



# GOING SOLAR? TRUST REC

The largest European brand of solar panels

Public



REC

SOLAR'S MOST TRUSTED

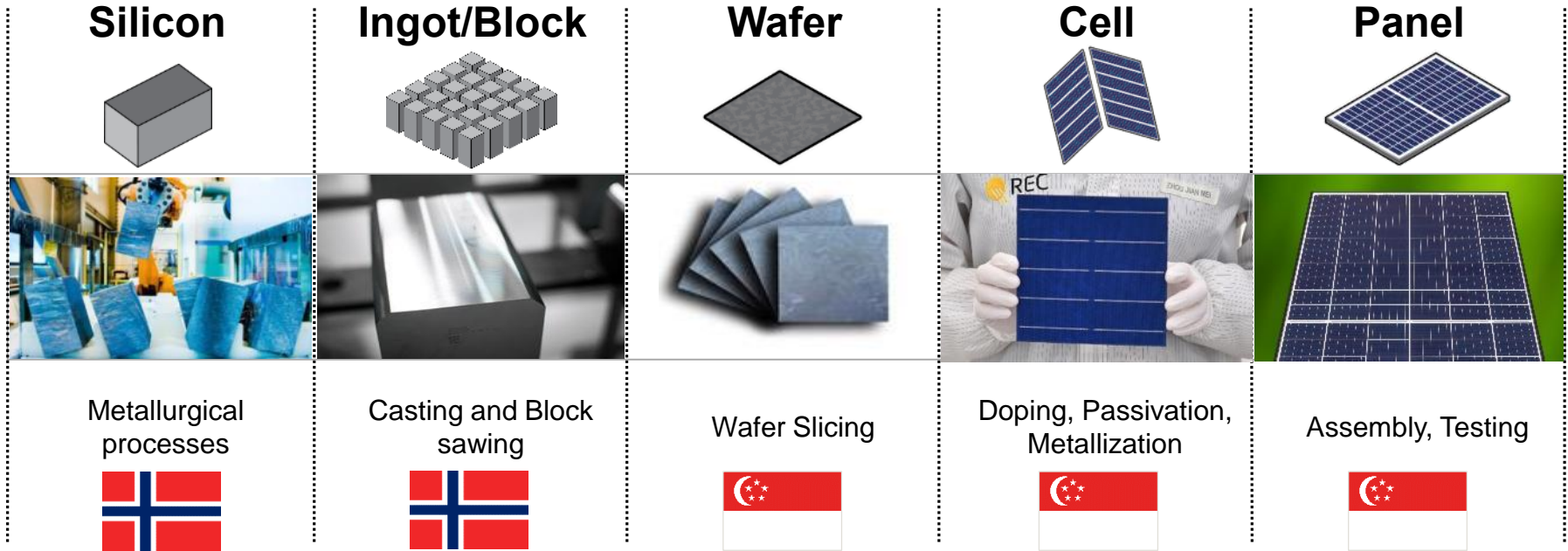
Bettina Hammerschmitt  
January 2020



Our Vision:

We want every person to benefit from electricity directly from the sun.

# Strength throughout the value chain



- Leading **European** brand of solar panels
- Founded in **Norway** in 1996
- Industry pioneer with **22 years** of experience
- **34 million panels** manufactured, amounting to 8.8 GW (at end-2018)
- **Integrated** manufacturing from silicon to blocks, wafers, cells, and panels

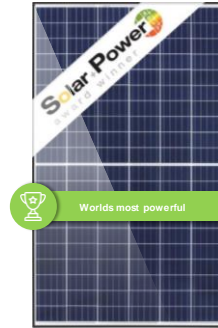
# History of REC



The early days	1996	• REC established in Norway
	1997	• First wafer washed by hand in summer 1997
Industrialization	1997–2010	• Production of wafers, solar cells, and solar panels in Scandinavia (Norway and Sweden)
Growth phase	2010	• Fully automated and integrated production of wafers, cells, and panels begins at state-of-the-art factory in Singapore
	2013	• Launch of REC Peak Energy Series
	2014	• Split of REC from Renewable Energy Corporation ASA (REC Silicon)
	2015	• Launch of REC Peak Energy 72 Series
	2016	• REC acquired by Norway's Elkem Group (Bluestar Investment Co. Ltd.)
	2017	• Launch of REC TwinPeak Series
	2018	• Launch of REC TwinPeak 72 Series
Changing the game	2019	• Launch of REC TwinPeak 2 Series
		• Launch of REC TwinPeak 2 BLK2 Series
		• Launch of REC TwinPeak 2S 72 Series
		• Launch of REC Peak Energy 2S Mono 50 BLK Series
		• Launch of REC N-Peak Series
		• Launch of REC TwinPeak 2 Mono Series
		• Launch of REC TwinPeak 2S Mono 72 Series
		• Launch of REC N-Peak Black Series
		• Launch of REC Alpha Series / REC Alpha Black Series



**Founded**  
1996



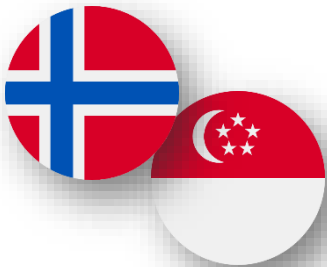
**>34 million**  
solar panels produced and sold



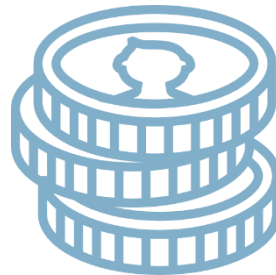
**>17M people**  
powered at home



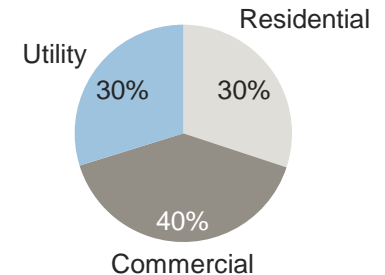
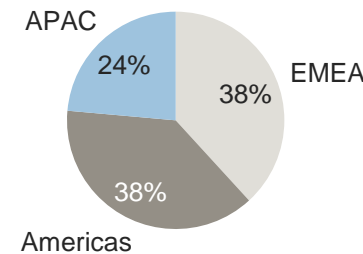
**~2,000**  
employees globally



**Norway & Singapore**  
Manufacturing facilities



**~USD 500 million**  
2018 sales revenue



**Balanced global sales**  
By geography and market segment

# A partnership approach to business



- REC is the most trusted brand in the global solar industry
- Focus on and demonstrated commitment to partnership
- Not only offer high-quality products and services, but also importantly: a reliable and lasting partnership
- This mentality is lived by our four values:
  - We are Responsible
  - We are Experienced
  - We are Collaborative
  - We are Straightforward



# REC – a global company with 2,000 employees



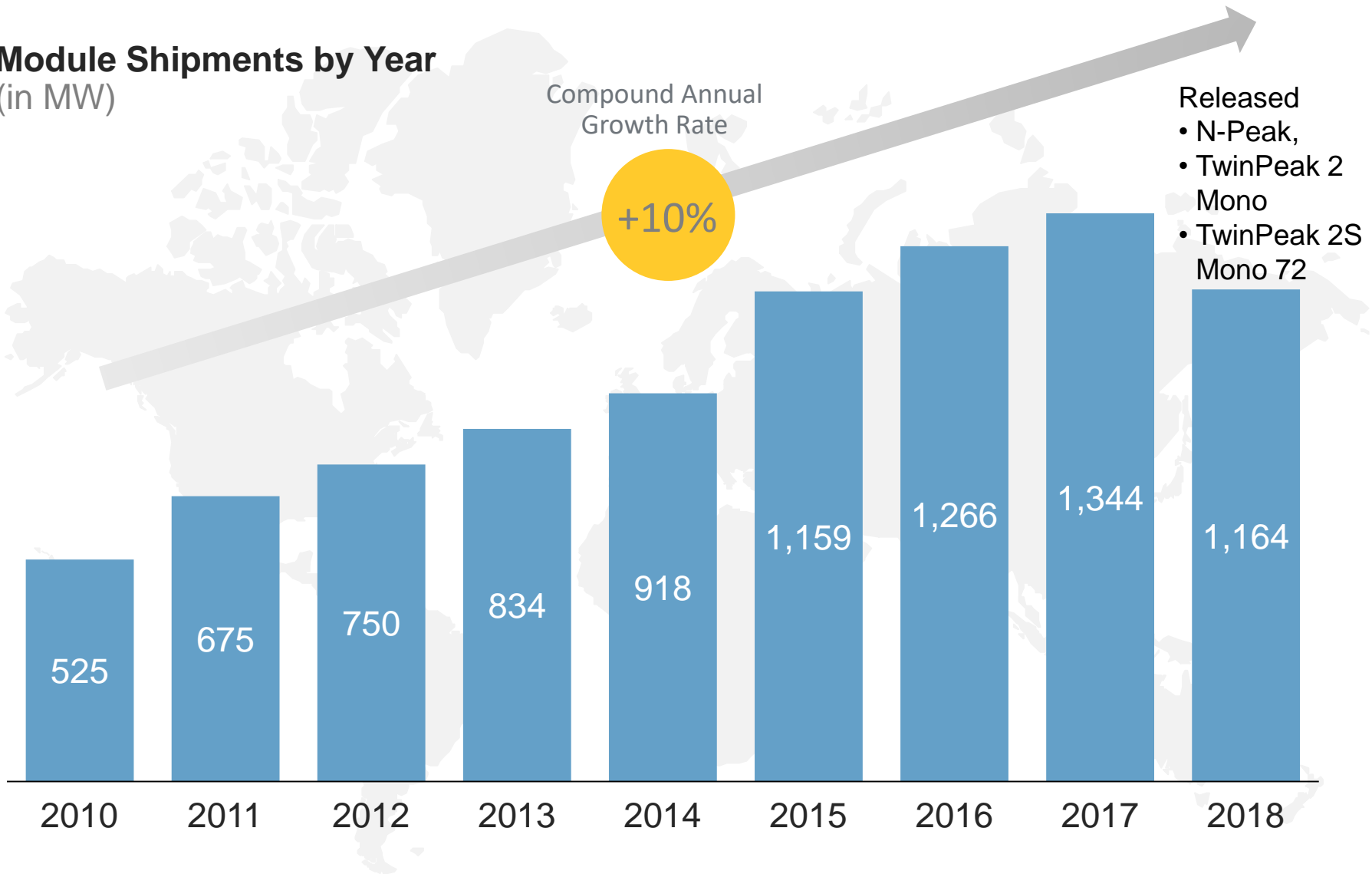
## Module Shipments by Year (in MW)

Compound Annual  
Growth Rate

+10%

Released

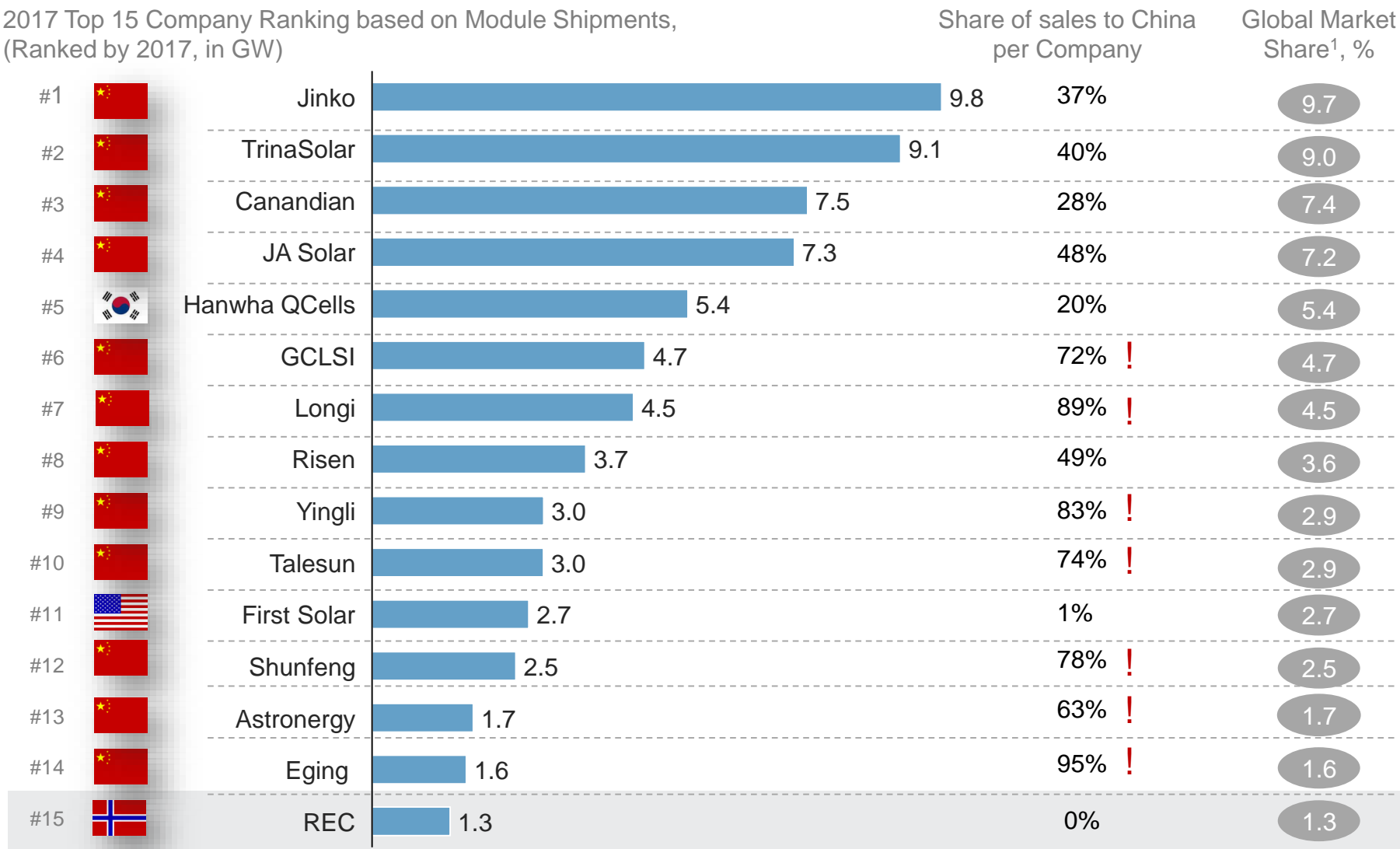
- N-Peak,
- TwinPeak 2
- Mono
- TwinPeak 2S
- Mono 72



# The Top 15 module supplier ranking is being dominated by Chinese players, benefitting from a strong domestic demand



2017 Top 15 Company Ranking based on Module Shipments,  
(Ranked by 2017, in GW)



<sup>1</sup> Based on global demand 2017 of 100.9GW

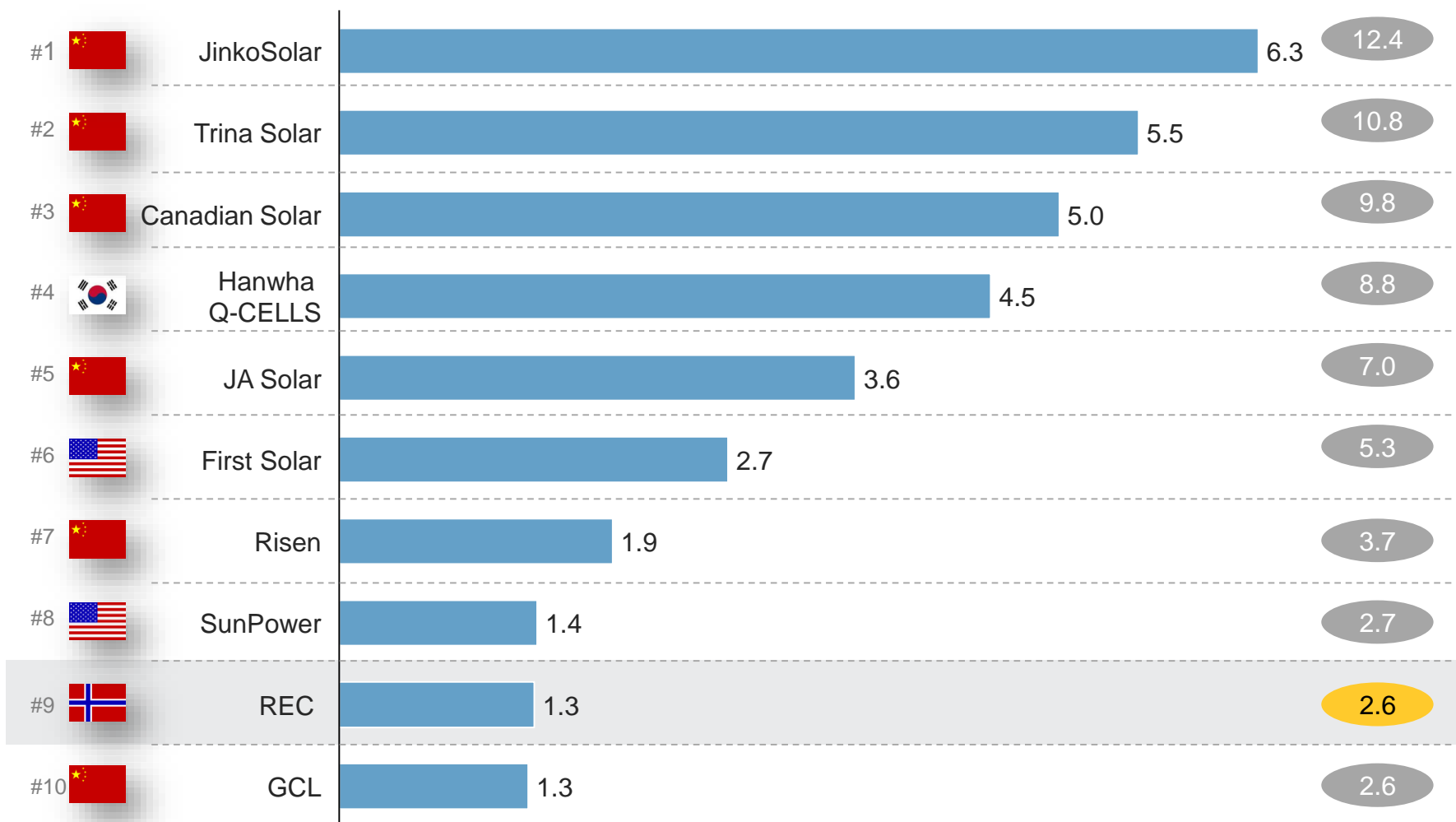
Source: SolarMedia Feb. 2018; IHS PV Demand Tracker – Q1 2018

# If the Chinese market is excluded, REC remains a Top 10 player with a 2.6% global market share in 2017



2017 Top 10 Company Ranking based on Module Shipments,  
Ranked by 2017, EXCLUDING CHINA

Global Market  
Share<sup>1</sup>, %



<sup>1</sup> Based on global demand 2017 of 50.8 GW **due to excluding China**

Source: SolarMedia Feb. 2018; IHS PV Demand Tracker – Q1 2018

# Brands that have gone solar with REC



# REC – The Facts



Leading **EUROPEAN** brand  
of solar panels, founded and  
headquartered in **NORWAY**

CELEBRATING  
**20**  
YEARS

Over 20 years experience in  
the solar industry,  
from silicon to panels



**1,500 MW**  
annual panel production (2018),  
**FULLY AUTOMATED**

**WINNER of THREE  
AWARDS** in 2017

1. Solar + Power Award in Silicon Module category
2. Norwegian Climate Business of the Year
3. Made in Singapore Award in Energy & Power category



Part of \$63B



global conglomerate



**>99%**  
accuracy of  
deliveries vs.  
orders (2018)

**LOWEST**  
known warranty  
**CLAIMS** rate

(REC 2018 PPM: <100)



**WORLD'S MOST  
POWERFUL**

multicrystalline panel

300 Wp (60 cell), 355 Wp (72 cell)

**LOWEST  
CARBON FOOTPRINT**

for solar grade silicon

(75% less energy used compared to traditional Siemens method)



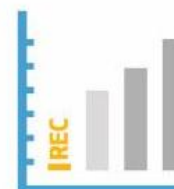
**100%**  
of production  
clearing IEC  
PID protocol



producer of panels with  
**HALF-CUT CELLS**

**LOWEST DEBT**

among leading panel  
manufacturers



to mass produce  
**PERC** on multi-  
crystalline cells

# REC's integrated production site in Singapore

## Wafer, Cell and Module production in one location



### N-type Cell Plant

- Industry 4.0
- 4 cell lines

### Wafer Plant

- P-type multi-crystalline
- 2 wafer factories

### Cell Plant

- multi/mono
- 8 cell lines

### Module Plant

- 6 Module lines
- Highly automated assembly



### Production Capacity

1.8 GW

146k m<sup>2</sup> of production space

# Winner of multiple awards

REC efforts have been recognized internationally

- DNV GL Top Performer
  - REC TwinPeak and REC TwinPeak 2
- Solar + Power Award
  - REC TwinPeak 2 in “Silicon Module” category
- Made in Singapore Award
  - REC TwinPeak 2 in “Energy & Power” category
- Norwegian Climate Business of the Year
- Intersolar Award
  - REC TwinPeak Series in “Photovoltaics” category
- Singapore 1000 “Net Profit Growth Excellence Award”
  - “Manufacturing” category
- IAIR Award
  - “Best Company for Sustainability; Solar Energy Solutions Global”
- Frost and Sullivan Best Practices Award
  - “Global Solar Power Customer Value Enhancement”
- Solar Industry Award
  - “Module Manufacturing Innovation”



# REC – A Multiple Award-Winner



## REC's industry leadership has been recognized by multiple awards worldwide

- Top Performer Awards by DNV GL for 4 years in a row
- Solar + Power Award for REC TwinPeak 2 Series
- Made in Singapore Award for REC TwinPeak 2 Series
- Norwegian Climate Business of the Year Award for New Silicon Production Methods
- Intersolar Award for REC TwinPeak Series
- Singapore 1000 Net Profit Growth Excellence Award
- IAIR Awards for Corporate Sustainability and Solar Energy Solutions
- Frost and Sullivan Best Practices Award for Customer Value Enhancement
- Solar Industry Award for Module Manufacturing Innovation

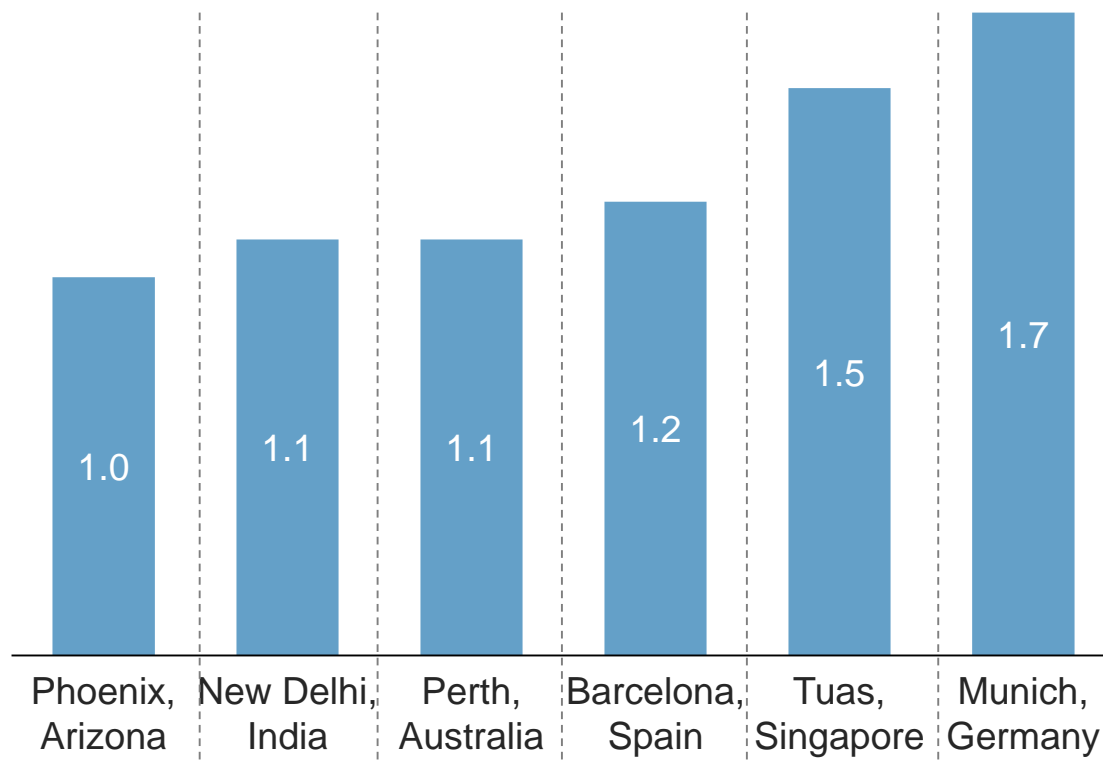


# REC achieves an industry-leading energy payback time thanks to its fully integrated solar value chain



- REC focuses on reducing its primary energy usage in its panel production
- Efforts **throughout the entire value chain** are leading the way in sustainable module production
- REC solar panels achieve an **energy payback<sup>1</sup> time of around 1 year**, which is class-leading
- As the most energy intensive phase of the entire production process is the silicon production, REC benefits from its REC Solar Norway operations

**Energy Payback Time by Location<sup>2</sup>**  
(in Years)



<sup>1</sup> One year of energy payback time refers to a time a module needs to generate the amount of electricity which has been required to produce it

<sup>2</sup> Data based on REC 290Wp solar module and calculated using Pvsyst simulation software

# Recycling contributes to 'green' credentials

## REC is world leader in recycling through the value chain



REC has partnered with multi-national electronic waste recycling companies to ensure effective solar module recycling systems



In 2018, REC introduced a silicon recovery process that will make it the first in the world to use silicon waste to produce solar grade silicon

- *Unique to REC – not replicable in Siemens or FBR processes*



REC has a leading carbon footprint

- *Certified by Certisolis (France)*



In 2011, REC was the first solar module manufacturer to demonstrate an Energy Payback Time of only 1 year



In 2012, REC was one of the first manufacturers to make a lead-free module commercially available

**With its strong environmental credentials and top performance, REC is the number 1 module choice for eco-friendly investors in solar**

# Manufacturing in both Norway and Singapore provide REC with significant advantages



Source: 2017-18 World Economic Forum Competitiveness Report, Global Ranking of Major solar PV producing countries; Global Human Capital Index 2017



1

2

3

4

5

6

## Reference cases

# Real life, real satisfaction



IKEA, Germany	Phenix Power Plant	Redtag (BMA International)
582 kW	24 MW	537 kW
2,476 REC solar panels	100,000 REC solar panels	2,016 REC solar panels
Regensburg & Freiburg, Germany	Canino, Italy	Dubai, UAE



# Real life, real satisfaction



Evans family home	Singapore National Stadium	Tomakomai Rinku Kashiwabara Plant
13.4 kW	707 kW	1.7 MW
61 REC solar panels	2,719 REC solar panels	6,528 REC solar panels
Monterey, CA, USA	Singapore	Tomakomai City, Japan



# Real life, real satisfaction



Caeremlyn Farm Whitland Plant	Audi Production Plant	BMD Solar Power Plant
18 MW	2.3 MW	5.8 MW
69,252 REC solar panels	9,288 REC solar panels	23,200 REC solar panels
Whitland, UK	Brussels, Belgium	Bikaner, India



# Real life, real satisfaction



Sauter family home	Rockville Solar II Project	Nakhon Pathom & Suphan Buri Plants
9.8 kW	3.2 MW	72 MW
42 REC solar panels	12,264 REC solar panels	292,608 REC solar panels
Wain im Allgäu, Germany	Indianapolis, IN, USA	Nakhon Pathom, Thailand



# Real life, real satisfaction



**NEXTDC Data Centre**

402 kW

1,575 REC solar panels

Port Melbourne, Australia



**Gibelstadt Power Plant**

28 MW

120,000 REC solar panels

Gibelstadt, Germany



**Heineken Wieckse Brewery**

921 kW

3,683 REC solar panels

Den Bosch, Netherlands



# Real life, real satisfaction



Dubai International Airport	Kenns Farm	Rio Tinto Stadium
635 kW	100 kW	2 MW
2,592 REC solar panels	400 REC solar panels	6,414 REC solar panels
Dubai, UAE	East Anglia, UK	Sandy, UT, USA



# REC's value proposition



SOLAR'S MOST TRUSTED

Highest Quality

Superior Product  
Performance

Customer Orientation

Financial Strength

Proven Track Record

# Thank You



**REC**

SOLAR'S MOST TRUSTED