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<td>6. U.S. PV Market Leaders Update</td>
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1. Upstream PV Supply Chain Update

Shyam Mehta
Lead Upstream Analyst
Upstream PV Q2 2014 – Agenda Items

• **Supply-Demand Trends:** 2014 Module Shipment Outlook, Capacity Additions and Module Supply Strategies

• **Pricing Trends:** Polysilicon, Cell and Module NT and LT Outlook

• **U.S.-China Trade Case:** Impact on Module Pricing and Module Competitive Landscape

• **Supplier Financials:** Gross Margin, Inventory and Cost Updates
Module Producers: Strong Focus on Growth in Japan in 2014

- Global shipments for the top 10 global module firms are expected to grow 31% in 2014, growing from 16.1 GW in 2013 to ~21.1 GW in 2014.

- Increasing shipments to Japan, the highest priced and second largest solar market, will be a large focus for top 10 producers.
  - Aggregated shipments to Japan are expected to grow 75% Y/Y.

- Shipment growth in 2013’s first and third largest market, China and the U.S., for top 10 producers will also remain key in 2014, growing a respective 40% and 39%.

- The EU is the one major market where top 10 producers will look to shift away from due to market adjustments and the Chinese shipment cap.

Source: GTM Research PV Pulse
2014 Supply Expansion: Component and Region Dependent

- We expect more expansions to be announced and implemented in 2014, following trend set by early movers, and incorporate these into our 2014 view.

- This results in a more balanced, less constrained supply market for 2014, assuming our base case demand view of ~42 GW installations.

- **Polysilicon:** Estimate incremental ~48K MT in nameplate capacity coming online in 2014, mostly from prior announcements (Daqo, Tokuyama, Hanwha, Powertec), but only ~22K in ramped capacity due to capacity and production ramp times.

- **China wafer/cell/module** additions mostly accomplished by M&A of weaker suppliers (e.g. Jinko-Topoint, Trina-Solartech) in line with MIIT regulations stipulating ban on “pure” capacity expansions.

- **Taiwan cell** expansions by equipment purchase (Motech, Gintech, etc.).

- **Rest of Asia cell/module** expansions by active producers in those regions (SunPower, REC, Q-Cells).

- **Smaller module fabs in emerging local markets** as JVs between incumbent suppliers and local partners (JA in South Africa, Renesola in Japan).

- Capacity constraints, particularly for poly/wafer/cell could surface in the event that end-demand (installations) exceed 45 GW.
Module Supply Strategies Vary by Vendor

Module

- China T1
  - Use OEM Chinese Capacity
  - Use Offshore OEM Capacity
  - Acquire China T2/T3 Capacity
  - New Local Market Plant

- Other T1
  - Use China/Taiwan OEM
  - Plant Expansion

- Taiwan Firms
  - Enter Module OEM

- New Entrants
  - New Local Market Plant

Source: GTM Research PV Pulse
Supply Strategies Vary by Market

China Module Firm

- **Japan**: Commercial: OEM/White label for Supplier/Installer
  Utility: Branded Module

- **China**: Captive Project Pipeline

- **EU**: Sell China product at price floor
  Sell non-China OEM product below price floor

- **U.S.**: Sell non-China OEM product
  Sell all-China product, pay tariff

- **South Africa**: Manufacturing JV with Local Partner

Source: GTM Research PV Pulse
Q2 Polysilicon Prices Slightly Down

- The average poly price in Q2 thus far (April to mid-June) is $21.0/kg (up 3% from Q1 2014 average of $20.5/kg)

- This is in part due to the large range in poly prices in Q1, where prices grew from $18.9/kg to $21.2/kg.

- Q2 poly prices have been comparatively stable with slight downward pressure as wafer, cell and module prices continued to fall.

- Spot prices are still excessively higher than a year ago (Q2 2013 average spot price: $16.9/kg, April to mid-June prices 24% higher).

- Prices are expected to increase H2 2014 as demand starts to pick up in key markets (China)
Near-Term Polysilicon Price Forecast

- Our base-case scenario forecasts the industry-average poly price increasing 20% Y/Y from $20/kg in Q4 2013 to $24.0/kg in Q4 2014.

- We estimate a realistic range for the Q4 2014 industry average poly price to be $25.0/kg in a high-case scenario and $21.0/kg in the low-case.

- Upside risks include:
  - Relatively conservative market behavior by suppliers in terms of factory utilization and focus on profit as opposed to sales growth.

- Downside risks include:
  - A weaker than expected end-market due to underperformance in China and “emerging” markets such as the Middle East and Latin America.
  - Significant volumes of previously shuttered capacity (mostly in China) coming back online due to early-year price increases.
  - More aggressive pricing behavior by incumbent suppliers to continue squeezing out less competitive firms.

Source: GTM Research PV Pulse
Long-Term Polysilicon Price Outlook

• Our base-case scenario forecasts the industry average poly price rising to $24/kg by 2014E and then falling at an annualized rate of 8% to $18.7/W by Q4 2017.

• The base-case assumes continued production cost improvements of advanced Siemens and FBR technology and ~217,125 MT of low cost capacity coming online in 2014-2017.

• We estimate a realistic range for the Q4 2017 industry average poly price to be $22.9/kg in a high-case scenario and $15.0/kg in the low-case.

• Upside risks include:
  • End-market demand exceeding our 2017 base-case outlook of 59 GW.
  • Inability to meet the base-case average cost forecast of $14/kg by the end of 2017.

• Downside risks include:
  • Weaker than expected end-market demand in China, Japan, and the U.S. (~44% of demand in 2017) and/or weak PV penetration in ROW markets.
  • Excessive poly capacity growth beyond our 570 GW 2017E expectations.
  • Meaningful market penetration of FBR produced poly and higher than expected Siemens/FBR blend ratios.

Source: GTM Research PV Pulse
Near-Term Module Price Forecast: Major Markets & ROW

- EU:
  - Selling prices for T1 Chinese suppliers are expected to stay close to price floor (which fell in April 2014 from €0.56/W to €0.53/W)
  - The majority of price forecast risk is in exchange rate levels

- China:
  - Prices are expected to increase H2 2014 as projects begin construction

- Japan:
  - Prices in Japan are expected to decrease 2% Y/Y to $0.73/W by 2014E as more competitive pricing enters the increasingly important utility-scale market
  - Q4 2014E China price by segment:
    - Japan Rooftop: $0.80/W
    - Japan Utility: $0.67/W

- ROW:
  - Prices are expected to increase to be in-line with higher global levels

Source: GTM Research PV Pulse
Our base-case scenario forecasts the average global module price increasing 1% Y/Y to $0.71/W in Q4 2014E then falling at an annualized rate of 8% to $0.55/W by Q4 2017.

The base-case is driven by forecasts for all-in costs to reduce 17% in 2015 to 44c/W followed by incremental manufacturing cost reduction.

We estimate a realistic range for industry average pricing by 2017E to be $0.62/W in the high-case scenario and $0.48/W in the low-case.

Upside risks include:
- High input prices and/or little processing cost improvement in 2015 and beyond
- Flat margin profiles of 20% between 2015-2017

Downside risks include:
- Significant cost reduction; total costs in the range of $0.34-0.29/W between 2015 – 2017
- Flat margin profiles of 15% between 2015-2017

Source: GTM Research PV Pulse
Chinese Module Pricing in U.S Would Increase by 14 Percent on Average Due to Imposition of Additional Duties: If
final margins imposed by the Department of Commerce (CVD plus AD) in the ongoing trade case were to exceed the
preliminary CVD margins of 27 percent and the scope of the case to remain unchanged, prices for Chinese modules sold
into the U.S market could increase from levels of $0.69/W - $0.73/W in the first half of 2014, to $0.74/W - $0.85/W in the
second half. This implies an average price increase of around 14 percent (from $0.72/W to $0.82/W) and a range of 7 to 20
percent depending on the specific module vendor and end-market segment.

Increases in Chinese Module Pricing Likely to Result in Market Share Gains for Key Non-Chinese Suppliers to U.S.
Rooftop Market: Under the pricing regime for Chinese modules we have laid out above, the primary competitive advantage
of Chinese suppliers in the U.S. market – lower pricing by as much as 25 percent historically – would be effectively
neutralized. Given this and the cloud of uncertainty still hanging over the trade case, we believe that many downstream U.S.
customers could initiate a switch to non-Chinese modules, particularly in the residential and commercial sectors, where
branding and perception plays a larger role in customer preferences. Firms most likely to take market share from the
Chinese in these segments in our view include REC, SolarWorld, Suniva and LG.

Chinese Supplier Shipment Strategies Will Vary, in Contrast to the 2012 Tariff Impact: Whereas the initial tariffs on
Chinese cells resulted in a relatively uniform strategy for Chinese suppliers (purchasing Taiwanese cells and assembling
them into modules in China), we expect that the current round of tariffs will create more diversity of supply sources into the
U.S. Overall, we believe that using all-Chinese product and paying the 2012 cell tariff seems to offer the best combination of
supply capability and pricing competitiveness, although it is only viable for those suppliers with industry-leading module costs
(below $0.55/W).
• **The Market Impact of Increased Prices Will Be Felt Most Severely in the Utility Segment:** While increases in module prices from Chinese suppliers will have reverberating effects throughout the U.S. solar market, they will be felt most severely in the highly cost-sensitive utility solar market. We anticipate that a meaningful number of utility-scale projects that were originated using Chinese modules could be acquired by First Solar as a direct result of this petition.

• **Impact on Future Manufacturing Investment Decisions:** Due to the lack of a well-developed supply chain for cell and module production, significantly higher labor costs and a painful recent history in terms of PV manufacturing exits, we believe it is unlikely that a final tariff ruling will directly result in any significant investment by Chinese suppliers in U.S. PV manufacturing. To the extent that manufacturing capacity is built to serve the U.S. market as a result of the trade case, we believe such capacity would most likely be constructed in Malaysia, Mexico and/or India.

• **Competitive Positioning:** We believe that First Solar and REC are most likely to benefit from the imposition of tariffs. Amongst the Chinese suppliers, we believe that Trina Solar (lower margins in both 2012 and 2014 case), JinkoSolar (industry-leading cost structure) and ReneSola (low-cost internal wafers and diverse OEM supply channels) are better positioned to deal with the challenges posed by the trade case than their peers.

• **For more detail, refer to GTM’s June 2014 report,** *The 2014 U.S.-China Solar Trade Dispute: Status, Strategies and Market Impacts*
# Chinese Tariff Mitigation Strategies

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<tbody>
<tr>
<td>Status Quo (CH Wafer-TW Cell-CH Module), Pay Preliminary CVD Tariff</td>
<td>&gt;$0.90</td>
<td>9 GW</td>
<td>No alternation in current U.S. supply strategy</td>
<td>Prohibitively high price point for most U.S. customers</td>
<td>-</td>
<td>-</td>
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<tr>
<td>TW Wafer - TW Cell - CH Module</td>
<td>$0.83/W-$0.87/W</td>
<td>8-9 GW</td>
<td>Minimal alteration in current U.S. supply strategy</td>
<td>Possible AD tariffs on TW cells, volatility in TW wafer/cell pricing</td>
<td>High internal cost structure</td>
<td>Hanwha SolarOne, ET Solar</td>
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<tr>
<td>CH Wafer - OEM Cell - OEM Module</td>
<td>$0.74/W-$0.80/W</td>
<td>1.5-2.0 GW</td>
<td>No tariff risk</td>
<td>Limited volume of cost and technologically competitive non-China/Taiwan cell capacity</td>
<td>Low cost internal poly/wafer manufacturing</td>
<td>ReneSola</td>
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<tr>
<td>All CH Product - Pay 2012 Cell Tariff</td>
<td>$0.75/W-$0.84/W</td>
<td>10-12 GW</td>
<td>No reliance on external component vendors</td>
<td>Complexity of guidelines regarding acceptable transfer price</td>
<td>Low cost structure</td>
<td>Yingli Solar, Trina Solar, JinkoSolar, JA Solar</td>
</tr>
<tr>
<td>Build/Use Off-Shore Capacity</td>
<td>$0.79/W-$0.87/W</td>
<td>500 MW - 1 GW</td>
<td>Limited tariff risk</td>
<td>Capital-intensive, especially for cells; higher regional cost structure</td>
<td>Existence of non-China cell/module manufacturing base, capital availability for capacity expansion</td>
<td>Canadian Solar</td>
</tr>
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</table>
Estimated Delivered Chinese Module Pricing into U.S. Market based on Tariff Mitigation Strategy, H2 2014E

- Q1 2014 (CH Wafer-TW Cell-CH Module)
- CH Wafer - OEM Cell - OEM Module
- All CH Product - Pay 2012 Cell Tariff
- Build/Use Off-Shore Capacity
- TW Wafer - CH Module
- Status Quo (CH Wafer-TW Cell-CH Module), Pay New Tariffs

Delivered Price ($/W)
Q1 Earnings: Gross Margin Continues Upward Trend

- Gross margin for top-tier Chinese module suppliers (Yingli, Trina, Canadian, JA and Jinko) has improved every quarter from Q1 2013 onward, ranging from 16.4% to 24% in Q1.

- Jinko has consistently recorded gross margins above its peers due to its industry-leading manufacturing cost (47c/W Q1 2014).

- Continuous margin growth driven by:
  - Stable-to-up pricing in major markets
  - Increased demand/higher utilization
  - Manufacturing cost reductions, particularly on the processing cost front

- Potential downside to GM in 2014:
  - Increased poly prices
  - More competitive pricing (Japan utility/commercial)
  - Weaker than expected end-market demand

Source: GTM Research PV Pulse
Inventory Days Up 57% Due to Seasonally Weak Demand

- The weighted average DSI for Chinese module manufacturers increased to 89 days in Q1 (down 4% Y/Y and up 57% Q/Q)
- Seasonally weak demand coupled with high utilization rates drove higher DSIs
- Trina saw the largest increase in inventory days as demand in China slowed down Q/Q and the company decreased shipments to the EU
- JA Solar and Renesola had the lowest increase in inventory days
  - Both companies shifted shipments to other regions in light of weak demand in China (JA: mostly Japan and Renesola: Japan and the UK)
- Inventory days are expected to recover across the board as demand picks up H2 2014

Source: GTM Research PV Pulse
Manufacturing Cost Slightly up in Q1

- The median all-in module production cost for Chinese suppliers was $0.54/W in Q1, declining 6% Y/Y and rising 1% Q/Q

- The general Q/Q increase was due to slightly lower utilization rates and increased poly prices

- Q1 2014 median Chinese production cost by value chain:
  - Silicon: $0.11/W
  - Ingot/Wafer Processing: $0.10/W
  - Cell Processing: $0.14/W
  - Module Assembly: $0.19/W

- Current module cost leader, Jinko Solar, had all-in module cost of $0.47/W in Q1 ($0.10/W silicon + $0.37/W non-silicon)

- Hanwha SolarOne’s cost remained the highest with at $0.59/W in Q1, flat to Q4 2013 levels

Source: GTM Research PV Pulse
2. Balance of Systems (BOS) Market Update

MJ Shiao
Director, Solar Research
BOS Market Update – News

• Tracking technology continues to raise attention and investment
  – Qbotix raises $12 million with investments from E.ON, Iberdrola
    • Includes previous funders of New Enterprise Associates, Firelake Capital, Draper Nexus
    • Has a 45 MW supply agreement in UK, active projects in U.S. and Japan
  – SunEdison signs 1.85 GW deal with NEXTracker
  – Wave of former CSP and CPV suppliers transitioning to PV trackers

• First Solar purchases Skytron Energy from AEG Power Solutions
  – AEG actively trying to restructure and likely saw an opportunity for cash on one of its better performing assets
  – First Solar gains:
    • Promising O&M data and toolsets with which to expand its standalone O&M division
    • Access to data on global systems and to the European retrofit market
    • System and plant performance expectations for distributed solar systems
    • More data with which to develop predictive performance
  – First Solar (2.5 GW) and Skytron (4.4 GW) combine for nearly 7 GW of monitored assets
Global PV Monitoring Landscape

Source: GTM Research Global PV Monitoring 2014-2018
Global PV Monitoring – Major Findings

• Total new monitored systems in 2013 grew to 39.7 GW (over just 20.5 GW in 2012)
  – Roughly 15% (6.3 GW) of capacity are retrofits or double monitored
  – U.S. accounted for 2 GW of retrofitted capacity with many utility projects reaching expiry or switching monitoring provider

• PV monitoring shifting from passive to active piece of supply chain
  – Development of system controls is becoming more important as grid codes evolve globally
    • Already see PV power plant control devices being developed by companies like Skytron, Emerson, SMA, Santerno, and many others
  – Monitoring players looking to monetize monitored assets as well
    • Many companies more aggressively pushing or developing services around asset management and data analytics

• Independent Software Providers still top providers
  – Except in the U.S. where downstream players lead
  – May shift towards inverter providers as more vendors package in monitoring
• RBI Solar Acquires Renusol GmbH
  – Renusol has been on the selling block with Centrosolar AG in administration
  – Product portfolio slots nicely together with Renusol providing international penetration and residential product lines
  – In 2013, RBI deployed ~200 MW, primarily ground mount fixed tilt
  – Renusol GmbH deployed ~400 MW in 2013, 60 MW in the U.S.
Where are the global opportunities?

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<th>Market</th>
<th>Application</th>
<th>N. America</th>
<th>APAC</th>
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<td>Residential Roof</td>
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<td>Commercial Flat Roof</td>
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<td>Ground Mount – Fixed Tilt</td>
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<tr>
<td>Major markets: CA, NC</td>
<td>Landscape Leaders: Schletter, PanelClaw, SunLink, PanelClaw</td>
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<td>Ground Mount – Tracker</td>
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<td>Major markets: CA</td>
<td>Landscape Leaders: Vertically Integrated Developers, Array Technologies</td>
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Europe

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APAC

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<tr>
<td>Residential Roof</td>
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<td>Landscape Leaders: Clenergy, Hilti, [Japanese Conglomerates]</td>
<td>Landscape Leaders: [Japanese Conglomerates]</td>
<td>Landscape Leaders: Local developers with proprietary or basic designs from local OEMs</td>
<td>Landscape Leaders: Niche players</td>
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Niche Market | Limited Prospects | Average Prospects | Potential Growth | Major Growth |

www.gtmresearch.com
US Market Breakdown

We see all sectors as big opportunities for 3rd party mounting structure vendors

- Vertically-integrated vendors focusing more on DG and looking to strategically source 3rd party versus internally
- Commercially rooftop segment especially attractive given very fragmented technology and market landscape
3. PV Inverter Market Update

MJ Shiao
Director, Solar Research
Inverter Supplier News and Updates

• TMEIC buys AEG 400 MW PV inverter facility in India
  – Total transaction at ~$12.5M
  – Facility had annual revenues of $17 million (~150 MW of inverter sales)
  – TMEIC is using facility as a base primarily for India, targeting $68 million in sales over next 5 years (between 750 MW – 1 GW)
  – International focus for TMEIC shifting to China, India and North America
  – Other major suppliers with India manufacturing include ABB, Bonfiglioli, Schneider Electric and Advanced Energy (Refusol)

• AEG continues to explore options for inverter business but at this point, is really only looking to maintain its current, primarily European, business
  – Are “not actively pursuing” Japan and U.S. market
  – U.S. sales facility closed in late Q1
  – Likely outcome is an acquisition of its inverter business
• Shunfeng (rebranded “Sunfu”) acquires Sunways from LDK

• Potential M&A and Consolidation activities
  – SolarCity hints at inverter and storage acquisition during discussion around Silevo acquisition
  – SolarEdge would be a well positioned for IPO or acquisition
    • Profitability questionable based on expansion profile, but has shown an ability to grow globally with differentiated technology
    • Well-matched to SolarCity’s target markets (residential, commercial) and aspirations (foreign residential markets with Zep Solar and DG storage)
  – Advanced Energy could make moves
    • Has $123M in the bank and has intimated more acquisitions are possible
    • Does solar drag margins down though?
  – AEG is a potential target
    • Could be a piece for a company looking for 50 Hz products, European-style central inverter technology, with some experience in Asia
Annual Global PV Inverter Shipments by Manufacturer (MWac)

- SMA
- SunGrow Power Supply
- ABB - Power-One
- Omron Corporation
- TMEIC
- Tabuchi Electric
- Advanced Energy
- Schneider Electric
- KACO New Energy*
- TBEA SunOasis*

Global Shipments (MWac) *Estimate

- 2009 Shipments
- 2010 Shipments
- 2011 Shipments
- 2012 Shipments
- 2013 Shipments
• 5 of top 10 are Asian manufacturers with >90% of deployments in domestic market
  – SunGrow and TMEIC are the best positioned within the group in terms of global expansion of footprint

• 3 out of 10 have strong U.S. presence (SMA, ABB, Advanced Energy)
  – Will see continued expansion efforts by SunGrow, Schneider Electric, KACO New Energy and TMEIC

• Other notable suppliers:
  – Huawei – claims nearly 1 GW of shipments, 500 MW outside of China
  – Santerno – nearly 700 MW of shipments
  – Enphase Energy – top 10 inverter manufacturer by revenues
  – SolarMax – stabilization despite overwhelming dependence on Europe
Global pricing is relatively similar across different regions, with the exception of Japan.

Limit to growth has more to do with operational costs associated with providing solutions:
- In most major markets, grid codes are not well-established (e.g., U.S., Japan, UK, Latin America)
Levers for Inverter Cost Reduction

• Supply chain optimization
  – Movement towards more manufacturing in China and India, especially of utility centrals and commercial string inverters

• Higher DC voltage inverters
  – Moving from 1000Vdc designs to 1500V, 1700V, and 2000V designs can lower busbar, enclosure, etc. costs but supply chain is not very robust yet and significant redesign is necessary

• Higher DC-to-AC loading ratios
  – Vendors pushing the ability for higher DC-to-AC loading ratio so that $/Wdc appears lower (e.g., AE 1000NX allows for 1.75 DC-to-AC ratio)

• Modularity for scale
  – “Modular” or “blade-style” inverters typically cost 10%-20% versus designs with only a couple, large power cores, but at scale could introduce manufacturing efficiencies and drive greater volume discounts

• Aggressive warranty treatment
  – Vendors now offerings “free” or steeply discounted warranty extension to provide more value at same cost
U.S. Market Complicated by Codes, Duties

• NEC 2014 Arc fault detection and rapid shutdown requirements impacting supply chains
  – Customer demand and adoption for commercial inverters with built-in arc fault detection and shutdown according to NEC 690.11 and 690.12
  – Rapid shutdown only required for buildings
  – Arc fault needed in all systems
  – Installers and integrators worried that 2014 codes will be required for projects installed today, even if 2014 codes hasn’t been adopted

• Duties could have a major effect on supply decisions by major developers and EPCs
  – Major downstream players looking into lowering inverter costs by switching to Asian vendors
  – $0.10/Wdc impact on modules may scuttle projects on the cusp
  – Utility project economics are the most threatened by tariff decisions
4. Global Demand Update

Adam James
Solar Analyst
Agenda

Part I – Base Case Forecast
Regional Forecast: Regional Dynamics and Major Market Trends
Emerging Markets: Latin America and Mexico

Part II – Risk in Global Markets
High and Low Demand Scenarios
Downside Risk
Upside Risk
Part I – Base Case Forecast

Regional Forecast: Regional Dynamics and Major Market Trends

Emerging Markets: Latin America and Mexico

Part II – Risk in Global Markets

High and Low Demand Scenarios

Downside Risk

Upside Risk
Why does global market growth slow between 2016 and 2017?

- ITC expiration weakens U.S. demand
- Asia Pacific demand stabilizes
- Surge of demand in Germany to qualify for FiT before the cap is met

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</tbody>
</table>

Why does global market growth slow between 2016 and 2017?

ITC expiration weakens U.S. demand

Surge of demand in Germany to qualify for FiT before the cap is met

Asia Pacific demand stabilizes

Why does global market growth slow between 2016 and 2017?

ITC expiration weakens U.S. demand

Surge of demand in Germany to qualify for FiT before the cap is met

Asia Pacific demand stabilizes
Major Markets in 2014

In 2014, the Chinese market will be larger that of the entire European region.

Seven countries have over 1 GW in demand in 2014, combining for a 33 GW market.

That means seven markets will install 80% of global PV in 2014.

Over 50% of all global demand will come from the top three markets, China, the U.S. and Japan.
China promises to be a key market in 2014, but there are some headwinds that may curtail demand below expectations.

<table>
<thead>
<tr>
<th>Headwinds to China Demand</th>
<th>2014 Market</th>
<th>GTM Forecast</th>
<th>National Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>FiT payments to utility-scale projects continue to be delayed</td>
<td>3 GW</td>
<td>11 GW</td>
<td>10 GW</td>
</tr>
<tr>
<td>However, coal-fired payments are coming through</td>
<td>8 GW Utility</td>
<td>6 GW Utility</td>
<td></td>
</tr>
<tr>
<td>Rooftop rights negotiations are hindering financing and the FiT for DG is too low</td>
<td>3 GW DG</td>
<td>4 GW DG</td>
<td></td>
</tr>
<tr>
<td>Buyers of DG power now must invoice projects, instead of producers, which will help boost DG installation</td>
<td>3 GW DG</td>
<td>4 GW DG</td>
<td></td>
</tr>
</tbody>
</table>

After a slow 1H14 with only 3 GW installed, we expect the national allocations to change to accommodate more utility and less DG, and changes to FiT policy for DG before the end of the year.
Anti-Dumping Duties Threaten Indian Market

How much domestic supply is there?  
1 GW

Where does that supply go?  
- 600 MW of local supply meets demand in non-Indian markets

How much domestic demand is there?  
2 GW

Where does that demand come from?  
- 1.3 GW outside the National Solar Mission
- 750 MW from the National Solar Mission, 375 MW in domestic content and 375 MW outside the domestic content requirement

Local Supply

Local Demand

www.gtmresearch.com
What Happens in 2014 if Duties are Imposed?

- **Local Supply**
  - **600 MW** of local supply meets demand in non-Indian markets.
  - **400 MW** of local supply meets demand, 375 MW from the National Solar Mission program.

- **Local Demand**
  - **1.7 GW**
  - **375 MW** from the National Solar Mission in domestic content.
  - **300 MW** of non-DCR projects in NSM are not built.
  - **Domestic module supply remains constant**
  - **Total market drops by 300 MW as projects in the NSM non-domestic content category face higher prices**
Tariffs Would Reduce 2015 Demand

Domestic module supply increases slightly

- **700 MW** of local supply meets demand in non-Indian markets
- **500 MW** of local supply meets demand from the National Solar Mission program

Total market shrinks by 2.1 GW below our forecast, since most demand cannot be cost-effectively met

- **2.2 GW** reduction in demand from tariff driven price increases
- **700 MW** market, **500 MW** from domestic content in National Solar Mission
- **1.2 GW** of local supply meets demand in non-Indian markets

Local Supply

Local Demand
The UK market overtook Germany in quarterly installations for the first time. We anticipate that Q1 was an outlier, but that the UK market will continue to be the 2nd largest, and lowest risk, European market.
The UK rooftop market is likely to get a boost in January as the FiT mechanism introduces a new degression band separating ground-mounted project deployment from rooftops.

### Levels of quarterly deployment (MW) necessary to trigger degression for current degression band

<table>
<thead>
<tr>
<th>Levels of quarterly deployment (MW) necessary to trigger degression for current degression band</th>
<th>Proposed levels of quarterly deployment (MW) necessary to trigger degression for new degression bands</th>
<th>Degression triggered</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50kW and all Stand-Alone</td>
<td>Stand-Alone</td>
<td>Other than stand-alone, above 50kW</td>
</tr>
<tr>
<td>Not more than 50MW</td>
<td>Not more than 12.5MW</td>
<td>Not more than 37.5MW</td>
</tr>
<tr>
<td>More than 50MW but not more than 100MW</td>
<td>More than 12.5MW but not more than 25MW</td>
<td>More than 37.5 but not more than 75MW</td>
</tr>
<tr>
<td>More than 100MW but not more than 150MW</td>
<td>More than 25MW but not more than 37.5MW</td>
<td>More than 75MW but not more than 112.5MW</td>
</tr>
<tr>
<td>More than 150MW but not more than 200MW</td>
<td>More than 37.5MW but not more than 50MW</td>
<td>More than 112.5MW but not more than 150MW</td>
</tr>
<tr>
<td>More than 200MW</td>
<td>More than 50MW</td>
<td>More than 150MW</td>
</tr>
</tbody>
</table>

**Source:** Department of Energy and Climate Change, “Consultation on Changes to financial support for solar PV”
Emerging markets become truly significant in 2018 amounting to 10% of global demand.
Emerging Market Dynamics—Latin America

**Chile installed 27 MW in Q2** bringing the total for 1H14 to 180 MW. We expect another 75 MW to be connected this year.

**Mexico passed Energy Reform** and is now in the process of passing the secondary laws. This is chilled utility-scale development, but will be positive for the market overall. The distributed generation market continues to grow, and is expected to be **over 60 MW** in 2014.

**Central America is a region to watch**, growing from installing 169 MW in 2014 to 530 MW in 2015

**Jamaica and the Dominican Republic** also are positioned for huge gains in 2015, combining for 247 MW
Emerging Market Dynamics—DG in Mexico

**Distributed generation in Mexico is growing rapidly** and companies are experimenting with new business models to harness this growth. **Three models in particular** are promising.

<table>
<thead>
<tr>
<th><strong>Multi-Site PPA</strong></th>
<th><strong>Non-Residential Community Solar</strong></th>
<th><strong>Agricultural Projects</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Q CELLS has signed a 20-year, 31 MW PPA with Soriana (one of Mexico’s largest retailers) to build &lt;500 kW projects across 120 different grocery stores. The projects are being built with 100% equity, but Q CELLS is working to close debt financing.</td>
<td>Developer Sonora80M is building a 20 MW project that has contracted 25-year PPAs with five municipalities and Ford. Because of the offtaker risk involved in municipal contracts financing has been tough to close, and we believe that this model would be better utilized with commercial and industrial entities. Projects can be developed offsite, and wheel power to be consumed elsewhere at negligible rates.</td>
<td>There is a 50% capital subsidy called FIRCO for approved solar project developers who have agricultural offtakers. Over 200 installers are approved and installing projects with FIRCO credits.</td>
</tr>
</tbody>
</table>
Part I – Base Case Forecast

Regional Forecast: Regional Dynamics and Major Market Trends

Emerging Markets: Latin America and Mexico

Part II – Risk in Global Markets

High and Low Demand Scenarios

Downside Risk

Upside Risk
There is always forecasting risk. The next few slides show our estimates of likely scenarios for global demand, and the probability and significance of upside and downside risk in different markets.
High and Low Demand Scenarios

<table>
<thead>
<tr>
<th>Year</th>
<th>Base Case</th>
<th>Low Demand</th>
<th>High Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>36.3 GW</td>
<td>31.1 GW</td>
<td>47.2 GW</td>
</tr>
<tr>
<td>2015</td>
<td>41.4 GW</td>
<td>43.3 GW</td>
<td>69.2 GW</td>
</tr>
<tr>
<td>2016</td>
<td>38.3 GW</td>
<td></td>
<td>73.4 GW</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td>80.7 GW</td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Downside risk is primarily driven by policy uncertainties in major markets: FiT policy in China, anti-dumping tariffs in India, and K.A. CARE in Saudi Arabia. We view downside risk as both relatively *probable* and highly *significant* in China and India.
Downside Risk in China and India

**Systemic administrative and technical challenges** mean the Chinese market could underperform, given the policy-dependence of the market.

**The imposition of tariffs on foreign modules/cells** in India is less likely but would be very significant, effectively eliminating a large share of demand due to higher costs and constrained supply.

---

**Figures represent cumulative market 2014-2018**

**China**

- High Demand: 79 GW
- Base Case: 65 GW
- Low Demand: 37 GW

**India**

- High Demand: 17 GW
- Base Case: 16 GW
- Low Demand: 2 GW
Upside risk is primarily driven by the potential for key markets to outperform expectations (China, Japan, and India) and stronger policy support in Saudi Arabia. Upside risk is both more probable and significant in Saudi Arabia.
Upside Risk in Saudi Arabia and Japan

The K.A. CARE program could lead to the competitive procurement of over 4 GW of solar PV annually. Currently, there are uncertainties around the timeline for implementation and we are cautiously optimistic.

Japan also has a strong upside potential as installed costs come down, and land and integration issues get resolved.

Figures represent cumulative market 2014-2018

<table>
<thead>
<tr>
<th>Saudi Arabia</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Demand</td>
<td>20 GW</td>
</tr>
<tr>
<td>Low Demand</td>
<td>300 MW</td>
</tr>
<tr>
<td>Base Case</td>
<td>6 GW</td>
</tr>
</tbody>
</table>

Figures represent cumulative market 2014-2018
Overall global risk tracks country risk in the Asia Pacific region, especially China: Asia Pacific will create 50% of global demand over the next 5 years—25% from China alone.

<table>
<thead>
<tr>
<th>Year</th>
<th>Asia Pacific Demand (GW)</th>
<th>China Demand (GW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>22.6</td>
<td>11</td>
</tr>
<tr>
<td>2015</td>
<td>25.2</td>
<td>13</td>
</tr>
<tr>
<td>2016</td>
<td>26.6</td>
<td>13</td>
</tr>
<tr>
<td>2017</td>
<td>27.8</td>
<td>13.1</td>
</tr>
<tr>
<td>2018</td>
<td>30.9</td>
<td>15</td>
</tr>
</tbody>
</table>

Overall, Asia Pacific will create 50% of global demand over the next 5 years, with China contributing 25%.
5. U.S. Market Update

Cory Honeyman
Solar Analyst
U.S.-China Trade Case Update

Preliminary Margins

- On June 2, the U.S. Dept. of Commerce announced higher than expected preliminary CVD (subsidy) margins on Chinese manufacturers.

Scope of the Case

- The scope of this case has been a major battleground. Thus far, DOC has adopted SolarWorld’s proposed scope (see below), but could change its mind in the final determination.

<table>
<thead>
<tr>
<th>Manufacturing Location</th>
<th>Subject to Initial Tariff?</th>
<th>Subject to New Petition?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wafer</td>
<td>Cell</td>
<td>Module</td>
</tr>
<tr>
<td>China</td>
<td>China</td>
<td>China</td>
</tr>
<tr>
<td>China</td>
<td>China</td>
<td>Taiwan</td>
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<tr>
<td>China</td>
<td>Taiwan</td>
<td>China</td>
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<tr>
<td>China</td>
<td>Taiwan</td>
<td>Taiwan</td>
</tr>
<tr>
<td>China</td>
<td>Taiwan</td>
<td>Other</td>
</tr>
<tr>
<td>China</td>
<td>Other</td>
<td>China</td>
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<tr>
<td>China</td>
<td>Other</td>
<td>Other</td>
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<tr>
<td>Other</td>
<td>Taiwan</td>
<td>Taiwan</td>
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<tr>
<td>Other</td>
<td>Taiwan</td>
<td>China</td>
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<tr>
<td>Other</td>
<td>China</td>
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<td>Other</td>
<td>China</td>
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<tr>
<td>Other</td>
<td>Other</td>
<td>China</td>
</tr>
<tr>
<td>Other</td>
<td>China</td>
<td>Other</td>
</tr>
</tbody>
</table>

Source: GTM Research – The 2014 U.S-China Solar Trade Dispute
U.S.-China Trade Case Update

Timeline

• Next major announcement will be July 24 – the preliminary antidumping determination
• This is when we will likely learn final scope, as well as what (if any) tariffs could be imposed on Taiwan

<table>
<thead>
<tr>
<th></th>
<th>AD Investigation</th>
<th>CVD Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOC Preliminary Determination</td>
<td>July 24, 2014</td>
<td>June 3, 2014</td>
</tr>
<tr>
<td>DOC Final Determination</td>
<td>October 7, 2014</td>
<td>August 18, 2014</td>
</tr>
<tr>
<td>ITC Final Determination</td>
<td>November 2014</td>
<td>October 3, 2014</td>
</tr>
<tr>
<td>Issuance of Order</td>
<td>November 2014</td>
<td>October 10, 2014</td>
</tr>
</tbody>
</table>

Market Impacts

• See section 1 for impact on module pricing
• Market impact will be felt most on utility-scale projects that were planning to use Chinese modules
• We expect some of these projects to switch to SunPower or First Solar

Source: GTM Research – The 2014 U.S-China Solar Trade Dispute
U.S. PV Installations by Market Segment

Source: GTM Research/SEIA U.S. Solar Market Insight, Q1 2014
A Tale of Two Sectors: Distributed PV in Q1 2014

Residential: 232 MW → Incremental Growth

- Evolving channel strategies
- Innovation in consumer and project financing solutions

Q1 2014 was the first time since 2002 that residential PV added more installations than non-residential

Non-Residential: 225 MW → Lumpy development

- Harsh winter delayed development timelines
- Sensitivity to state incentive reductions
- Continued need to standardize financing/deal origination

Source: GTM Research/SEIA U.S. Solar Market Insight, Q1 2014
Residential Market: Major Trends to Watch

Consolidated Distribution of Demand

- Top 5 states accounted for 83% of residential installations

Source: GTM Research/SEIA U.S. Solar Market Insight, Q1 2014

Growing Retail Rate Parity

- > 50% of residential installations came online without a state incentive in CA & AZ

Source: GTM Research/SEIA U.S. Solar Market Insight, Q1 2014
Residential Market: Major Trends to Watch

Slight Reversal in TPO Market Share

- Third-party owned (TPO) systems continue to drive new residential installations in major state markets
- But direct ownership has grown increasingly popular as installers ramp up partnerships with national/regional banks to provide loans and offer PACE as well

NEM Activity Across the US

- **Monthly NEM Fee:** AZ\textsubscript{1}, CA\textsubscript{3}, GA\textsubscript{4}, ID\textsubscript{4}, OK\textsubscript{2}, UT\textsubscript{3}
- **Roll Back NEM to Wholesale Rate:** CO\textsubscript{3}, KS\textsubscript{2}, NC\textsubscript{3}, PA\textsubscript{3}
- **Expand/Remove Aggregate NEM Cap:** CA\textsubscript{2}, MA\textsubscript{3}, NY\textsubscript{2}, VT\textsubscript{2}
- **Rate Design Reform:** CA\textsubscript{3}, MA\textsubscript{3}

Source: GTM Research/SEIA U.S. Solar Market Insight, Q1 2014
Residential Market: State Level Analysis

- **CA**: Retail rate parity underlies growth
  - 58% of IOU-based installations came online without a California Solar Initiative rebate in Q1 2014

- **AZ**: $0.70/kW/month NEM fee now in effect
  - **Installations grew**: Demand pull-in effect from December 2013 rush to grandfather customers in under old NEM scheme in APS territory
  - **Interconnection applications dropped**: NEM fee caused customer confusion and hesitancy to sign contracts

- **HI**: HECO is playing “catch-up” to manage PV grid saturation challenge

- **CO**: CPUC approved 20 MW in additional incentive funding for individual systems less than 25 kW as part of Xcel’s Solar*Rewards

*Source: GTM Research/SEIA U.S. Solar Market Insight, Q1 2014*
Non-Residential Market: Major Trends to Watch

**Growth of Gov’t/Nonprofit PV Market**
- Gov’t/nonprofit PV installations added > 100 MW for the second straight quarter
- Primarily driven by weaker incentives for commercial projects than gov’t/nonprofit in CA and abrupt end to commercial incentives in AZ in early 2013

**Small Scale C&I Remains Untapped**
- Small scale commercial has continued to see limited development opportunities due to higher transactional costs when the customer is non-investment-grade

*Source: GTM Research/SEIA U.S. Solar Market Insight, Q1 2014*
Non-Residential Market: State Level Analysis

- **CA and AZ**: School, gov’t, and nonprofit installations monopolized market growth
  - **CA**: Drove 75% of non-residential installations
  - **AZ**: Drove 86% of non-residential installations

- **NY**: Revisions to NYSEDA’s incentive program spurred market growth for small scale C&I

- **MA**: Rush to qualify under SREC I shifted to Q2 2014
  - Harsh winter delayed developers’ timelines to interconnect and qualify under SREC I
  - April 2014 added more non-residential installations than the first three months of 2014

- **NJ**: SREC market rebounds (slightly)
  - SREC prices stabilized (~$170/MWh) over last 6 months to unfreeze development

Source: GTM Research/SEIA U.S. Solar Market Insight, Q1 2014
Q1 2014: 873 MW of utility PV installed
• Second largest quarter for utility PV behind Q4 2013 (1.4 GW)

Key Market Takeaways
• Benefited from early completion of mega-scale projects with longstanding PPAs in CA
• Developers are rushing to complete as many projects as possible before the impending phase down of the Federal ITC

State Market Headlines in Q1 2014
• CA: Legacy PPAs for mega-scale projects
• NC: Attractive 35% in-state tax credit
• GA: Round two of Advanced Solar Initiative
• TX: Merchant solar projects in development (i.e. without a PPA in place)
• MN: 100 MW of utility PV approved in competitive solicitation including natural gas bids
U.S. PV Installation Forecast: 2014 Outlook

Residential: 1,276 MW in 2014
- CA will continue to account for majority of growth, but will be outpaced by the expansion of other states where retail rate parity is close to being or already reached (i.e. AZ)

Non-Residential: 1,574 MW in 2014
- Resumptions of growth due to pent-up demand for small scale C&I in CA, spillover demand of SREC I-eligible projects in MA, and the ramp up of NYSERDA’s Competitive PV Program in NY

Utility PV: 3,758 MW in 2014
- Growth will come from the usual cast of state market leaders – CA, NC, and AZ – followed by GA and TX
Bullish Outlook for 2014-2016
• The next three years will see continued, strong growth across all market segments

2017 Market Dynamics
• We expect a drop off in installations, partially due to pull-in of demand in 2016 ahead of the Federal ITC’s expiration
  – Financial innovations (i.e. securities and YieldCos) are expected to help soften the downturn for distributed PV installations

2018 Market Dynamics
• Supported by ramp up of new incentive programs (i.e. MA and NY), states driven by SRECs that can absorb the drop off in tax equity, and utility owned generation opportunities
# Q1 2014: Need-to-Know U.S. PV Market Facts

## Residential: 232 MW in Q1 2014; up 38% over Q1 2013

- More than 1/3 of residential installations came online without a state rebate
- More than 80% of residential installations came from just five states
- **Upside Potential**: Growing number of installations have come online without state rebates
- **Downside Risk**: Potentially unfavorable rate design/NEM reforms in key states

## Non-Residential: 225 MW in Q1 2014; down 12% over Q1 2013

- Market remains heavily dependent on state incentive availability
- School, government, and nonprofit installations added more than 100 MW for the second straight quarter
- **Major Barrier to Growth**: Standardizing risk analysis for small scale projects under 250 kW

## Utility PV: 873 MW in Q1 2014; second largest quarter ever for the market segment behind Q4 2013

- Utility PV will remain largest market segment in the U.S. up through 2016, led by CA and followed by NC and GA
- Developers in CA are bringing online as many projects as possible ahead of the Federal ITC drop off at the end of 2016, even if that means bringing the project online before the PPA takes effect (if the PPA begins after 2016)
6. U.S. PV Market Leaders Update

Nicole Litvak
Solar Analyst
Based on SolarCity’s 2014 guidance and GTM Research’s 2014 residential forecast, SolarCity will have a residential market share of 33% in 2014, compared to 26.7% in 2013.

After falling to a 6.6% market share in Q4 2013, Vivint rebounded to 8.6% in Q1 2014. The company’s most recent expansion is in Arizona.

Other leading installers expanding to new states include Verengo Solar, Solar Universe, NRG Home Solar (formerly Roof Diagnostics), Astrum Solar, and PetersenDean.

Source: GTM Research US PV Leaderboard
Consolidation is happening primarily due to the leading installers growing organically rather than through acquisition (though there is some acquisition of installers – see next slide.)

• The decline in top-10 market share in 2012 coincides with a drastic rise in the share of third-party ownership (from 42% in 2011 to 60% in 2012). The rapid growth of TPO providers who use installation partners (e.g. SunPower, Clean Power Finance, and Sunrun) likely contributed to this trend.
### M&A In the Residential Market

<table>
<thead>
<tr>
<th>Acquirer</th>
<th>Market Expansion/Consolidation</th>
<th>Downstream Vertical Integration</th>
<th>Soft Cost Reduction</th>
<th>Supply Chain Cost Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>SolarCity</td>
<td></td>
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<tr>
<td>Vivint Solar</td>
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<td>Sunrun</td>
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<td>NRG</td>
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<td>RGS Energy</td>
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<tr>
<td>SolarUniverse</td>
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<td>Solgent</td>
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</tbody>
</table>

**Market Expansion** – growth through acquisition, as opposed to organic growth

**Downstream Vertical Integration** – financiers acquiring installation partners

**Soft Cost Reduction**
- Customer Acquisition (Paramount Solar, Gen11)
- System Design (Solmetric)
- Financing (Common Assets)

**Supply Chain Cost Reduction**
- also a form of vertical integration when acquiring suppliers

Residential Solar Finance Providers

<table>
<thead>
<tr>
<th>Financier</th>
<th>Lead Generation</th>
<th>Sales</th>
<th>Financing Offered</th>
<th>Installation</th>
<th>Active Markets</th>
<th>Acquisitions Since 2013</th>
<th>Customer Acquisition Partnerships</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vertically Integrated</strong></td>
<td></td>
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<tr>
<td>vivint.solar</td>
<td>vivint.solar</td>
<td>vivint.solar</td>
<td>X</td>
<td>vivint.solar</td>
<td>Solmetric</td>
<td></td>
<td></td>
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<tr>
<td><strong>Partner Model</strong></td>
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</tr>
<tr>
<td>Clean Power / Finance</td>
<td>Partners</td>
<td>Partners</td>
<td>X</td>
<td>X</td>
<td>Partners</td>
<td>North American Power</td>
<td></td>
</tr>
<tr>
<td>SUNPOWER</td>
<td>Partners</td>
<td>Partners</td>
<td>X</td>
<td>X*</td>
<td>Partners</td>
<td>Nissan, Ford</td>
<td></td>
</tr>
<tr>
<td>CNE Power</td>
<td>Partners</td>
<td>Partners</td>
<td>X</td>
<td>X*</td>
<td>Partners</td>
<td>Choose Energy</td>
<td></td>
</tr>
<tr>
<td>Sunnova</td>
<td>Partners</td>
<td>Partners</td>
<td>X</td>
<td></td>
<td>Partners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kilowatt Financial</td>
<td>Partners through Clean Power / Finance</td>
<td>Partners through Clean Power / Finance</td>
<td>X</td>
<td>O</td>
<td>Partners</td>
<td></td>
<td></td>
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<td>Sunage</td>
<td>Partners</td>
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<td>X</td>
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<td>MOSAIC</td>
<td>Partners</td>
<td>Partners</td>
<td>X</td>
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<td>Partners</td>
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<td><strong>Semi-Integrated Financiers</strong></td>
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<td>Sunrun</td>
<td>Sunrun and Partners</td>
<td>Sunrun and Partners</td>
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<td>Sunrun and Partners</td>
<td>Rec Solar (residential), AEE Solar, SnapNRock</td>
<td>Nest</td>
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<td>nrg, Residential Solar Solutions</td>
<td>nrg and Partners</td>
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<td>Rfof Diagnostics Solar</td>
<td>Home Depot, Reliant Energy</td>
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<td>Sungevity and TPO Partners</td>
<td>Sungevity and TPO Partners</td>
<td>Sungevity and TPO Partners</td>
<td>X</td>
<td>X*</td>
<td>Sungevity Via Subcontractors</td>
<td>Mercury Solar, Syndicated Solar, Suntric</td>
<td>Green America</td>
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<td>RGS ENERGY and TPO Partners</td>
<td>RGS ENERGY and TPO Partners</td>
<td>RGS ENERGY and TPO Partners</td>
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<td>X*</td>
<td>RGS ENERGY</td>
<td>Mercury Solar, Syndicated Solar, Suntric</td>
<td>Green America</td>
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<td>AstrumSolar and TPO Partners</td>
<td>X</td>
<td>X*</td>
<td>AstrumSolar</td>
<td>Ethical Electric</td>
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</table>

X = Currently Offered | O = In Development | * = through partnerships with third-party loan providers such as commercial banks
Major projects completed in Q1 2014:

- Davis-Monthan Air Force Base - Pima, AZ
  - Developed and installed by SunEdison
  - 16.4 MWdc
  - Largest U.S. DOE solar project

- Mercer County Community College – West Windsor, NJ
  - Developed by SunLight General Capital, installed by Mastec
  - 9.4 MWdc
  - One of the largest school solar projects in the country (if not the largest)

Leading Non-Residential Installers, Q1-2014

- SunEdison: 44%
- MasTec: 12%
- Gehrlicher Solar America Corp.: 8%
- SolarCity: 7%
- Trinity Solar: 7%
- Next 5 Installers: 5%
- All Others: 17%

Source: GTM Research US PV Leaderboard
• **Trina** is still shipping a large quantity to be sold to SolarCity, but this could change as SolarCity shifts some business to REC and Silevo.

• **REC Solar** will need to increase shipments to the US to meet demand from SolarCity.

• **SunPower** is increasing its footprint in the US through its residential and commercial dealer network.
**Effects of Prelim. Tariff on US Supply Landscape**

- **SolarCity** announced a 100 MW supply agreement with European module supplier REC Solar (option to increase to 240 MW) just a few days after the preliminary ruling on tariffs imposed on Chinese modules.

- **SolarCity** will also acquire the high-efficiency module manufacturer Silevo Solar, which currently has manufacturing capacity in China but has plans to build a plant in New York.
  - SolarCity expanded Silevo’s plan for a 200 MW plant to 1 GW by 2016 and then further manufacturing in the US

- **SolarWorld** signed module supply agreements with PetersenDean in April and RGS Energy in June (capacity undisclosed for both).
Thank You!

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