



***SMART SOLUTIONS TO DRIVE THE FUTURE***

***SINGULUS TECHNOLOGIES AG***

**SINGULUS** 

# Agenda

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## Overview

Financials

Optical Disc

Solar

Investment Highlights



# Milestones

## SINGULUS TECHNOLOGIES

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- 1995 Start of SINGULUS TECHNOLOGIES AG
- 1996 Introduction of CD Inline systems in Optical Disc industry
- 1997 Introduction of DVD inline replication system
- 2001/2002 Acquisition of injection molding and 1<sup>st</sup> mastering
- 2004 2<sup>nd</sup> Mastering acquisition
- 2006 Take over of majority share in largest competitor HamaTech
- 2007 Acquisition of STANGL to enter the Solar Equipment market  
First revenues in Blu-ray replication lines
- 2008 Acquisition of Blu-ray business from Oerlikon
- 2009 First shipment of SINGULAR for Solar Cell - AR coating

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Overview

**Financials**

Optical Disc

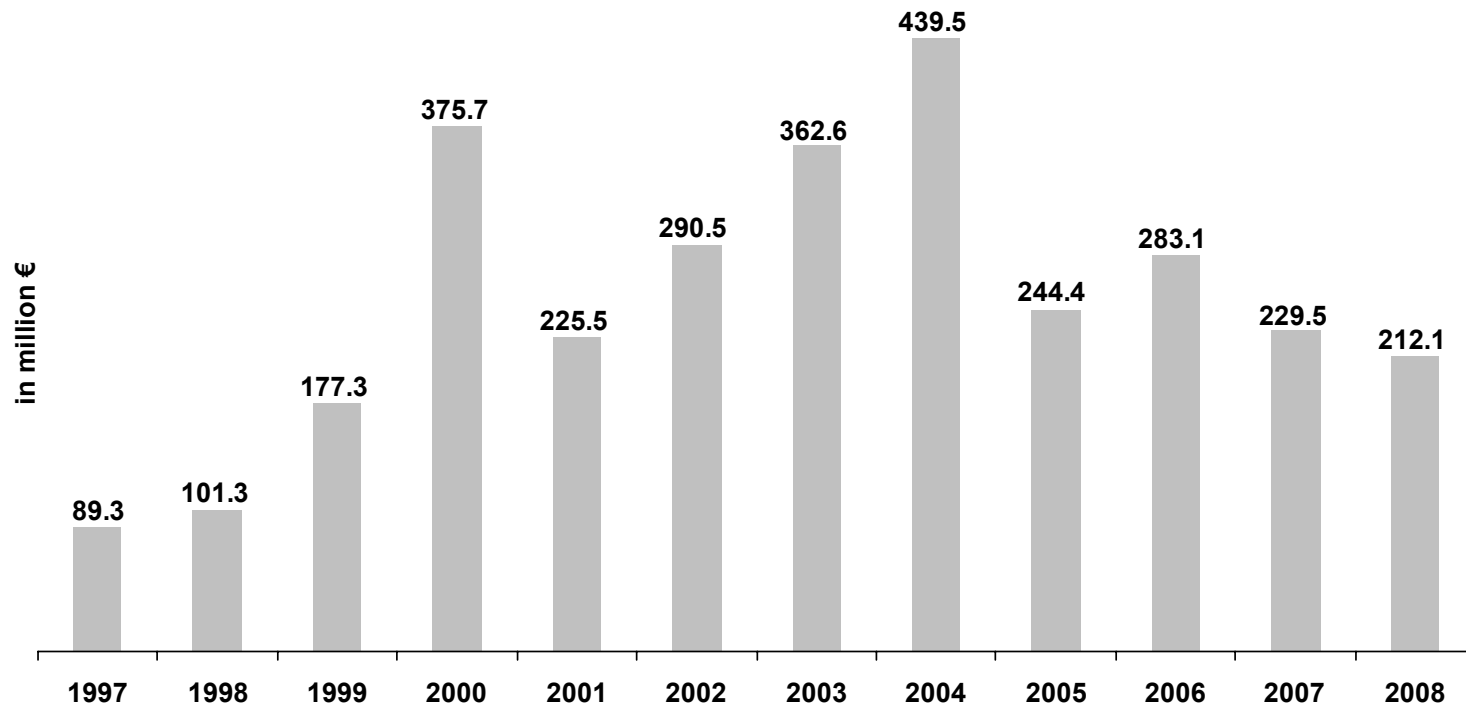
Solar

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# Group Revenue 1997 - 2008

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# Financial Overview

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in million €	Q2 2008	Q2 2009
<b>Revenues</b>	<b>51.0</b>	<b>31.7</b>
<b>Order Intake</b>	<b>70.8</b>	<b>23.4</b>
<b>Order Backlog</b>	<b>129.7</b>	<b>43.9</b>
<b>EBIT</b>	<b>-2.0</b>	<b>-5.7</b>
<b>EBITDA</b>	<b>4.6</b>	<b>-0.6</b>
<b>Profit Before Tax</b>	<b>-3.9</b>	<b>-7.0</b>
<b>Net Profit</b>	<b>-3.2</b>	<b>-7.8</b>
<b>Operating Cash Flow</b>	<b>6.1</b>	<b>3.5</b>
<b>Total Assets (YE)</b>	<b>424.6</b>	<b>380.5</b>

# Employees

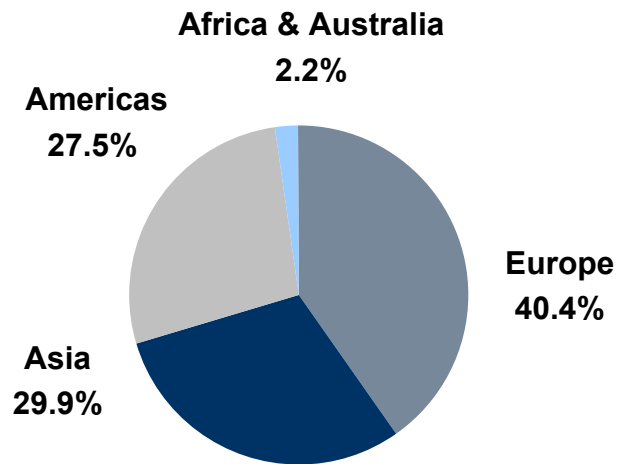
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	YE 2008	6M 2009	change
<b>HamaTech</b>	98	68	-30
<b>STANGL</b>	172	176	+4
<b>SINGULUS</b>	452	364	-88
<b>SINGULUS Group</b>	722	608	-114
<b>Domestic</b>	515	444	-71
<b>Abroad</b>	207	164	-43

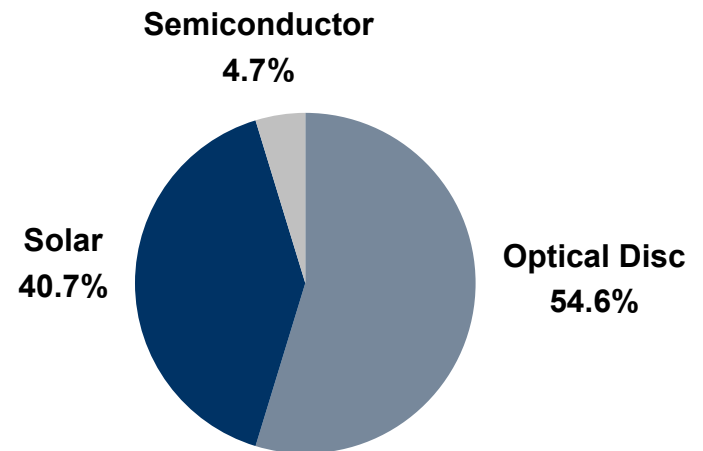
# Sales Split 6M 2009

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## ... by region



## ... by product



- Consolidation efforts to address market requirements and costs
- Market demand for Optical Disc and Solar slow, but growing activities for new projects
- Reduced cost base will lead us to improved financials in 2010 and back to profits

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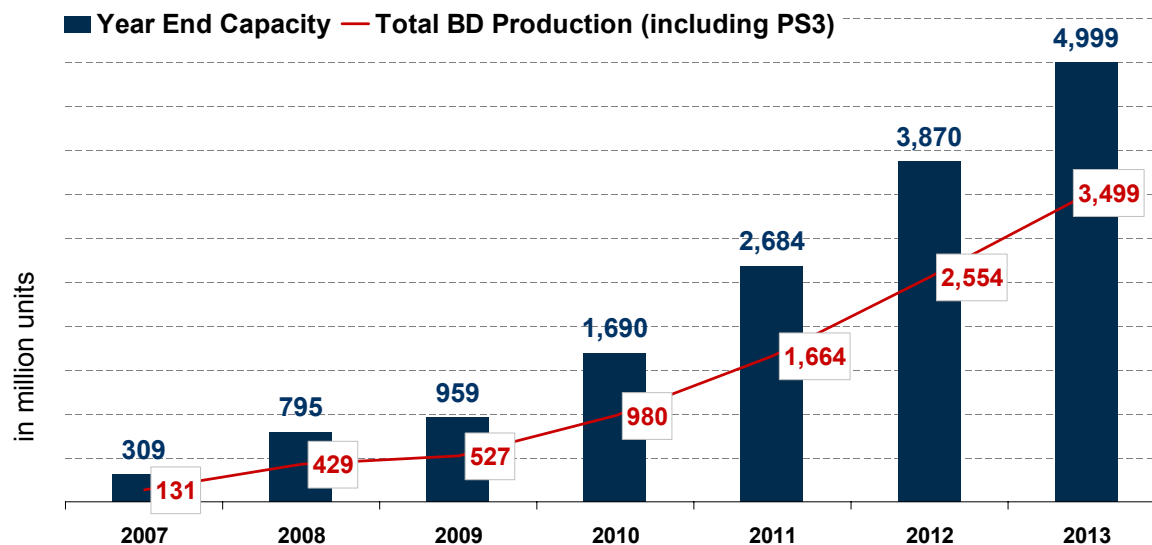
**Optical Disc**

Solar

Investment Highlights



# Optical Disc: Minimum Future BD Pressing Capacity Requirements Worldwide

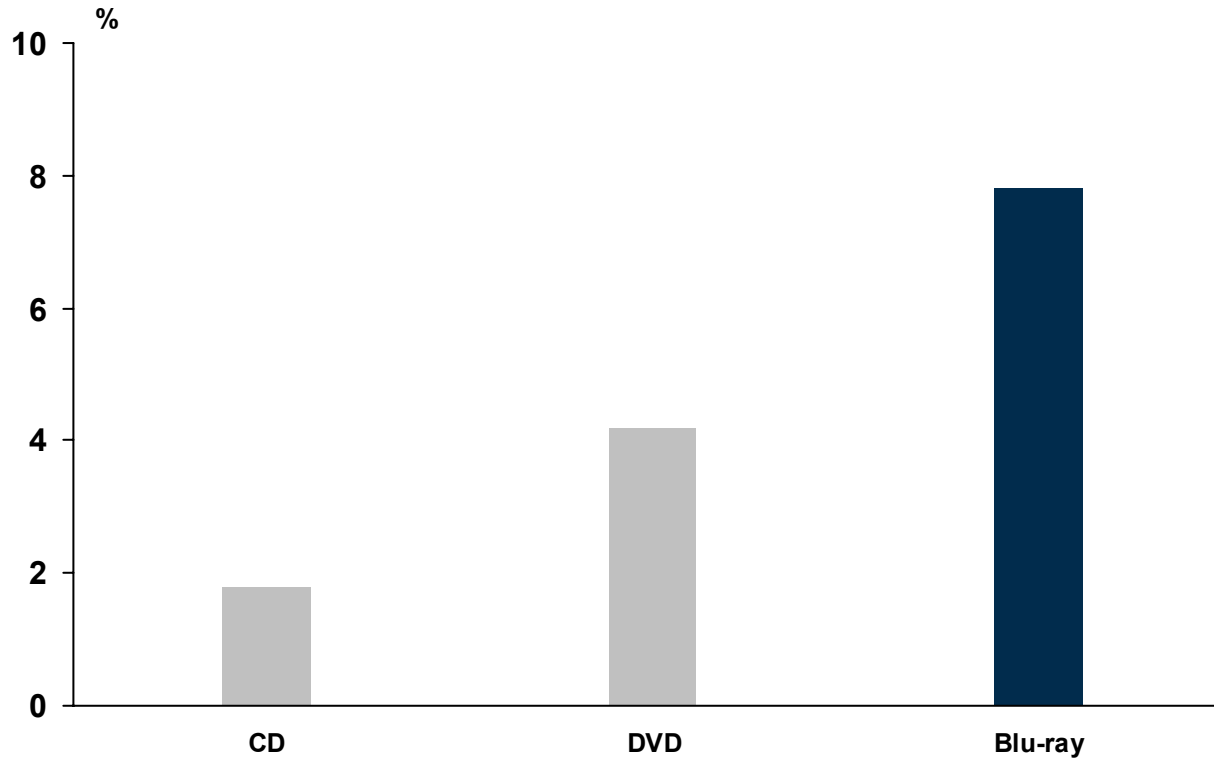


Capacity Utilization	50%	54%	55%	58%	62%	66%	70%
No. of Lines Installed at Year End	76	175	213(e)	338(e)	488(e)	645(e)	769(e)

Source: futuresource CONSULTING 2009 / own estimates

# Penetration of the 3 Optical Disc Formats in the US at 3rd Year

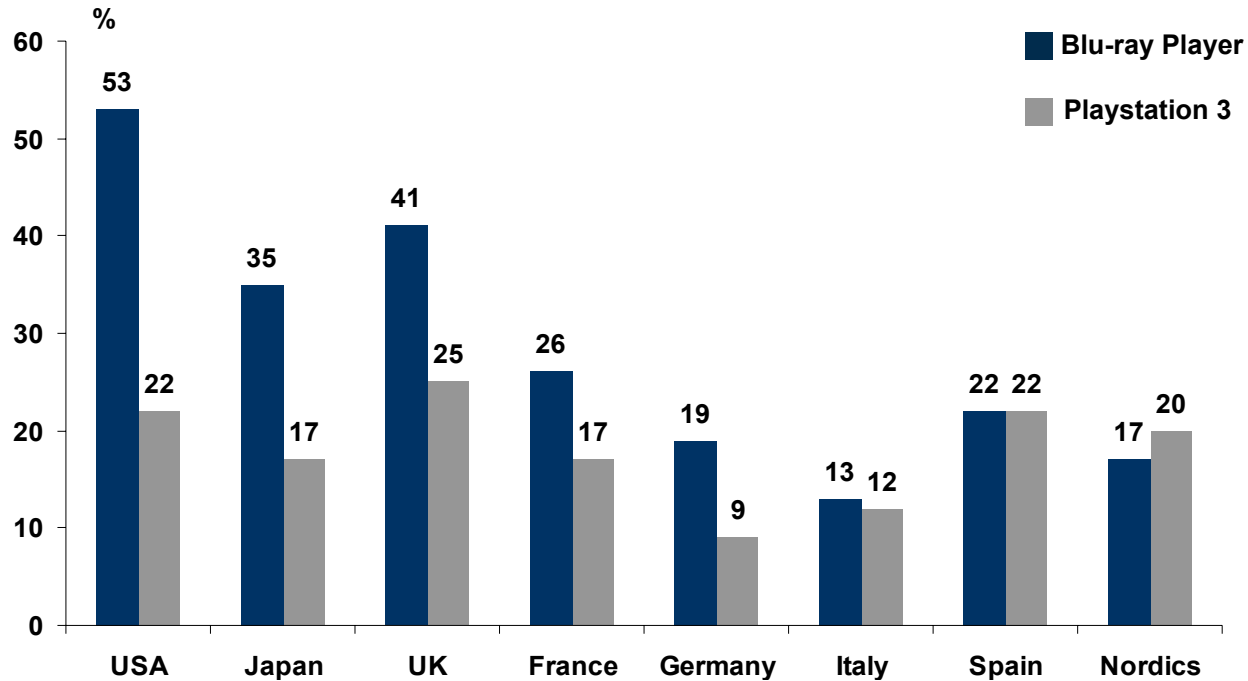
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Source: Adams Media Research

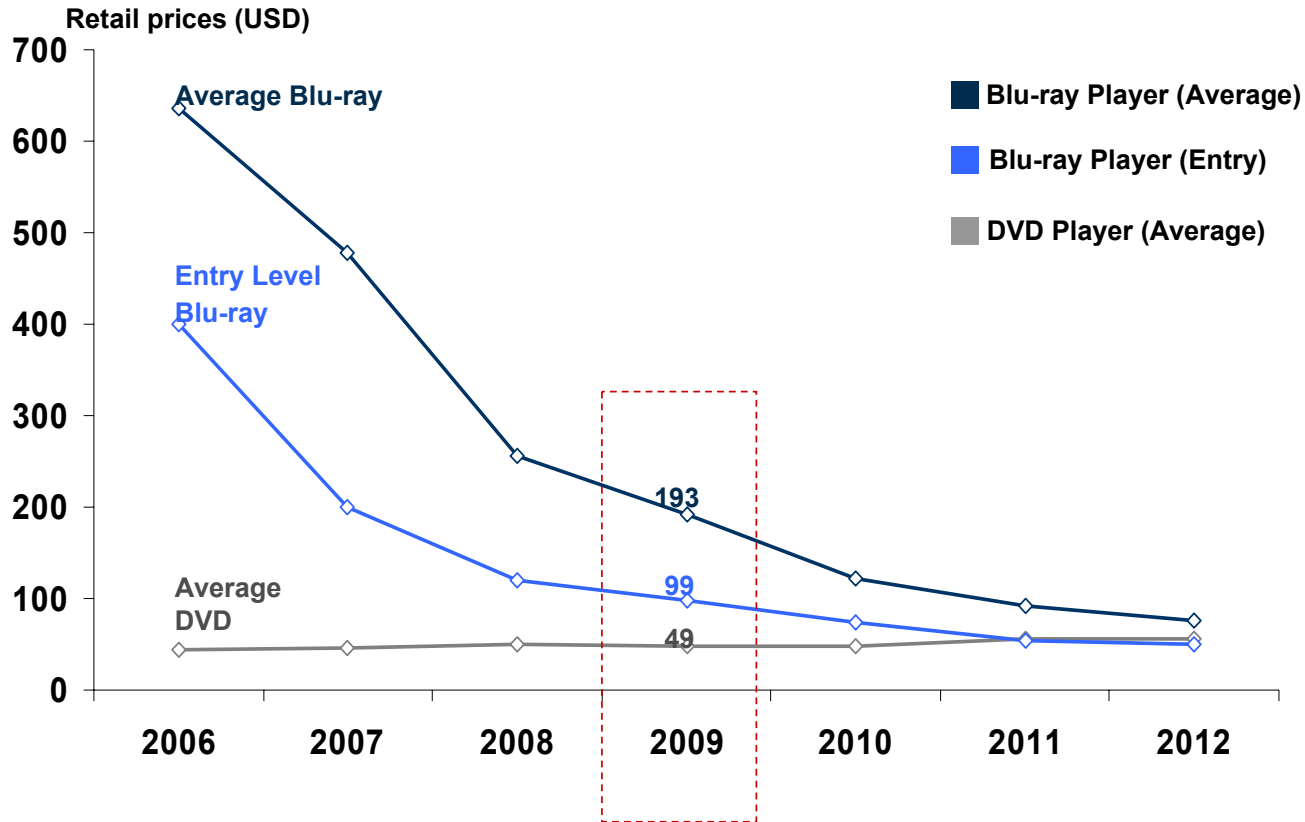
# Optical Disc: Expected Household Penetration by Blu-ray Players 2012

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Source: Futuresource Consulting, July 2009

# Optical Disc: Hardware Prices USA



Source: Futuresource Consulting, July 2009

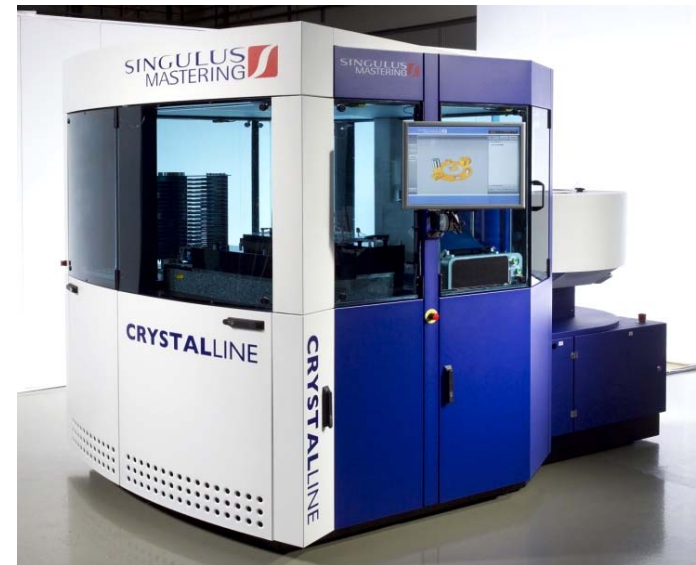
# Optical Disc: Mastering System CRYSTALLINE for Blu-ray

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## High Margin Product

- Unique Phase Change Technology
- No competitor (except Sony)
- Designed for Blu-ray Single & Dual Layer

## CRYSTALLINE



# Optical Disc: Replication System BLULINE II for Blu-ray Single and Dual Layer

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## High Margin Product

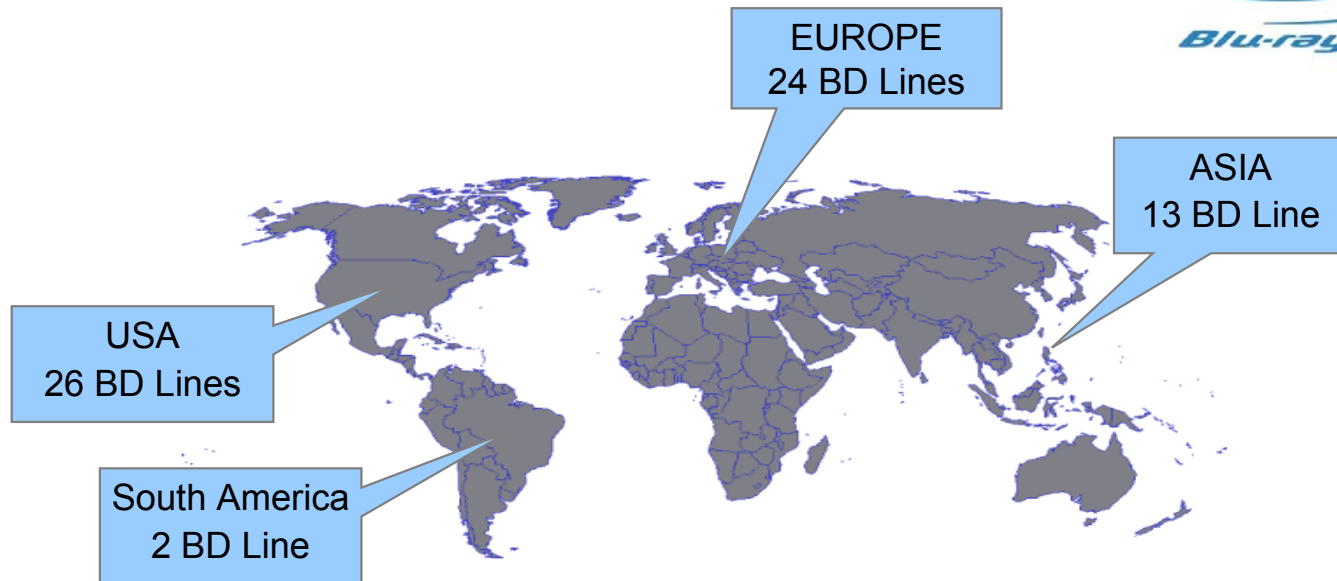
- Best of class
- Market share 80 % (without Sony)
- Excellent equipment performance

## BLULINE II



# Optical Disc: Global Presence of SINGULUS TECHNOLOGIES Group

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# Blu-Ray will be the Future Format in Home Entertainment

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- Over 150 BD Players
- More than 1,500 BD titles
- HD will be the norm for Home Entertainment
- 1 in 10 European homes now BD enabled
- 20 % by end 2011
- Half of 2009 BD player sales expected in Q4
- Unstoppable momentum for format

Increased availability

Enhanced home entertainment

BD innovation

Unstoppable momentum

# Optical Disc :Blu-ray Future With More Than 50 GByte

## Blu-ray – the Driver of Future Growth

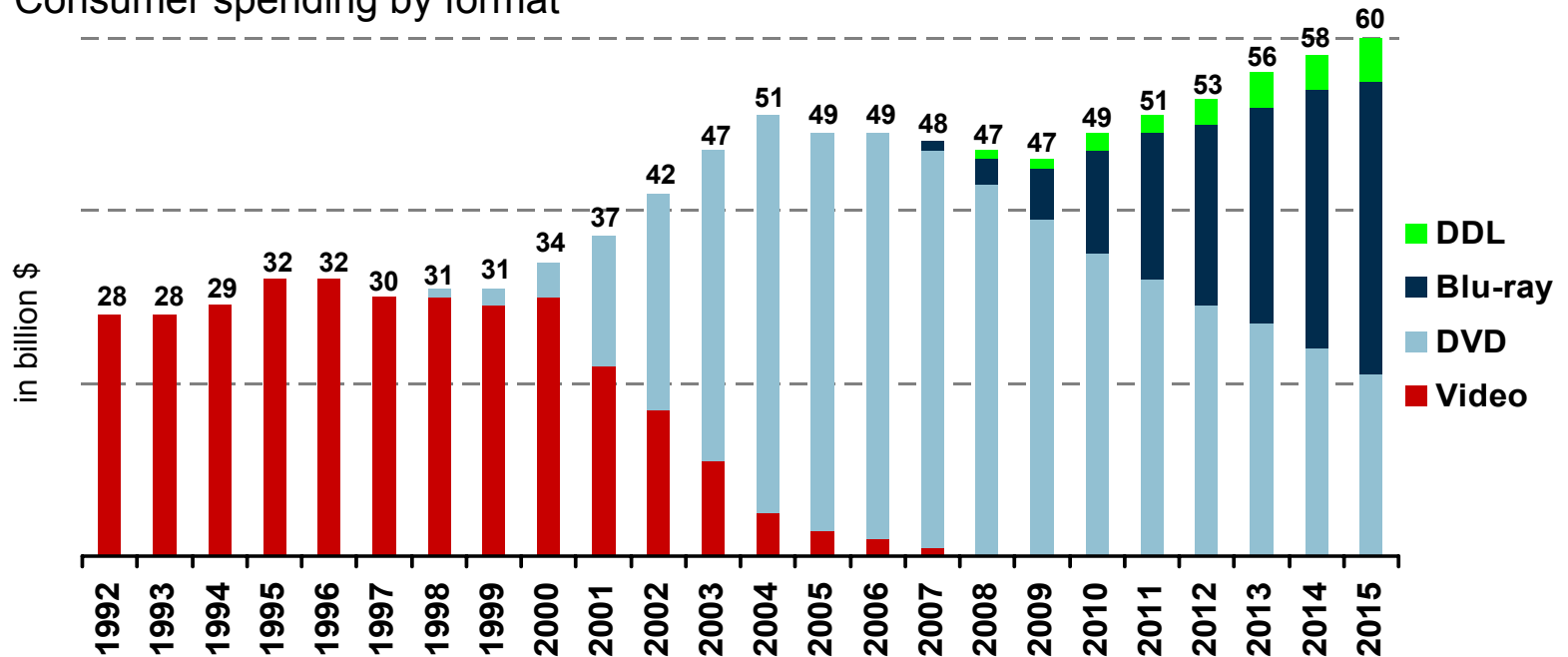
- 25 Gbyte → Games
- 50 Gbyte → High resolution movies  
1080 x 1920 pixels
  
- Future upside for BD Technology → Future applications
- Capacity up to 100 Gbyte by triple layer →
  - New 3 D movies in HD quality
- Capacity up to 1000 Gbyte by multiple layer →
  - "Super Hi-Vision" technology, resolution up to 7680 x 4320 pixels
  - Professional storage

- Packaged media (DVD + Blu-ray) are by far the first choice of consumers for home entertainment
- Decline in DVD, but consistently growing Blu-ray market
- Blu-ray is the key driver for growth in the media business over the next years
- Online delivery is growing, however at low levels with market share below 5 % of total market
- Packaged media (DVD + Blu-ray) generate higher revenues for Hollywood studios than movie theaters – more than 50 % of total revenues

# Optical Disc Innovative Formats Like Blu-ray and Digital Will Grow Global Spending to \$60B+

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Consumer spending by format\*



\*Rental and sell-through (excluding EST rental)

Source: WDSHE Distribution Outlook, Screen Digest Video Intelligence, WDSHE Estimates (FYP), Q2 2008

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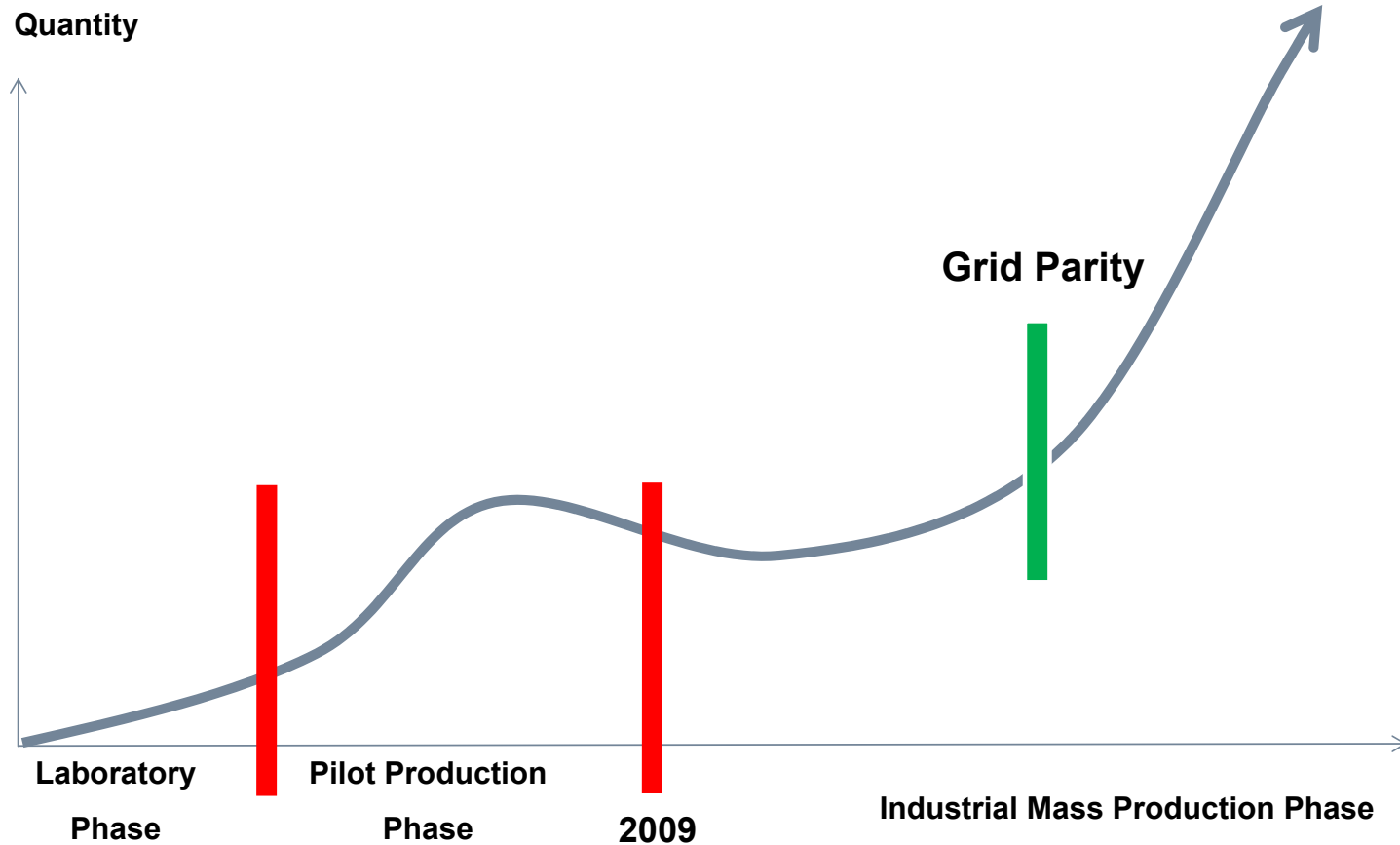
**Solar**

Investment Highlights

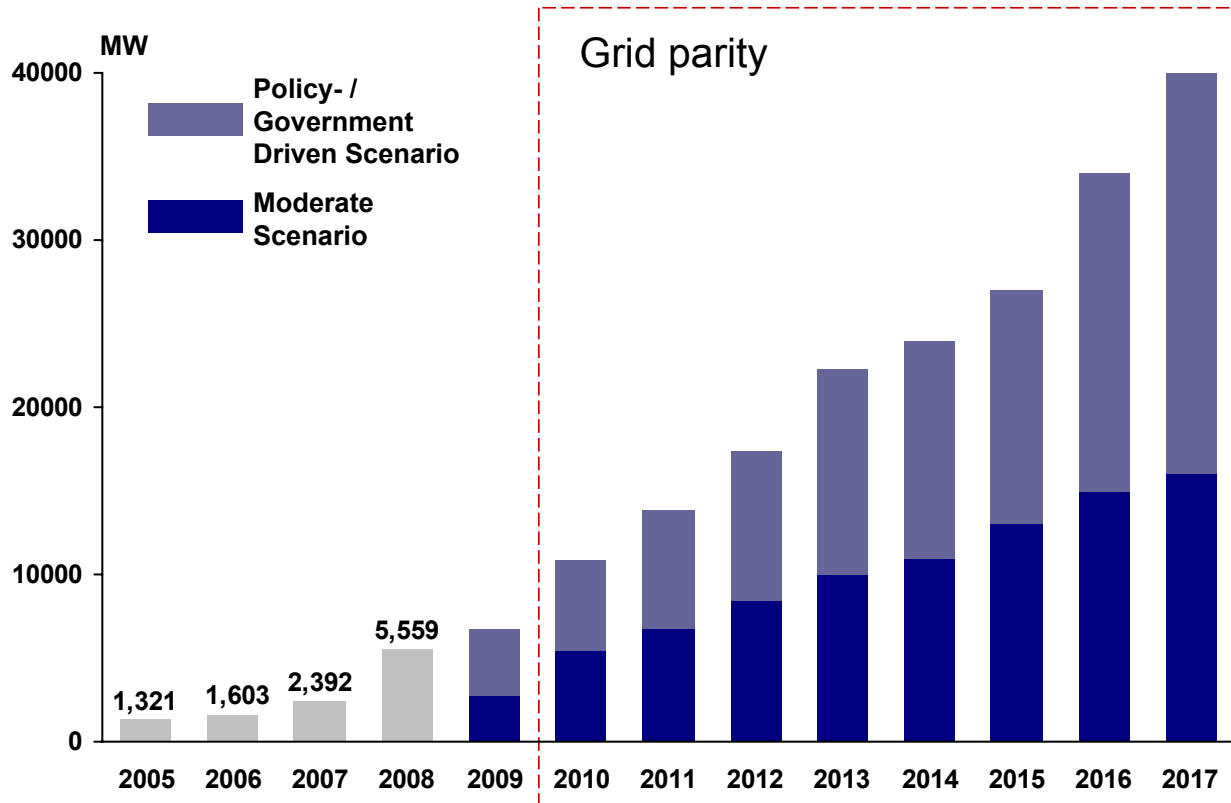


# Solar: Market Development

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# Solar: Growth Market 2000-2013



Source: European Photovoltaic Industry Association (EPIA) March 2009, & own figures

## Up to 2008

- Fast growing market
- Higher demand than supply
- High margin business

## 2009

- Higher supply than demand
- Market prices declining
- Lower margins vs. the past
- Change from seller market to buyer market

## 2010 and later

- Growing market long term with higher supply than demand
- Market will remain buyer market
- Price pressure will call for innovation and standardization
- New designs for cells and panels
- New designs for manufacturing processes and equipment for lower cost of ownership
- Price pressure will drive consolidation for cell/panel manufacturers and equipment supplier

# Solar: SINGULUS/STANGL

## Main Business Areas Photovoltaic

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### Silicon Solar Technology

#### Process Equipment for Silicon Solar Technology

STANGL provides completely automated solutions for poly silicon etching as well as treatment for Si wafers & cells in standard and high-efficient production lines.

SINGULUS has developed an AR coating system which meets the demands for both current and future PV cell designs.



### Thin-Film Solar on Glass

#### Process Equipment for Photovoltaic Thin-Film Cells on Glass

STANGL provides high-tech systems which are used for fully-automated coating processes of the single-sided wet chemical CdS .

Dry Process Equipment is ready for market introduction this year.



### Thin-Film Solar on Flexible Substrates

#### Process Equipment for Photovoltaic Thin-Film Cells on Flexible Substrates

Thin-Film solar cells on flexible substrates are on the advance due to their properties of low weight, high flexibility and low cost of manufacturing compared to silicon based solar cells.

# Solar: Sustainable Investment with SINGULUS/STANGL

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## Silicon based Solar Cells



## Thin Film Solar Cells on Glass

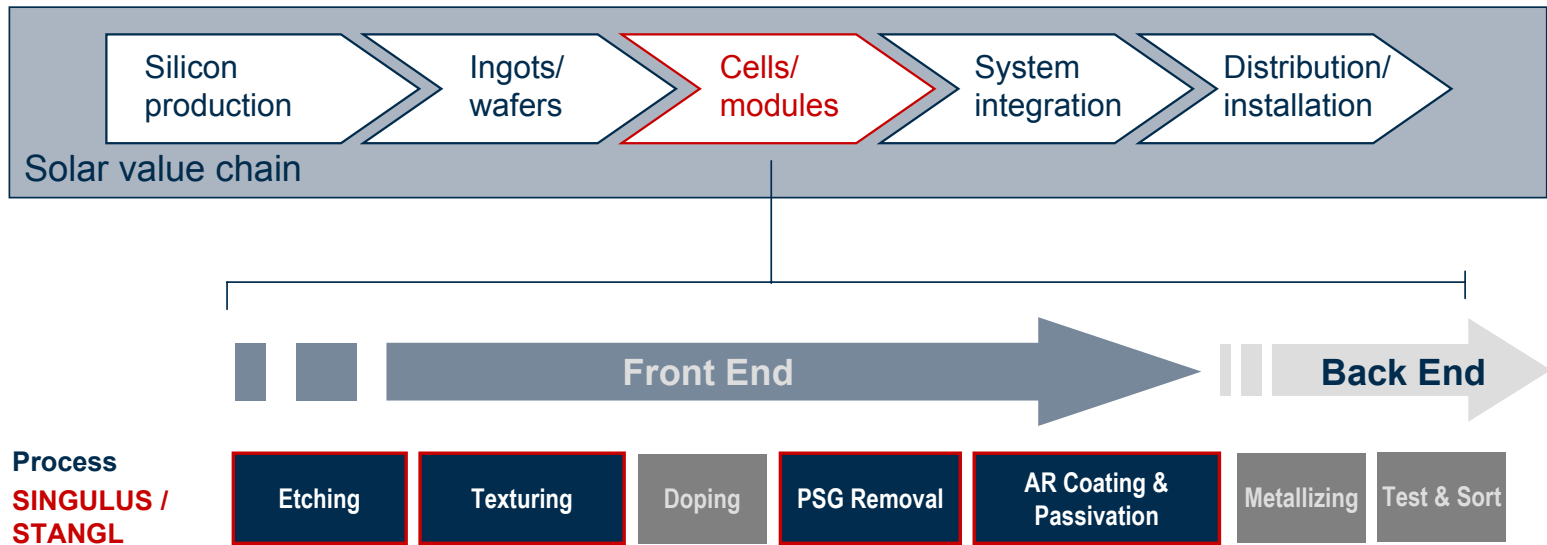


## Thin Film Solar Cells on Flexible Substrates



# Silicon Solar: SINGULUS/STANGL Proprietary Technologies

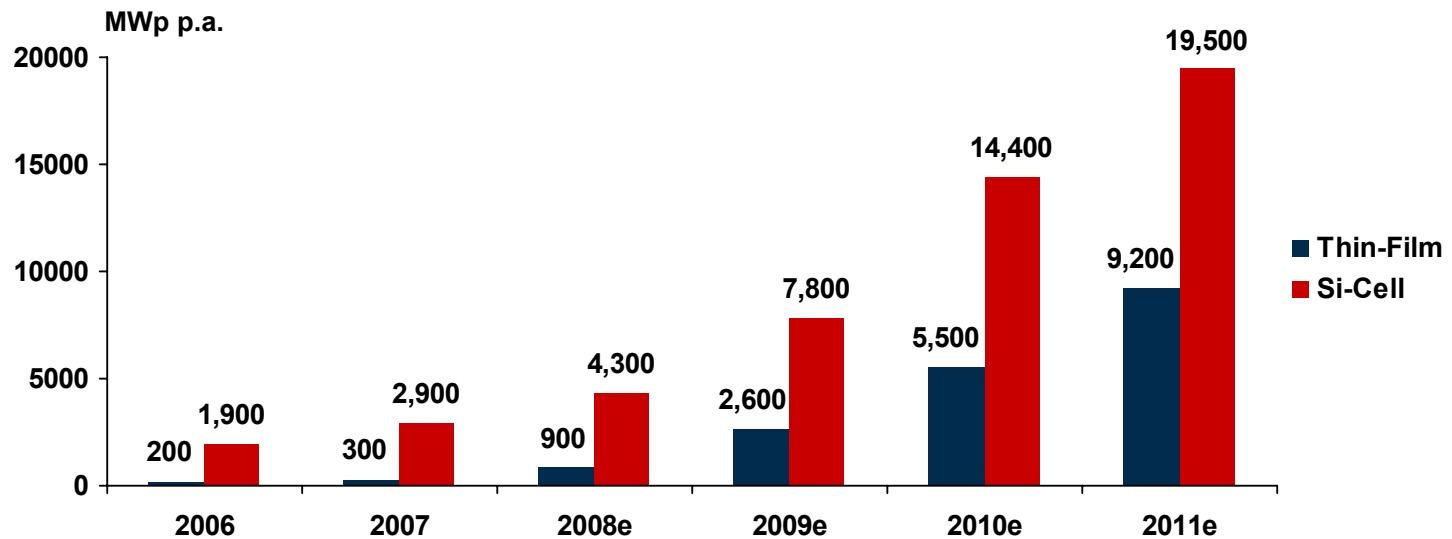
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# Silicon Solar: Strong Growth Projections

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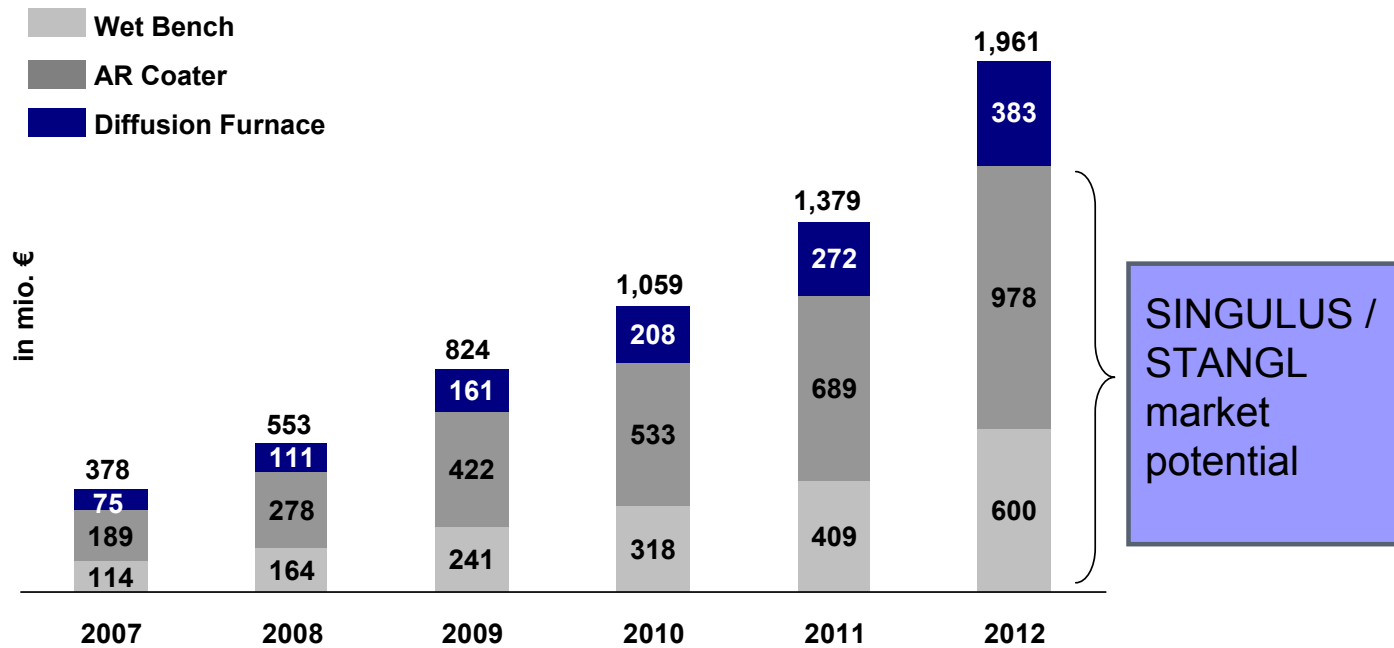
Total Capacity: over 70 % CAGR 2007-2011



Source: Commerzbank Equity Research, August 2008

# Silicon Solar: Total Front End Equipment Market

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Source: Yole Developement 2008

# Silicon Solar: SINGULUS/STANGL Combined Strengths in Solar

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## Silicon Solar Cells

MATERIA/GERULUS  
Saw Material /Si Block

SILEX Batch  
PSG/Texturing

LINEA Inline  
PSG/Texturing

SINGULAR  
AR Coating

Established Solar Competence  
Complementary R&D Activities

# Silicon Solar: Wet Processing for Si-Raw Material & Si-Blocks

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## MATERIA for Etching, Cleaning & Drying of Polycrystalline Silicon Material



## GERULUS for Precleaning & Deglueing of Wafer Blocks



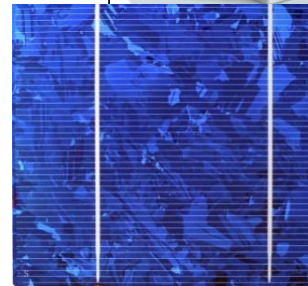
# Silicon Solar: : Wet Process Equipment

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## Batch Texturing & PSG Removal of Cells

- Wet Process Equipment for Photovoltaic Si-Cells
- Economic processing of multi/mono crystalline solar wafer
- Lowest cost of ownership
- Outstanding machine and process reliability
- State-of-the-art design and technology

## SILEX



# Silicon Solar: Wet Process Equipment

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## Inline Texturing & PSG Removal of Cells

- For Si wafer & Si cell production
- Inline machines for wafer-cleaning / texturing and PSG-removal
- First Shipment 2009

## LINEA



# Silicon Solar: SINGULAR Modular Inline AR Coating System

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## Advanced AR Layer Deposition

- Fully automated system “Single Cell”
- For coating of anti-reflective and passivation layer on silicon cells
- Inline concept for high throughput
- High quality coatings for high performance cells
- Modular concept

## SINGULAR



# Thin Film Solar: SINGULUS/STANGL - Combined Strengths

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## Thin Film Solar:

TENUIS  
Glass

VITRUM Inline  
Glass

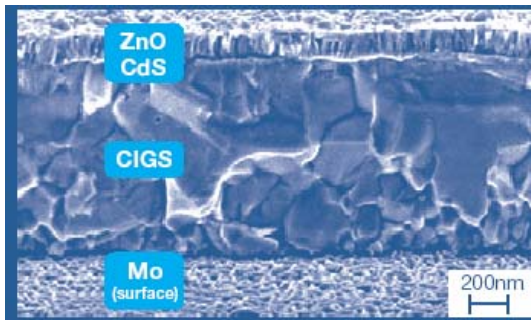
IMPEDIO  
Flexible Substrates

ILGAR

Established Solar Competence  
Complementary R&D Activities

## TENUIS

- Economic processing of CdS buffer layers for CIS Cells
- Uptime > 98 %
- High throughput



## Thin-Film Solar Cells on Glass



## VITRUM – Inline

- For all thin-film applications
- Cleaning – etching – coating
- Uptime > 98 %
- High throughput

## Thin-Film Solar Cells on Glass



# Thin Film Solar: Wet Processing on Flexible Substrates

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## Coating, cleaning and etching for Flexible Substrates

- Efficient process for coating, cleaning and etching
- Roll to roll
- Uptime > 98 %
- High throughput

## IMPEDIO



- Increasing market demand in thin-film technology
- Strong market demand for innovation “ILGAR” - Ion Layer Gas Reaction Process to substitute toxic materials
- First R&D Project with key costumers

## Mid-Term Goals Optical Disc

- Leading Optical Disc equipment manufacturer worldwide
- Overcome entrance barrier into Sony
- Follow Blu-ray development up to 100 Gbyte (R & D activities for 1000 Gbyte)

## Mid-Term Goals Solar

- Leading supplier of production equipment for silicon and thin film cells
- Enabler of mass production of new cell design and manufacturing processes by lower cost of ownership
- Innovative approach to reach “grid parity” as fast as possible
- Global presence in all relevant markets

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