

NSG
GROUP

The Solar Opportunity

14 November 2008

The Solar Opportunity Agenda

- Solar Industry Background
- Glass as Part of the Solar Industry
- NSG Group as a Solar Player
- NSG Group Current Plans
- NSG Group Future Options

Drive for Renewable Energy

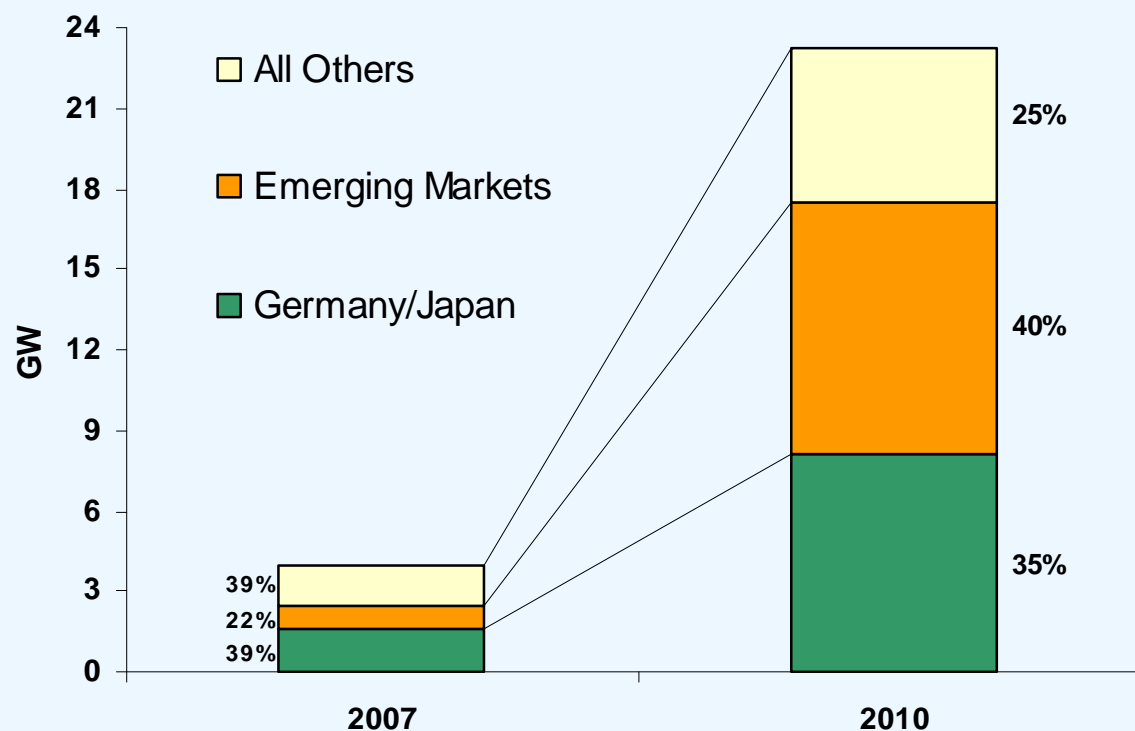
- Legislation
 - Kyoto and subsequent EU & national targets
 - Carbon Trading, EU ETS encourage CO₂ reductions
- Subsidies to achieve the above
 - Feed-in Tariff: Germany, Spain, Italy, etc.
 - Japan indicated likely support for 50% subsidy for homeowner installations
 - Many other schemes, such as US, emerging
- A move from hydrocarbons is essential
 - Supplies are not limitless
 - Climate change is a reality
- Many systems make economic sense without subsidy

The Economics of Solar

- Fossil fuel costs will rise, increasing electricity prices
- PV costs falling through economies of scale and technology improvements
- Solar 'Grid Parity' has already been achieved in some sunny, high energy cost countries.
- Even without parity, investments can give good return, assisted by 'Feed-in Tariffs'
- Ideal for 'Off-Grid' where connection is difficult
- Power from solar is generated at time of peak demand and peak price

Long Term Energy Outlook

Installations by Market, 2007 to 2010 (GW, Percent)



Source: PHOTON Consulting. Note: Rough estimates. Emerging markets include Spain, Italy, and North America

Grid Parity

Abundant sun, high electricity prices

Already achieved – California

Within 4 years – Japan, Italy, other Southern Europe & USA

Future Outlook – Australia, Germany, other Central Europe

- Fossil fuel cost continue to rise, whilst PV costs fall due to technology improvements and up-scaling
- Grid parity is quoted as the “magic \$1/Wp”. First Solar current costs are around \$1.08/Wp

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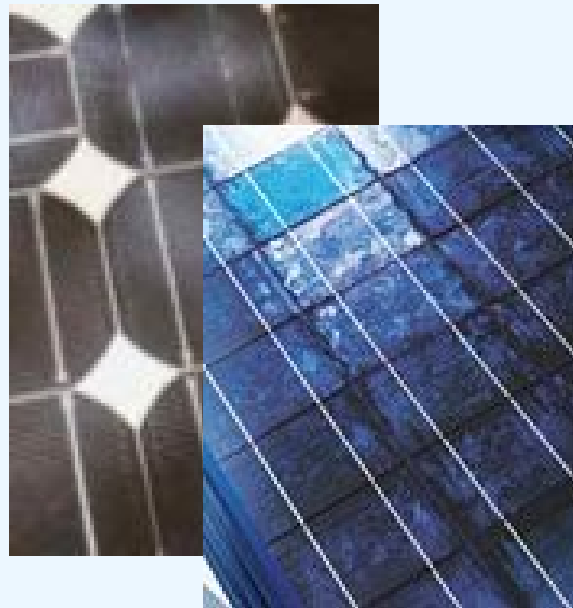
Solar Technologies and Glass Usage

Concentrated Solar Power
Large area, high sun



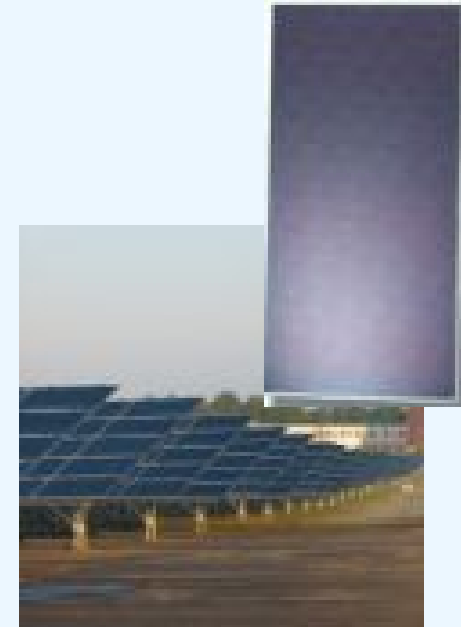
Low Iron Float

Crystalline PV
High efficiency, high cost



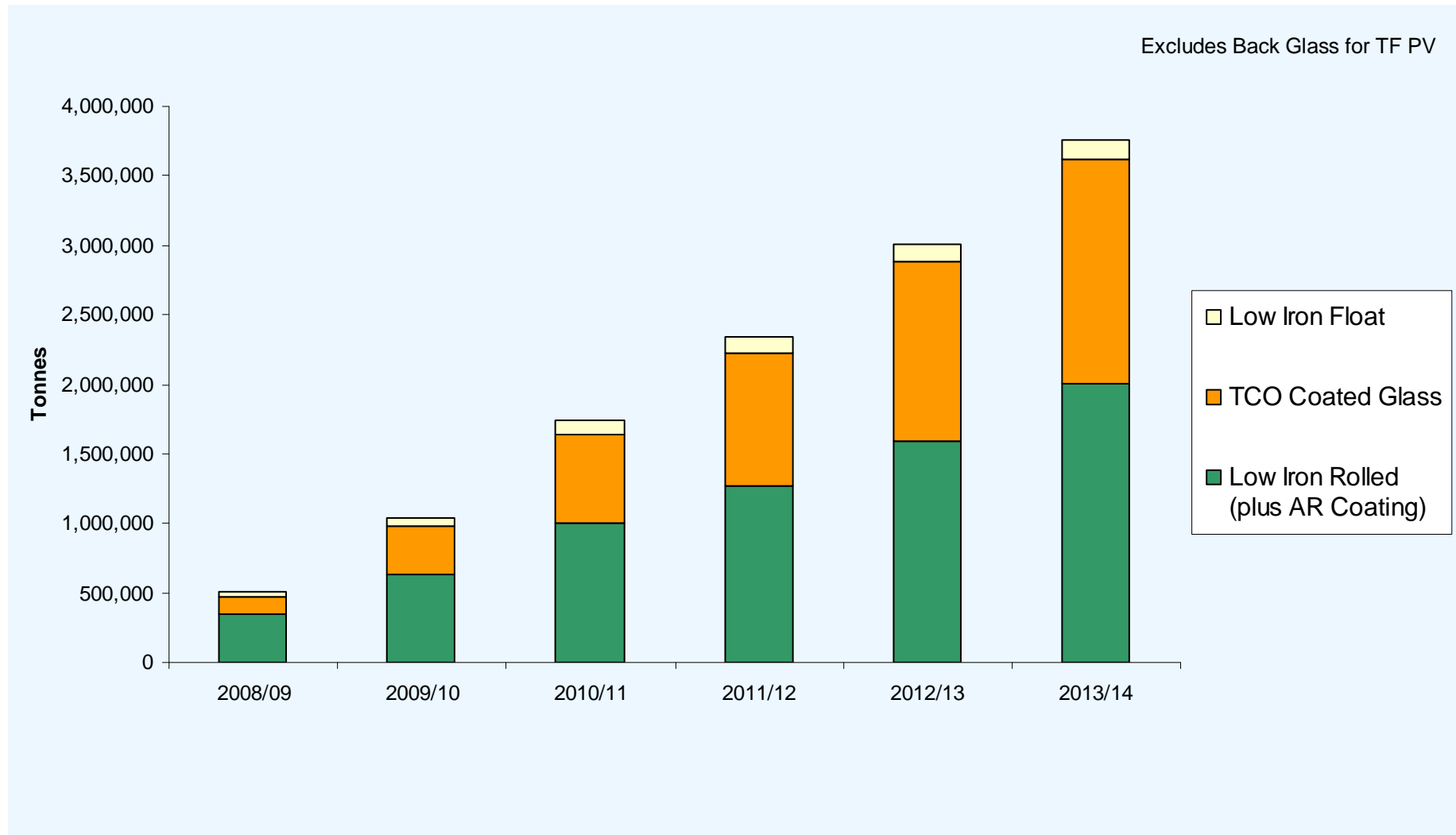
Low Iron Rolled
plus AR Coating

Thin Film PV
Low \$/W, large area



Transparent Conductive
Oxide Coating on Float

Solar-Related Glass Demand



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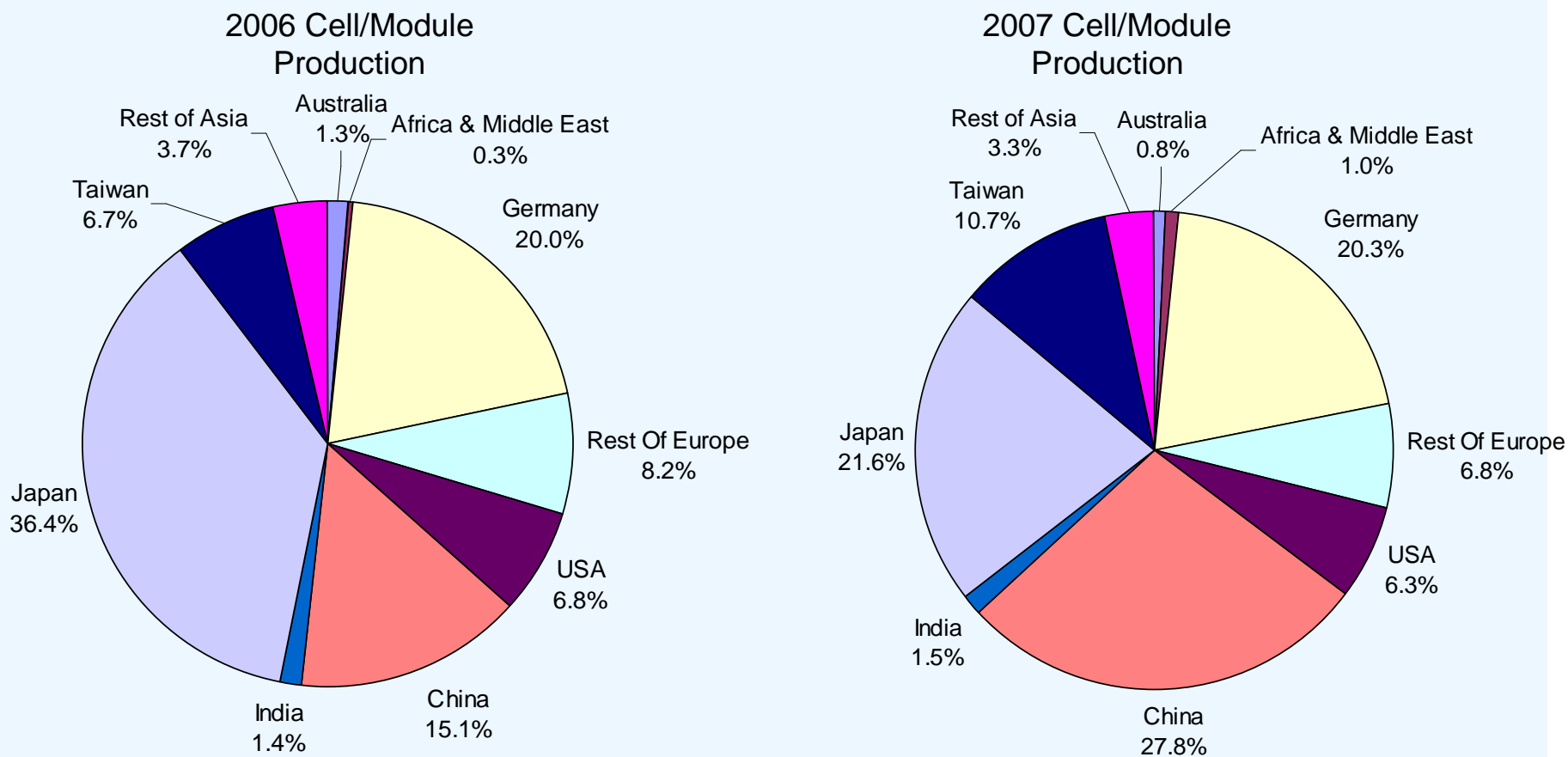
1. Low Iron Rolled and AR for Crystalline PV



1. Low Iron Rolled and AR for Crystalline PV

- Glass demand compound annual growth rate of close to 40% over the next 5 years*
- Emergence of anti-reflection (AR) coating technology to enhance module performance
- Strong historical position through Pilkington operations
- NSG Group investment in China in response to module manufacturer expansion

Crystalline PV Module Production



Increasing move towards China for module manufacture

2. TCO Coated Glass for Thin Film PV



2. TCO Coated Glass for Thin Film PV

- Glass demand compound annual growth of around 65% over the next 5 years*
- Market leading multi-layer, on-line coating technology which can be 'tuned' to customers' PV technology
- Current market share >70%
- Coating operations in North America, Europe and Japan
- Coating capacity expansion underway

* NSG Group Estimate

3. Low Iron Float for Concentrated Solar Power



Image courtesy of Flabeg GmbH

3. Low Iron Float for Concentrated Solar Power

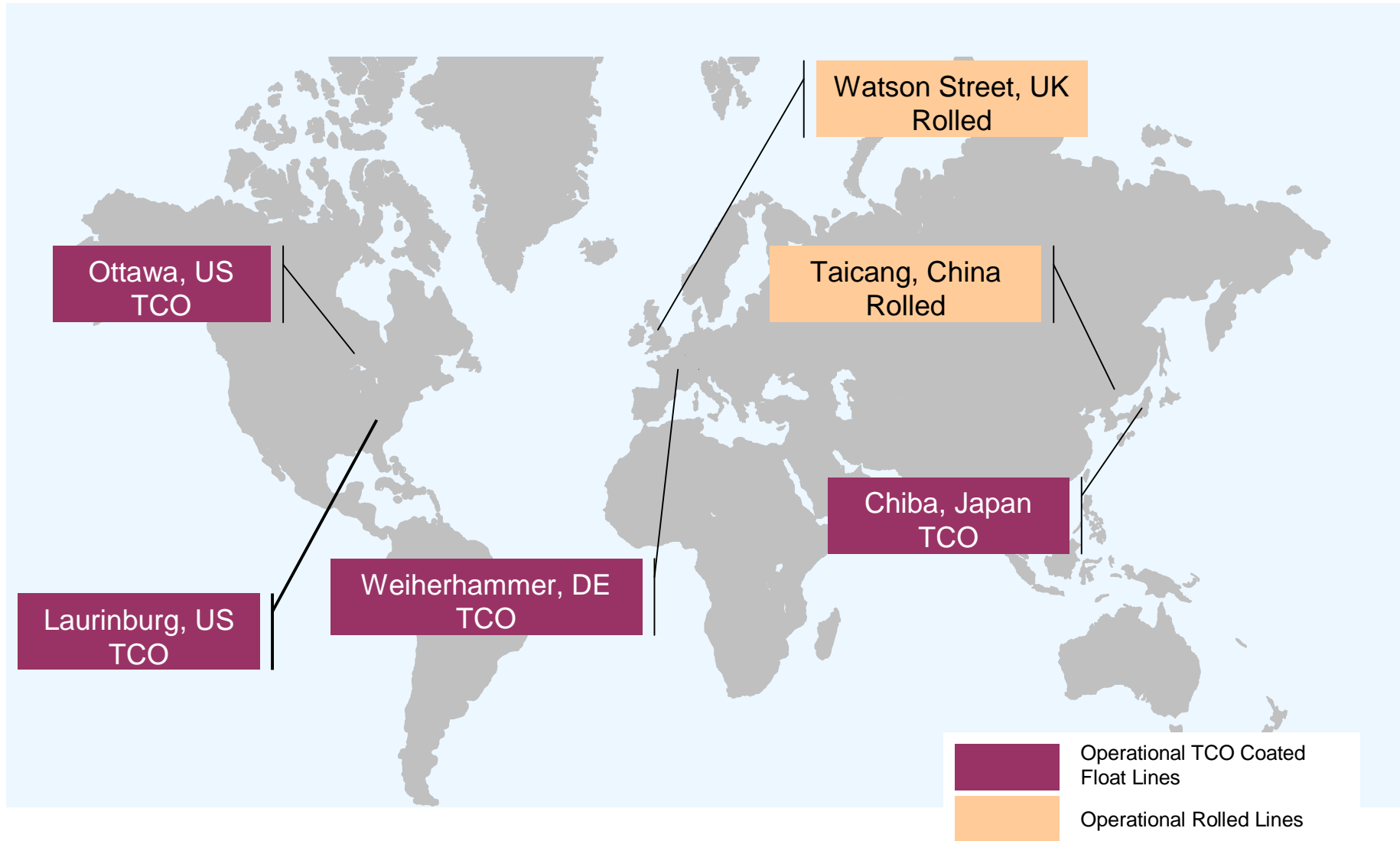
- Glass demand compound annual growth rate of close to 30% over the next 5 years*
- Product of choice for parabolic trough market leader
- Forward look demand to be supplied from existing plants

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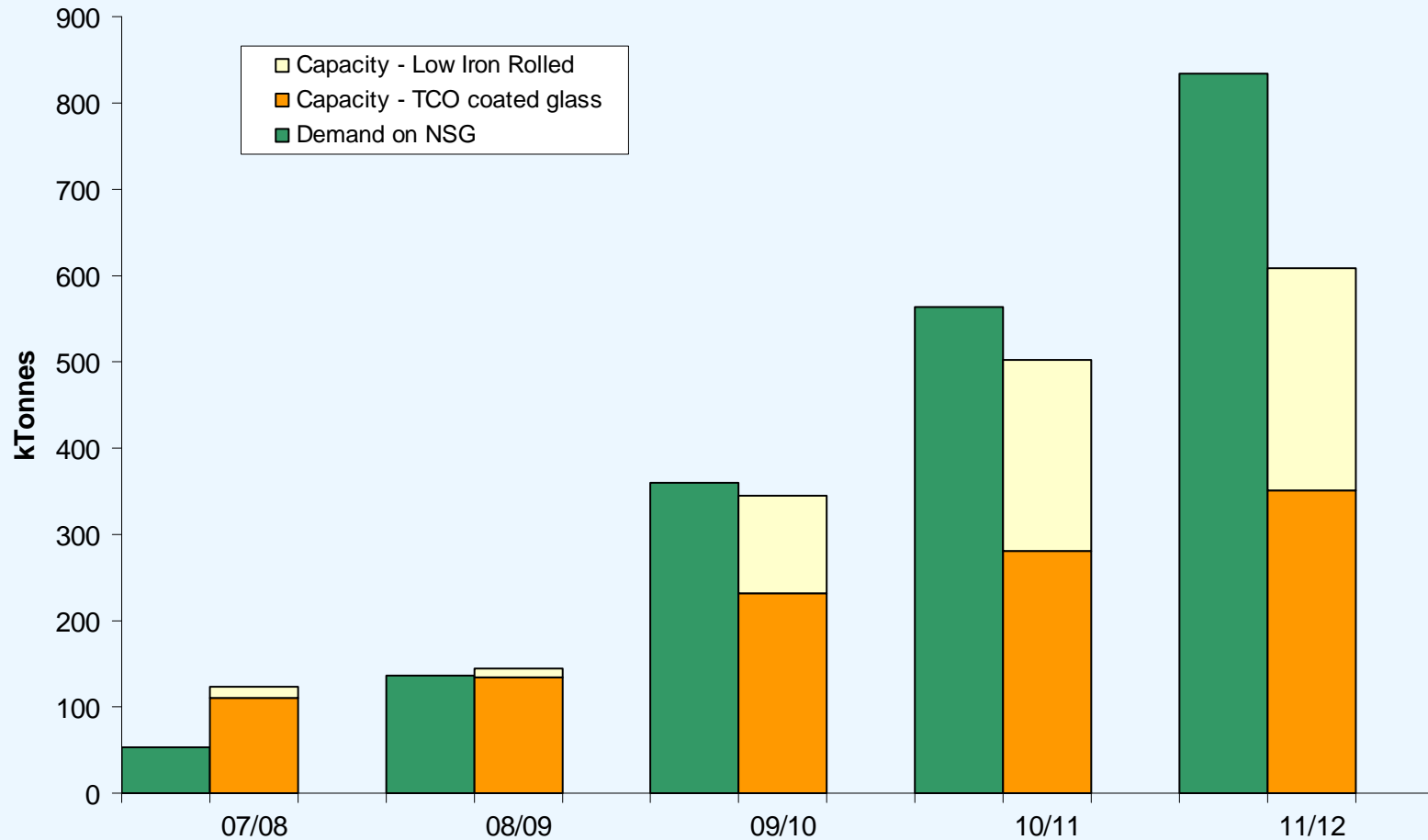
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Solar Production Facilities

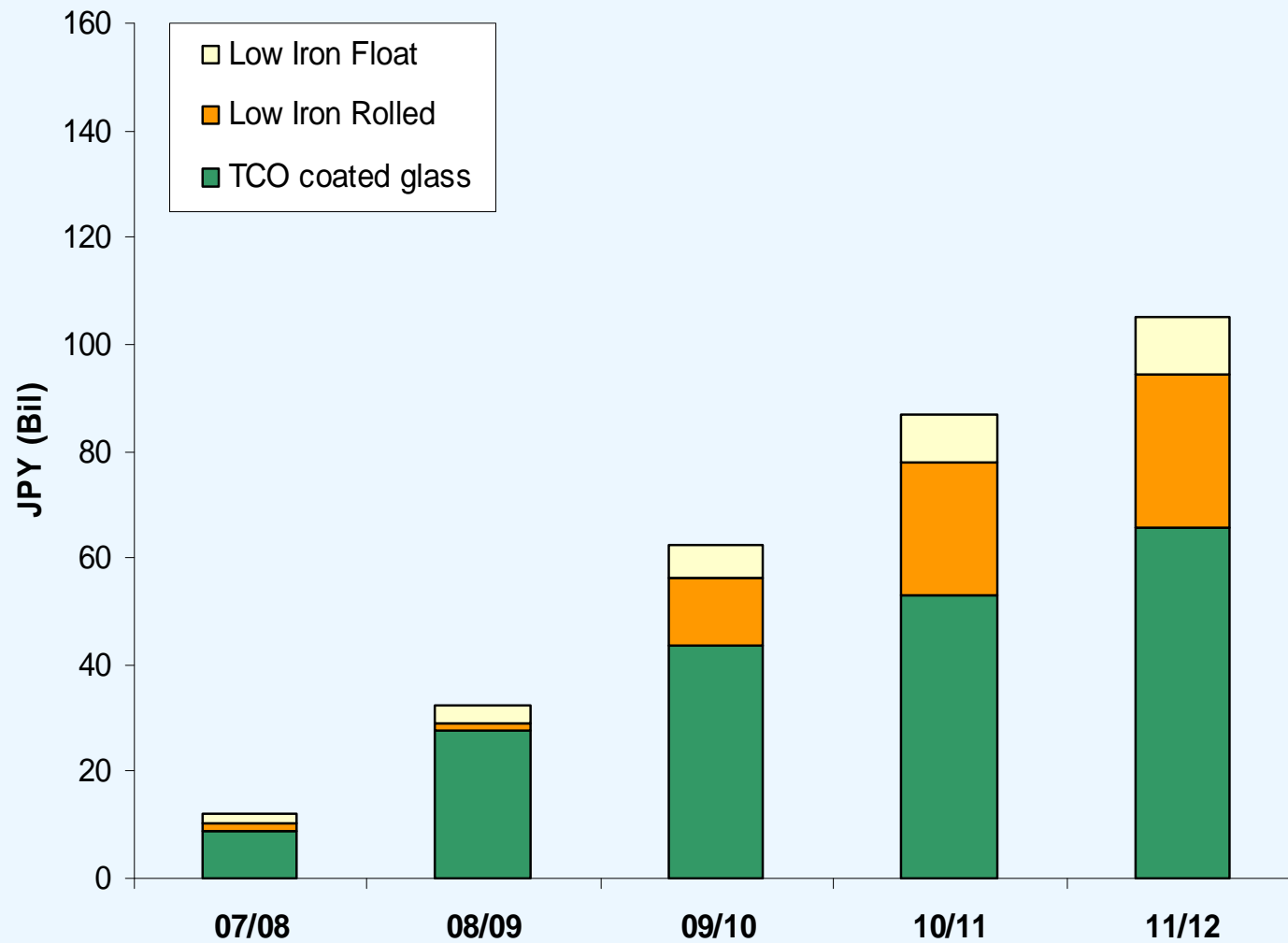
Operational Plants



NSG Group - Current and Planned Capacity



NSG Group Sales from Solar Sector



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NSG Group Future Growth Options

- Low Iron Rolled for Crystalline PV
 - Further additional capacity in China through JVs
- TCO coated float for Thin Film PV
 - Further conversion in US
 - Further conversion in Europe
 - Multiple conversions in Japan & Asia
 - New build opportunities dedicated to Solar

TCO Investment Metrics

- Greenfield TCO float
 - Around €180M investment cost
 - 100kT TCO per annum
 - 24 months minimum from approval to glass
- Float conversion
 - €25M cost, includes float and toughening
 - 60kT TCO per annum
 - 18 months minimum from approval to glass

Summary

- Substantial market growth expected in all solar sectors
- NSG Group has a leading position in the Thin Film PV sector and plans to expand capacity to maintain this leadership
- NSG Group well placed to enjoy strong share in the crystalline PV sector through JV partnerships and strong customer relationships
- 10% of Group revenue from Solar in FY11

Notice

The projections contained in this document are based on information currently available to us and certain assumptions that we consider to be reasonable. Hence the actual results may differ. The major factors that may affect the results are the economic environment in major markets (such as Europe, Japan, the U.S. and Asia), product supply/demand shifts, and currency exchange fluctuations.

Nippon Sheet Glass Co., Ltd.

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