

# Capital Market Days 2011

## August 23 - 24

Oerlikon Solar  
Helmut Frankenberger

August 23, 2011



# Agenda

**1** Did you know?

**2** Technology Leadership

**3** Markets & Customers

**4** Operational Excellence

**5** Tactics & Financials

**6** Summary

# Agenda

**1** Did you know?

**2** Technology Leadership

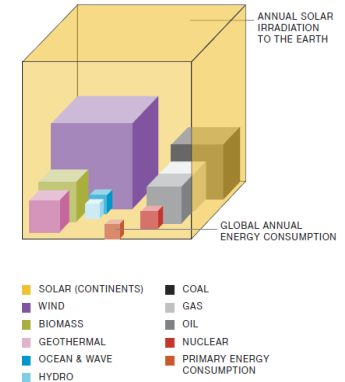
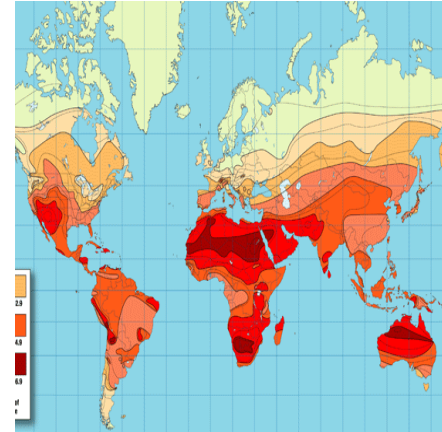
**3** Markets & Customers

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# Did you Know?



source: DLR, IEA WEO, EPA's own calculations.

Africa has 16% of the world's population...

...but consumes just 4% of world's energy

because energy is simply not available

In India, over 50% of the population is without access to electricity

Some 70% households use traditional biomass cooking

One kW Solar system in India can light up to 200 rural houses

Future demand for energy is likely to come from countries where access to Solar power is high and access to Fossil Fuels is low

The total solar energy that reaches the Earth's surface could meet the current global energy needs 10,000 times over

# Did you Know?

To confront the world's dire need for energy ....

Oerlikon Solar is on a mission to make ...

**Solar Power Economically Viable**



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# Oerlikon Solar at a Glance

Equipment  
Supplier

Turnkey  
Solutions

Module  
Manufacturer

BOS  
Suppliers

EPC  
Integrator

Wholesale  
Utilities

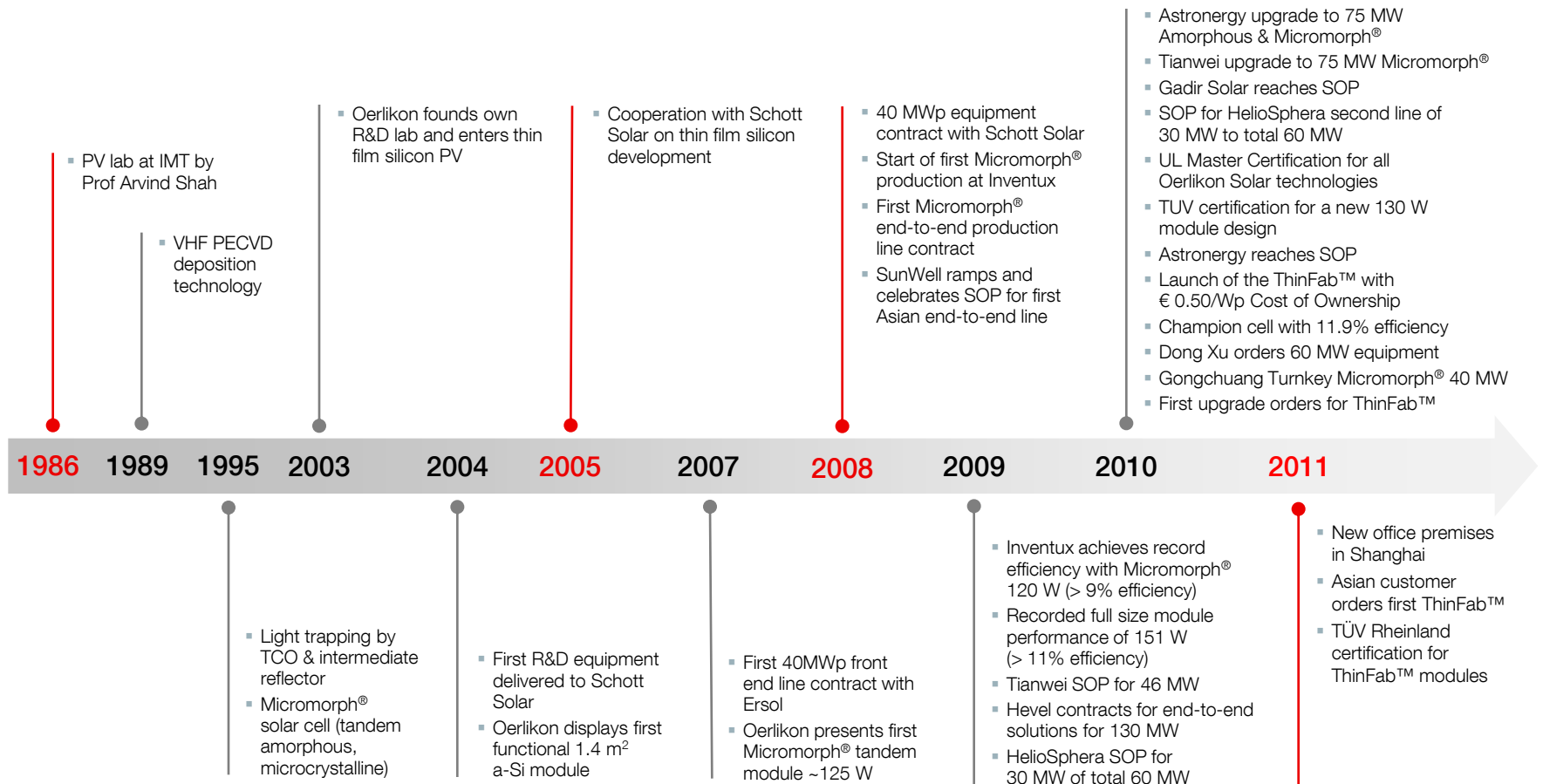
Oerlikon Solar's vision  
is to make solar power  
economically viable.

- A leading supplier of production lines for thin film silicon modules
- More than 870 MW contracted to date
- More than 4,000,000 Panels Produced with Oerlikon Equipment to date
- 700 employees including 300 scientists and engineers as well as 200 customer service personnel around the globe



*Serving from 13 locations in 9 countries*

# Oerlikon Solar - 25 Years of R&D Experience and Industrial Mass Production



Opportunity  
identification

Concept &  
product

Commercialization &  
Mass Production



# Think Thin with Oerlikon Solar Technology

## Front End

## Back End



Thinner silicon absorber in amorphous and microcrystal-line film



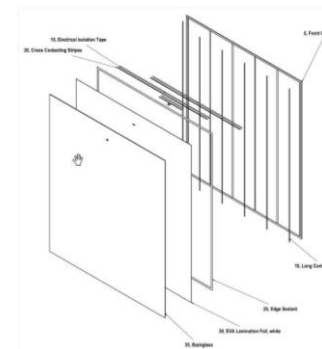
Thinnest laser dead zone through most accurate high speed production systems



Unique thin film front contact solution for enhanced light trapping



Thinning the back-end into a simple and more environmentally friendly fabrication

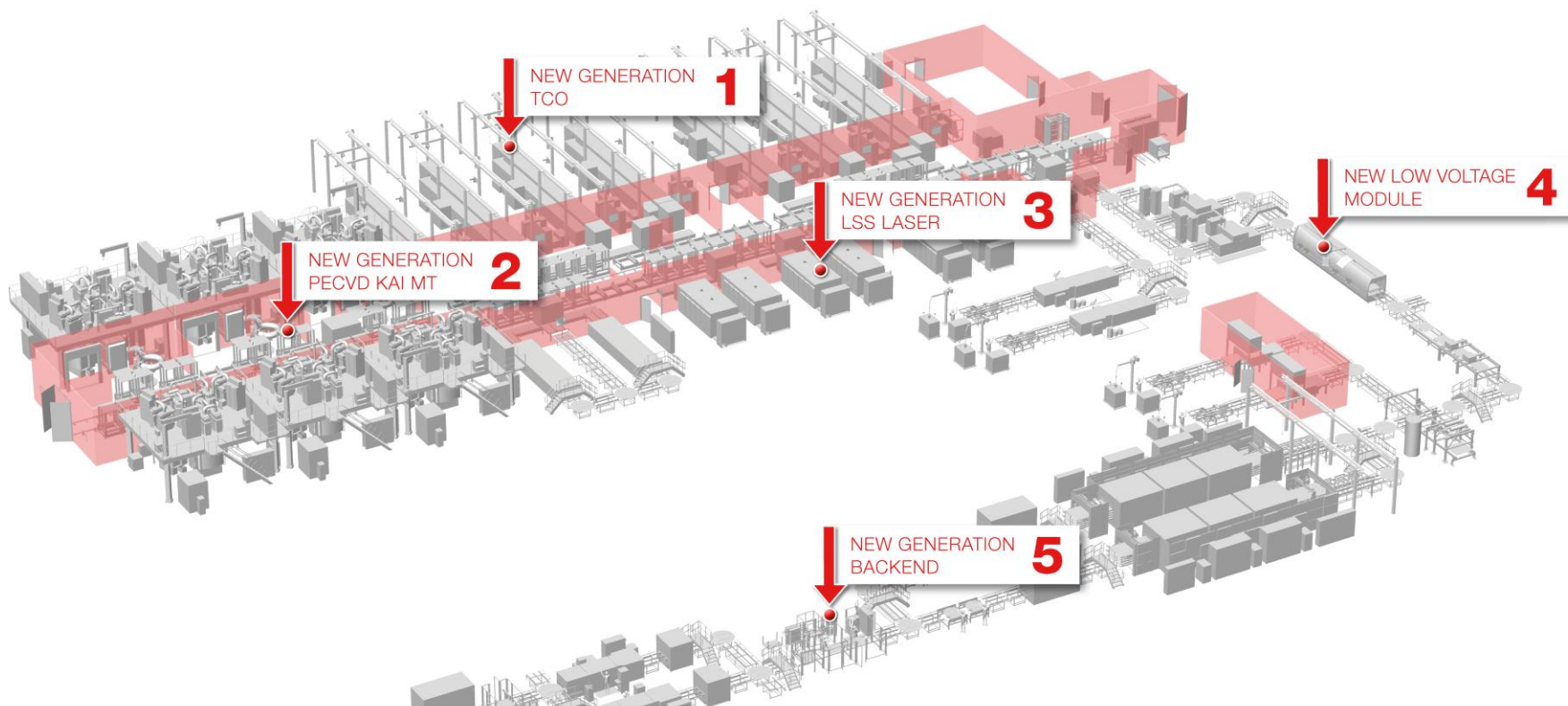


Thinner modules – reduced weight enables wide range of applications



# Oerlikon Solar THINFAB™ End-to-End Glass to Module Production Factory

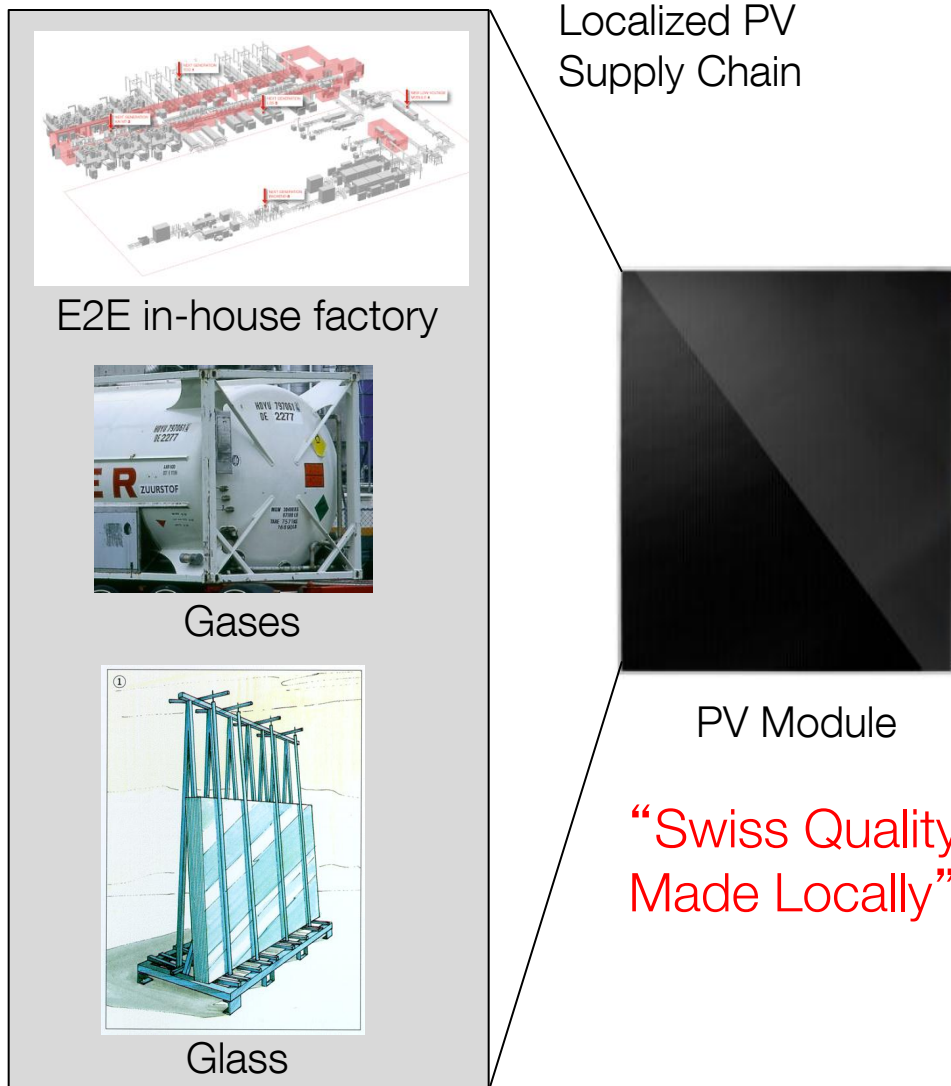
innovation  
has a name  
**oerlikon**  
solar



**Module production  
cost < € 0.50 per watt**

<b>Module Efficiency</b>	10% / 143 Wp
<b>Module Size</b>	1.1 x 1.3 m <sup>2</sup>
<b>Technology</b>	Micromorph®
<b>Annual Output</b>	120 MW ~850'000 Modules
<b>Yield</b>	97%

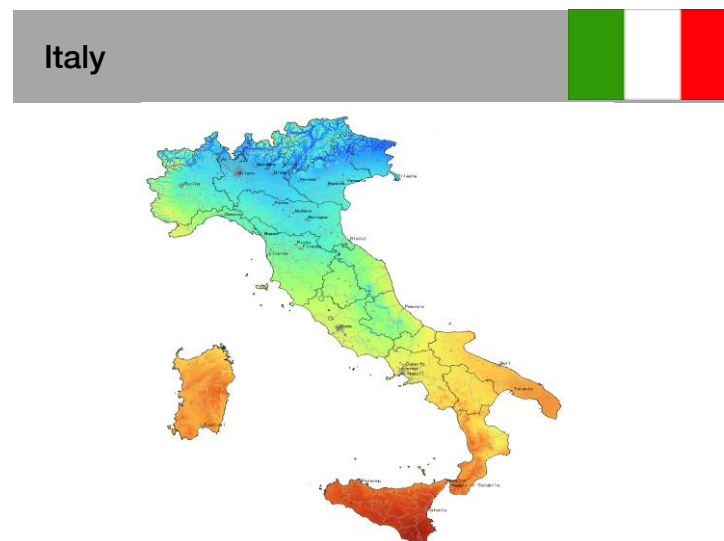
# THINFAB™ - Investment Analysis



THINFAB Payback	€/W
Capital Investment (Equipment Only)	1.0
Module Production Cost incl. Depreciation	0.5
Expected Module ASP	0.7-0.8
Gross Margin (%)	30-40%
Payback Period	3.5-4.5 yrs
Energy Payback Period	< 1 yr

# Cost of Electricity with THINFAB™ Technology 10 MW Solar Farm in Italy

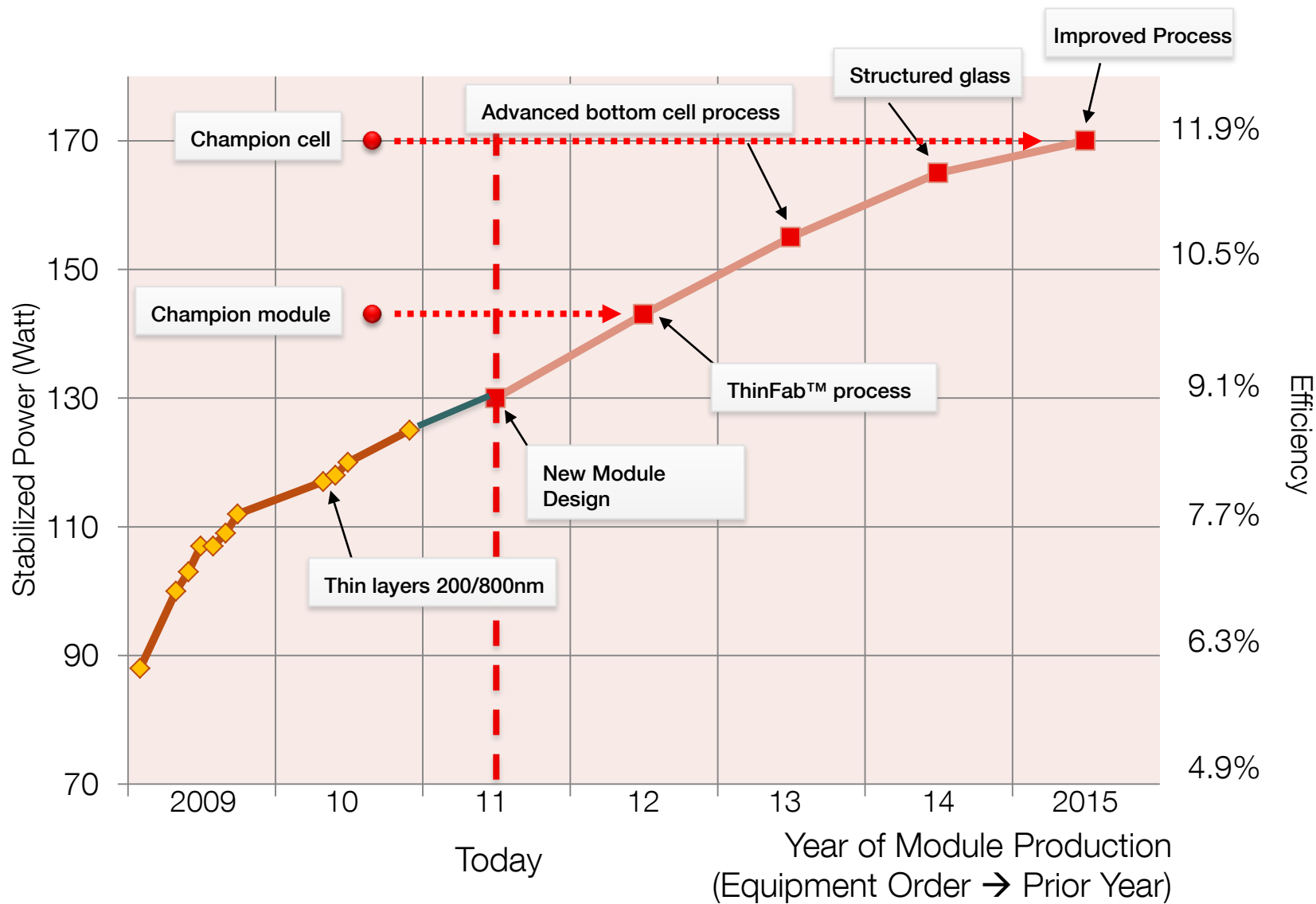
Module Production Cost	0.50	€/Wp
Module Margin (35%)	0.27	€/Wp
<b>Module Price</b>	<b>0.77</b>	<b>€/Wp</b>
BOS Price	0.92	€/Wp
<b>Total system cost</b>	<b>1.69</b>	<b>€/Wp</b>
Electricity Price*	0.12	€/kWh



Assumptions: Module Production Cost in EU, 10 MW solar farm in Bari, Italy, Energy Yield: 1690 kWh/kWp/year, Module power 143 Wp, BoS → Based on OS USA estimates in 2012, Annual Land Lease Costs ~ 2000 EUR/ha, 13% EPC Margin included, Corporate Tax 30%, Inflation Rate 2.5%, O&M costs/yr: 0.7% of System Cost, Project life 25 yrs.

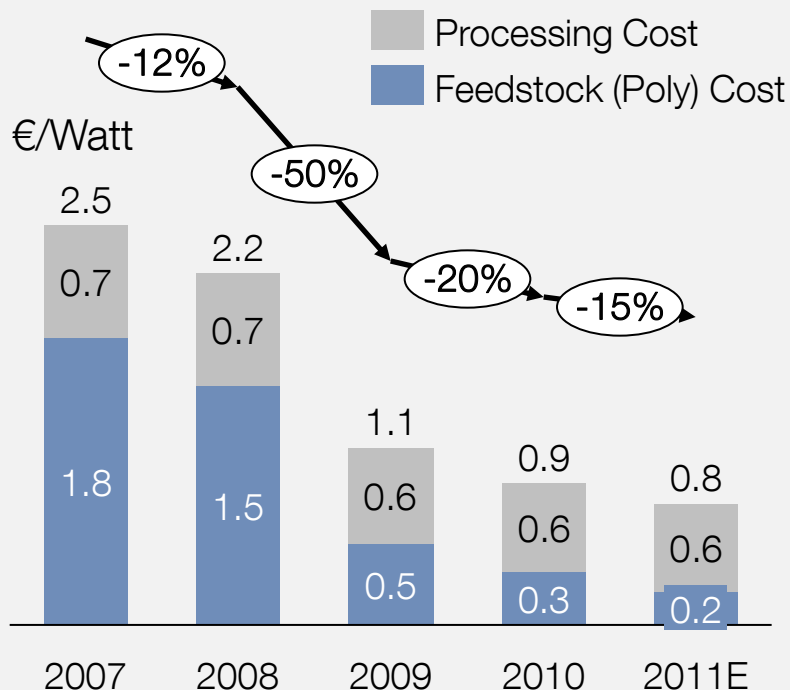
\*Including Financing Cost @ Discount Rate (WACC) of 8.5%

# Oerlikon Solar Innovation Roadmap

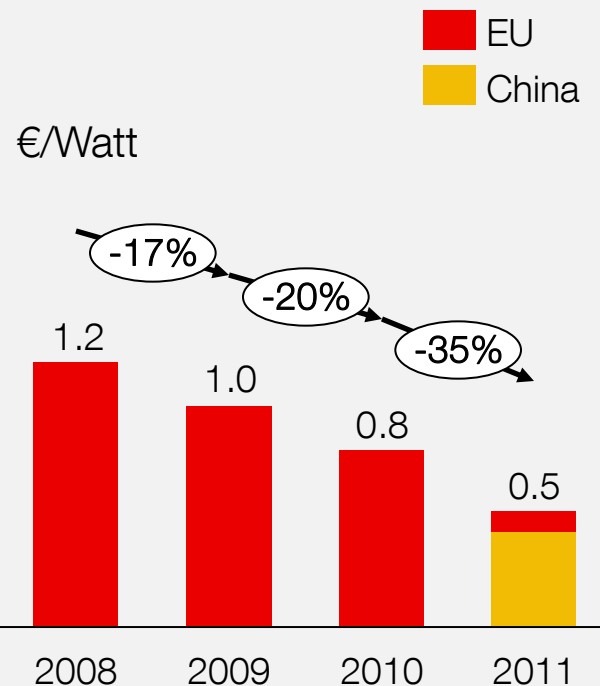


# Competitive Advantage of Thin Film on Module Production Cost

Lowest Cost Crystalline Silicon  
(China Vert. Intg. @ GW Scale)



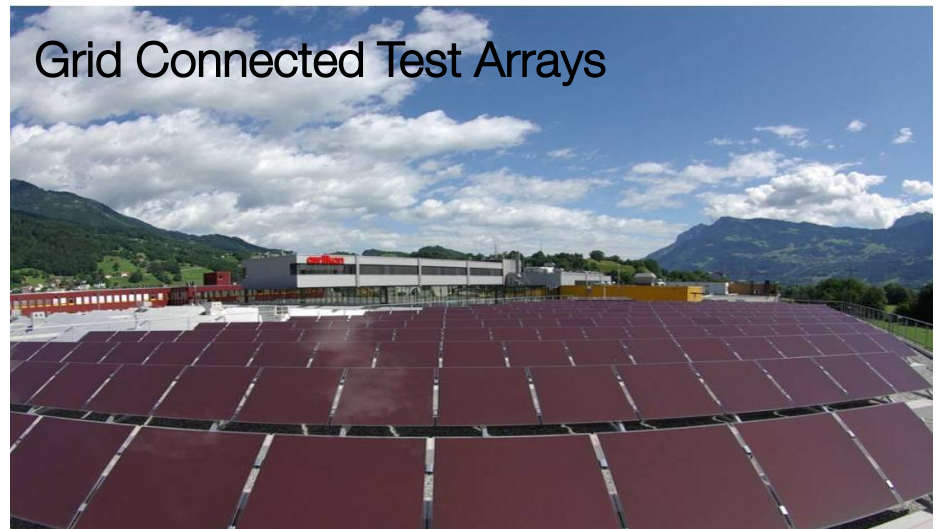
Oerlikon Solar Thin Film Silicon  
(@ 120 MW Scale)



# Oerlikon Solar Outdoor Performance

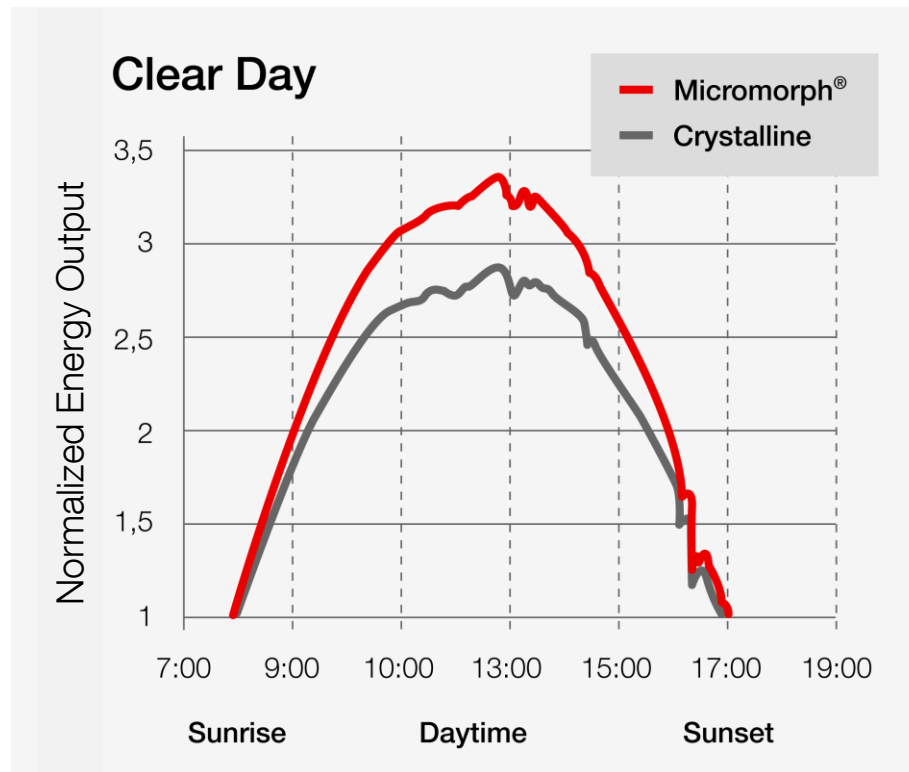


- Comprehensive Technology Benchmarking
- Different Climates: Moderate European (CH), Hot & Dry (Arizona, USA), Alpine (under construction)
- R&D: Continuous Product Improvement
- Project Development and Funding: test program supports Oerlikon Solar customers, project developers, investors, banks and institutes



# Competitive Advantage of Thin Film on Energy Output

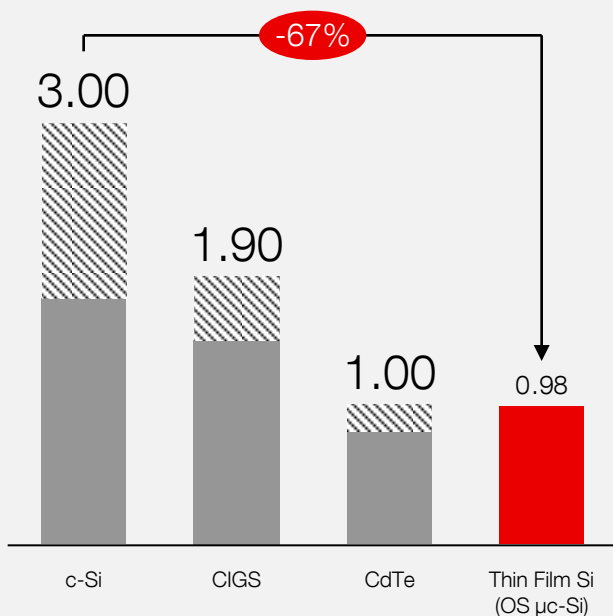
Due to the lower temperature coefficient  
Thin Film Silicon  
Micromorph® offers more than 9% higher energy output at higher temperatures compared to crystalline silicon PV



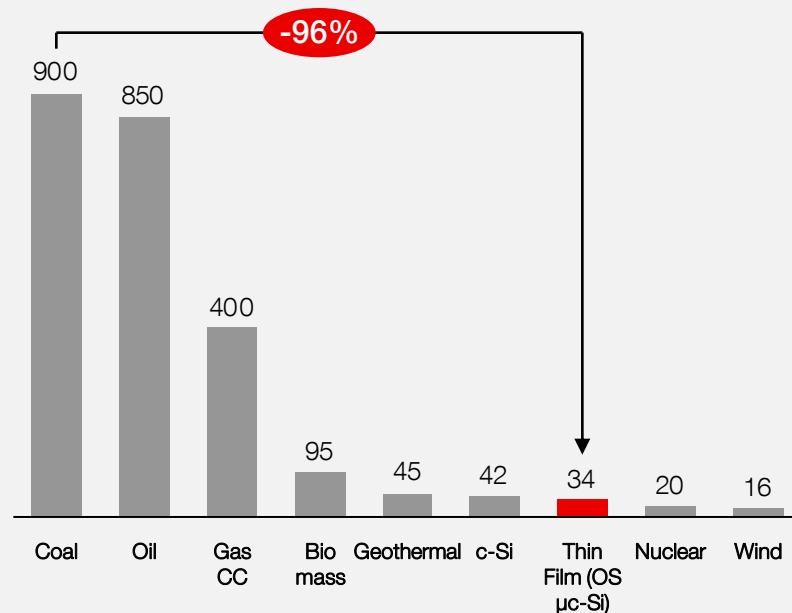


# Competitive Advantage of Thin Film on Energy Consumption & Payback

### Photovoltaic Energy Payback (yrs)



### Carbon Footprint (g Co<sub>2</sub> eq/kWh)



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# Driven by Fundamental Drivers – PV Markets have Consistently Outperformed Analyst Expectations

Energy Demand



Conventional Energy Costs



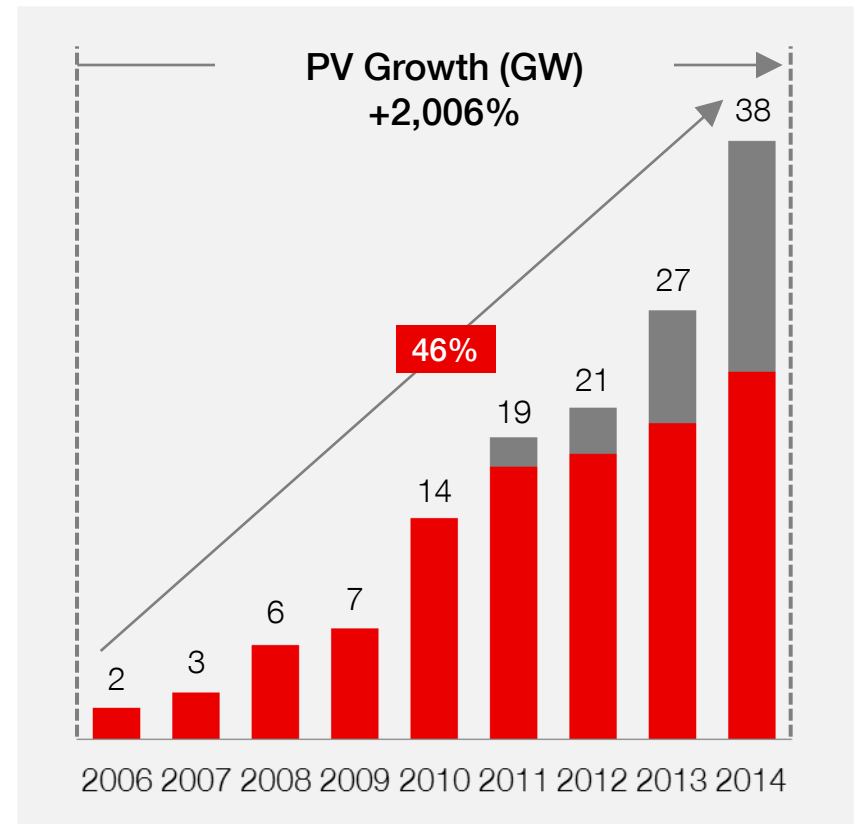
Fossil Resources



Environmental Regulations



National Security



Source: Navigant Consulting, Feb 2011

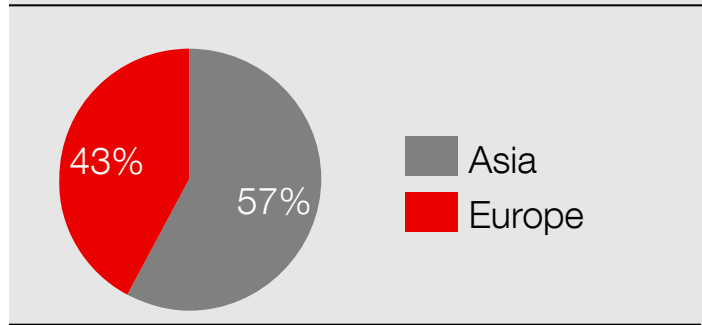
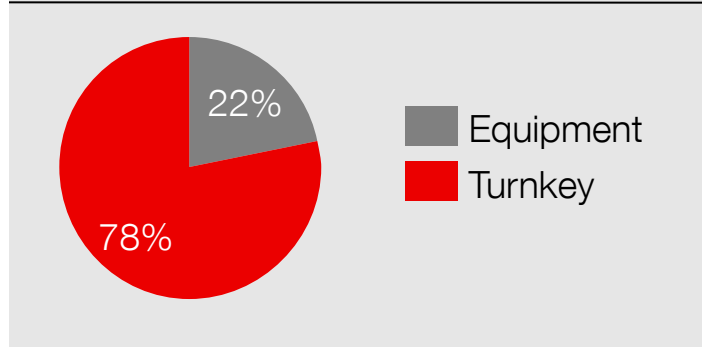
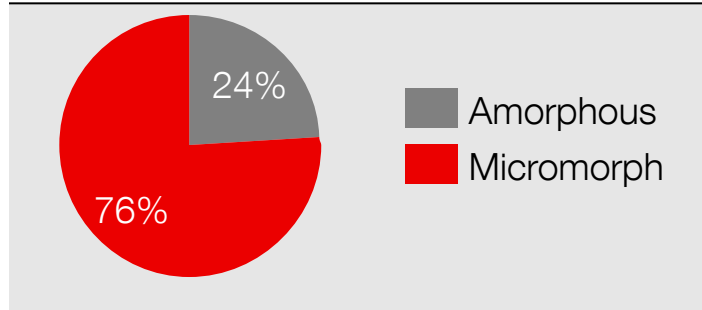
# Key Market Drivers for the Success of PV Technology

	Cost of Electricity per kWh	End-Market Application	Raw Material Bottleneck	Energy Consumption	Use of Harmful Chemicals
<b>Attractiveness</b> ○ Very Low ◐ Low ◑ Medium ◒ High ● Very High	<ul style="list-style-type: none"> <li>Module cost</li> <li>Installation cost</li> <li>Field performance</li> </ul>	<ul style="list-style-type: none"> <li>Building-integrated</li> <li>Free field install</li> <li>Roof-top mounting</li> </ul>	<ul style="list-style-type: none"> <li>Scarcity of raw materials used in production of modules</li> </ul>	<ul style="list-style-type: none"> <li>Energy pay back time</li> <li>Carbon Foot Print</li> </ul>	<ul style="list-style-type: none"> <li>Toxicity of raw materials used in production of modules</li> </ul>
Thin Film Silicon	◑	◑	●	●	●
Thin Film CIGS	◐	◑	◑	◑	◑
Thin Film CdTe	◑	◑	◑	●	◐
Crystalline Silicon	◑	◑	●	◐	●

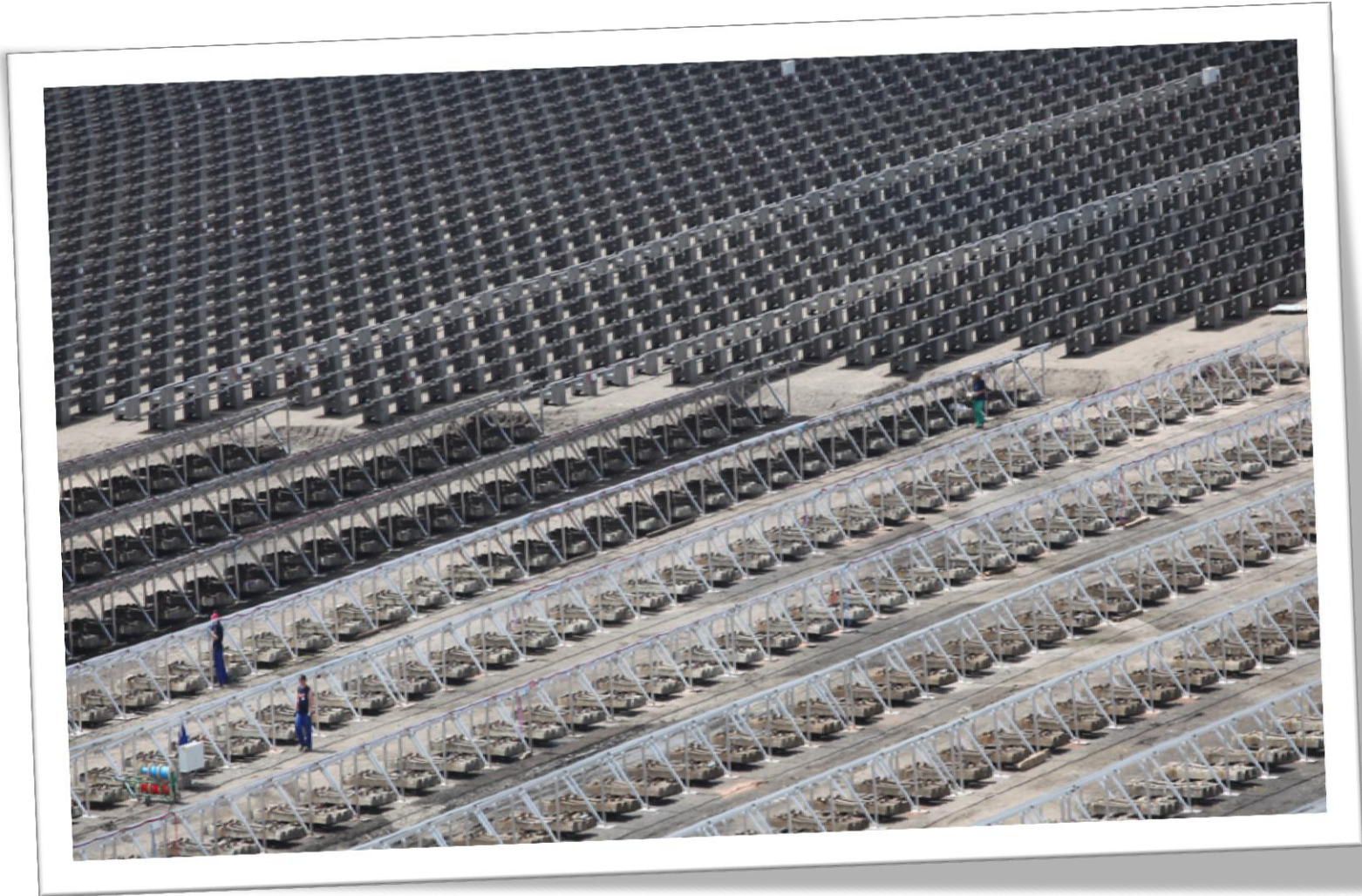
# Oerlikon Solar Customers: Reaching the Giga-Watt Landmark



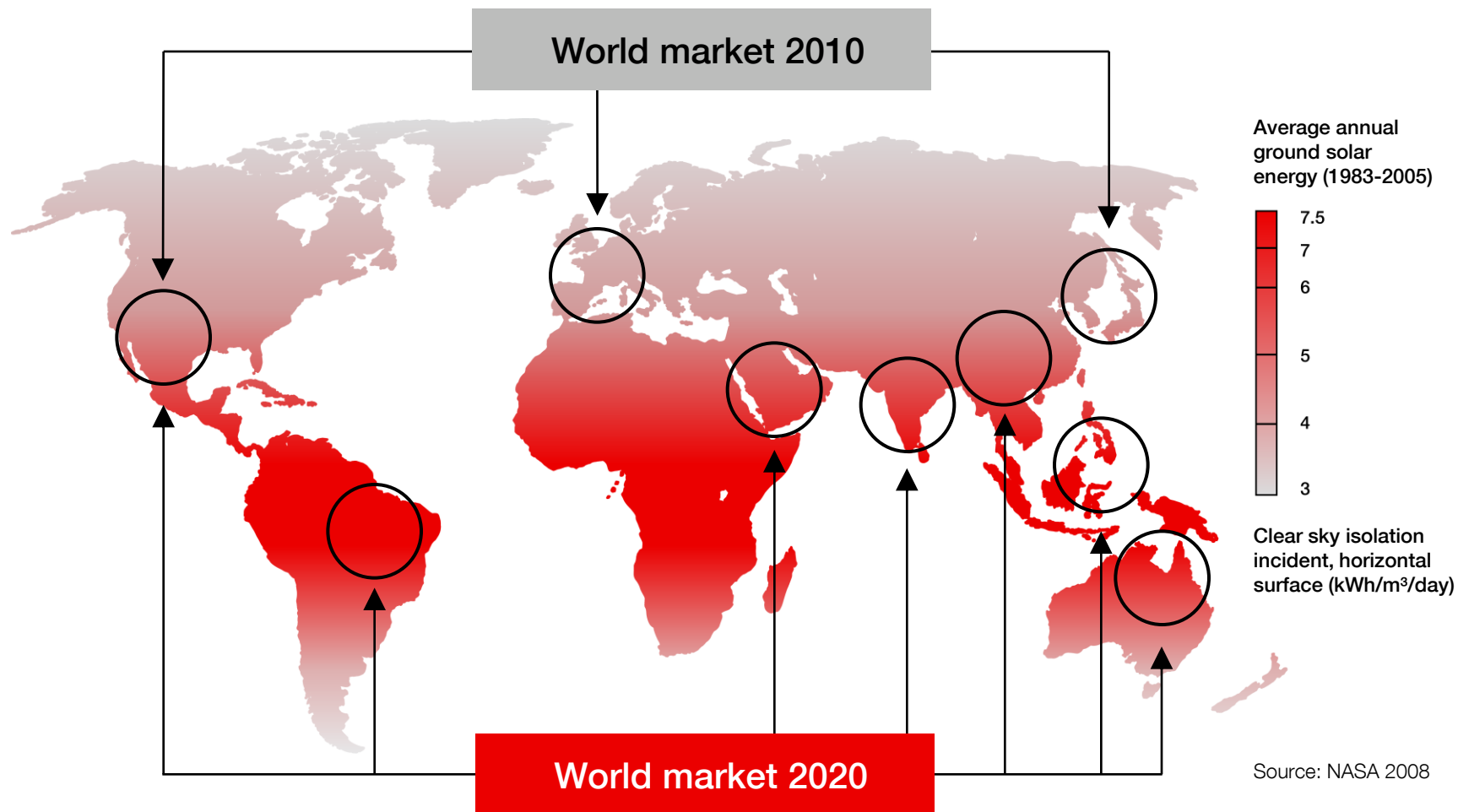
Customer	Project MW
Bosch Solar	40
Schott Solar	40
CSG	20
Sun Well	50
Inventux	30
Auria Solar	60
Pramac	30
Astronergy	75
Tianwei	75
Gadir Solar	40
Heliosphera	60
Hevel	130
DongXu	60
Gongchuang	40
Asia (ThinFab™)	120
<b>TOTAL</b>	<b>870 MW</b>



# More than 4 million Panels Produced to date with Oerlikon Equipment



# ... And Much More to Come given a Fundamental Shift of PV Markets to Thin Film Regions (Sunbelt)



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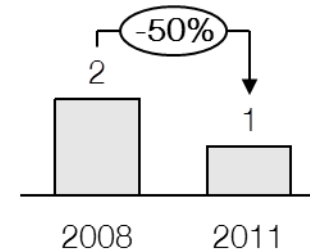


# Main Pillars of Operational Excellence



## Cost reduction

- 50% capex reduction for customers
- > 50% module cost reduction
- Improved Fab Design and Output

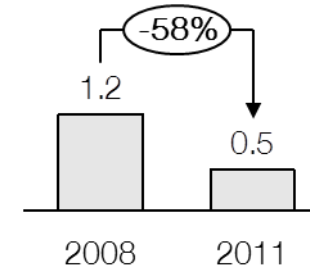


Fab Price (Capex)  
(€/Watt)

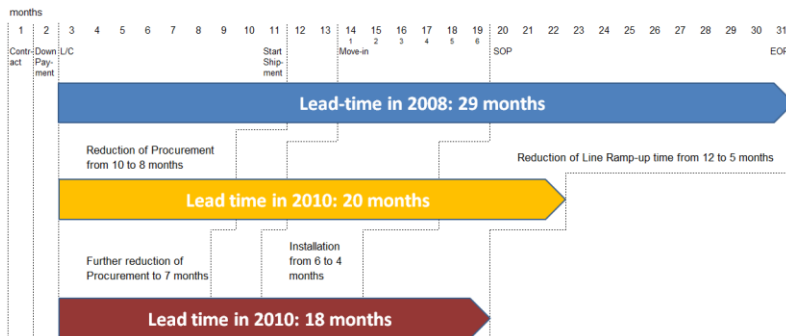


## Reduced Lead time to Customers

- 40% reduction lead time to ramp-up
- Local suppliers and Go -Asia
- On-time delivery from Suppliers > 85%



Module Production  
Cost (€/Watt)



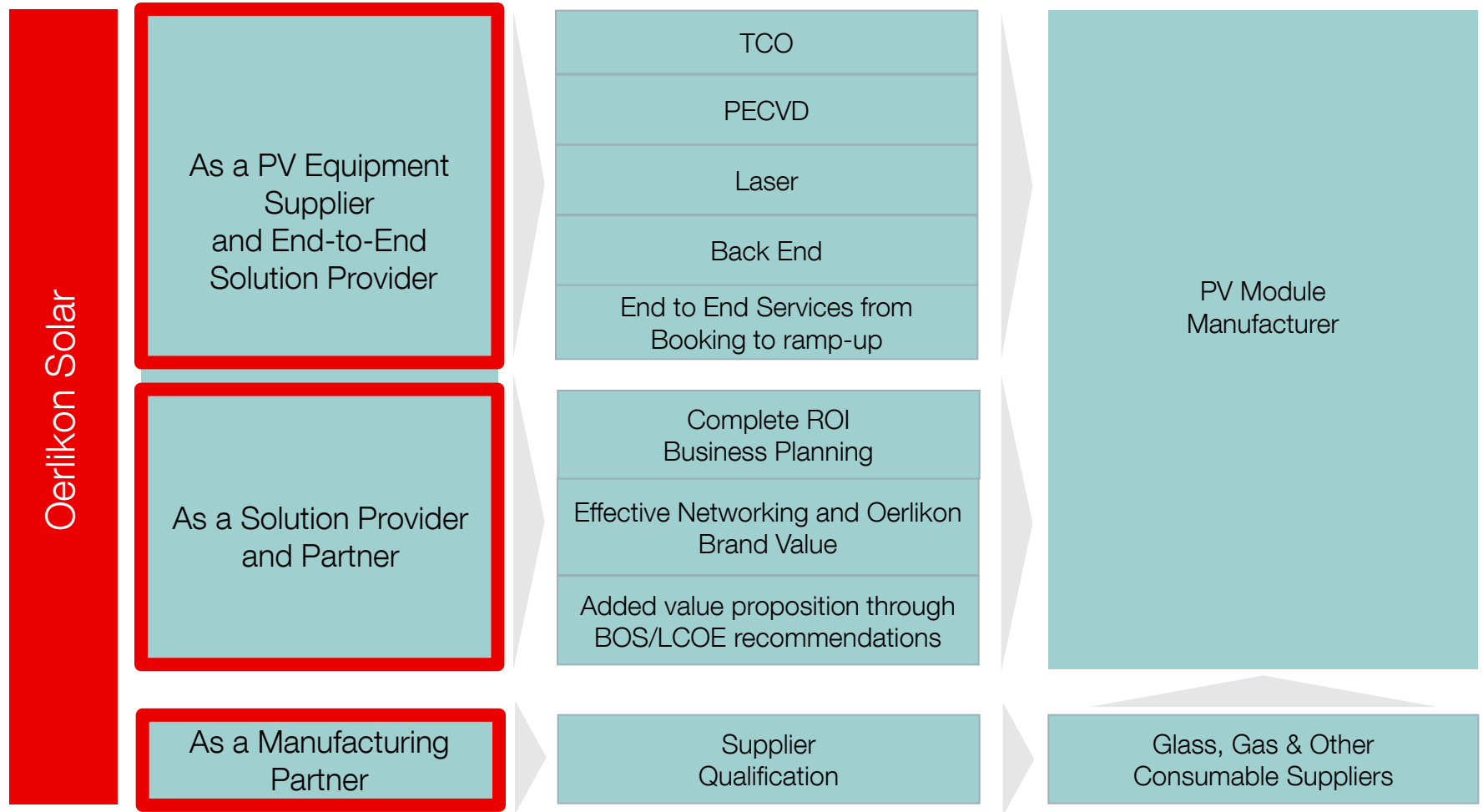
## Improved Flexibility and Scalability

- Modular Sourcing
- Go -Asia
- Contract Manuf. e. g. Flextronics
- Ship & Merge

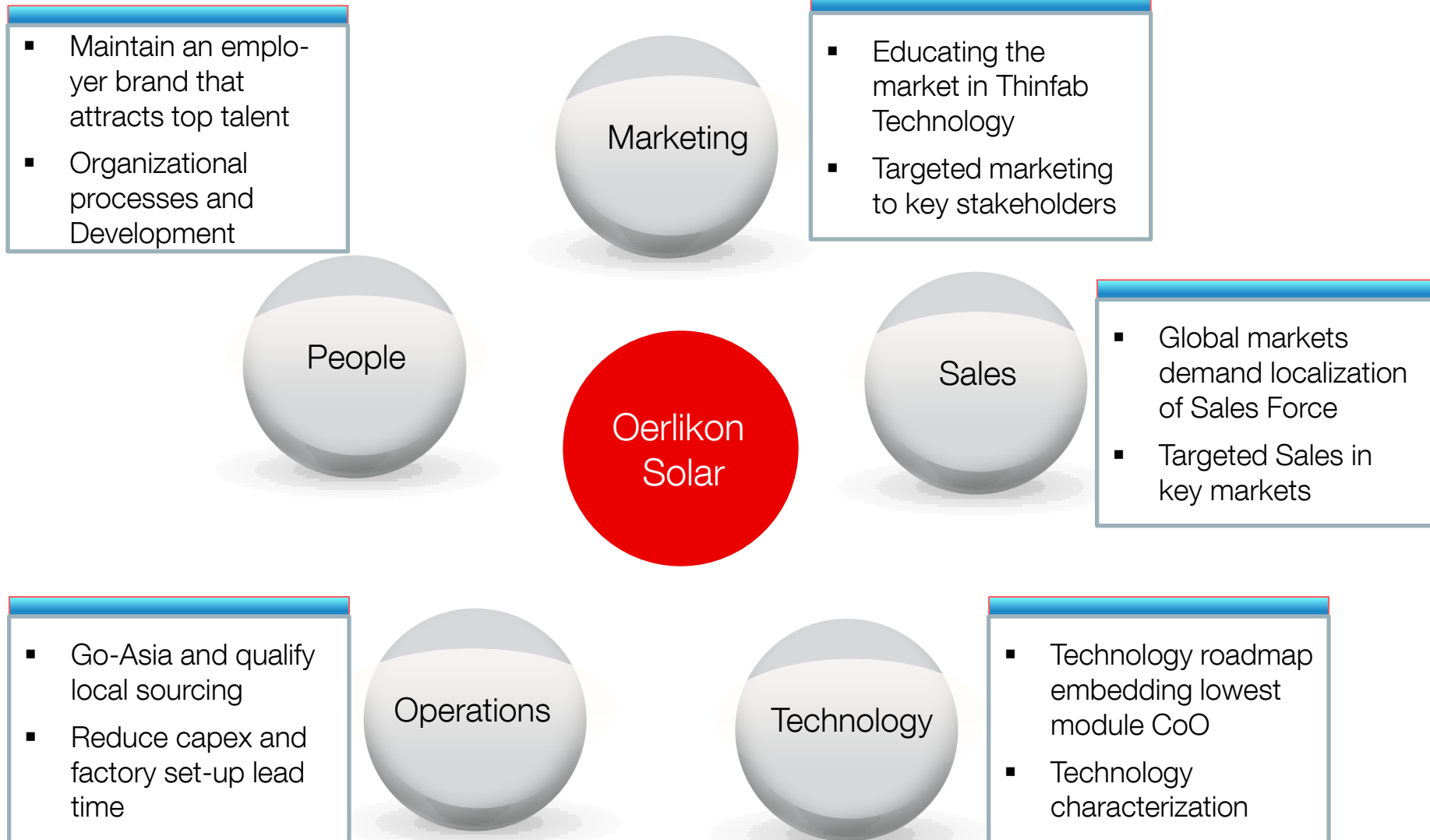
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# Oerlikon Solar Business Model



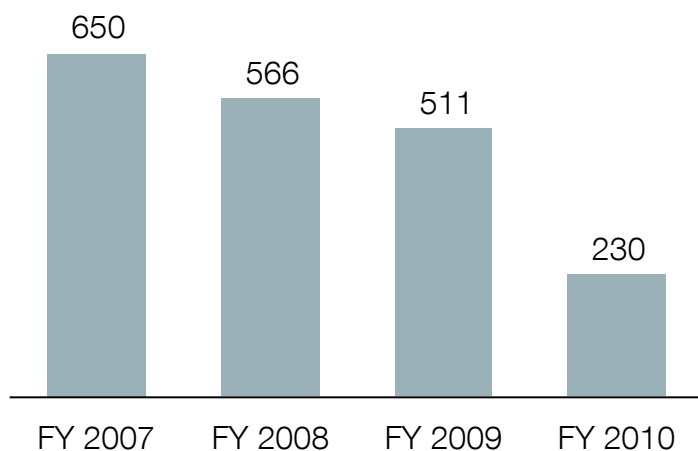
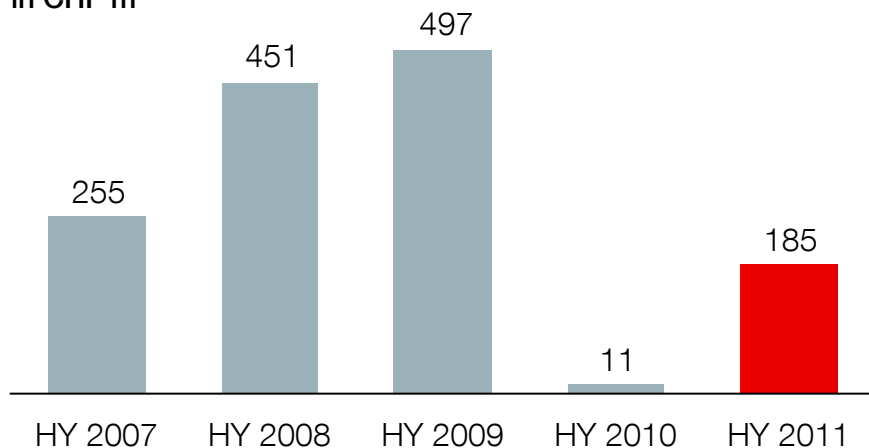
# Oerlikon Solar Business Model Growth hinges on 5 Focus Areas



# Order Intake reflects technological roadmap

## Order Intake Oerlikon Solar 2007 – HY 2011

in CHF m



## Comment

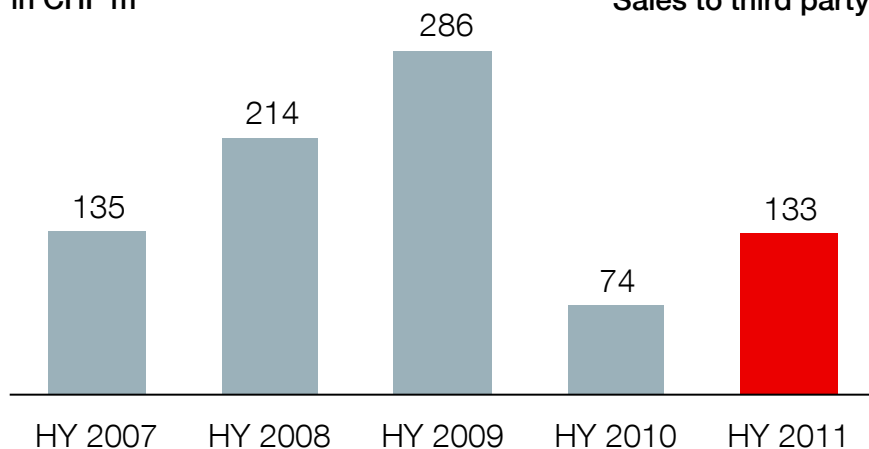
- Technological milestone in 2010 fueled order intake
- Commercial milestone of first THINFAB™ order reached in HY 2011
- Further market adoption and completion of strategic discussions with existing and potential customers in H2 2011
- Further improvements in technology in the second half of 2011

# Oerlikon Solar nearly doubled sales in HY 2011

## Sales\* Oerlikon Solar 2007 – HY 2011

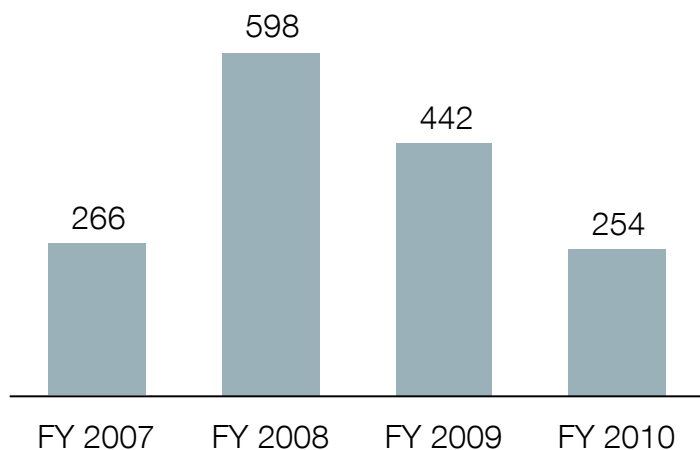
in CHF m

\* Sales to third party



## Comment

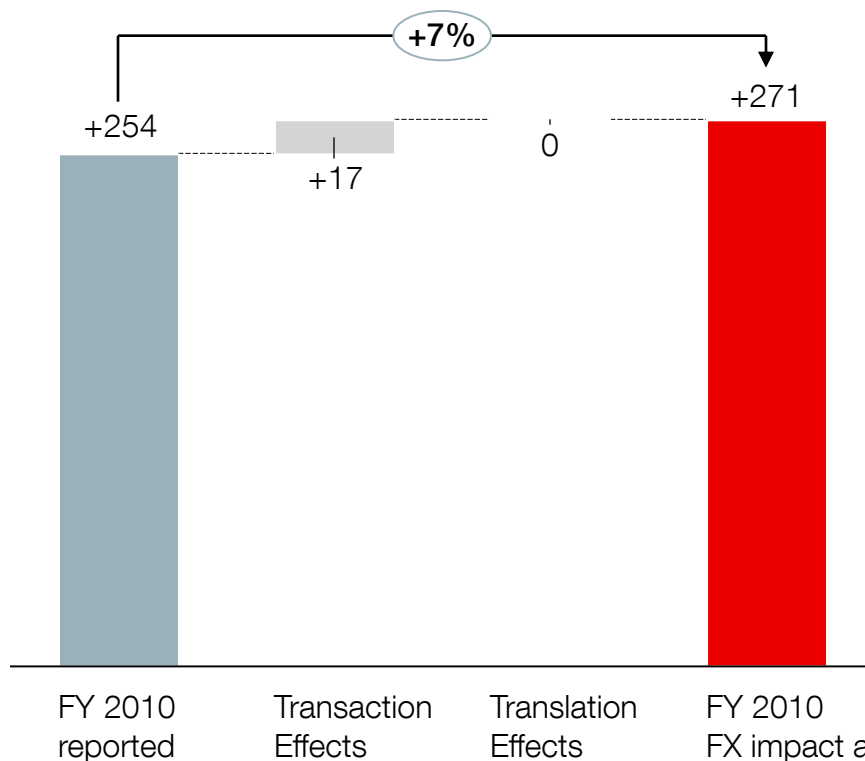
- Sales recognized according to Percentage of Completion (PoC)
- Sales for FY 2011 expected to significantly exceed previous year



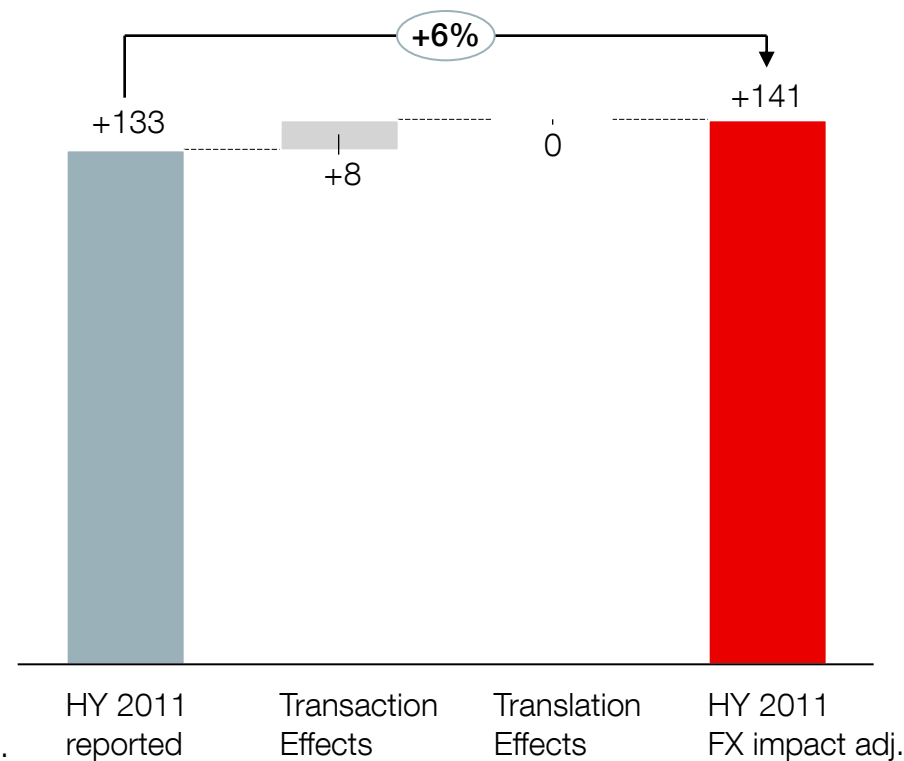
# Value of Swiss Franc affects Sales due to transaction effects

## Oerlikon Solar Sales FY 2010

in CHF m



## Oerlikon Solar Sales HY 2011

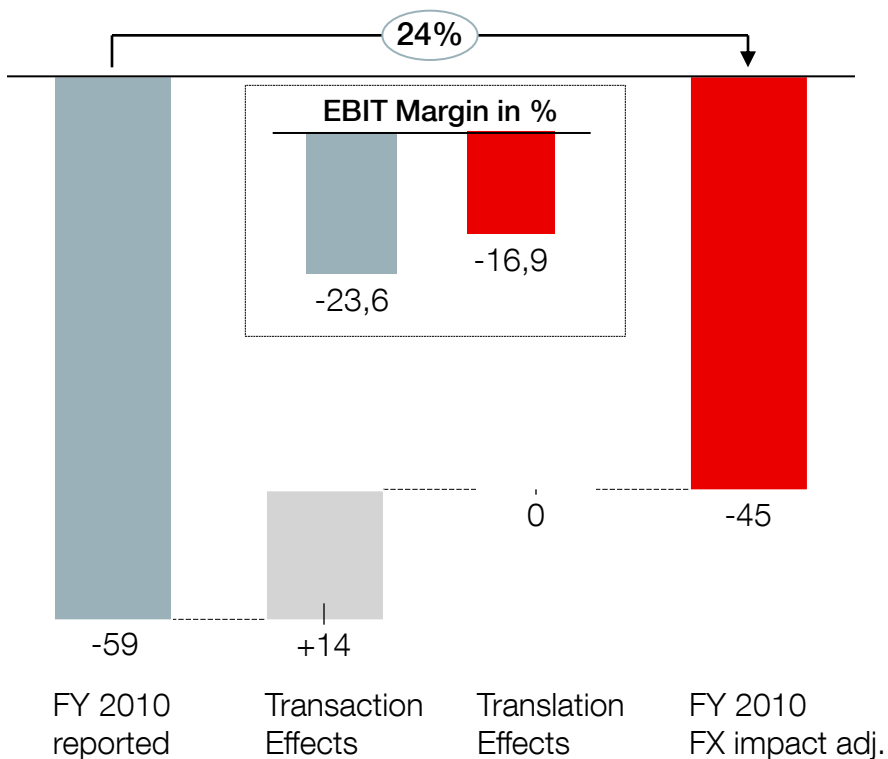


- Oerlikon Solar production and R&D in Swiss Franc environment
- Sales in Euro

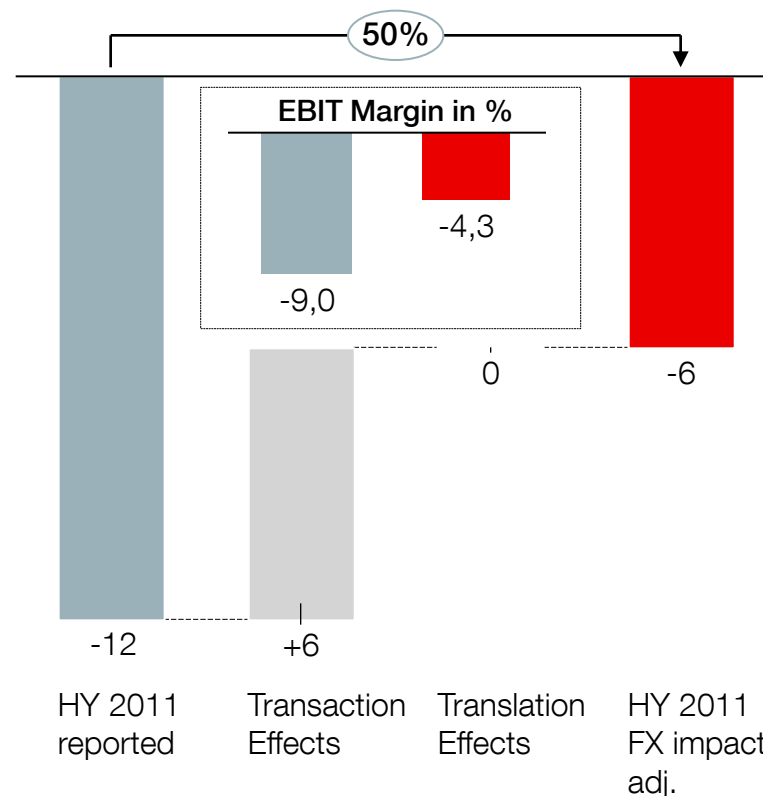
# EBIT Margin significantly affected due to transaction effects

## Oerlikon Solar EBIT FY 2010

in CHF m / Margin in %



## Oerlikon Solar EBIT HY 2011



- Profitability in local currencies make up 470 bps.
- Oerlikon Solar working on strategies to optimize currency exposure

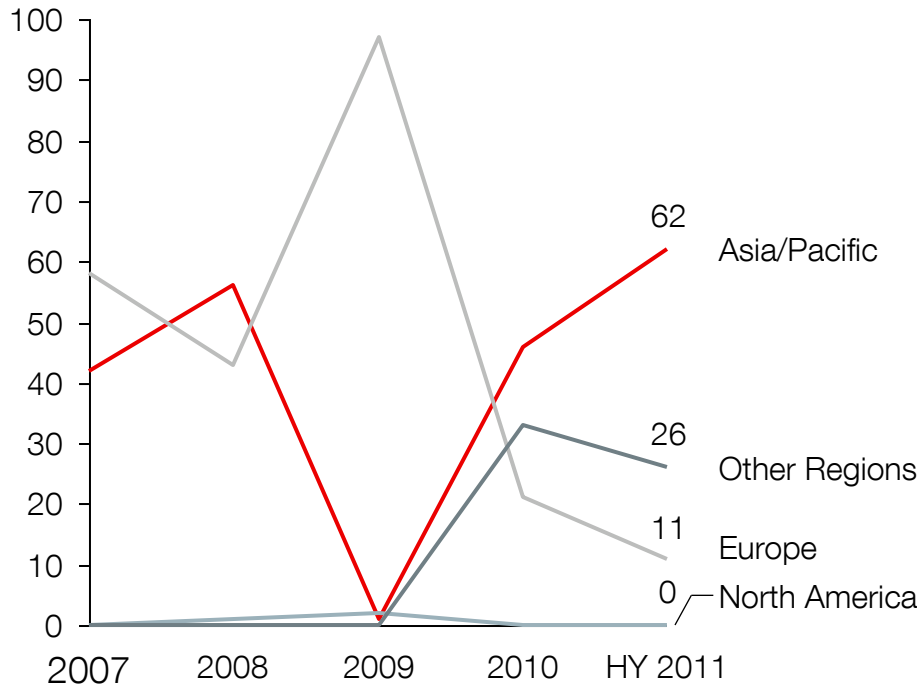


# Oerlikon Solar accelerated customer base in Asia

**Regional Sales Split  
Oerlikon Solar 2007 – HY 2011**

## Comment

In %

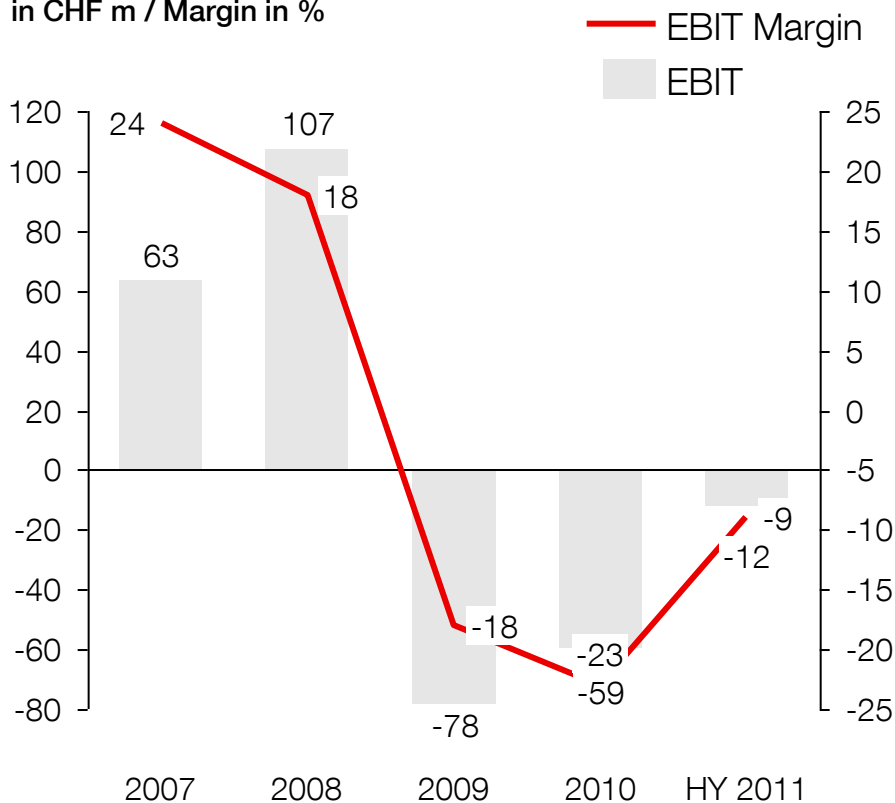


- Asian market has the financial potential to adopt thin film technology
- Customer base in Europe facing bankability issues since 2009
- North American growth opportunity

# Oerlikon Solar aims for Break-Even in 2011

## EBIT and EBIT Margin Oerlikon Solar 2007 – HY 2011

in CHF m / Margin in %



## Comment

- EBIT in HY 2011 significantly improved
- Operational Excellence programs to further improve profitability
- Break-Even target for 2011

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## Technological Leadership

- Innovative Micromorph® technology
- Lowest PV module production cost
- Most environmentally friendly PV technology – no toxic material, no scarce resources
- Lowest energy consumption and carbon footprint
- Highest PV energy yield

## Markets & Customers

- Fundamental drivers continuously surpass expectations
- Oerlikon Solar reaching the Giga-Watt landmark
- Fundamental shift of PV markets to Thin Film regions

## Operational Excellence

- Significant cost reductions without sacrificing strong technology leadership
- On time delivery and ramp-up
- Flexible and scalable supply chain and execution

## Tactics

- PV Equipment provider
- End-to-End Solution provider
- Sustain technology roadmap
- Focus on key strategic markets

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