



**REC Group**  
**The most trusted brand in solar**



**REC**

ENERGIZING LIFE TOGETHER

APRIL 2017

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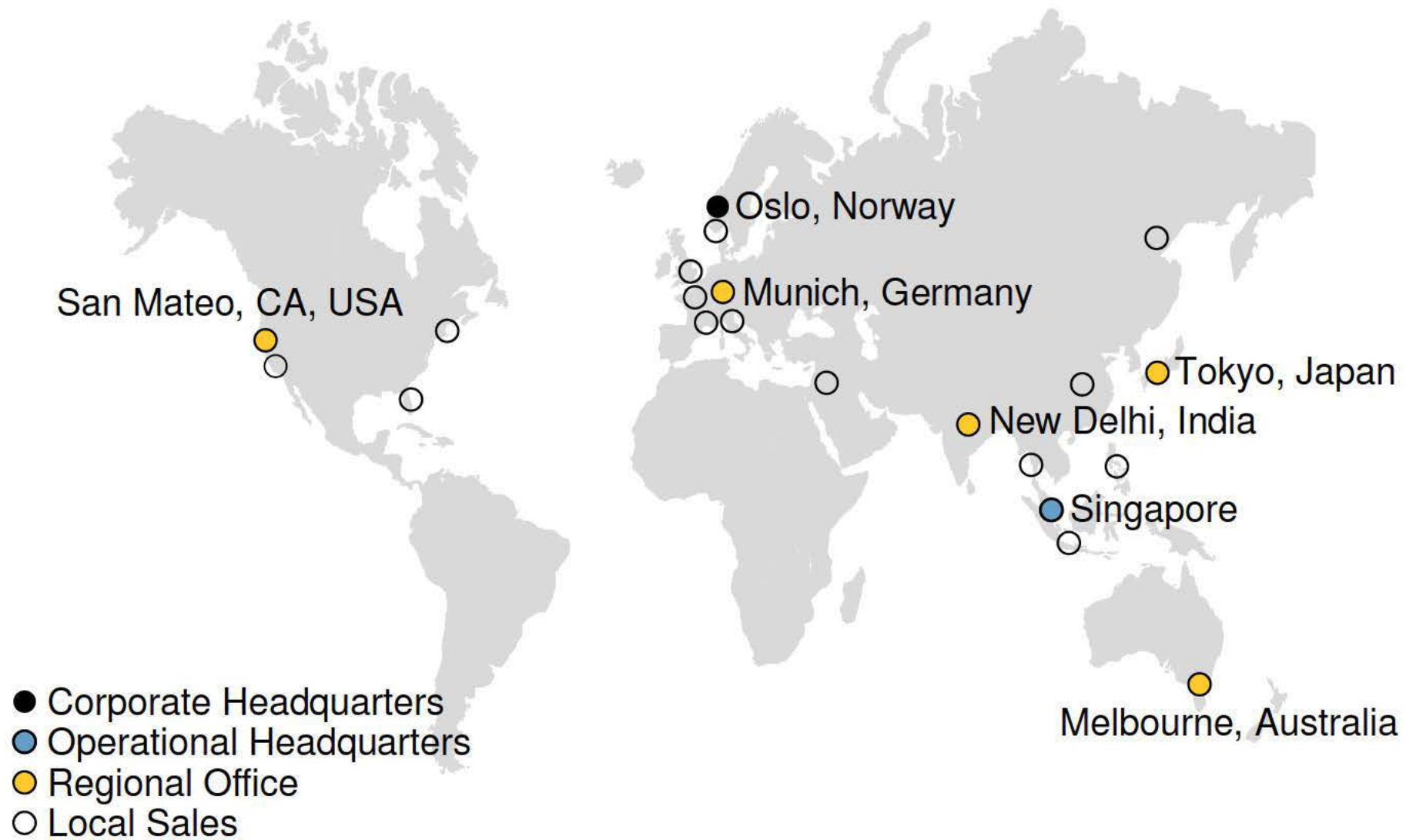


2.2 MW, Singapore

## Company profile



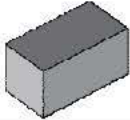









# REC Group is a global company





# REC's integration throughout the solar PV value chain allows for quality control every step of the way

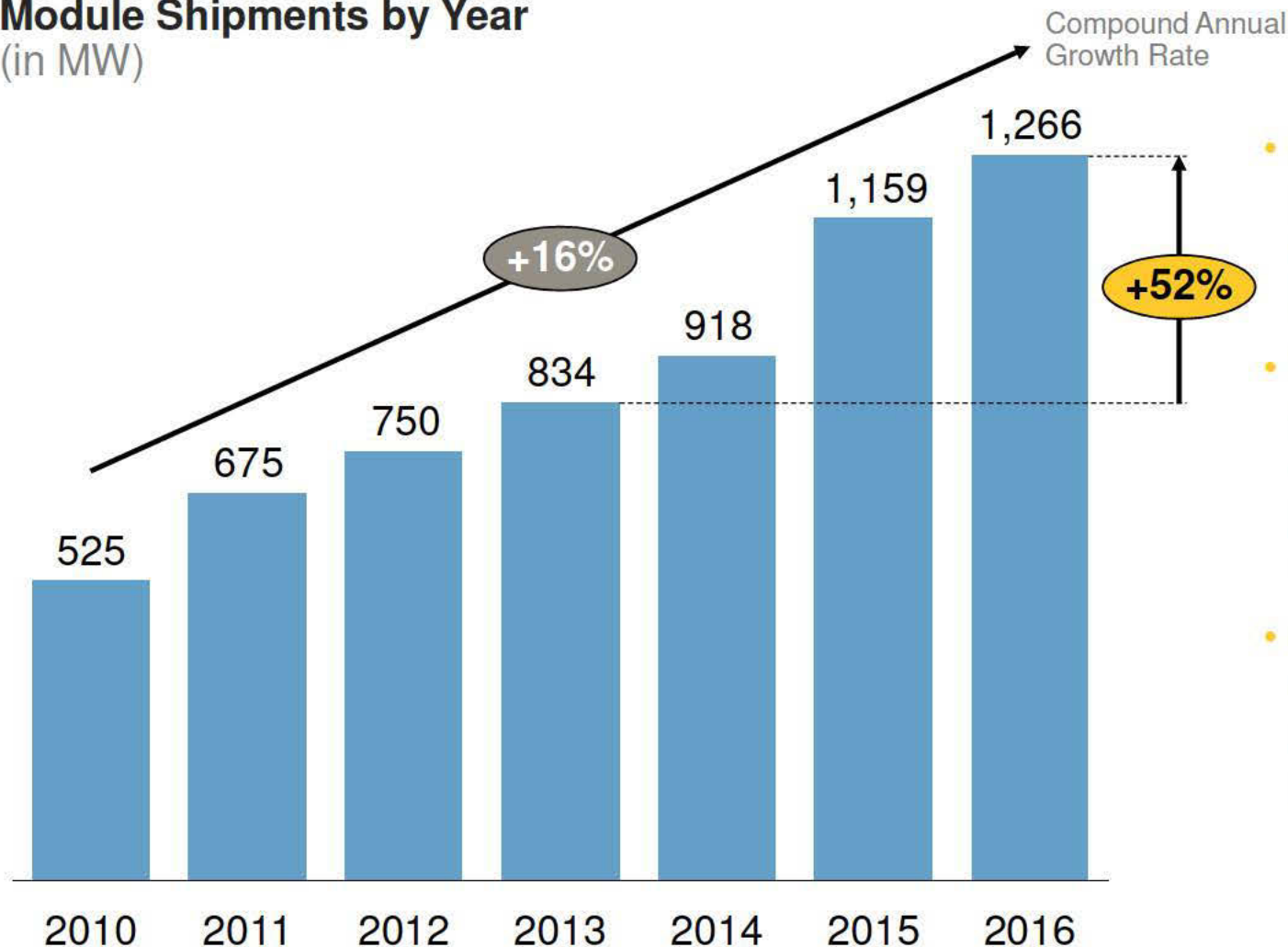


Silicon	Wafer	Cells	Solar panels	Solutions
				
				
<b>Polysilicon production and ingot casting</b>	<b>Casting, wafer manufacture and slicing</b>	<b>Doping, Passivation and Metallization</b>	<b>Module Assembly and Testing</b>	<b>EPC Services and tendering support</b>
<ul style="list-style-type: none"> <li>• Production in Norway</li> <li>• Polysilicon production capacity of 6,600 tonnes and block capacity of 1,800 MW</li> </ul>	<ul style="list-style-type: none"> <li>• Production in Singapore</li> <li>• 800 MW production capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Production in Singapore</li> <li>• 800 MW production capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Production in Singapore</li> <li>• 1400 MW production capacity</li> </ul>	<ul style="list-style-type: none"> <li>• REC Solutions – A JV Company between REC and Gräss offers a range of EPC services globally</li> </ul>

REC has grown at a steady but sustainable pace, ensuring that our commitment to quality is maintained



### Module Shipments by Year (in MW)


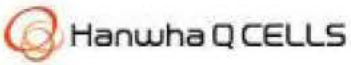





- REC grew its shipments by **over 50%** in the last 3 years
- Continuous **growth year-over-year** in module shipments
- Continuous focus on **quality and customer satisfaction**

# REC is your partner, not a competitor



## Most large solar PV manufacturers compete against their customers for PPA awards

Company	Project Development Activity
 The Canadian Solar logo features a stylized sun icon with rays in red and orange, above the text "CanadianSolar" in a red, sans-serif font.	<ul style="list-style-type: none"><li>• Through its subsidiary Recurrent Energy, Canadian Solar is developing a 4 GW pipeline of projects with 2.1 GW of projects already won via competitive tender in the US and globally</li></ul>
 The Hanwha Q CELLS logo features a stylized orange and red circular icon, followed by the text "Hanwha Q CELLS" in a black, sans-serif font.	<ul style="list-style-type: none"><li>• Beat out dozens of US developers to sign a 170 MW PPA with Austin Energy for 25-year supply</li><li>• Recently won PPAs in Hawaii and Mexico</li></ul>
 The Jinko Solar logo features the word "Jinko" in a bold, green, sans-serif font, with "Solar" in a smaller, green, sans-serif font above it. Below the text is the tagline "We Build Your Trust in Sun" in a small, green, sans-serif font.	<ul style="list-style-type: none"><li>• Beat out dozens of global developers to win a 188 MW PPA award in the most recent Mexican solar PV auction</li><li>• Together with Marubeni won a PPA auction for solar PV supply in UAE with a bid of \$0.024/kWh</li></ul>
 The Trinasolar logo features the word "Trinasolar" in a blue, sans-serif font, with a small red square above the "i" in "Trina".	<ul style="list-style-type: none"><li>• Added 27 MW of DG solar PV projects to its portfolio</li><li>• Announced the acquisition of a 49.9 MW solar PV plant in the UK</li></ul>
 The REC logo consists of a yellow circle with three stylized, curved lines inside, followed by the letters "REC" in a bold, black, sans-serif font.	<ul style="list-style-type: none"><li>• <b>Does not develop projects and does not compete for PPAs</b></li></ul>





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## Financial strength

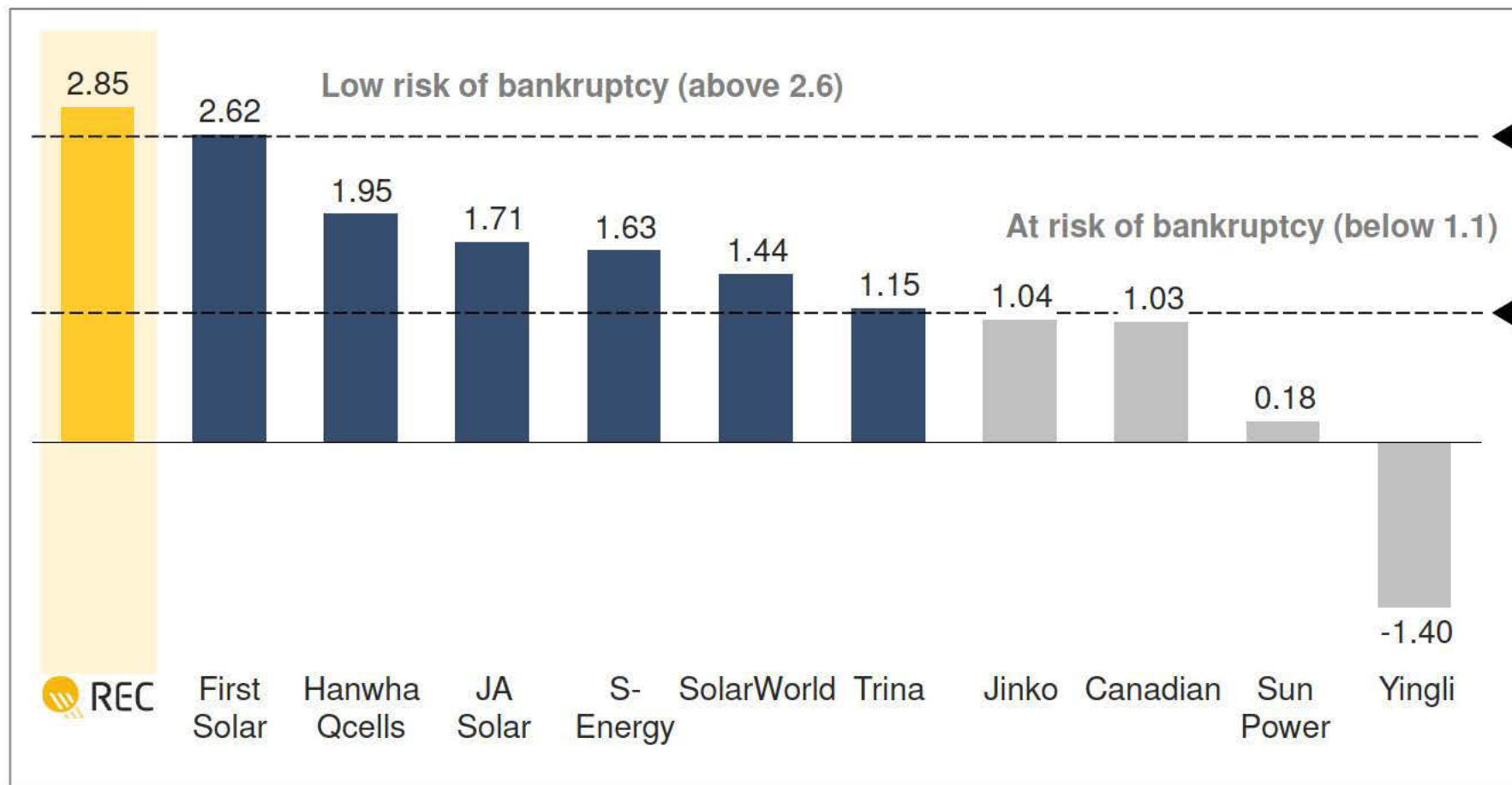




# REC ranks #1 with respect to lowest bankruptcy risk



Altman-Z scores\* of PV Manufacturers (as of Q3 2016)

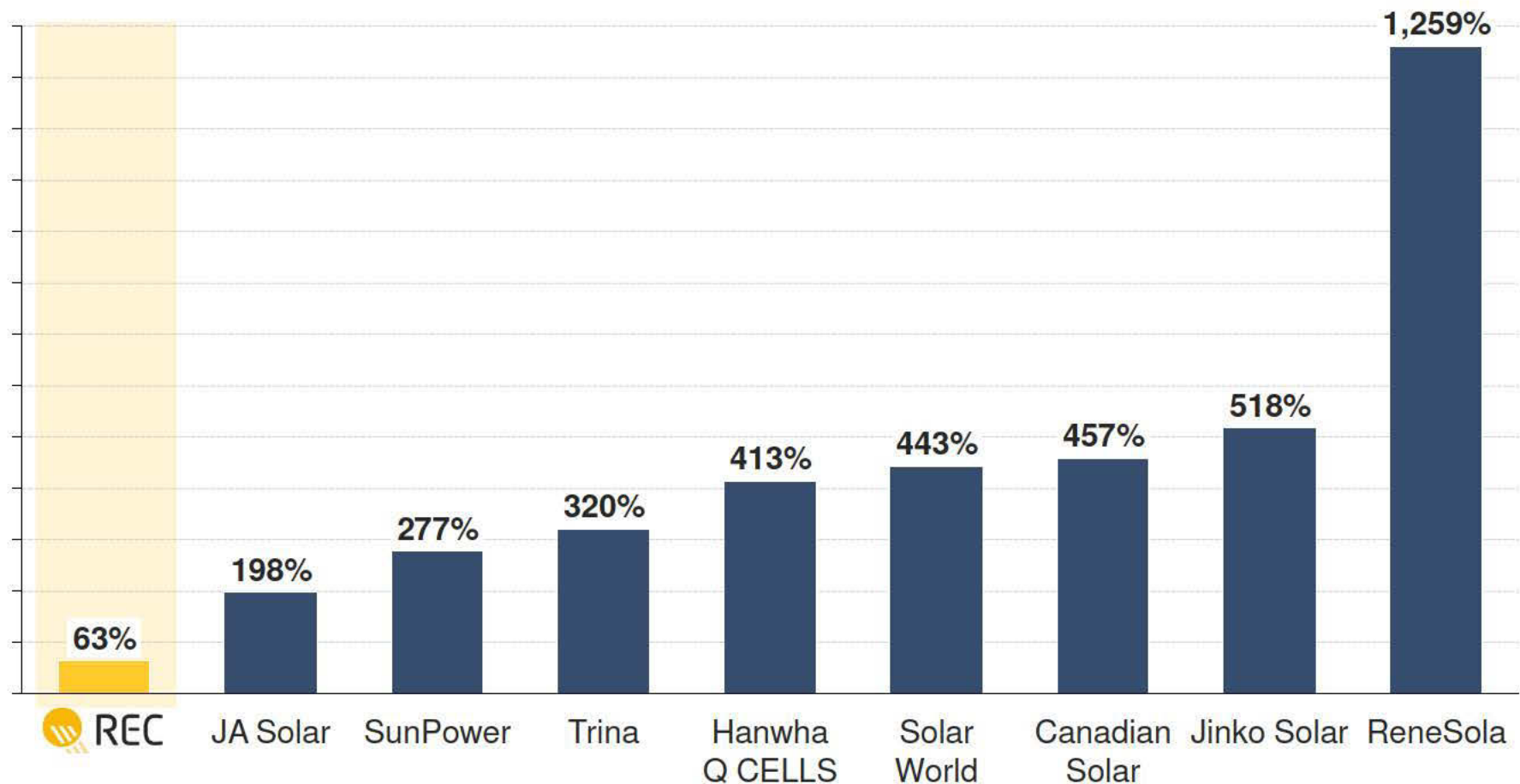


*\*Developed by Edward Altman in 1968, the Altman-Z score is a measure used to predict the probability that a business will go into bankruptcy. It is a function of tangible assets, working capital, retained earnings, EBIT, value of equity, total liabilities, and historical revenue. The score is widely accepted by auditors, accountants, courts, and database systems used to evaluate loans. The Altman Z score can be calculated for private or public companies based on slightly different formulas*

# REC ranks #1 amongst major crystalline silicon peers with respect to healthiest debt to equity ratio



Total debt\* as a percentage of total equity at end of Q3 2016  
%



\*Total liabilities (debt and other liabilities) divided by total equity; Ranking is against major crystalline silicon PV manufacturers

Source: Quarterly financial reports



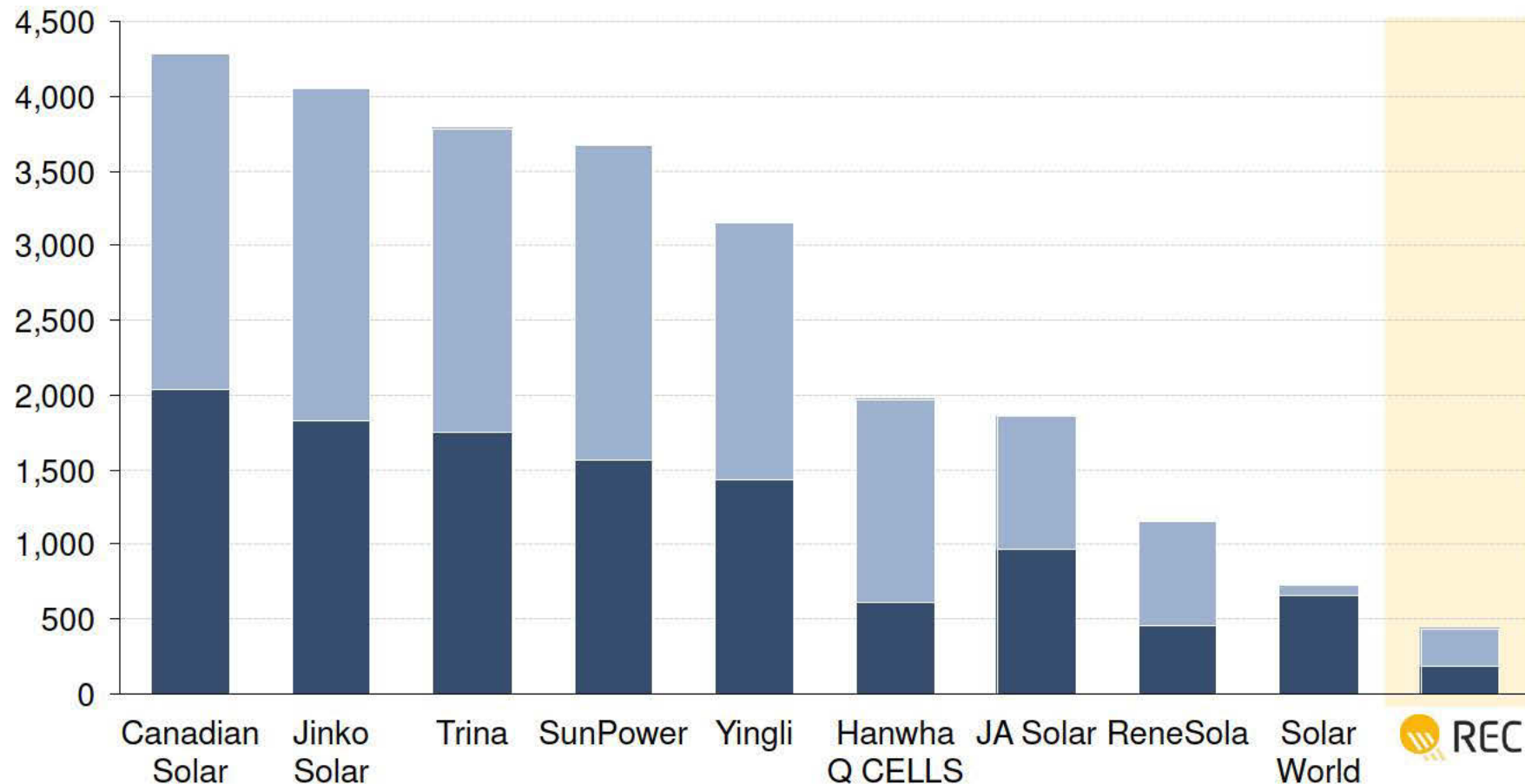
# REC ranks #1 with respect to lowest levels of debt



Total Liabilities (debt and other liabilities) at end of Q3 2016

USD million

Debt  
Other Liabilities\*



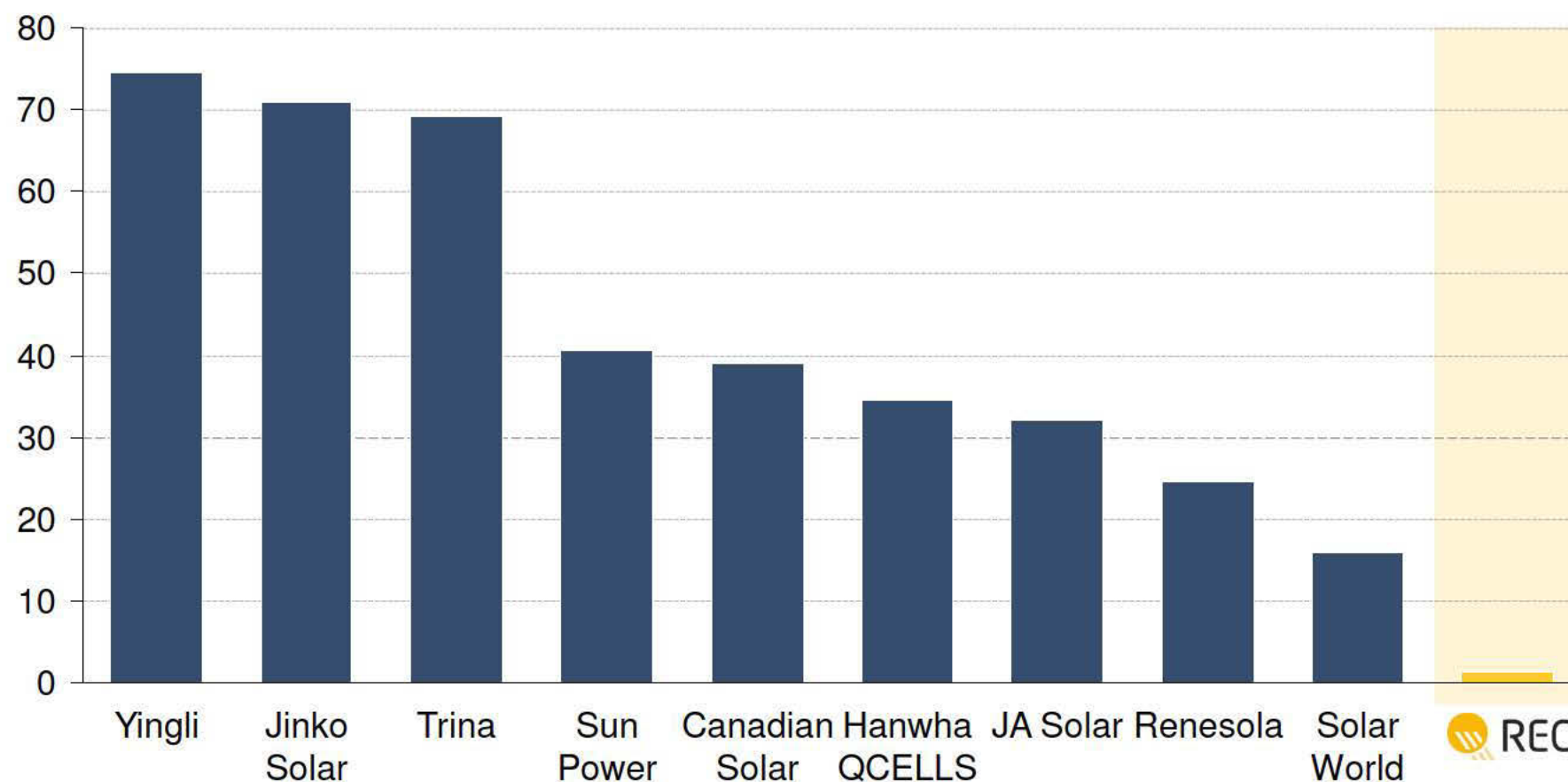
\*Includes accounts payable, notes payable, accruals, bonds payable and other liabilities; Ranking is against major solar PV manufacturers

Source: Quarterly financial reports

# REC ranks #1 with respect to lowest interest expenses REC

Q1- Q3 2016 Total Net Interest Expense

US\$ million



Ranking is against major solar PV manufacturers

Source: Company Financial Reports



REC's performance has been facilitated by a well-capitalized balance sheet with low debt levels



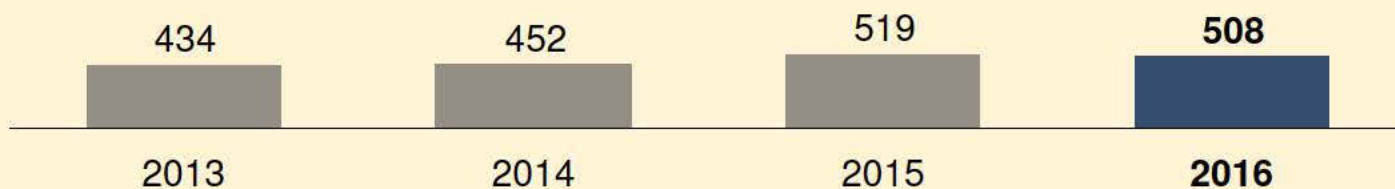
## REC Group Balance Sheet

US\$ million

### Assets



### Equity



### Liabilities





24 MW. Canino. Italy

## Product Strength

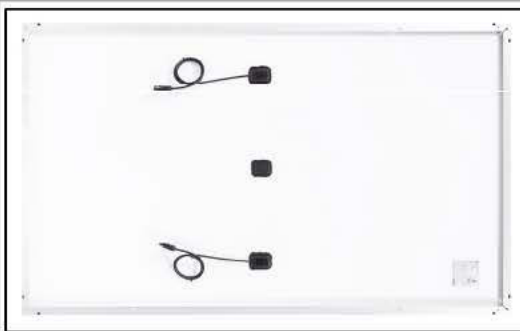




# Leading Product Features



- **Highest power multi crystalline module** in both 60 and 72-cell formats
- Unique **half-cut cell architecture** provides **unparalleled performance** in **shaded** conditions



- **Thinner frames** allow for **greater packing density** and **reduced shipping** and **storage** costs



- **100% free** from Potential Induced Degradation (PID)
- Low LID
- Internal **testing to 3x** the industry standard

# REC Quality Pillars



## PRODUCTION QUALITY

- 1 High Level of Automation
- 2 REC Product Development Model (RPDM)
- 3 Up to 3x IEC Qualification
- 4 REC Quality Management System (QMS)
- 5 REC Rolling Reliability Testing (RRT)
- 6 Factory Audits & 3<sup>rd</sup> Party Testing
- 7 Wide Range of Product Certifications

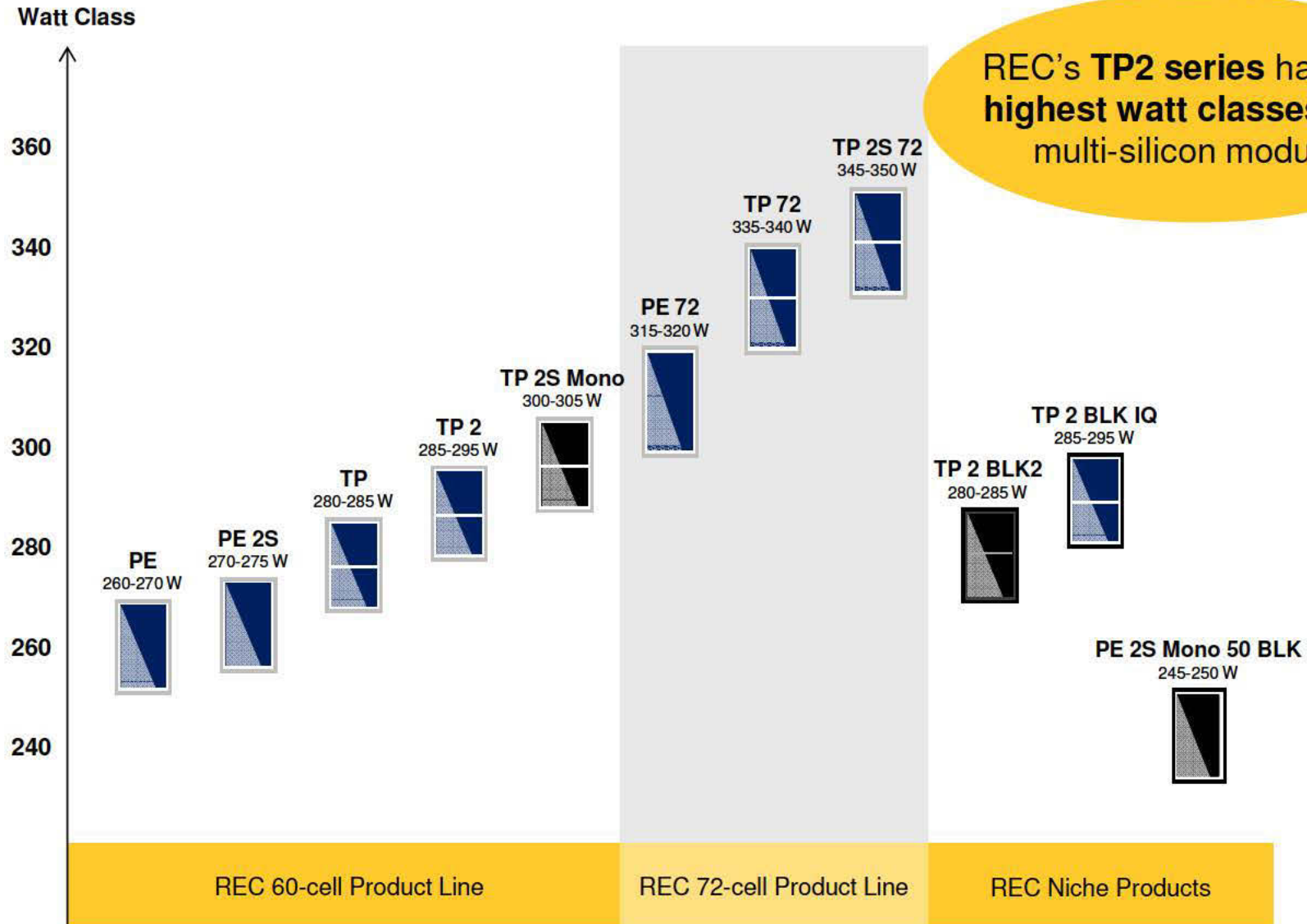


## IN-FIELD QUALITY

- 1 Warranty Claims**
  - < 100 PPM
  - Response time < 14 days for > 80% of total claims
- 2 Power Degradation Studies**
  - Measured at different customer sites in different climate zones
  - < 0.7% degradation per year
- 3 Energy Yield Monitoring**
  - Monitoring energy yield at different customer sites in different climate zones
  - Higher EY vs. PVsyst simulations
- 4 Energy Yield Benchmarking**
  - REC test sites in Germany, Singapore and coming soon in US
  - Better performance vs. competition



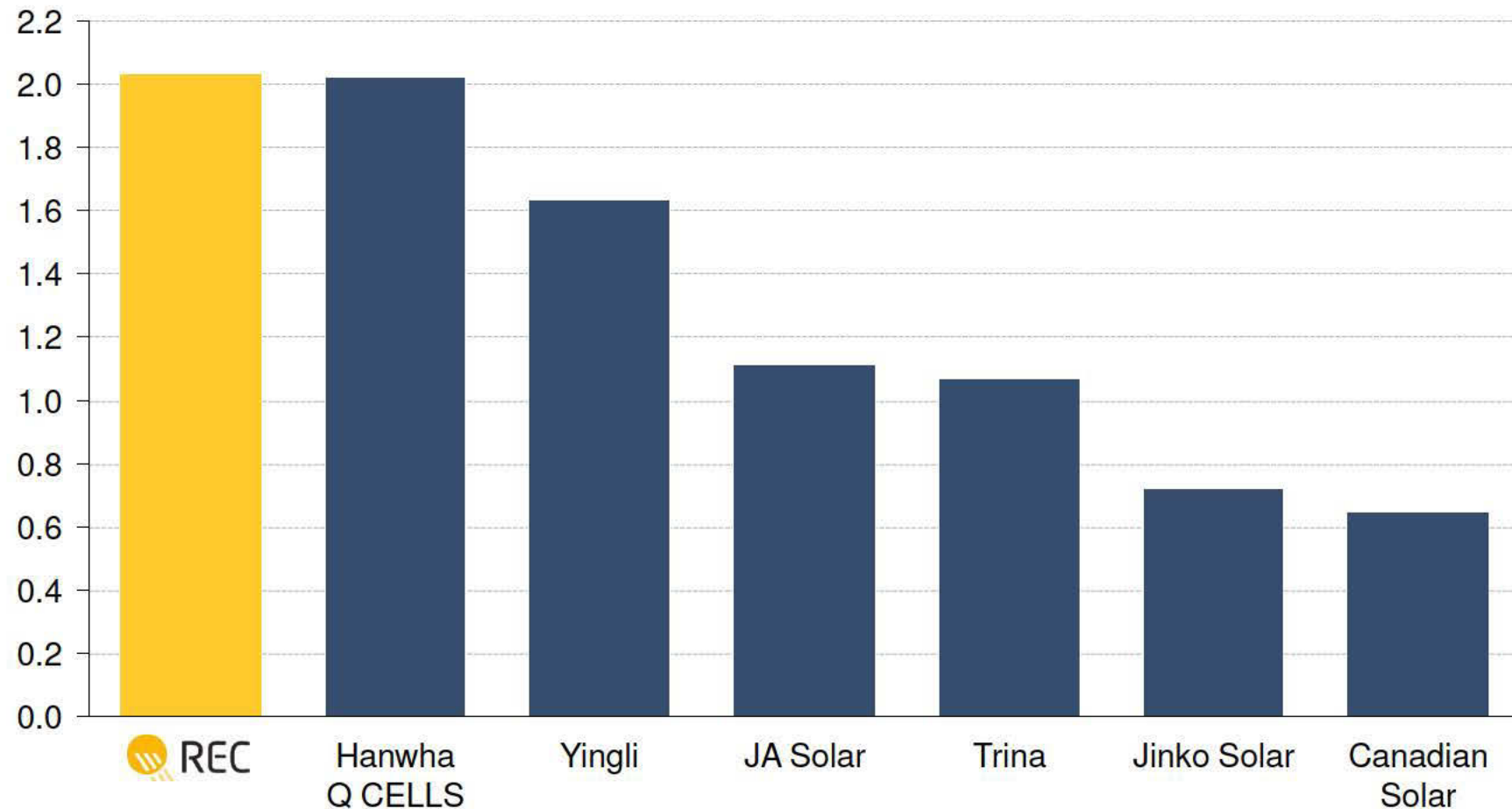
# REC ranks #1 for highest power in multi modules



## REC ranks #1 in R&D as a percentage of revenue amongst major multi-silicon producers



Q1-Q3 2016 Total R&D expenditure as percentage of total revenue  
%



Source: Financial Reports

# REC ranks #1 with respect to multi-crystalline cell efficiency



- REC recently achieved a **multi-crystalline solar cell efficiency of 20.46%** and expects to see an average efficiency **above 20% in mass production from the beginning of 2017**
- This achievement illustrates REC's focus on **technology leadership and commitment to delivering the greatest value to our customers worldwide**
- REC is the **first known manufacturer** to successfully achieve **such a high cell efficiency** on a **multicrystalline platform for industrial-scale production**
- *"REC continuously strives to develop new products and processes that provide customers with high quality, high power, and high value solar panels," says Steve O'Neil, Chief Executive Officer at REC.*

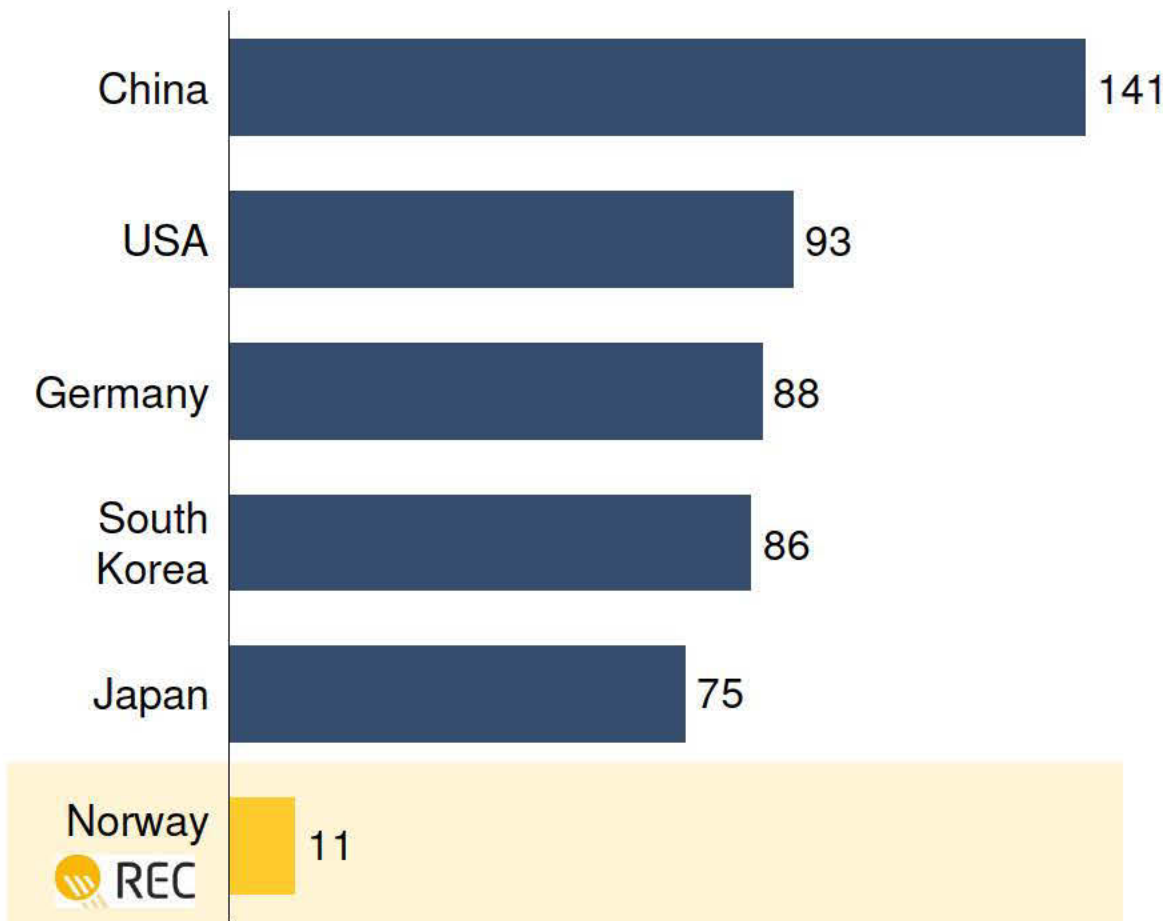




# REC ranks #1 in sustainable PV manufacturing



Polysilicon CO<sub>2</sub> Footprint based on region of manufacture  
Kg CO<sub>2</sub>e/kg polysilicon



- The polysilicon manufactured by REC at its Norwegian polysilicon plant has the **World's lowest carbon footprint** thanks to an energy efficient process and hydro powered energy source
- Cell and module manufacturing is done in Singapore under some of the **most rigorous environmental standards in the World**
- Numerous global certifications for the **highest standards of product quality and production**

Our accomplishments have not gone unnoticed



- **Intersolar Award** in “**Photovoltaics**” category for REC TwinPeak Series
- Singapore 1000 “**Net Profit Growth Excellence Award (Manufacturing)**”
- IAIR Award: “**Best Company for Sustainability**; Solar Energy Solutions Global” (two years in a row)
- Frost and Sullivan “**Customer Value Enhancement Award**” for Solar Industry
- Solar Industry Award for “**Module Manufacturing Innovation**”
- Global certifications for the **highest standards** of product and production quality



SINGAPORE 1000  
SINGAPORE SME 1000  
INTERNATIONAL 100







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## Performance

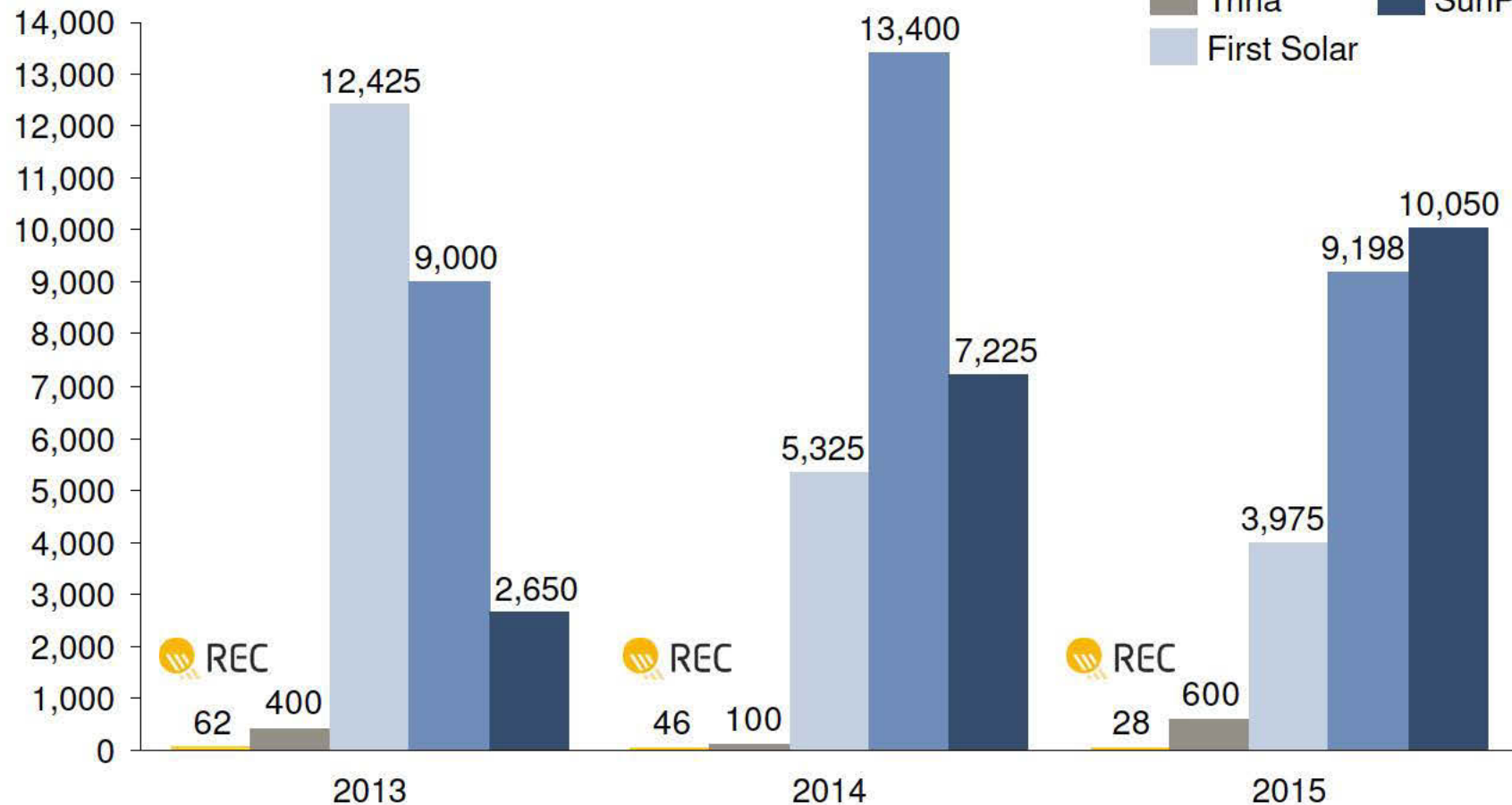
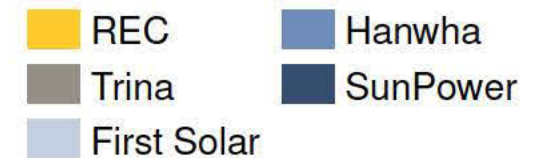


# REC ranks #1 with respect to lowest warranty claims\*



## Warranty Returns

Per million



\* Data shown is based on publicly available information

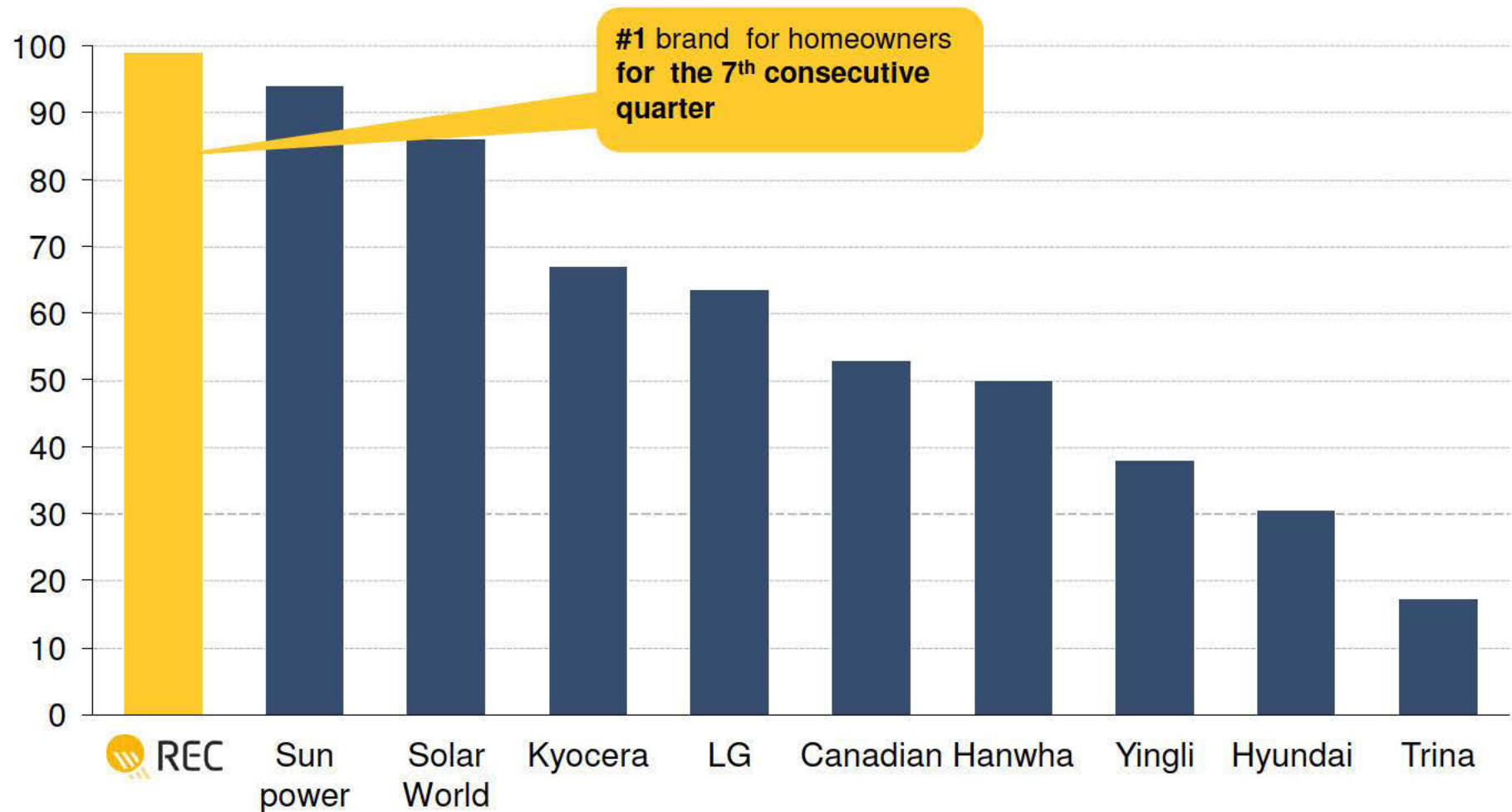
Source: Warranty Week 2016

# REC ranks #1 in the largest residential solar PV market in the US



## Q3 2016 California Residential Solar PV Installations

MW

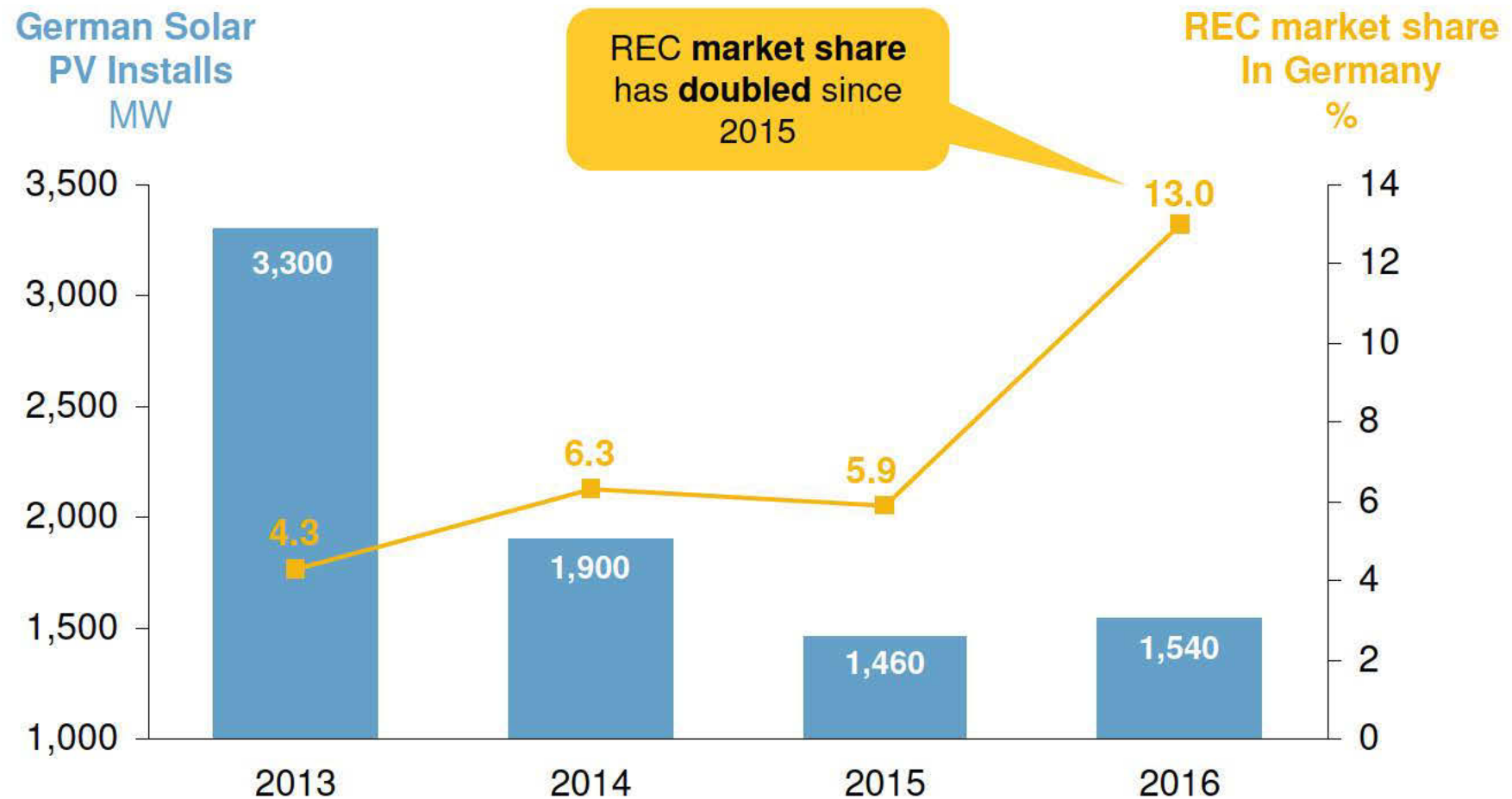


Source: GTM Research US PV Leaderboard Q4 2016

# REC ranks as the #1 module supplier in Germany



REC continues to win market share in the German solar PV market







## Sales and Service



REC has complete global coverage for pre- and post-sales technical support



Americas

EMEA

APAC and Japan



**Fully dedicated pre- and post-sales technical teams resolve 80% of all claims in <14 days**

# REC works closely with you through an industry-leading installer certification program



- **REC Solar Professional Program** offers added benefits to solar installers
- **Unique training** on how to best install and sell REC solar panels, enabling installers to maximize business potential
- Exclusive access to **tools and services**:
  - Warranty extension (10+2 years)
  - Flash data
  - Inclusion in Installer Locator
  - Training videos
- **Re-certification sessions** to ensure installers stay at the forefront
- Hundreds certified around the world



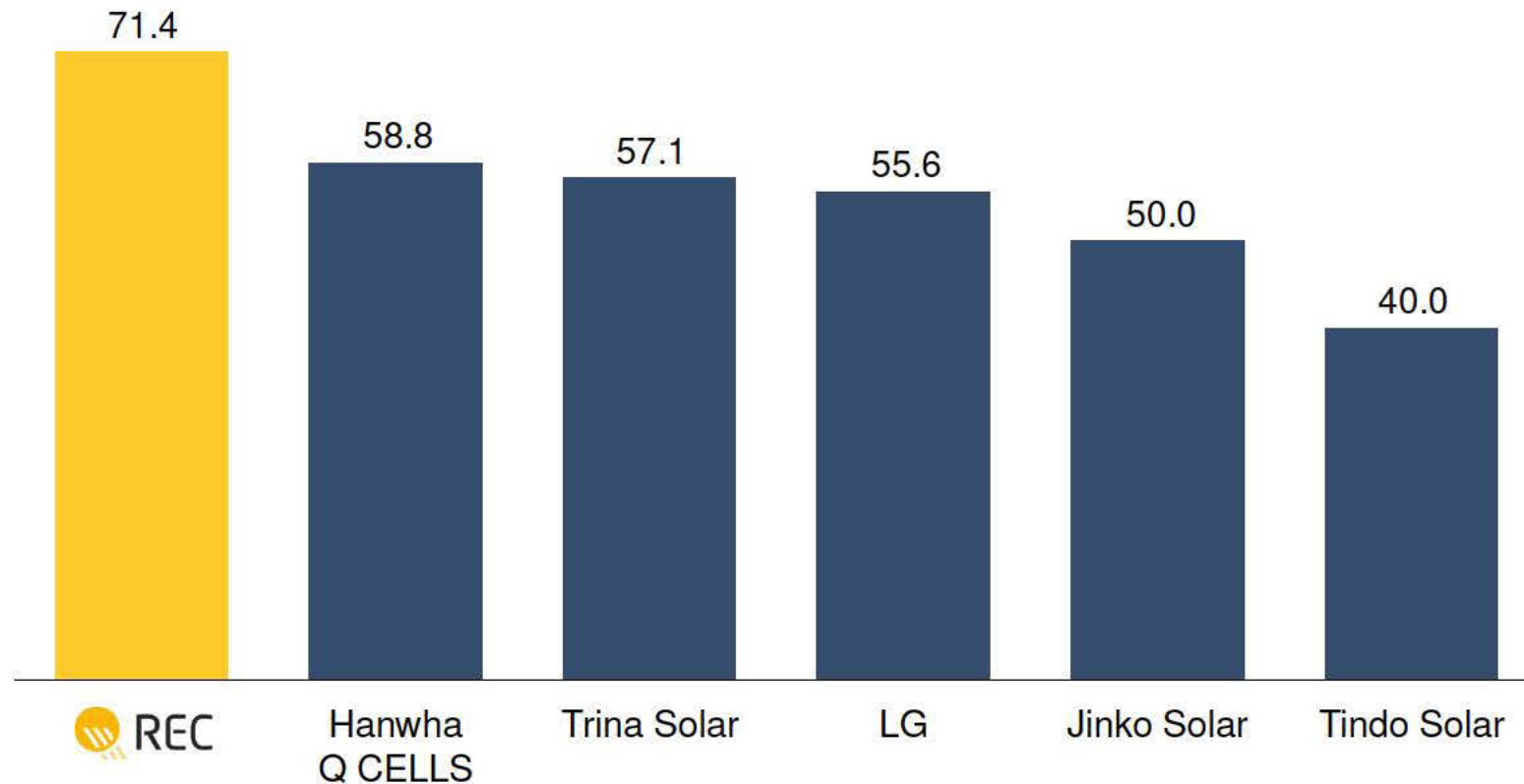


# REC ranks as the #1 most recommended brand amongst installers in the Australian market



## Net Promoter Score Results\*

Responses to the Question: How likely are you to recommend this brand to your customers?



*\*The Net Promoter Score is a tool used to measure customer loyalty to a brand or company. In an independent market survey conducted by EuPD Research, installers were asked to indicate how likely they were to recommend these brands to their customers on a scale of 0 (unlikely) to 10 (very likely). The NPS is calculated by subtracting the number of detractors (scores of 0-6) from the number of promoters (score of 9-10).*

# Thank you!



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