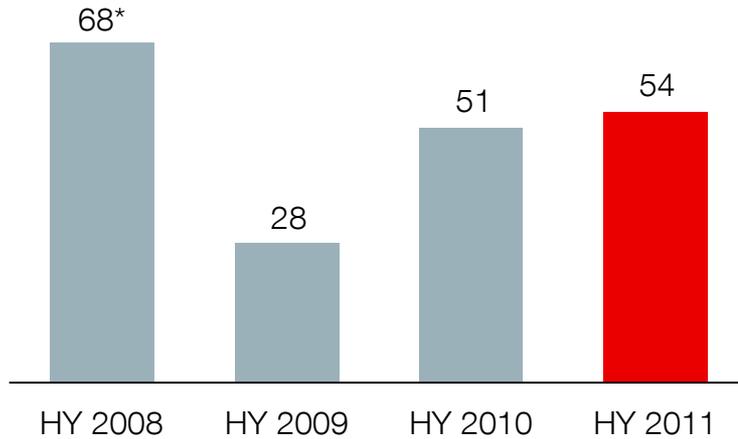


- First Solaris volume order for crystalline PV cells received in 2009
- Semiconductor business was main driver for increase in 2010
- Positive trend from Semiconductor business continued in HY 2011
- Decline in order intake in HY 2011 compared to HY 2010 related to Optical Disc business; no investments in Blu-ray production capacities in HY 2011
- Softening demand for Semiconductor equipment expected in H2 2011; recovery of Optical Disc business expected in H1 2012

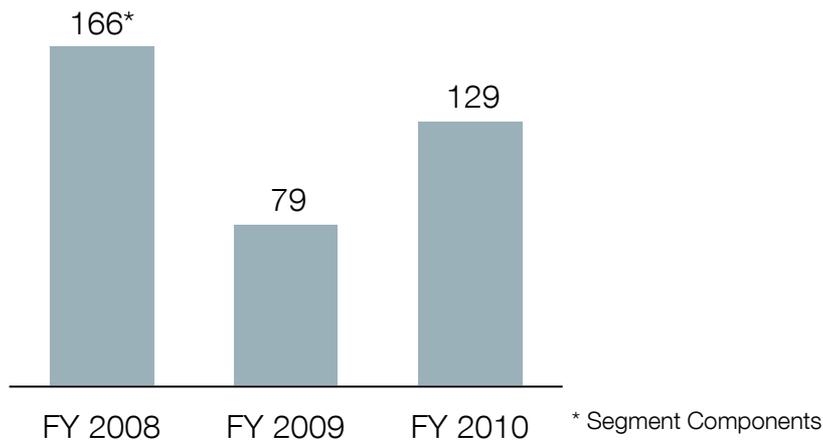
# Strong HY sales driven by investments in Semiconductor production equipment

## Oerlikon Advanced Technologies Sales 2008 – HY 2011

in CHF m



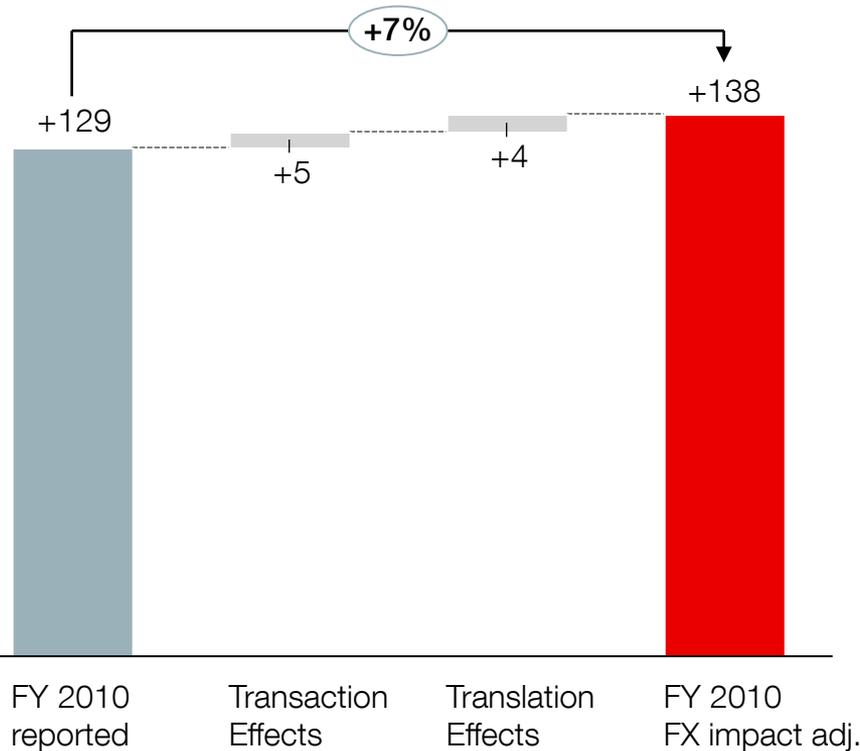
- Semiconductor business was main driver for recovery in 2010 and the first Solaris volume order for crystalline PV cells was successfully executed in 2010
- Semiconductor and Customer Support business are the main contributors to the higher sales compared to HY 2010.



# Transaction effects due to production in Swiss Francs significantly affects Sales

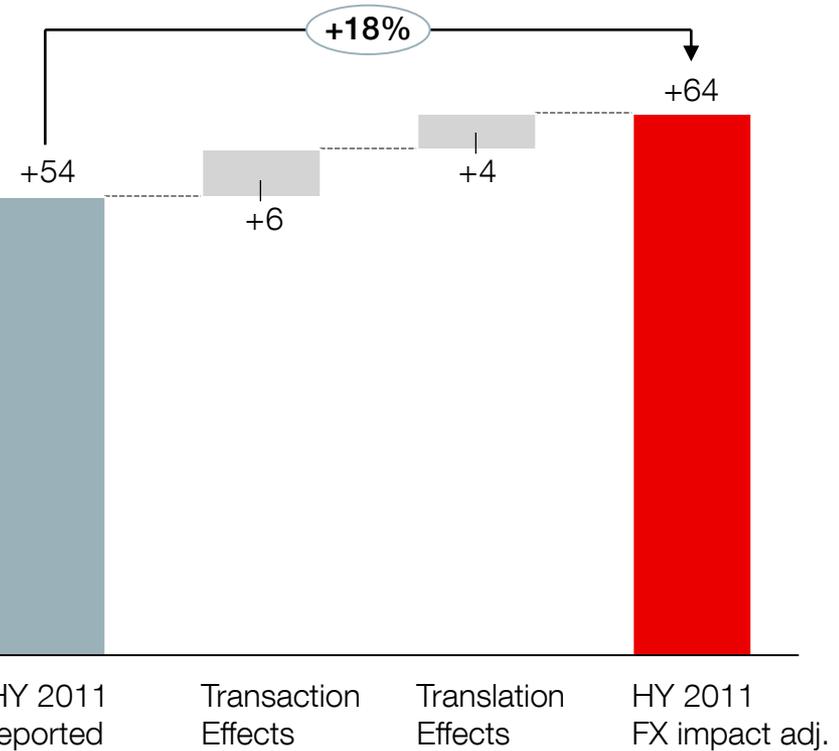
## Oerlikon Advanced Technologies Sales 2010

in CHF m



## Oerlikon Advanced Technologies Sales H1 2011

in CHF m

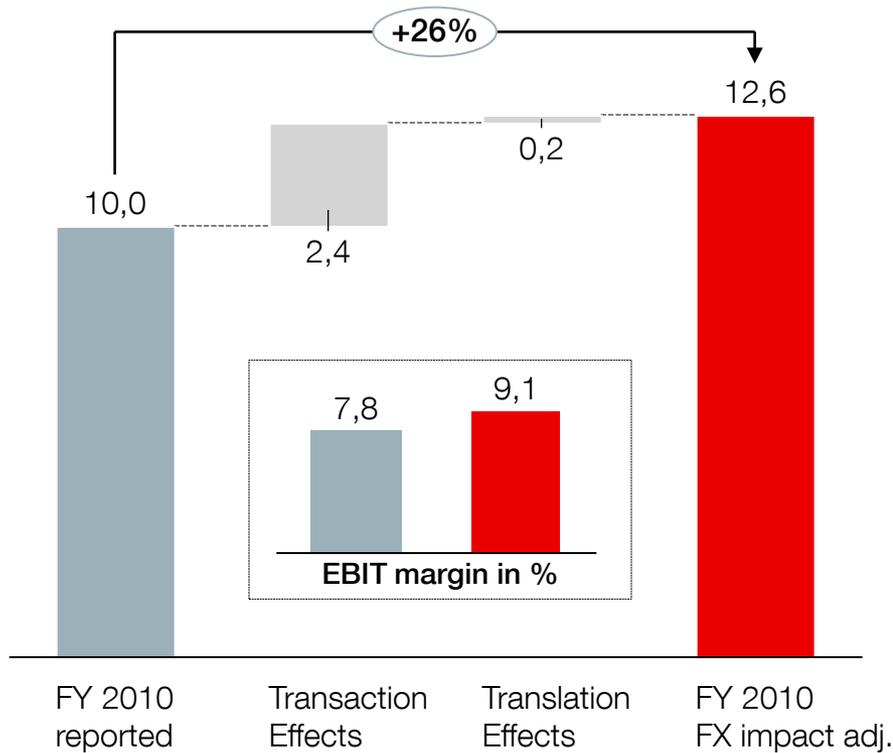


- Main sales currencies are USD and EUR
- Cost base predominantly in CHF

# EBIT Margin significantly affected due to transaction and translation effects

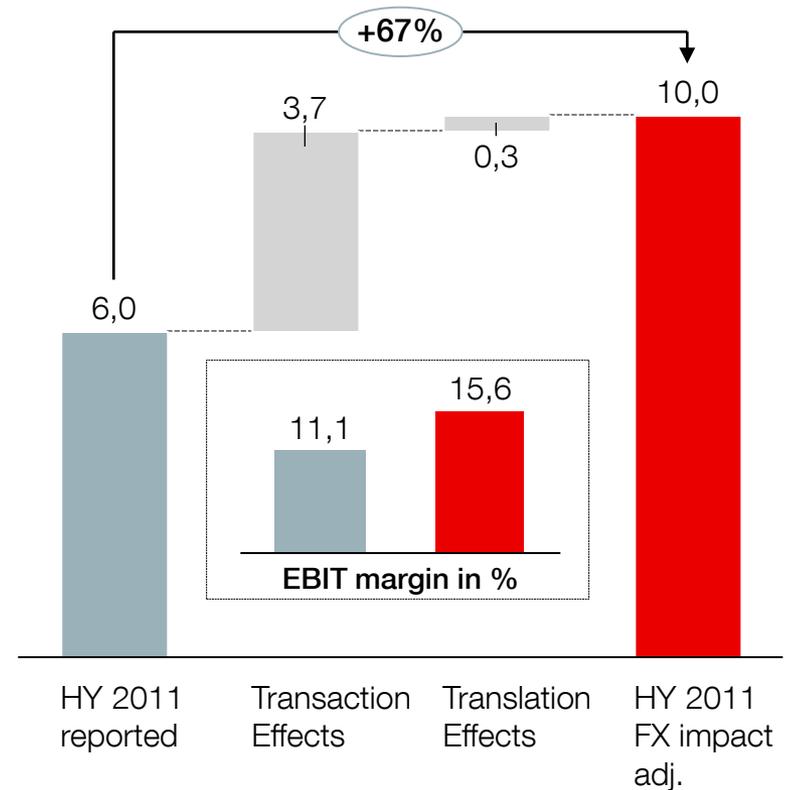
## Oerlikon Advanced Technologies EBIT FY 2010

in CHF m



## Oerlikon Advanced Technologies EBIT H1 2011

in CHF m

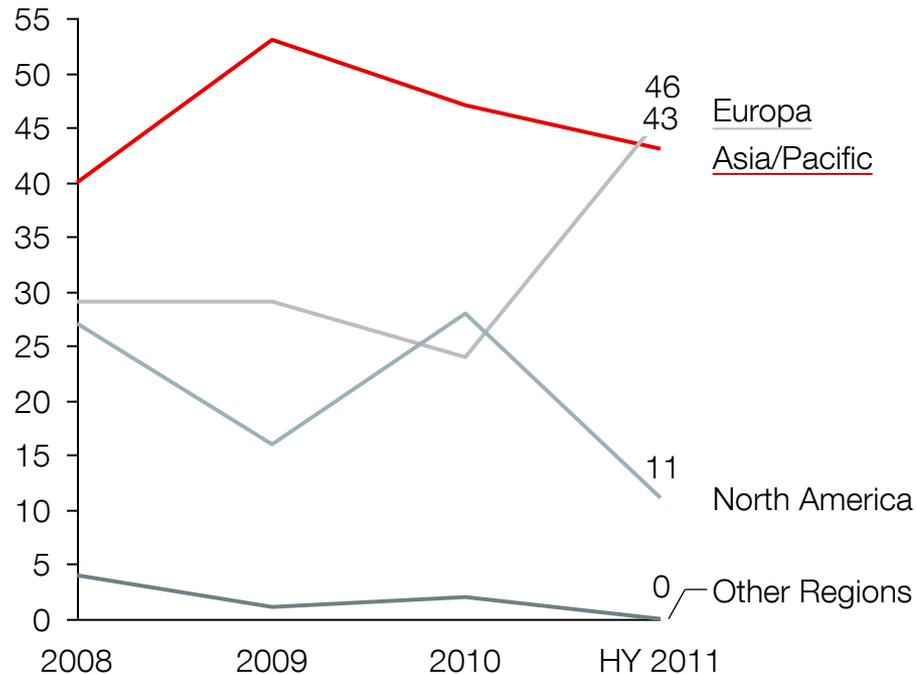


- Main sales currencies are USD and EUR

# Asia is main contributor to sales volume

## Oerlikon Advanced Technologies Regional Sales Split 2008 – HY 2011

in %

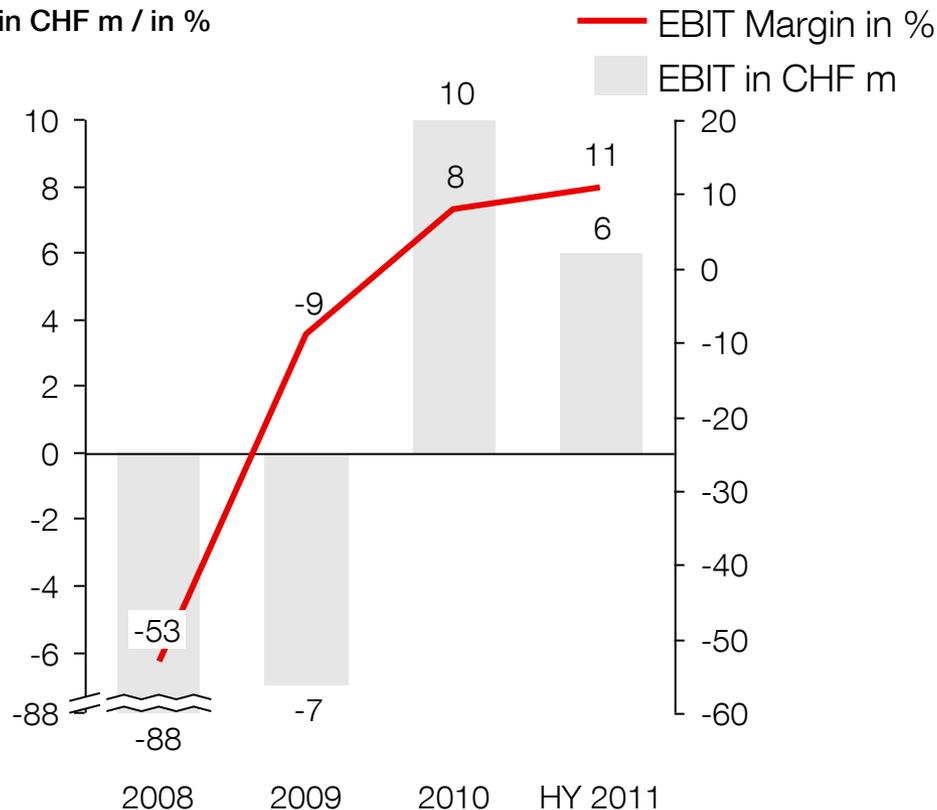


- Asia is the biggest contributor to regional sales volume in the years 2008 to 2010; about 50% of 2011 sales volume is expected to come from here
- EMEA sales were stable from 2008 – 2010; outlook for 2011 amounts to 35% of total sales.
- The US is expected to contribute 15% of overall sales in 2011

# Back to profitability in 2010, strong HY 2011

## EBIT and EBIT Margin 2008 – HY 2011

in CHF m / in %



- 2008 result impacted by restructuring, divestments and impairments
- Results before restructuring and non recurring expenses was positive in 2009; divestments and restructuring projects successfully executed
- 2010 result driven by higher sales volume and significantly reduced cost base compared to previous year
- Strong HY 2011 result driven by successful implementation of COGS reduction programs and price increases

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## Technological Leadership

- Core competence in industrializing thin film coating applications
- Proven 50+ year track record
- Leading PVD source and process technology
- Highest productivity PVD tools for semi, optical disc and clean tech applications

## Markets & Customers

- Supplier to all major players in semiconductor industry
- Focus on semiconductor market and clean tech applications
- Strong customer base in Asia

## Operational Excellence

- Excellent reputation confirmed by independent market surveys
- Outstanding On Time Delivery
- Lean processes and organization

## Tactics

- Differentiation: superior technology in selected semiconductor markets
- Enable commercialization of clean tech applications
- Incubator for Oerlikon Group

# Capital Market Days 2011

## August 23 - 24

Oerlikon Advanced Technologies

Andreas R. Dill

August 24, 2011



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