



North America
United States
Industrials
Clean Technology

Industry
Solar

Date
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Industry Update

2014 Outlook: Let the Second Gold Rush Begin

Demand Could Surprise to the Upside

While we have been generally constructive on the global demand outlook, we are raising our 2014 and 2015 demand expectations to ~46GW and ~56GW respectively. We believe upside demand surprises from the US, Japanese and Chinese markets could continue in 2014. We expect streamlined incentive programs in China, additional subsidy cut signals in end 2014, and decreasing financing constraints to act as catalysts for upside. Similar to the '05-07 capacity rush, we expect another gold rush by downstream installers to add recurring MW ahead of policy changes over the next 2-3 years. Moreover, we expect grid and financing constraints to improve from 2014.

Supply Situation to Remain Tight

We expect global project finance focus to remain skewed towards downstream as opposed to upstream, which in our view could limit capacity expansion and drive some supply tightness. We expect some tightness in the poly and wafer segments and see prices rising by ~10-20% from current levels. We believe cash costs of some of the tier 1 poly suppliers are in the high teens to low 20s, at or below the current price levels and prices would need to rise above \$25/kg levels in order to drive some of the tier 2/3 poly suppliers to turn on their mothballed production capacities. More importantly, we also expect availability of working capital financing from Chinese banks to remain relatively challenging which in turn means supply tightness could persist through early/mid 2015 timeframe until new greenfield/brownfield projects come on line. The initial response of a lot of Chinese module suppliers has been to expand module capacity which has a low capital cost. However, due to a sharp increase in module capacity relative to cell/wafer capacity growth, we expect some tightness to emerge in the wafer/cell segments as well.

Improving Business Models, Increasing Investor Participation and Decreasing Financing Constraints Could Drive Multiple Expansion

Solar stocks have historically traded at a big discount to the market due to concerns about low entry barriers, low margin manufacturing businesses and high reliance on government subsidies. We believe evidence of more sustainable, diverse demand drivers along with emergence of new business models with high entry barriers could result in increased investor participation and valuation multiple expansion. Solar shares outperformed the broader equity markets in 2013 primarily due to short covering and increased participation from short term trading oriented investors, in our view. We expect 2014 performance of these stocks to be largely driven by long only investor participation. As financing constraints for the sector start to ease in 2014, we expect demand upside in several new/existing markets to drive consensus estimate revisions and multiple expansion.

Key Catalysts/Swing Factors

1) Q1 seasonality: We believe solar stocks are generally discounting weak Q1 seasonality as demand from Europe, US and China has been historically very weak. However, we expect demand in China to remain relatively strong and also expect markets such as Japan, UK and other international markets to drive strong Q1 momentum; 2) China and Japan demand outlook: Both China and Japan could represent ~45-50% of 2013 demand and we expect demand from both markets to remain a major swing factor.

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Top picks

Trina Solar (TSL.N),USD15.35	Buy
Yingli Green Energy (YGE.N),USD6.61	Buy

Source: Deutsche Bank

Companies Featured

First Solar Inc. (FSLR.OQ),USD56.74			Hold
	2012A	2013E	2014E
EPS (USD)	–	4.49	4.09
P/E (x)	–	12.6	13.9
EV/EBITDA (x)	–	4.3	4.1
Enphase Energy (ENPH.OQ),USD6.92			Buy
	2012A	2013E	2014E
EPS (USD)	-0.72	-0.43	0.13
P/E (x)	–	–	52.6
EV/EBITDA (x)	–	–	–
SunPower (SPWR.OQ),USD32.73			Hold
	2012A	2013E	2014E
EPS (USD)	–	1.46	1.08
P/E (x)	–	22.4	30.4
EV/EBITDA (x)	–	9.1	7.3
Trina Solar (TSL.N),USD15.35			Buy
	2012A	2013E	2014E
EPS (USD)	–	-1.12	1.06
P/E (x)	–	–	14.5
EV/EBITDA (x)	–	48.1	8.1
Yingli Green Energy (YGE.N),USD6.61			Buy
	2012A	2013E	2014E
EPS (USD)	–	-1.40	0.46
P/E (x)	–	–	14.5
EV/EBITDA (x)	–	26.4	7.5

Source: Deutsche Bank

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Let the Second Gold Rush Begin

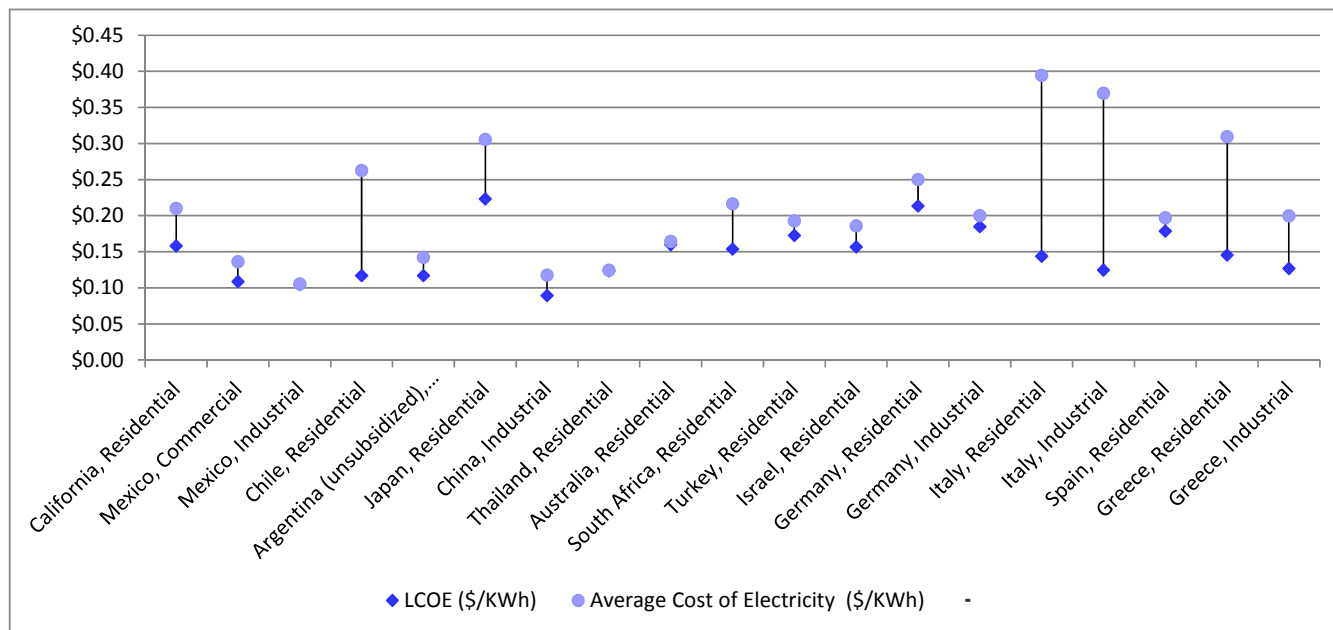
Demand Could Continue to Surprise to the Upside

While we have been generally constructive on the global demand outlook, we are raising our 2014 and 2015 demand expectations from 44.5 to 46.1GW and from ~52 to ~56GW respectively. We believe upside demand surprises from the US, Japanese and Chinese markets could continue in 2014. We expect a combination of streamlined incentive programs in China, additional subsidy cut signals in end 2014 and decreasing financing constraints to act as catalysts for upside demand surprises. While these 3 markets showed the most upside relative to expectations in 2013, we expect many more international markets to become meaningful growth contributors from 2014. Specifically, we expect India, South Africa, Mexico, Australia, Middle East, South America and South East Asia to all act as strong growth contributors. The majority of these markets are at grid parity and as such sustainable. Moreover, we believe some of the grid and financing constraints that have inhibited growth so far are set to improve in 2014.

Our above consensus view on 2014 demand is predicated on the following 5 reasons:

1) Solar is currently competitive without subsidies in at least 19 markets globally and we expect more markets to reach grid parity in 2014 as system prices decline further;

Figure 1: Markets at Grid Parity



Source: DB, BLS, Ontario Energy Board, Mexican Ministry of Energy, Chile Energy Group, Argentinean Secretary of Energy, NASA, Tepco, Chinese Economic Observer, Beijing International, Indian Central Regulatory Commission, Australia Power and Gas, Saudi Electric Company, Eksom, EuroStat



2) US based distributed generation business models are set to become more pervasive in international markets and act as a significant growth catalyst in FiT based European markets that have significantly scaled back subsidies;

3) Financing costs and availability for the solar sector are set to improve from 2014 - sufficient access to low cost financing has been a significant constraint inhibiting the growth of global solar sector so far. We expect yieldco/ABS transactions to fuel solar sector growth in 2014;

4) In markets such as the US, we expect downstream solar companies to participate in the gold rush to acquire solar customers at an accelerated pace. Just like upstream/midstream solar companies participated in the gold rush to add manufacturing capacity during the 2005-07 timeframe, we expect another gold rush to add recurring MW over the next 2-3 years until the ITC expires in the US in 2016 timeframe.

5) While the past 5 years were above module cost reduction, the next 3 years would be about BoS cost reduction - which includes the inverters, hardware, customer acquisition and financing costs.

Our 2014 base case demand estimate assumes Japanese market increases from ~7GW in 2013 to ~8GW in 2014, US market increases from ~6GW in 2013 to ~8GW in 2014 and China market increases from ~8GW to ~12GW. We expect Europe to account for ~7-8GW and expect international markets to account for ~12-17GW of demand. Specifically within international markets, we expect India, South Africa, South America, South East Asia, Australia and other emerging markets to each contribute to over 1 GW per market.

Global Demand Fundamentals Influenced by Historically Low Financing Costs, System Costs and improving Policy Response

We expect the 3 most important demand drivers - system prices, financing costs and policy outlook to act as increasing tailwinds for the solar sector over the next 12-18 months. Solar module prices are likely to remain at record low levels for the next 18 months and beyond that timeframe, we see some inflationary pressures driving prices higher. While balance of system costs have room to decline further, we expect a rapid decline in these costs over the next 18 months and then expect inflationary wage pressures on overall costs. Along the same lines, while overall financing costs have room to decline as solar moves down the risk curve and innovative financing structures drive down costs, we expect rising global interest rate environment from 2015 timeframe to drive upward pressure on overall financing costs. Bottom line: we expect solar LCOE to reach a cash bottom over the next 18-24 months and expect a rush for installations during the corresponding period.



Figure 2: Summary of Solar Economics (Self Consumed system)

City, State	Insolation (kWh/m ² /day)	Cost of Electricity	LCOE	Solar Premium/ Discount	IRR
California, USA, Residential	5.93	\$0.21	\$0.16	-\$0.05	13.22%
Ontario, Canada, Residential	3.92	\$0.16	\$0.24	\$0.07	1.76%
Mexico, Residential	5.78	\$0.39	\$0.14	-\$0.26	38.68%
Mexico, Commercial	5.78	\$0.16	\$0.11	-\$0.05	16.26%
Mexico, Industrial	5.78	\$0.13	\$0.10	-\$0.03	11.72%
Chile, Residential	5.76	\$0.10	\$0.12	\$0.02	4.25%
Argentina (unsubsidized), Residen	5.75	\$0.14	\$0.12	-\$0.02	10.53%
Argentina (subsidized), Residentia	5.75	\$0.11	\$0.12	\$0.01	5.72%
Japan, Residential	4.30	\$0.26	\$0.22	-\$0.04	10.67%
China, Residential	4.35	\$0.14	\$0.11	-\$0.03	11.71%
China, Industrial	4.35	\$0.10	\$0.09	-\$0.01	9.42%
India, Wholesale	5.70	\$0.31	\$0.09	-\$0.22	46.40%
Malaysia, Commercial	4.88	\$0.08	\$0.12	\$0.04	1.94%
Malaysia, Industrial	4.88	\$0.12	\$0.11	-\$0.01	8.89%
Thailand, Residential	5.24	\$0.09	\$0.12	\$0.03	2.62%
South Korea, Residential	4.67	\$0.09	\$0.20	\$0.11	-
South Korea, Wholesale	4.67	\$0.08	\$0.16	\$0.08	-
Australia, Residential	5.27	\$0.12	\$0.16	\$0.04	3.41%
Saudi Arabia, Wholesale	5.94	\$0.20	\$0.12	-\$0.08	19.52%
South Africa, Residential	5.64	\$0.10	\$0.15	\$0.05	1.40%
Turkey, Residential	4.51	\$0.16	\$0.17	\$0.01	6.70%
Turkey, Commercial	4.51	\$0.07	\$0.16	\$0.09	-
Israel, Residential	6.13	\$0.22	\$0.16	-\$0.06	14.21%
Germany, Residential	3.22	\$0.25	\$0.21	-\$0.04	10.60%
Germany, Industrial	3.22	\$0.20	\$0.18	-\$0.02	8.97%
Italy, Residential	4.78	\$0.19	\$0.14	-\$0.04	12.71%
Italy, Industrial	4.78	\$0.15	\$0.12	-\$0.03	11.56%
France, Residential	3.43	\$0.13	\$0.24	\$0.10	-
France, Industrial	3.43	\$0.39	\$0.20	-\$0.20	23.39%
Spain, Residential	4.55	\$0.37	\$0.18	-\$0.19	24.58%
Spain, Industrial	4.55	\$0.18	\$0.16	-\$0.02	9.38%
United Kingdom, Residential	3.62	\$0.16	\$0.25	\$0.09	0.76%
United Kingdom, Industrial	3.62	\$0.20	\$0.21	\$0.01	6.31%
Greece, Residential	5.49	\$0.14	\$0.13	-\$0.01	9.17%
Greece, Industrial	5.49	\$0.16	\$0.11	-\$0.04	14.01%

Source: DB, BLS, Ontario Energy Board, Mexican Ministry of Energy, Chile Energy Group, Argentinean Secretary of Energy, NASA, Tepco, Chinese Economic Observer, Beijing International, Indian Central Regulatory Commission, Australia Power and Gas, Saudi Electric Company, Eksom, EuroStat

Supply Situation Could Remain Tight

We expect global project finance focus to remain skewed towards downstream as opposed to upstream, which in our view could limit capacity expansion and drive some supply tightness across the upstream part of the value chain. In particular, we expect some tightness in the poly and wafer segments and see prices rising by ~10-20% from current levels. We believe cash costs of some of the tier 1 poly suppliers are in the high teens to low 20s, at or below the current price levels and prices would need to rise above \$25/kg levels in order to drive some of the tier 2/3 poly suppliers to turn on their mothballed production capacities. More importantly, we also expect availability of working capital financing from Chinese banks to remain relatively challenging which in turn means supply tightness could persist through early/mid 2015 timeframe until new greenfield/brownfield projects come on line. The initial response of a lot of Chinese module suppliers has been to expand module capacity as it is a relatively low capital cost expansion. However, due to a sharp increase in module capacity relative to cell/wafer



capacity growth, we expect some tightness to emerge in the wafer/cell segments as well.

Improving Business Models, Increasing Investor Participation and Decreasing Financing Constraints Could Drive Multiple Expansion

Solar stocks have historically traded at a big discount to the market due to concerns about low entry barriers, low margin manufacturing businesses and high reliance on government subsidies. We believe evidence of more sustainable, diverse demand drivers along with the emergence of new business models with high entry barriers could result in increased investor participation and valuation multiple expansion. Solar shares outperformed the broader equity markets in 2013 primarily due to short covering and increased participation from short term trading oriented investors, in our view. We expect 2014 performance of these stocks to be largely driven by long only investor participation. As financing constraints for the sector start to ease in 2014, we expect demand upside in several new/existing markets to drive consensus estimate revisions and multiple expansion.

Key Catalysts/Swing Factors

* Q1 seasonality: We believe solar stocks are generally discounting weak Q1 seasonality as demand from Europe, US and China has been historically very weak. However, we expect demand in China to remain relatively strong and also expect markets such as Japan, UK and other international markets to drive strong Q1 momentum. Also note that consensus Q1 estimates are already discounting 15-20% sequential shipments decline (assuming flat pricing) and relative to strong Q4 shipments, we believe Q1 industry shipments could turn out to be flat or down only modestly.

* China and Japan demand outlook: Both China and Japan could represent ~45-50% of 2013 demand and we expect demand from both markets to remain a major swing factor. For China, we currently assume 2014 demand of ~10GW - in the bear case, demand could turn out to be ~6GW if utility scale projects are capped at ~4GW and DG projects remain at ~2GW levels. In the bull case, demand could increase to ~12-14GW, driving upside to our current demand projections. Similarly, we currently expect the Japanese market to remain flat at ~7GW, but in a bull case scenario, demand could reach ~10GW.



Figure 3: Demand Outlook

MW	2010	2011	2012	2013E	2014E	2015E
China	520	2,000	3,510	8,000	12,000	13,800
y/y (%)	128%	285%	76%	128%	50%	15%
Japan	991	1,296	2,086	7,000	8,000	8,800
y/y (%)	105%	31%	61%	236%	14%	10%
Germany	7,216	7,485	7,604	3,502	2,801	2,801
y/y (%)	90%	4%	2%	-54%	-20%	0%
Italy	2,321	8,971	3,337	1,500	750	788
y/y (%)	224%	287%	-63%	-55%	-50%	5%
Spain	369	400	276	276	276	304
y/y (%)	515%	8%	-31%	0%	0%	10%
France	719	1,500	1,079	1,079	1,349	1,619
y/y (%)	228%	109%	-28%	0%	25%	20%
Rest of Europe	658	2,007	3,190	3,127	3,127	3,847
y/y (%)	370%	205%	59%	-2%	0%	23%
USA	878	1,600	3,313	5,000	8,000	12,000
y/y (%)	85%	82%	107%	51%	60%	50%
Canada	186	297	268	223	268	295
y/y (%)	119%	59%	-10%	-17%	20%	10%
India	158	190	980	990	1,980	2,771
y/y (%)	120%	20%	416%	1%	100%	40%
Others	1,012	1,194	2,312	5,600	7,560	9,072
y/y (%)	141%	18%	94%	142%	35%	20%
Total	15,028	26,940	27,955	36,297	46,111	56,096
y/y (%)	124%	79%	4%	30%	27%	22%

Source: Deutsche Bank, Official Country Sources where available for historicals

Figure 4: Supply Outlook

Worldwide Polysilicon Supply, Metric Tons

Annual Supply (MT)	2010	2011	2012	2013E	2014E	2015E
INCUMBENT POLY SUPPLIERS						
Hemlock Semiconductor	27,900	34,000	39,950	43,000	43,000	43,000
Tokuyama	7,300	8,200	8,200	8,200	8,200	8,200
Mitsubishi Materials	2,168	3,251	3,698	4,000	4,100	4,200
Sumitomo Titanium	1,190	2,125	3,188	3,200	3,300	3,400
Mitsubishi Polysilicon	1,275	1,488	1,785	2,000	2,100	2,200
REC	10,500	16,672	18,790	19,500	20,000	20,000
Wacker	30,500	35,500	39,000	46,800	52,000	60,000
Traditional Poly Suppliers - Total	86,934	107,186	119,970	130,900	141,900	150,200
Non-China Poly Supply						
OCI	18,000	35,000	42,000	40,000	45,000	62,000
Non - China Total	25,077	47,500	57,500	55,500	65,500	82,500
China Poly Supply						
GCL	17,040	29,414	47,000	50,000	62,000	65,000
China - Total	36,070	62,624	97,380	71,500	89,500	89,500
Total (excl. Met Poly)	148,081	217,310	274,850	257,900	296,900	322,200

Source: Deutsche Bank, Company Reports



Figure 5: Supply/Demand Outlook

Supply/Demand	2010	2011	2012E	2013E	2014E	2015E
New PV Installation (MW)	17,682	26,940	27,955	36,297	46,111	56,096
Inventory Requirement (MW)	1,768	2,694	2,796	1,815	2,306	2,805
Inventory % of Demand	10%	10%	10%	5%	5%	5%
Total PV Module Shipments (MW)	19,450	29,634	30,751	38,112	48,417	58,901
Efficiency Loss	5.0%	5.0%	5.0%	4.0%	4.0%	4.0%
Total PV Cell Shipments (MW)	20,423	31,116	32,288	39,637	50,353	61,257
Thin Film Supply (MW)	1,480	2,083	1,945	1,742	2,279	2,663
Polysilicon Consumed (ton/MW)	6.5	6.5	6.0	5.8	5.7	5.6
Total Solar Poly Req'd (MT)	123,127	188,713	182,060	219,791	274,025	328,124
Poly demand from Semis (MT)	27,406	29,657	30,218	32,839	32,839	32,839
Total poly demand (MT)	150,533	218,370	212,277	252,630	306,863	360,963
Poly supply (MT) - excluding scrap/UMG	148,081	274,850	274,850	257,900	296,900	322,200
Under Supply (Over Supply) (MT)	2,452	(56,480)	(62,573)	(5,270)	9,963	38,763
Under Supply (Over Supply) (MW)	377	(8,689)	(10,429)	(909)	1,748	6,922
% of demand	2%	-32%	-37%	-3%	4%	12%

Source: Deutsche Bank



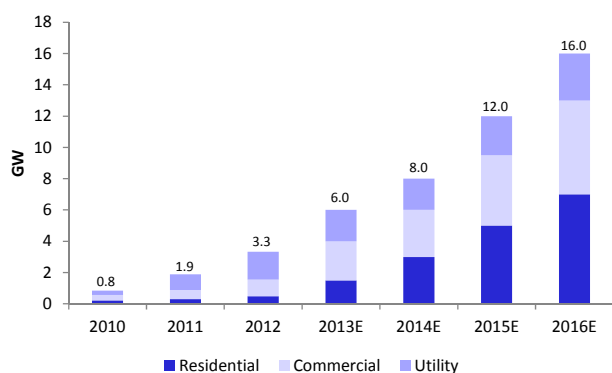
Important and Emerging Countries Demand

US Market: 5 Reasons we see Growth

1) Grid parity in 10+ states currently

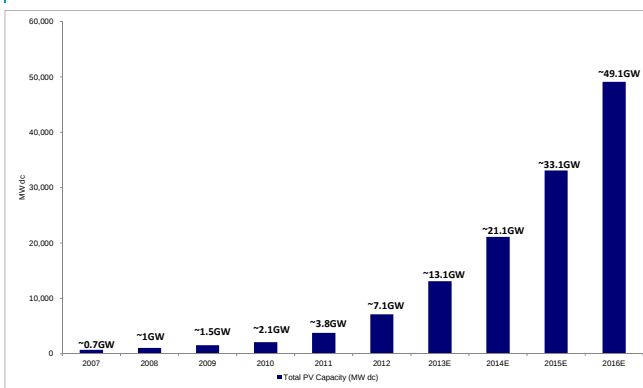
We believe solar is currently competitive in more than 10 states in the U.S without additional state subsidies. Solar LCOE in these states ranges from 11-15 c/kWh and compares to retail electricity price of 11-37 c/kWh in these markets. These grid parity states currently have a cumulative installed capacity of ~6GW as of 2012. However, considering the improved economics of solar in these markets along with other growth enablers such as solar leasing, availability of low cost financing, we expect installed capacity growth of ~600% over the next 4 years.

Figure 6: US Total PV Installations



Source: Deutsche Bank, SEIA

Figure 7: Total PV Capacity



Source: Deutsche Bank

2) Potential for further cost reductions and solar growth in additional states over the next 18 months

Assuming solar system prices decline from sub \$3/W currently to sub \$2.50/W over the next 12-18 months, solar LCOE in existing grid parity states could decrease further to 9-14 c/kWh driving further acceleration in solar shipments in these markets. At these system price levels, solar has the potential to reach grid parity in 12 additional states as LCOE approaches 11-14 c/kWh in these states.



Figure 8: States Currently at Grid Parity

Grid Parity at \$3.00 (\$2.10 w/ ITC)	LCOE (\$/KWh)	Average Cost of Electricity (\$/KWh)
Arizona	\$0.11	\$0.11
California	\$0.12	\$0.16
Connecticut	\$0.15	\$0.17
Hawaii	\$0.12	\$0.37
Nevada	\$0.10	\$0.12
New Hampshire	\$0.15	\$0.16
New Jersey	\$0.15	\$0.16
New Mexico	\$0.11	\$0.11
New York	\$0.15	\$0.18
Vermont	\$0.16	\$0.17

Source: Deutsche Bank

Figure 9: Additional States Poised to Reach Grid Parity

Grid Parity at \$2.50 (\$1.75 w/ ITC)	LCOE (\$/KWh)	Average Cost of Electricity (\$/KWh)
Colorado	\$0.10	\$0.12
Delaware	\$0.12	\$0.13
Washington, DC	\$0.12	\$0.12
Florida	\$0.11	\$0.11
Kansas	\$0.11	\$0.11
Maryland	\$0.12	\$0.13
Massachusetts	\$0.13	\$0.15
Michigan	\$0.14	\$0.14
Pennsylvania	\$0.13	\$0.13
Rhode Island	\$0.13	\$0.15
South Carolina	\$0.11	\$0.12
Wisconsin	\$0.13	\$0.13

Source: Deutsche Bank

3) Lower financing costs could provide additional growth kicker

We believe the broader acceptance of yieldco type structures could lower solar financing costs by ~200-300 bps in addition to providing significant amount of liquidity within the solar sector. Every 100 bps reduction in financing costs results in 1 c/kWh reduction of LCOE, in our view. We believe solar LCOE could potentially decrease from 10-16 c/kWh to 8-14 c/kWh as a result of wider acceptance of yieldco type structures. Wider availability of financing options could provide project developers some cushion in a rising interest rate environment.

Figure 10: Shift in LCOE for 100bps Reduction

Cost of Debt / Discount Rate	Average LCOE (\$2.10 w/ITC)	Reduction per 100bps
7.50%	\$0.15	
6.50%	\$0.14	\$0.008
5.50%	\$0.13	\$0.008
4.50%	\$0.12	\$0.008
3.50%	\$0.12	\$0.008
2.50%	\$0.11	\$0.007

Source: Deutsche Bank

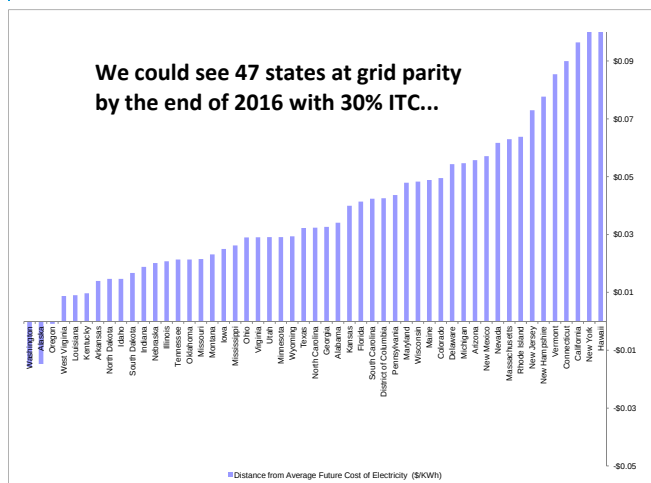
Note: Average of all 50 states and DC for current net system LCOE (with ITC)

4) ITC expiration could act as another catalyst

Current forms of federal investment tax credits are set to expire in 2016. Without any ITC, solar LCOE increases from 10-16 c/kWh to 15-21c/kWh and only 1 state (Hawaii) screening at grid parity states vs ~10 states currently. In a 2017+ 10% ITC environment, solar would be at grid parity in ~36 states (vs ~47 states with 30% ITC), assuming system prices and financing costs decline although the economics for solar would not be as attractive. Consequently, we expect to see a big rush of new installations ahead of the 2016 ITC expiration.

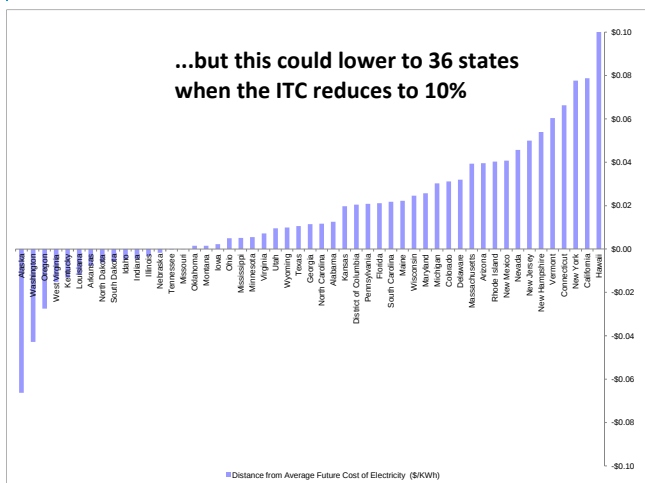


Figure 11: 2016 Grid Parity With ~30% ITC



Source: Deutsche Bank, EIA
Note: Both Graphs above show LCOE minus average electricity price in States

Figure 12: Grid Parity When ITC Steps Down to 10%



Source: Deutsche Bank, EIA

5) Leasing model could become mainstream

We believe the availability of residential leasing option would also act as a significant growth catalyst for the sector considering the fact that solar leasing companies are highly profitable and have strong incentive to maximize the number of leasing customers ahead of ITC expiration in 2016. While solar leasing is already attractive, we expect lease prices to decline further over the next 18 months and growth to accelerate.



China - National Policy Initiatives Continue to Fuel Robust Growth

The Chinese government policies towards solar companies appear to be a rapidly moving target, but have become considerably more constructive in recent years. While the much publicized 35GW capacity target by 2015 is likely priced into stocks, we believe markets are still digesting the policy movements from China and the implications for installation growth in the region. We expect ongoing policy changes to continue to support installation growth in these regions. In order to fund solar incentives the Chinese government mandated that starting September 25th, additional charges for wholesale power would double from 0.008 RMB/kWh to 0.015 RMB/kWh.

2013 Rush, 2014-15 Boom

We see upside to consensus 2013 estimates of 6-7 GW and our 2014 estimates of 10GW in light of recent policy changes which will likely drive a rush of installations in 2H13 and 2014. The country-wide ¥1/kWh (~\$0.16/kWh) gross feed in tariff for utility scale projects will change at the beginning of next year. As such, regions with higher insolation levels and access to labor will receive a lower FiT (0.90-1 RMB vs ¥1 across the board in 2013). In order to lock in the higher FiT, developers across the country are placing rush orders, which has led to 90-100% capacity utilization for tier 1 suppliers.

Figure 13: Utility Scale FiT

Previous Fit - Utility Scale	
All Regions	¥1.00
New FiT - Utility Scale	
Zone 1 - Western	¥0.90
Zone 2 - Northern	¥0.95
Zone 3 - All Others	¥1.00

Source: Deutsche Bank, State Release

The new rules state that if the projects are approved earlier than September 2013 and completed before 2014, all utility scale projects in the country (except Tibet) can qualify for the 1 RMB/kWh FiT, but any project that gains approval after that time is subject to the new rules.

Small Scale Subsidies in Place and Increasing

In addition to utility scale feed in tariffs, China offers a more robust and involved FiT for distributed generation under 6MW. Distributed generation users are awarded a ¥0.42/kWh FiT, which is on top of the reduction in electricity use inherent in having a distributed system. This effectively means that the customer is offsetting their cost of electricity and is being paid ¥0.42/kWh to do so. Residential electricity prices generally range between ¥0.60 and ¥0.80, while commercial prices are in the higher ¥0.90-¥1.20 range. We expect the commercial segment to ramp over the next several years as customer education takes hold. Since commercial users are often large electricity consumers, it is reasonable to assume that all the electricity production will be consumed, which yields a considerably higher effective feed in tariff (cost of electricity + ¥0.42).

Provincial/Local Incentives Provide Additional Growth Catalyst

In addition to central government incentives, we expect a number of provinces to provide additional local incentives as well, further improving project IRRs and fueling growth in respective regions. For example, the Hebei province currently provides RMB 30c/kWh for the first 3 years on top of the national RMB 1.0/kWh FiT. For projects starting in 2014/15, the 3 year provincial incentive is set to decrease to RMB 20c/kWh and RMB 15c/kWh respectively. Similarly, the Jiangsu province provides a 50c/kWh incentive on top of the



national incentive for 5 years whereas the city of ShaoXin provides an additional RMB 1.0/kWh for 3 years for all commercial rooftop applications. Checks indicate that several additional provinces are considering similar local incentive programs which could likely get announced in the 2014 timeframe.

Figure 14: Example Projects

Example (Utility Scale)	Gross Fit (¥/kwh)	LCOE (¥/kwh)	IRR - Utility Scale	
			W/ National FiT	W/ Provincial FiT
Hebei	¥0.95	¥0.62	11.2%	13.6%
Jiangsu	¥1.00	¥0.68	10.5%	16.2%
Example (Provincial DG)	Effective Gross FiT (¥/kwh)	LCOE (¥/kwh)	IRR - Distributed Generation	
Hebei DG (W/ Provincial)	¥1.50	¥0.69	17.4%	
Jiangsu DG (W/ Provincial)	¥1.70	¥0.75	17.0%	
Example (City DG)	Effective Gross FiT (¥/kwh)	LCOE (¥/kwh)	IRR - Distributed Generation	
			Utility Scale (For Comparison)	Distributed Generation
Shaoxing City, Zhejiang (Rooftop)	¥2.02	¥0.82	7.8%	15.3%

Source: Deutsche Bank.

Note: Gross FiT's are our estimate of DG FiT + cost of electricity.

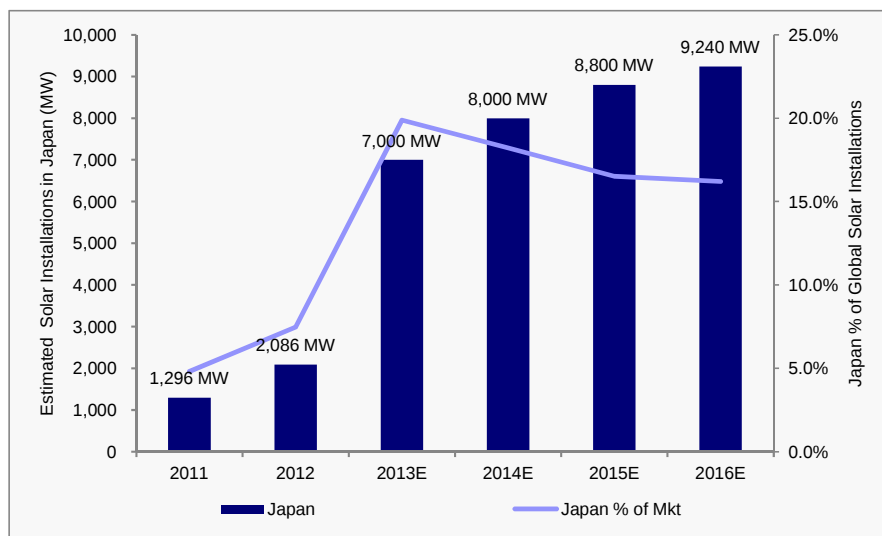


Japan

While ~1.1GW of solar was installed under the FiT scheme last year (April to December), ~2.8GW was installed in 1H 2013. This rapid acceleration will likely continue and into 2014 as projects start to run into a likely FiT reduction in April 2014 (announced in March). The 11% reduction from ~42 yen/kWh to ~38 Yen/kWh still implies ~\$0.35-40 cents per kwh which is one of the highest in the world. Another reduction to \$0.30-0.40 cents per kwh would still provide for attractive rates for both household and utility scale “megasolar” projects. According to official data, just under 4GW of solar power was connected due to the FiT scheme as of July 2013, while over 22GW have been approved. Roughly a third of total MW installed have been rooftop DG projects for households, which implies a healthy DG market going forward.

Recently, several foreign solar companies have announced investments in Japan. First Solar recently opened an operations center in Japan and is expected to roll out TetraSun’s modules primarily to that market. Canadian Solar signed a ~\$40M loan agreement for ~145MW of Japanese projects as well, and every major module manufacturer has a presence to varying degrees. We expect demand in Japan to reach 7GW in 2013 and expect 7-10GW if Japanese FiTs are marginally reduced and METI implements more aggressive measures to speed up the 22GW of pipeline.

Figure 15: Japan Shipments Forecast



Source: PVPS, EPIA Deutsche Bank Estimates



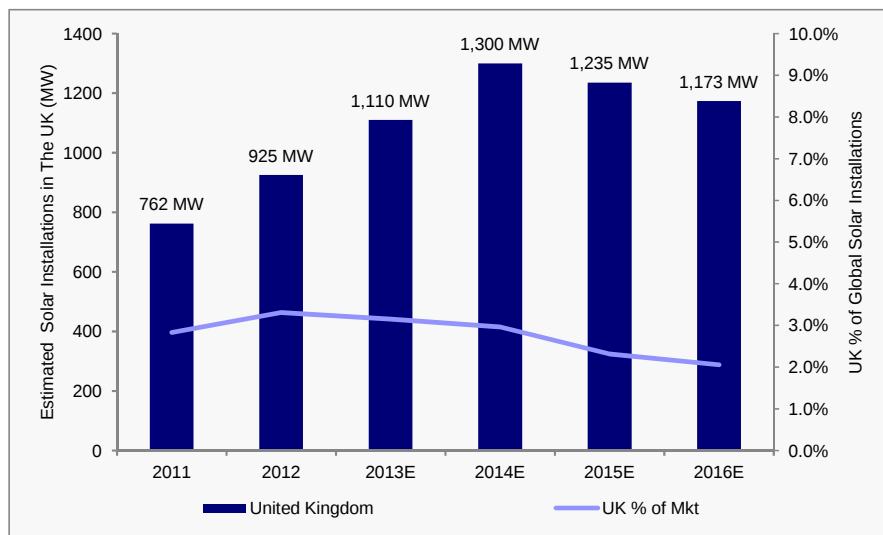
UK

The UK solar market has been negatively affected by ongoing reforms to clean energy programs in 2013, starting with April 2013 cuts to Renewable Obligation Certificate's (ROCs, which must be purchased by electricity suppliers and are similar to state renewable energy portfolio requirements in the US). The BBC reported in the beginning of December that further cuts to wind and solar incentives were likely coming in 2015, but this applies to "strike prices" (effectively FiTs) rather than ROC's. David Cameron recently pledged to roll back 'green levies' which indicates lessening support during an election cycle.

Q3 demand in the UK was weak given short supply pending the EU trade case, but more certainty and potential cuts should help spur development into 2014. Greg Barker (Energy Minister) has been an outspoken critic of Greenfield ground mounted PV (due to local opposition) and his general sentiment is much more positive on DG, particularly for the commercial segment. Since the compliance period starts/ends in April, there is often a rush in Q1. Producers of solar electricity are currently receiving 1.6 ROC's, which will decrease to 1.4ROC in April 2014, 1.3ROC in 2015, 1.2 ROC in 2016. Furthermore, commercial scale investment will be helped by the ROC incentive structure announced earlier this year of 1.7 ROC/MWh in 2013, reducing by 0.1 every year.

The government recently released the "UK Solar PV Strategy Part 1" report, which suggested solar can make a meaningful contribution to the country's goal of 15% renewable generation by 2020. Greg Barker also recently suggested that the country can achieve a long term goal of 10GW+ by 2020 and would update his official strategy by spring 2014. Unofficially he has indicated a 20GW target. ~2.5GW of solar capacity was in place in the UK by October 2013. We forecast 1.1GW demand in the UK in 2013 and 1.3GW in 2014.

Figure 16: UK Shipments Forecast



Source: Deutsche Bank, PVPS



India

The Indian Government launched the Jawaharlal Nehru National Solar Mission (NSM) in 2010 that targets 20GW of grid-connected solar capacity by 2022, under a 3-phase approach – with Phase 1 (2010-13) targeting 1-2GW of cumulative grid-connected solar capacity, Phase 2 (2013-17) targeting 4-10GW, and Phase 3 (2017-22) targeting 20GW.

For FY2013/14 (ending Mar 2014), India's Ministry of New and Renewable Energy (MNRE) has set a target to install 1.1GW of grid-connected solar in the country. However, only ~395MW was installed in the first 7 months of the fiscal year (Apr-Oct 2013) – which raises doubts on whether the full-year target will be achieved. Cumulatively, the country has installed ~2GW of grid-connected solar as of Oct 2013. MNRE aims to install 40MW of off-grid PV in FY2013/14, but only ~14MW was installed in the first 7 months.

Recently, MNRE approved Phase 2 of NSM, which effectively approved funding for projects and confirmed domestic content requirements. Projects developed in India cannot be sold for at least 12 months but may be helped by govt support for up to 30% of the project cost for Utility scale systems.

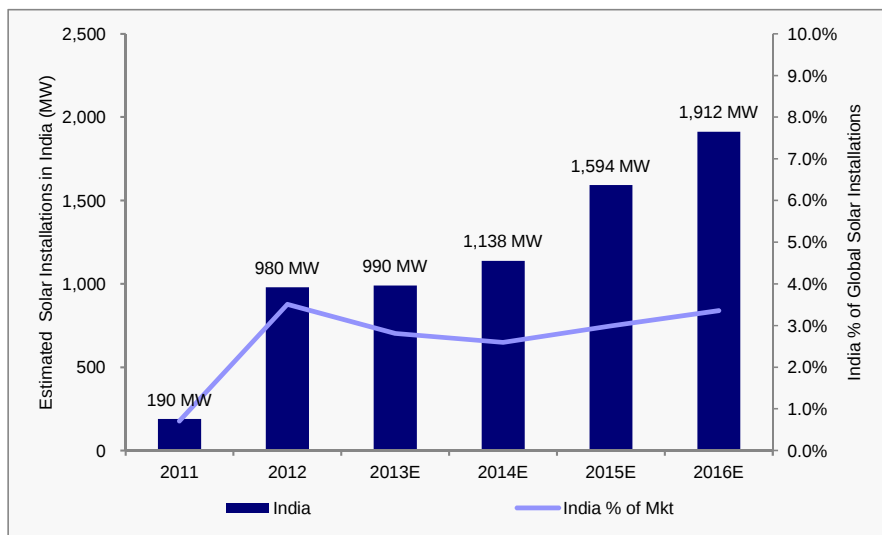
Several Indian state governments have declared their state-level solar policies. Solar installed capacity targets set by major states are: Gujarat – 500MW in 2010-14, Karnataka 250MW in 2013-16, Rajasthan – 600MW in 2013-17, Madhya Pradesh – 200MW in 2012-13, Andhra Pradesh – 1GW in 2013-17, and Tamilnadu – 3GW in 2013-15. Recently some media reports indicated that Gujarat is about to issue a new policy regulating rooftop solar, which will run until the end of Mar 2015 and would target 20MW of residential rooftop installations and a further 20MW of industrial, commercial, institutional and agricultural systems. Although both types of rooftop would reportedly qualify for a 30% central subsidy with residential systems eligible for a further 40% discount (ceiling of INR32k/kW), the systems would not be eligible for payments from electricity companies if they generate surplus energy.

Net metering is also beginning to take root, as local governments (most recently New Delhi) began to invite feedback/suggestions from various stakeholders in response to MNRE's recently released net metering guidelines. Most notable Indian state to implement net metering is Tamil Nadu, which aims to install 350MW of solar roof-top systems by 2015. In addition to the introduction of a net metering mechanism, the state will also offer a generation-based incentive (GBI) worth INR2/kWh for the first 2 years, INR1/kWh for the following 2 years, and INR 0.5/kWh for a final 2 years, for all systems installed before 31 Mar 2014.

We expect 2013 installations to be in the range of 0.9-1GW. Going forward, we expect 2014-17 to witness a surge in installations, mainly driven by state-level targets and Phase 2 of NSM. However, we believe there is a possibility that some states might miss their targets. As such, we estimate 2014 installations at ~1.1GW, 2015 at ~1.6GW, 2016 at ~1.9GW. By 2017, we expect India to have an installed capacity of ~8.8GW (vs. MNRE target of 10GW).



Figure 17: India Installations



Source: Deutsche Bank, EPIA

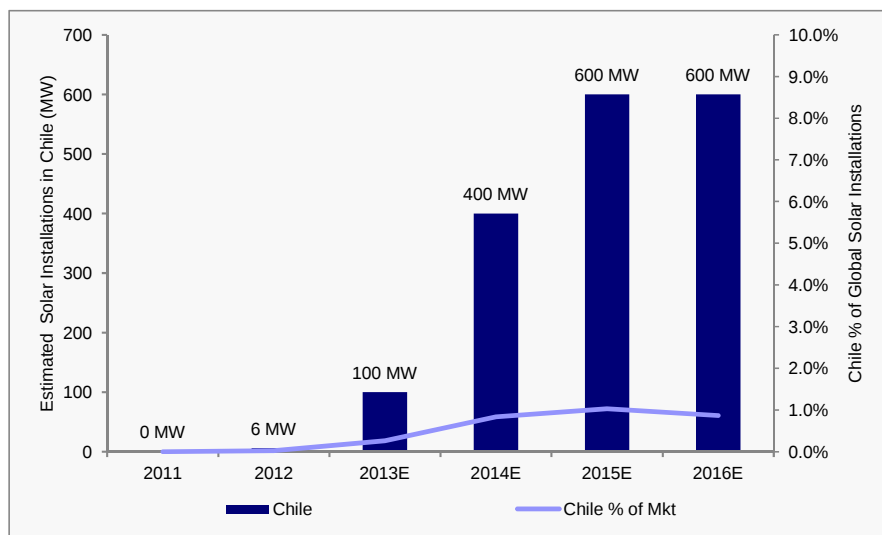


Chile has Significant Growth Potential

Chile is exciting primarily because solar development in the region does not require any form of government incentive. Average power prices range from ~\$0.15/kWh to ~\$0.25/kWh – helping to make unconventional sources of electricity cost competitive. High power prices coupled with high solar penetration levels in the north of the country are enabling grid parity and fueling a robust pipeline of projects. However, actual implementation will favor experienced players with patience. We expect extensive permitting and offtake needs to translate into a reduced funnel of viable projects as pipelines move forward.

Although most projects generally use 70-80% debt, we estimate fully, equity-funded solar installations that successfully navigate the permitting issues can generate electricity at an LCOE of \$0.12-0.18/kWh. At these prices, solar can be cost competitive with traditional forms of generation. However, Chile's market is still relatively small in a global context.

Figure 18: Chile installations



Source: PVPS, EPIA Deutsche Bank Estimates

Following recent approvals by the Environmental Evaluation Service (SEA) in Chile, the potential pipeline of potential projects stands at 7-8GW, but construction is still likely to ramp relatively slowly. Recall from our August 19, 2013 report, "Chilean Market – At Grid Parity, But Not Without Challenges" that the country has only ~7MW of solar plants in operation, although there are ~120MW under construction according to Centre of Renewable Energy (CER). We see ongoing optimism from Chile tempered by availability of capital and regional resources (labor, materials, etc).



Australia

Residential installations have historically dominated the Australian solar industry, accounting for ~90-95% of installation volumes. According to the latest data from Australian PV Institute, cumulative PV installations in Australia reached an estimated ~3.2GW as of Oct 2013 – with ~752MW installed during Jan-Oct 2013 (1H13 was ~414MW, Jul-Oct was ~338MW). State/ Territory wise, Queensland leads with ~992MW of cumulative PV installed, followed by New South Wales (616MW), Victoria (516MW), South Australia (444MW), Western Australia (348MW), Tasmania (52MW), Australian Capital Territory (36MW), Northern Territory (14MW). In terms of percentage of dwellings with a PV system, SA led other states/territories with an estimated 23.6% of dwellings with PV installations, followed by QLD (22.5%), WA (16.9%), ACT (10.9%), NSW (10.9%), VIC (10.1%), TAS (8.2%), and NT (4.6%). Nationwide, ~14% of dwellings have a PV system.

In the last couple of years, the country has witnessed a nationwide move to significantly reduce FiTs. The current FiT schemes prevalent in the major solar states are listed below.

- **Queensland (QLD):** The state of QLD offers a solar bonus scheme, under which a government mandated solar FiT is paid to eligible customers for the surplus electricity generated from solar PV systems, which is exported to the Queensland electricity grid. The FiT was reduced from A\$0.44/kWh (payments end on 1 Jul 2028) to A\$0.08/kWh (payments end on 30 Jun 2014) for those customers who joined the scheme after 10 Jul 2012. To be eligible for the scheme, the solar PV system should have an inverter capacity not exceeding 5kW, and the customer should consume <100MWh of electricity a year.
- **New South Wales (NSW):** The state of NSW has closed its solar bonus scheme to new applicants. However, NSW residents can avail themselves to "Voluntary Solar Buyback". NSW's Independent Pricing and Regulatory Tribunal (IPART) announced the Solar Bonus Scheme benchmark buyback rate range of A\$0.77-0.129/kWh for solar power fed into the electricity grid for FY12/13-2013. The rate range, while not mandatory, is the amount that grid-connected solar PV system owners should seek from their electricity retailer for the period. Previously, the state offered FiT payments of A\$0.60/kWh, which were later reduced to A\$0.20/kWh, to those customers who applied before 28 Apr 2011 and connected systems by 30 June 2012.
- **Victoria (VIC):** The state of Victoria commenced a new FiT arrangement from 1 Jan 2013, under which a minimum of A\$0.08/kWh will be offered for excess electricity fed back into the grid for the year 2013. The rate for the feed-in tariff will be reviewed/ updated annually until 2016 by the Essential Services Commission (ESC). The ESC has released a draft decision setting the FiT for 2014 at a minimum of A\$0.08/kWh for exports of electricity to the grid. The FiT is only available to solar systems with a capacity of <100kW. Previously, the state offered Transitional and Standard FiT schemes (closed on 31 Dec 2012) with rates of A\$0.25/kWh or 1:1 buy back.
- **South Australia (SA):** South Australia closed its solar FiT scheme to new entrants at midnight on 30 Sep 2013. However, all customers consuming less than 160MWh per annum with a solar system up to 10kVA (single phase) or 30kVA (three phase) may be eligible for a minimum payment from their electricity retailer for any excess electricity they export to the grid. The Essential Services Commission of South Australia (ESCOSA) released a price determination for the solar minimum retailer payment, applying from 27 Jan 2012. ESCOSA has determined a minimum fair and



reasonable rate of A\$0.098/kWh applying for the remainder of the 2013 calendar year, and has proposed a draft determination of a minimum of A\$0.076/kWh for 2014.

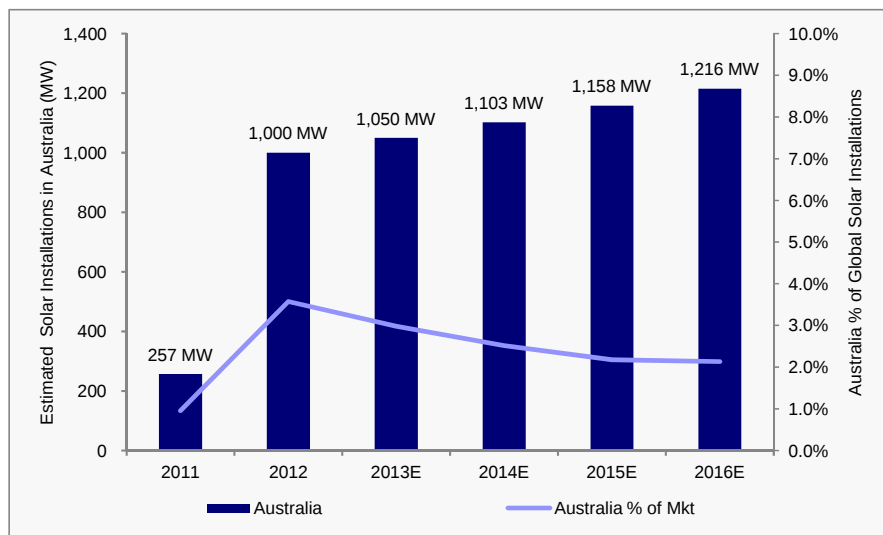
- Western Australia (WA): WA government stopped its FiT scheme last year. In Aug this year, WA government backed down on its earlier decision to retrospectively halve A\$0.40/kWh FiT for residential solar power. Synergy, Western Australia's largest energy retailer, offers a Renewable Energy Buyback Scheme for systems having a capacity of 500W to 5kW. Currently, Synergy buys renewable energy from customer at ~A\$0.088/kWh.

Additionally, the country supports renewable energy deployment through Small-scale Renewable Energy Scheme (SRES), under which a customer receives a number of small scale technology certificates (STCs) on purchasing an eligible solar power system. The value of the STCs can be applied to the value of the system, thereby reducing the upfront costs.

The country is also witnessing a growth in its solar leasing market for both residential and commercial customers. Sungevity entered the Australian market in 4Q12, while Trina Solar introduced a solar leasing scheme (through a new company called Lightleasing) a couple of months back. Several other players like Infinite Energy, SunPower and Photon Energy have also come up with such offerings for residential/ commercial customers.

We expect additional capacity installations of 80-100MW in Nov/Dec, which will take the full-year 2013 installation to ~850MW. Going forward, we expect annual installations to remain in the 0.8-1GW range for the next few years.

Figure 19: Australia Installations



Source: PVPS, EPIA Deutsche Bank Estimates



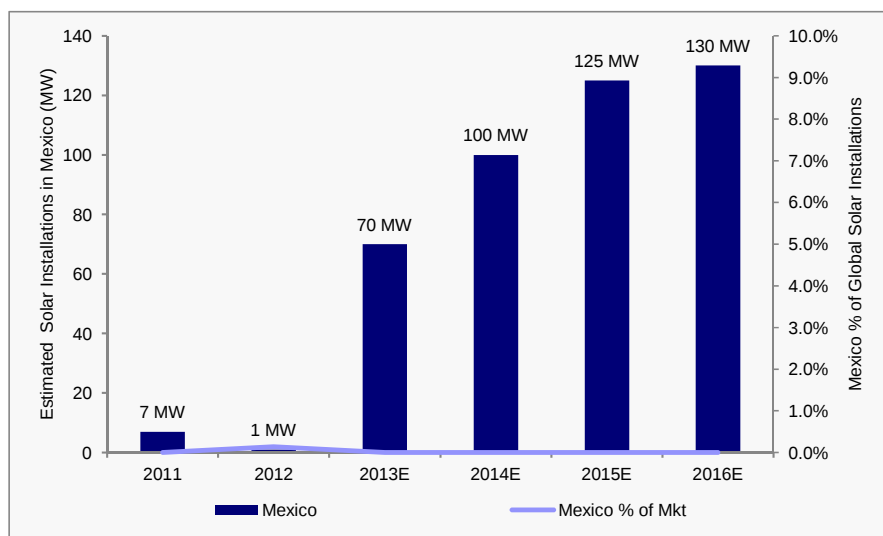
Mexico

Past progress in Mexico has been slow for solar. However, given good insolation levels ($>4.5\text{kWh/m}^2/\text{day}$ in $\sim 70\%$ of the country) and high energy prices for industrial consumers the fundamentals are in place. The country aims to generate 35% of its energy from clean sources by 2026 for strong growth over the next few years (up from less than 15% now). According to the industry regulator, Comisión Reguladora de Energía (CRE), 215MW of solar has permitting secured, mainly in Mexico's sunnier northern regions. In June 2013, the government set up a renewables council to draft an energy program, which included setting the nation's first capacity targets. The Energy Ministry forecasts solar capacity of $\sim 2.17\text{GW}$ by the end of the decade.

The country offers tax incentives for solar projects and a net metering system, as well as the possibility of long-term PPAs with CFE. Although residential installations dominate the industry as of now, the country has witnessed progress in utility scale projects as well. In Sep '13, Martifer Solar commissioned the 30MW Aura Solar 1 solar PV plant in Baja California, which is said to be the largest grid-connected solar plant in Latin America and the first to secure a PPA with the Utility, Comision Federal de Electricidad (CFE). Sonora80M has also initiated the construction of the first 20MW phase of its solar park in Hermosillo, Sonora, which is scheduled to come on line in 1Q14. Sonora80M eventually plans to raise the capacity of the plant to 80MW in four stages. In Aug, First Solar entered the Mexican utility-scale solar market through its purchase of a project pipeline from Element Power. Additionally, there are quite a few developers - including Saferay and Grupotec Tecnologia - that own licenses in the country.

Given that Mexico has witnessed an uptick in utility-scale PV installations (initial permits already secured for 215MW), we expect a significant increase in installed PV capacity in the coming few years. We expect 100MW of installations in 2014, followed by 125MW in 2015 and 130MW in 2016.

Figure 20: Mexico Installations



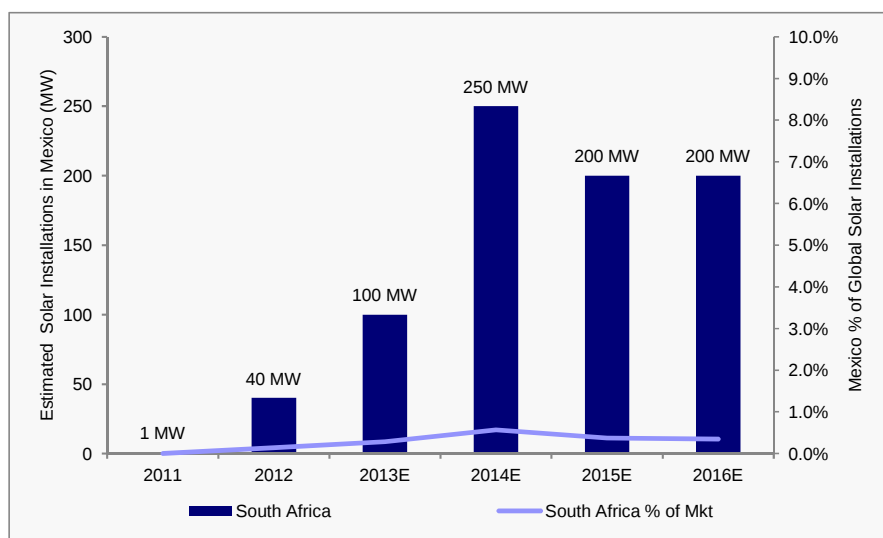
Source: PVPS, EPIA Deutsche Bank Estimates



South Africa

South Africa has emerged recently as an increasingly important source of solar installations due to the Renewable Energy Independent Power Producer Programme (REIPPPP). This program was initially seeking to install ~3.7GW of renewable energy by 2016, but the target was subsequently raised to almost ~7GW by 2020. In the most recent round, ~450MW out of 1.47GW of renewable energy projects were slated for solar projects, which implies 2+GW of projects by 2020. Installations have only recently started to complete, with a 75MW project from Scatec Solar coming on line in September. We expect South Africa to provide a steady source of demand but will not likely move the needle significantly on a global basis.

Figure 21: South Africa Installations



Source: PVPS, EPIA Deutsche Bank Estimates



Supply

We are updating our supply/demand model and are publishing our 2015 worldwide supply/demand outlook. We believe the worldwide demand outlook has improved from our previous estimate of ~44.5GW in 2014 to ~46GW in 2014 and from ~52GW to ~56GW in 2015. Given recent industry strength and continued momentum into 2014, we expect the major poly players (GCL/Wacker/ Hemlock/OCI) to either reach full capacity (GCL) or add capacity (OCI, DQ, Wacker) by 2015. The industry is much more consolidated (Likely <10 players operating in China) and the largest suppliers hold 70-80% market share. While there is still some uncompetitive supply that could be upgraded and come back into the market (LDK) we believe a more likely scenario involves increasing consolidation by the largest players and marginal cost improvements over the next several years. Best in class poly cash costs will likely reach the \$11-12 level within the next 12 months at commercial production scales which would further increase barriers to entry and increase the likelihood of long-term supply contracts.

Major Players Increasing Utilization and Capacity Adds

GCL Poly

GCL produced ~22KMT of poly in 1H13 and used ~61% of the poly internally, selling the rest at a \$17 average ASP. The company believes it has ~80% market share in the Chinese market and Chinese producers overall output reached ~28KMT in the 1H. Following Chinese New Year in 2013, GCL reached notably higher utilization and expects to maintain those levels of production going forward. At ~82-83% implied capacity utilization in the most recent quarters (~65KMT capacity) the company has room to increase supply by 10-15KMT in 2014 assuming it reaches full utilization. The construction of a captive power plant which was approved by the state government could raise all-in poly costs but GCL sources internally for its effective 10GW of wafer capacity. We estimate ~20KMT of incremental supply could come on line in 2014 in China assuming tier 2 producers ramp 5-10KMT.

Wacker

Wacker sees the global solar market demand at 34-40GW, rising to 42-50GW next year, and management suggested the supply/demand situation should improve in late 2013 or early 2014. Q3 shipments of poly was a record high for Wacker, and the company reached full utilization rates at the end of the quarter coupled with notably low inventory levels due to high shipment volume. Management suggested that low inventory levels across the industry and limited capacity should lead to higher prices in 2014, and that its 15-20KMT, \$1.5B Charleston, Tennessee plant is expected to come on line in mid 2015 could moderate this effect. Longer term, the company could expand this to ~50KMT. We see 20KMT of additional capacity ramping into 2H15 for an effective ~7-8KMT of supply added in 2015.

Costs should come down as upgrades to the Tennessee plant go into place, but the company did not give a specific cost targets on the last call (indications are that it sells for a slightly higher asp). Management believes that supply in China has rationalized from 50-100 poly production sites to ~5 sites today.



OCI Co.

OCI, which has recently consolidated the Polysilicon line into its “Basic Chemical” segment (expected to make up 30-40% of segment revenues), indicated that revenues were strong primarily because of poly shipment increases, but costs were higher due to high electricity prices and maintenance in the summer. The company had longer-than-expected maintenance in Q3 but suggested utilization would increase to normalized rates in Q4. Electricity shortages in Korea also affected the ability to produce at high utilization rates in Q3 and added \$5 to overall production costs, which could be a risk to full supply utilization in the future. Inventory levels for poly were at historical lows (2 weeks vs 4-6 weeks preferred) in October.

OCI is expecting 35-40GW of solar demand in 2013 rising to 40-45GW in 2014. The company is seeking a “strategic partner” for its poly business – and we would expect this translates into some kind of long-term supply contract going forward. Furthermore, the company has invested heavily into the P4 and P3.9 poly plants, which could add up to ~30KMT of capacity in under a year (20K and 10K respectively). The company would only finish the plants if it sees a clear undersupply situation, which could become evident in 2014. We see OCI capacity expanding into 2015 consequently.

Hemlock

In the beginning of 2013, Hemlock laid off ¾ of the employees (~300 in Tennessee and 100 in Michigan) at its planned \$1.2B Clarksville, Tennessee plant, which was initially planned for 2013 delayed production start. The Tennessee plant was estimated to have 10KMT of capacity and could be expanded to 21KMT, but we believe much of the initial expansion plans have been shelved given recent layoffs and industry uncertainty. Recent news reports indicate that the Tennessee plant is still mothballed, just barely finished phase 1, and has not been commissioned.

Daqo

Daqo is expected to complete the Xinjiang Polysilicon facility next year, adding ~6KMT capacity. The company expects a total of 12KMT of capacity by the end of 2014 when it can start producing trial runs, while actual production should average ~6.1KMT in 2014. We expect full utilization of new capacity in 2015 and ongoing full utilization of existing capacity. Daqo signed a long-term supply agreement in September 2013 for 70%+ of existing capacity (5KMT in 2013 raised to 6,150MT by 2013 end) and suggested that their demand estimates for 2014 of 45-50GW imply 250-275KMT of poly, which cannot be met by existing sub \$20/kg cost poly capacity of 200-220KMT. DQ's current production cost is ~\$15 and the company will likely reduce this \$1-2 next year with reduced depreciation expense and the new expansion.

REC

REC reported most recent quarterly production of ~4.45KMT and guided to ~19.5KMT supply in 2013 (4.85KMT in Q4). The company has shut down part of its poly production (the Siemens process part) due to market conditions and has no definitive timeline for start up again. The company has large Silane gas plants (III and IV, while I is down) which feed the FBR process plants for the



current poly production, and the company will likely produce FBR poly at ~\$14-15/kg

US Demand

We are tweaking our US Demand estimate for 2013 from 6 to 5 GW, given recent industry reports suggesting ~2.5GW installed through Q3 2013. Q4 has traditionally been a quarter with significantly higher install rates (in 2012, Q4 was ~190% of Q3 installs). We believe installation rates will continue to increase as several large utility scale projects come on line and distributed generation continues ramping aggressively. Our 2014 and 2015 estimates are 8 and 12GW respectively

China Demand

Our 2013 Chinese demand estimate is unchanged at 8GW, and our 2014/2015 outlook is revised up to 12GW (from 10GW) and 13.8GW (From 12GW) – in line with our recent China solar note. We see ongoing policy support from the Chinese government driving continued installation growth in 2014/2015 of ~12GW in 2014 and just under ~14GW in 2015.

Other Demand Changes

We also adjusted our estimates for India down from ~4GW to ~3GW as progress appears to be slower than expected, but this is offset by strength in other markets (Chile/South Africa/Australia). Our overall 2013 demand estimate is largely unchanged at ~38GW, and our 2014 demand outlook is revised up to 48GW (from ~45GW).

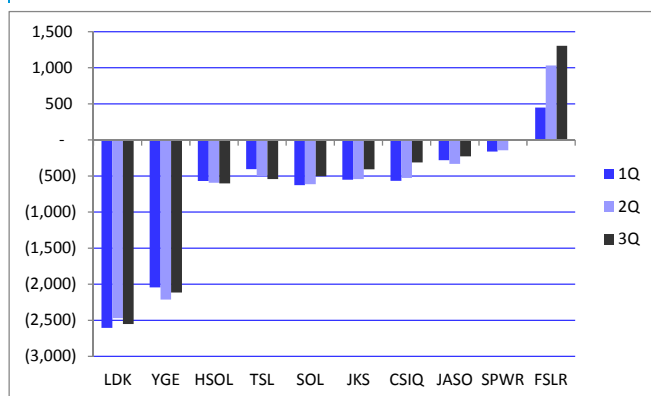


Key Charts and Figures

Balance Sheets

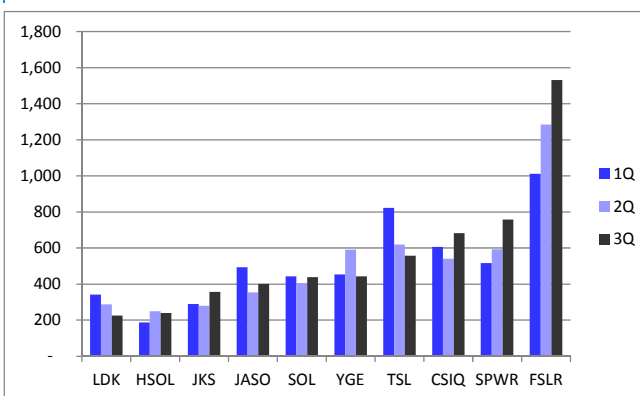
2013 has been primarily a year of balance sheet repair and rightsizing for the major module manufacturers, while players like TSL and YGE have utilized their size and scope to leverage the balance sheet as the project business kicks into high gear next year. US companies continue to be the most prudent with cash and debt, improving their net debt and total cash positions consistently q/q. First Solar has more than double the cash of any other player in the industry.

Figure 22: 2013 Net Cash Positions



Source: Deutsche Bank, Company Reports

Figure 23: 2013 Total Cash Balances

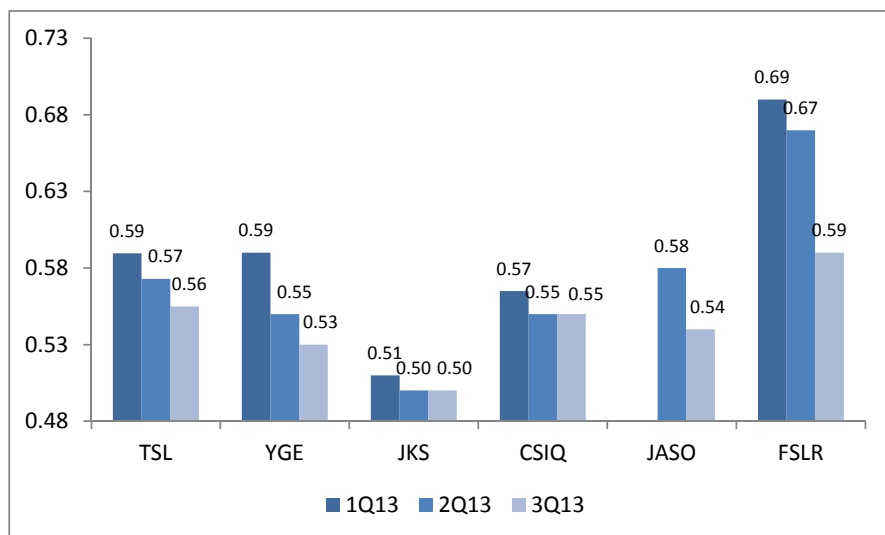


Source: Deutsche Bank, Company Reports

Cost Per Watt

We have seen the rate of decline slow in cost per watt for the traditional module manufacturers, which was expected given aggressive cost cutting over the last several years.

Figure 24: Cost/Watt



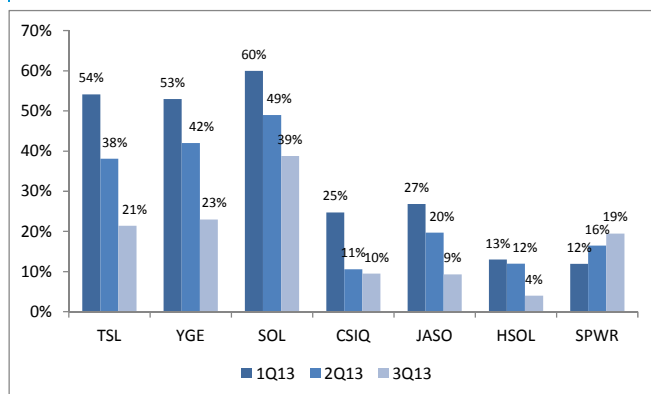
Source: Deutsche Bank, Company Reports
*Note, FSLR cost/watt includes recycling charges



The graph above shows reported or estimated costs for several major manufacturers where available. On an apples-to-apples basis First Solar has likely closed the cost gap with the Chinese module manufacturers, which had a slight advantage in the beginning of the year. FSLR includes additional costs (such as recycling) so comparable costs are likely ~10 cents lower than their reported cost.

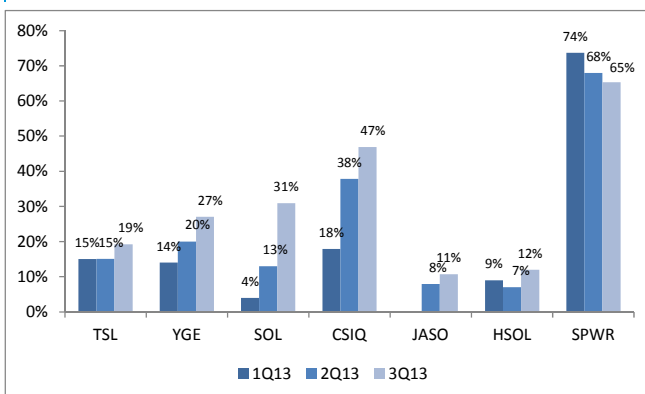
Regional Shipments/Revenue Breakdown

Figure 25: Rev/Shipment to Europe



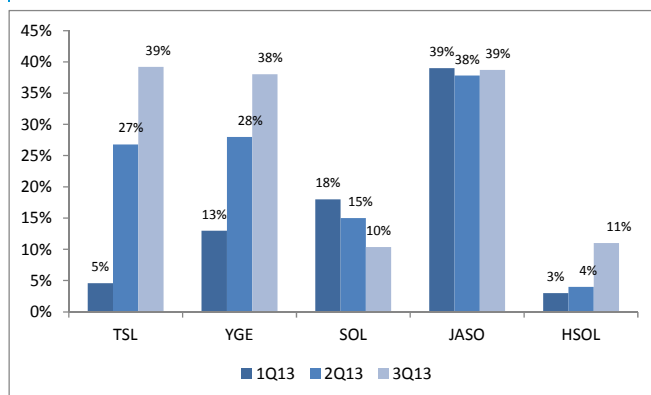
Source: Deutsche Bank, Company Reports
SPWR=EMEA

Figure 26: Rev/Shipment to US/America



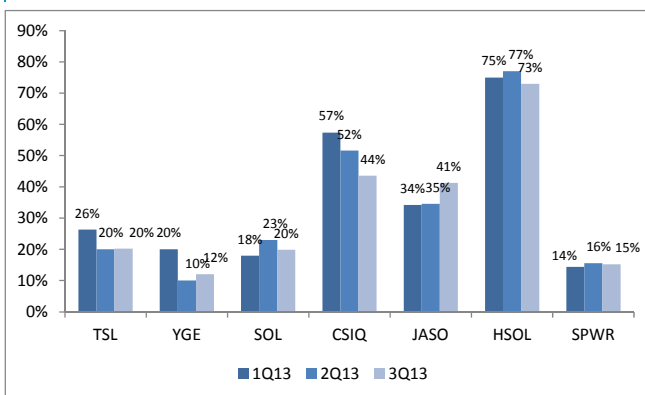
Source: Deutsche Bank, Company Reports
*CSIQ = North America. SPWR/JASO

Figure 27: Rev/Shipment to China



Source: Deutsche Bank, Company Reports

Figure 28: Rev/Shipment to ROW

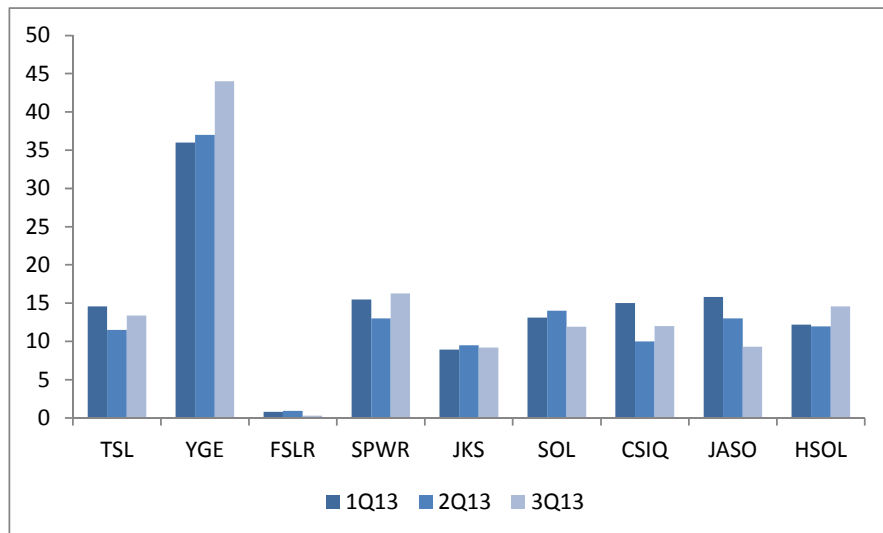


Source: Deutsche Bank, Company Reports
*CSIQ - ROW includes China.
**SPWR = APAC



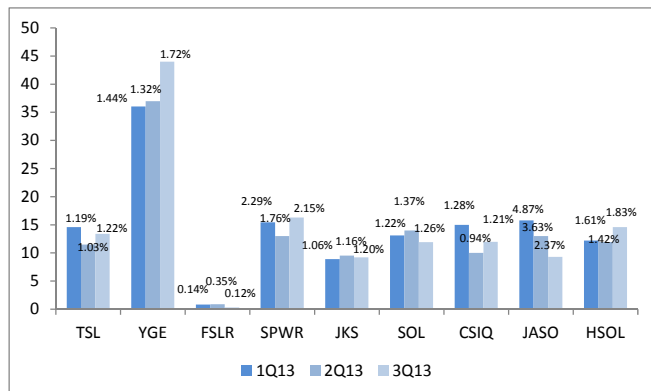
Interest Expense

Figure 29: Absolute Interest Expense (Million \$)



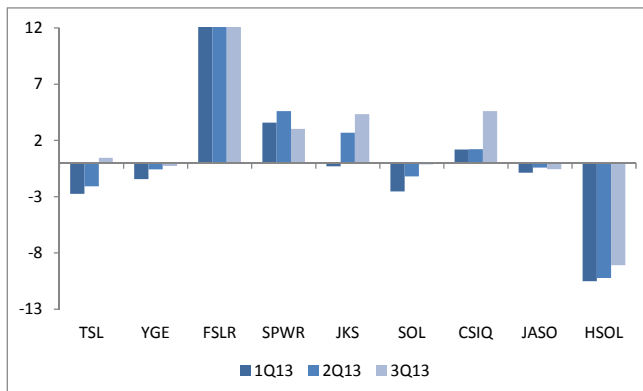
Source: Deutsche Bank, Company Reports

Figure 30: Expense as a % of Total Debt



Source: Deutsche Bank, Company Reports

Figure 31: EBIT/Interest Expense



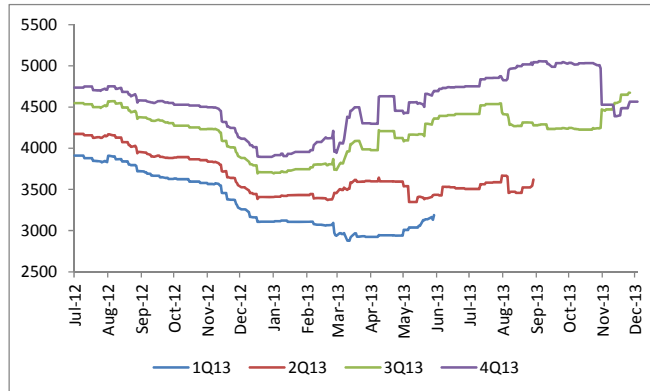
Source: Deutsche Bank, Company Reports



Consensus Estimates

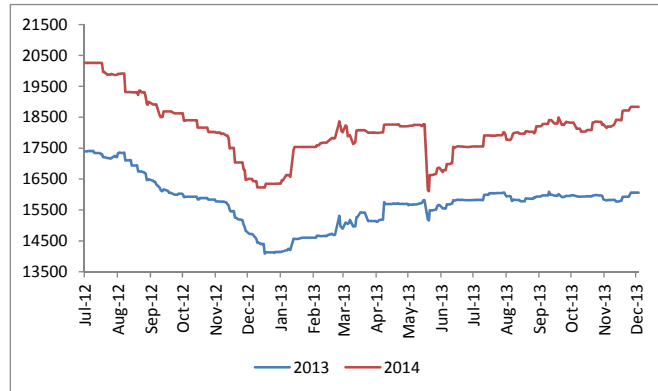
Aggregation of FSLR, SPWR, TSL, YGE, JKS, SOL, CSIQ, JASO, HSOL

Figure 32: 2013 Quarterly Revenue Ests



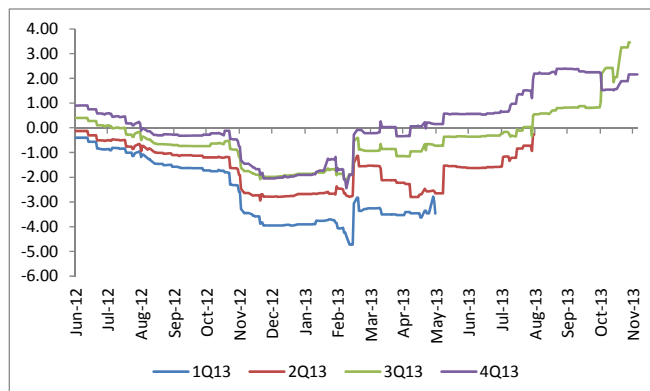
Source: Deutsche Bank, Reuters

Figure 33: Yearly Revenue Ests



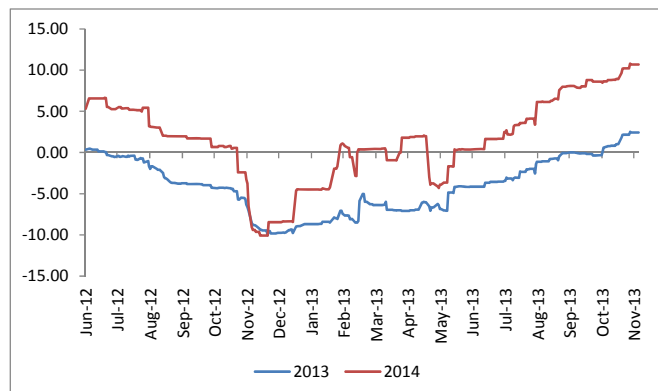
Source: Deutsche Bank, Reuters

Figure 34: 2013 Quarterly EPS ests



Source: Deutsche Bank, Reuters

Figure 35: Yearly EPS Ests



Source: Deutsche Bank, Reuters



Appendix 1

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Notes:

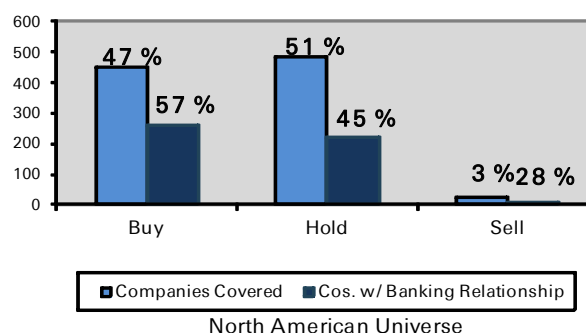
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