

Woodlawn Associates

Management Consulting

Solar Sales Channels:

Current Status and Likely Evolution of Residential Solar Sales in the U.S.

April 2011

Contents

- **Introduction and executive summary**
- **Manufacturer sales channel execution**
- **Solar dealer business model evolution**
- **Downstream vertical integration**

About Woodlawn Associates



- **Boutique management consulting firm founded in September 2009**
- **Offices in Chicago and San Francisco**
- **Significant experience in:**
 - Clean energy
 - Telecommunications
 - High tech
 - Private equity
- **Deep international experience, especially:**
 - China
 - Japan
 - S.E. Asia
 - Germany

Relevant Experience

- **Clean energy business strategy**

- Through primary research and economic analysis, concluded photovoltaic modules are commodity-like. Advised module manufacturer on importance of cost leadership in commodity markets and on possible differentiation strategies.
- Counseled global wind farm developer on implications of choosing emerging wind turbine vendor over established blue chip alternatives. Examined implications on financing availability, cost, and capital structure.
- Advised wind turbine manufacturers on appropriate level of vertical integration, how to reduce fixed and working capital requirements, and perception by top wind farm developers in the U.S. Benchmarked manufacturing best practices.
- Helped supplier to fuel cell manufacturer evaluate major capacity expansion.

- **Channel management and sales operations**

- Headed \$500 million, 700-person retail sales channel for global mobile phone maker. Overhauled way the company used and managed distributors, dealers, and its own sales force.
- Helped electronics manufacturer improve gross margins by 23% with pricing optimization.
- Headed distributed generation sales, business development, and product management for fuel cell manufacturer.

- **Finance and M&A**

- Led or evaluated more than 100 investments for private equity funds, including multiple transactions in energy.
- Helped numerous companies with capital raising, including more than \$45 million in venture funding
- Advised lithium-ion battery firm on valuation and valuation maximization as they sought series C venture funding.
- Helped an \$800 million distributor smoothly integrate a major acquisition.
- Conducted acquisition screen in photo industry. Negotiated purchase agreement and led due diligence.
- Led the financial portions of merger negotiations with a publicly traded competitor of an energy technology company. Provided negotiation support to the company's CEO.

Executive summary

- **Woodlawn Associates undertook this study with two objectives:**
 - Help manufacturers of solar PV equipment understand how to increase their sales in the U.S. residential channel
 - Help residential dealers understand how the sales channel will evolve and what they can do to maximize their chances of success
- **We interviewed more than 20 U.S. residential solar dealers, distributors, and other experts and drew upon our experience in solar and other industries for this report**
- **SunPower and SMA had highest consideration rates for PV modules and inverters, respectively**
 - Scores of Mitsubishi, Schott, Sanyo, and Trina suggest they could gain market share if they execute well
- **Product availability, commercial terms, and customer sales leads are among the most important purchase drivers**
 - Survey excluded price, quality, and technical performance to focus on execution opportunities for sales teams
- **Leases and PPAs have become hugely important**
 - Manufacturers that can help small and mid-size dealers offer these products will benefit
 - Larger dealers typically handle these offers internally or through third parties
 - The rise of leasing potentially reduces the importance of manufacturer brands
- **Sungevity's and SunRun's business models are less novel (and less risky) than many perceive**
- **Solar franchising has been missing some of the ingredients common in other successfully franchised industries**
- **Companies can increase chances of success by mitigating their risks and building on strengths**
 - Large conventional dealers could explore (partially) adopting elements from new distribution business models to increase flexibility and capital efficiency
- **The residential sales market is highly fragmented, so manufacturers are unlikely to integrate downstream**

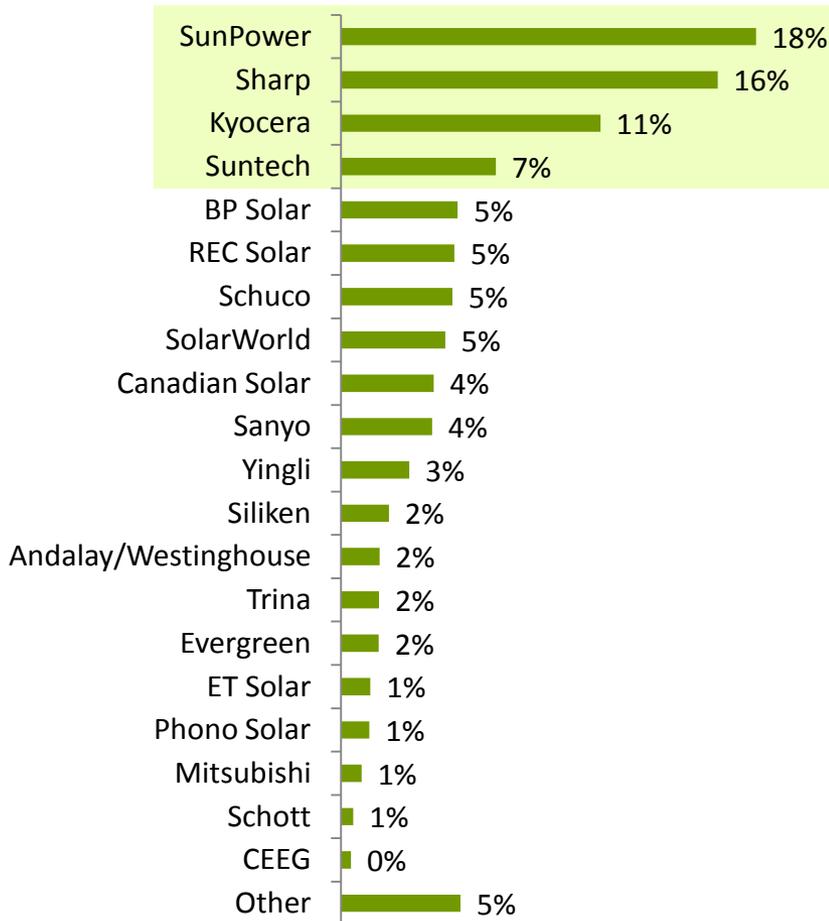
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Leading module vendors also lead in consideration rate; SunPower tops list

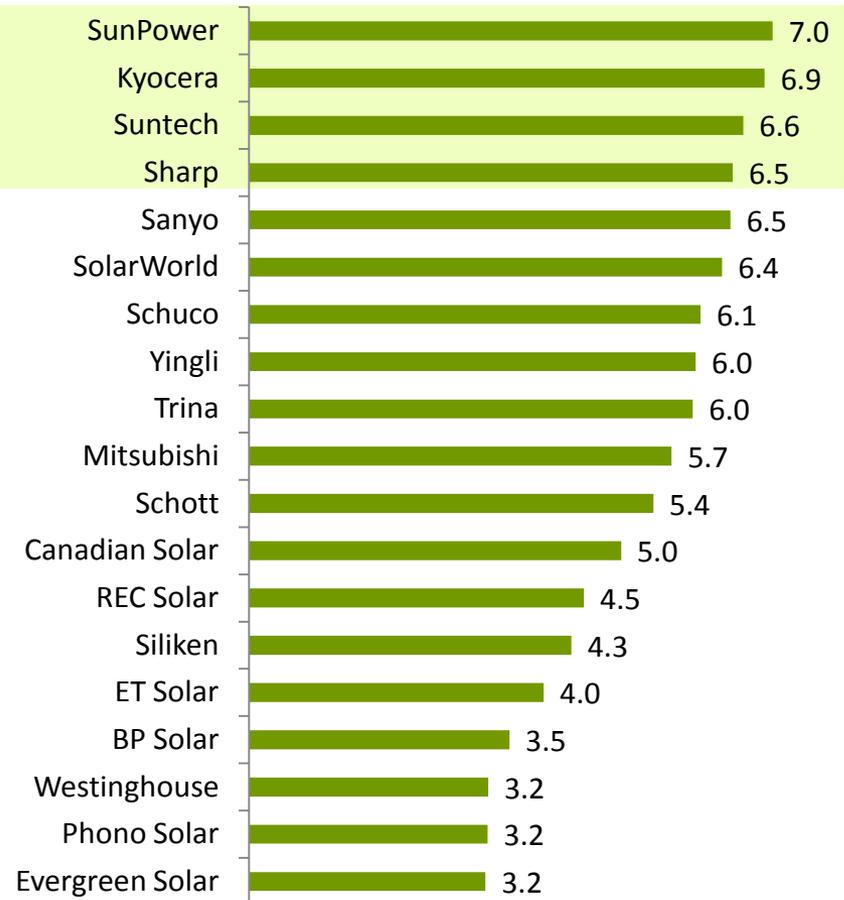
Residential Module Market Share

(California Solar Initiative)



Dealer Consideration Rate

(0-10 Scale)



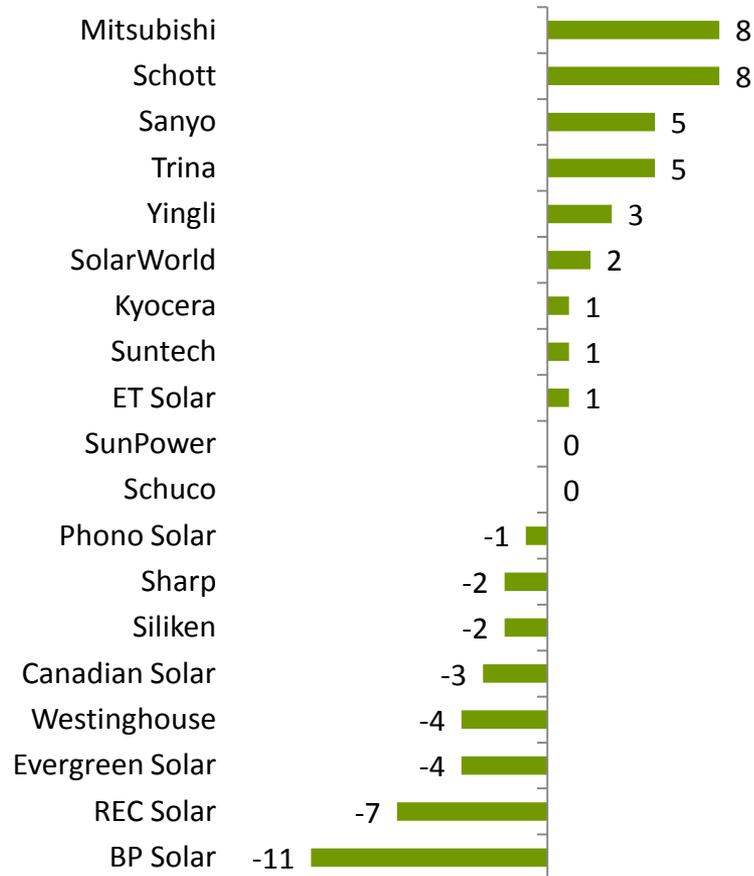
Source: California Solar Initiative (residential systems with "First Completed" date December 2010 through February 2011);

Woodlawn Associates; n=16; All interviewees were from U.S. residential solar PV integrators;

Question: How likely would you be to consider using each of these vendors, with 0 being not at all likely and 10 being extremely likely?"

Mitsubishi, Schott, Sanyo and Trina have opportunity to gain share

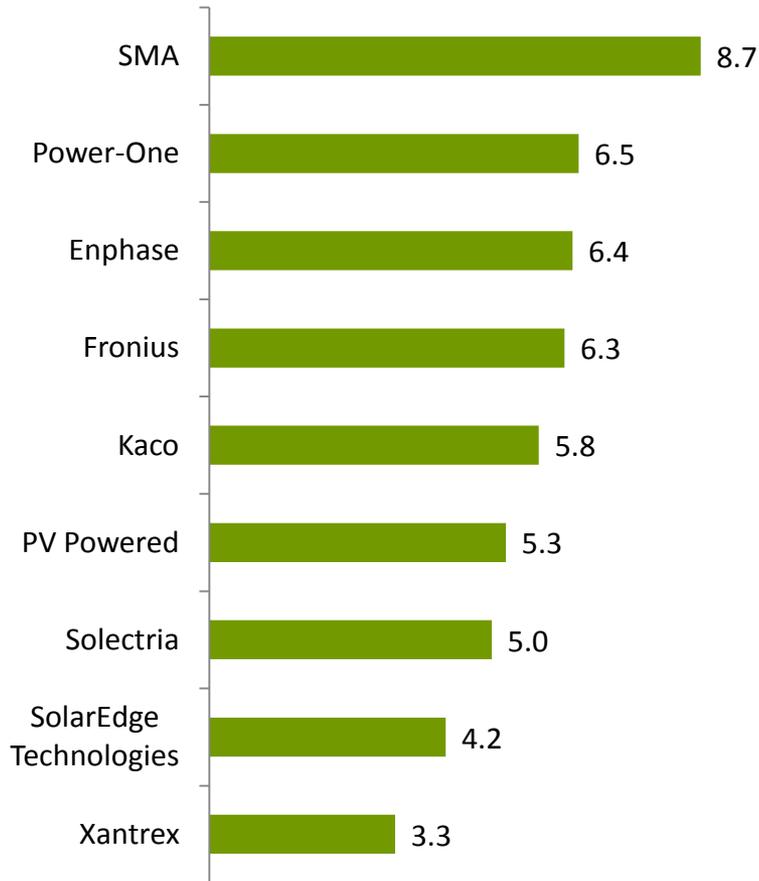
Opportunity Index



- **Woodlawn created an “Opportunity Index” to measure how consideration rate compares with current market share**
 - Index = market share rank less consideration rate rank
 - Higher numbers indicate market share lower than consideration rate would suggest
- **Mitsubishi, Schott, Sanyo, and Trina have relatively low residential market shares, but high consideration rates among dealers**
 - Suggests opportunity to gain share if they execute well
- **Conversely, some vendors have relatively high market share but low consideration rate**
 - Several dealers hurt by Canadian Solar supply hiccups
 - Some dealers view REC as competitor due to its (partial) vertical integration
 - BP Solar hurt by Gulf of Mexico accident, other issues

SMA leads inverter manufacturers in consideration rate by a healthy margin

Dealer Consideration Rate
(0-10 Scale)



- **SMA was the strong favorite**

- “It’s all about failure rates. SMA makes a great product—unbelievable materials and components. Far and away the best product.”
EVP, Dealer A
- “By far the best residential product.”
VP, Dealer B
- “We have settled down on SMA, and have had almost zero failures. In fact, I can’t remember one in the past five years.”
Co-Owner, Dealer C
- “No. 1 in the world. Costs that are most competitive. Product is good, strong R&D. Very good support and great manufacturing.”
Director, Dealer D

Source: Woodlawn Associates; n=15; All interviewees were from U.S. residential solar PV integrators; Question: “How likely would you be to consider using each of these vendors, with 0 being not at all likely and 10 being extremely likely?”

Product availability, commercial terms, and customer sales leads are important purchase drivers

Purchase Drivers

(1-7 Scale)*



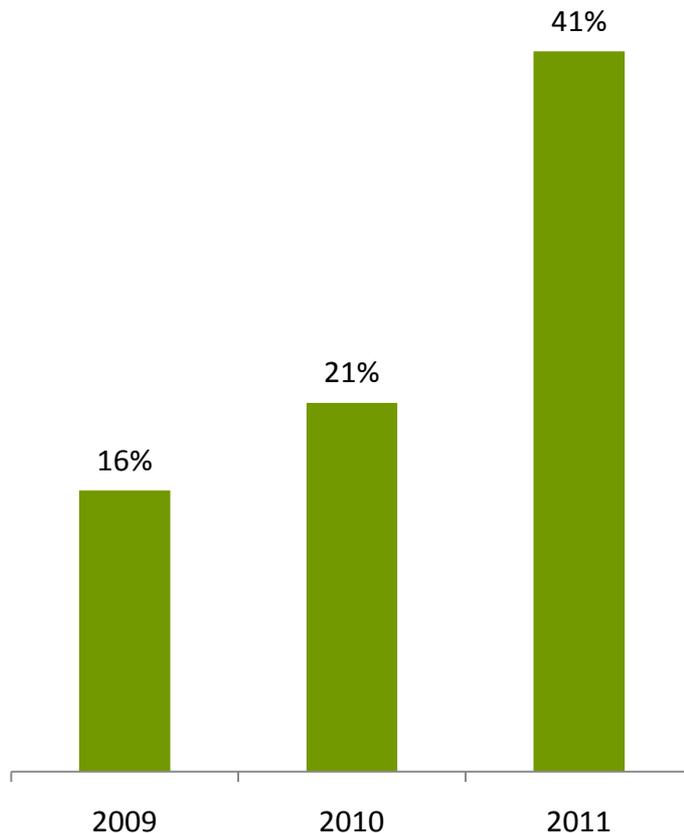
- **Survey was of U.S. residential dealers and assumed equal price, performance, and quality**
- **The most important selection drivers are product availability...**
 - "...We have to set a project in motion 90 days before it is actually installed...so certainty about availability and price would help a lot."
EVP, Dealer A
 - "[They] left us hanging multiple times in 2010. We will not do business with them."
VP, Dealer E
- **...commercial terms...**
 - "This is definitely one of the most important things we look at."
VP, Dealer E
 - "We have 30 day terms now – longer would help, but the key issue is that we need more credit."
President, Dealer F
 - "Credit is always an issue for small companies like us."
VP, Dealer B
- **...and customer sales leads**
 - "SunPower provides an entirely different level of service...They provide us with sales leads via Salesforce.com..."
VP, Dealer B
 - "One of our most expensive areas in developing leads."
GM, Dealer G
 - "This is a rounding error now, but if someone sent me a lot of referrals I'd be highly motivated to use their panels."
VP, Dealer H

Source: Woodlawn Associates; n=15

Notes: * "Please rate the importance of the following characteristics of an offer from a module/inverter vendor according to their importance to your vendor selection, with 0 meaning 'no influence' and 10 meaning 'critically influential'."

Leases and PPAs have become important, potentially reducing the relevance of manufacturer brands

Third Party Ownership (Three months ended Feb. 28, 2009-2011)

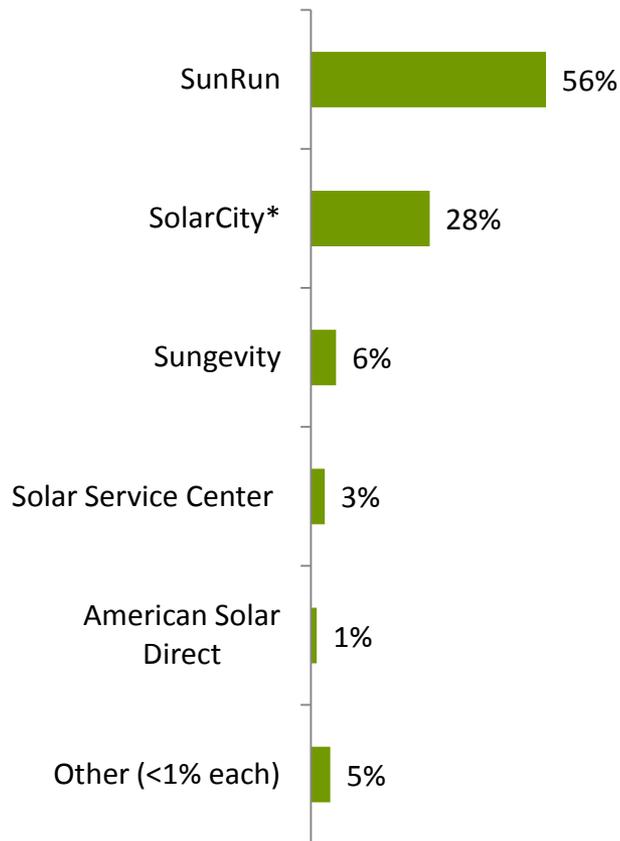


- **SunRun pioneered residential solar PPAs in 2007 and brought them to market through a network of dealer partners**
- **Leases and PPAs have become hugely important**
 - Larger dealers handle these internally or with other third parties, but smaller dealers regard manufacturer assistance with leases as extremely valuable
 - “Seventy percent of all systems being installed these days are leased.”
EVP, Dealer I
 - “Basically, these days you are selling money, not solar.”
Co-Owner, Dealer J
 - “Leases and PPAs definitely help deal flow accelerate. There is some evidence that with a lease a dealer can close three times the deals per dollar of marketing invested.”
Director, Dealer D
 - “This has become a critical, key element. We have a lot of people who want solar but can’t get the money to invest.”
GM, Dealer G
- **Leases and PPAs reduce customer risk in making a large, technical purchase decision**
 - Brands can be seen as a way consumers reduce risk, so third-party ownership reduces the need for the security of a brand
 - “Most customers in the PPA world have no brand preference whatsoever...There is very little discussion of the manufacturer.”
VP, Dealer K
 - “When people were paying cash...it was ‘Who is making [the system] and what is the warranty?’ Now, the majority of customers are leasing or using a PPA. For them, it is about the rates and terms. Panel manufacturers are becoming marginalized.”
VP, Dealer H

Source: California Solar Initiative. Residential projects with first confirmed reservation date in the three months ended Feb 28 for the years 2009-2011. Excludes applications with current status of cancelled, withdrawn, or suspended.)

SunRun leader in leases and PPAs, though many companies entering market

Residential 3rd Party Ownership Market Share



- **As the first mover, SunRun has become the market leader in third-party solar finance**
 - Goes to market through dealer partners such as REC Solar, Real Goods Solar, Petersen-Dean, Acro Energy, etc.
 - SunRun has 11,000 systems worth of experience and established relationships with many of the top dealers
- **Dealers such as SolarCity, Sungevity, The Solar Service Center, American Solar Direct offer their own lease/PPA products**
- **Dealers without captive finance solutions now have more options**
 - “The market is getting flooded with ‘me too’ residential leases right now. They are aggressive in price and options for prepaying the lease...[The question is] whether contractors like us should just dive in and go for it and drop SunRun or not go there with the...un-established firms.”
EVP, Dealer A (SunRun Dealer)
 - Manufacturers such as Suntech, SunPower, CentroSolar, and SET-Solar are providing some of their dealers with financing options
 - In some cases these are enabled through third-party financiers (i.e., CentroSolar’s cooperation with Brightgrid) and in others directly off the manufacturers’ balance sheets (i.e. Suntech’s BrightLease)
 - SunEdison and Brightgrid also providing wholesale finance solutions for dealers

Source: Woodlawn Associates, California Solar Initiative, for systems with first completion date from December 2010 through February 2011.

Notes: * includes groSolar. According to SolarCity, they were intentionally delaying filing of certain incentive payment forms during the period of our analysis, reducing their apparent market share.

Panel manufacturers could try an “Intel Inside” strategy to build the importance of their brands



- **Launched in 1991, Intel Inside was designed to produce brand equity and preference with end users**
 - Traditionally, microprocessors had be marketed only to design engineers at PC OEMs
- **Two main thrusts: cooperative ads and direct-to-consumer branding ads**
 - Cooperative advertising and rebate programs for OEMs who featured Intel Inside logo in ads, product catalogs, point of sale materials, product packaging, and on products themselves
 - Consumer ads highlighting software compatibility and advanced technology
- **1200 PC OEMs enrolled by end of 1992. From 1991 to 1992 Intel’s sales increased 63%**
 - While many OEMs embraced, some—especially larger ones such as Compaq and IBM—were reluctant. They saw Intel Inside as reducing the value of their own brands and “leveling the playing field” for smaller OEMs
- **Through 1993, Intel invested >\$500M on Intel Inside and related programs**
- **As of 2010, Intel is the 7th-most valuable brand in the world**
- **Other companies have successfully branded components**
 - NutraSweet, Teflon, Dolby, and Pella

However, while there are similarities, differences between the industries suggest a cautious approach

Market Characteristic	CPUs (1990s)	Solar (Today)	Comments
Highly technical product	Yes	Yes	
One component drives overall system performance	Yes	Yes	
Advertising focused on “safety” and performance	Yes	Possible	Intel focused on compatibility and technical performance. Solar could focus on stability of manufacturer and technical performance.
Large customers see as a threat to their own brands	Yes	Yes	Larger solar dealers would prefer to be the primary consumer brand, but Intel showed both vendor and customer can be successful.
Downstream customers do significant advertising	Yes	Varies	Compaq, HP, Dell, IBM, etc. advertised heavily.
Efficient outlets for brand advertising	Yes	No	Intel could advertise in national print and TV channels, some specifically dedicated to PC buyers. Solar manufacturer would want to do this regionally, and would probably have to use less targeted, general interest outlets.
Repeat buyers	Yes	No	PCs typically replaced every 2-4 years. Solar is a one time purchase.
Dominant supplier of core component	Yes	No	Intel had >70% share of CPUs, but PV is much more fragmented. Advertising may help competitors as much as advertiser.
Purchased end product	Yes	Sometimes, but less often	Dealers say lease and PPA customers are essentially brand agnostic.

A controlled, regional test could demonstrate whether a similar campaign could influence market share in solar

Manufacturers can also stand out with dealers by:

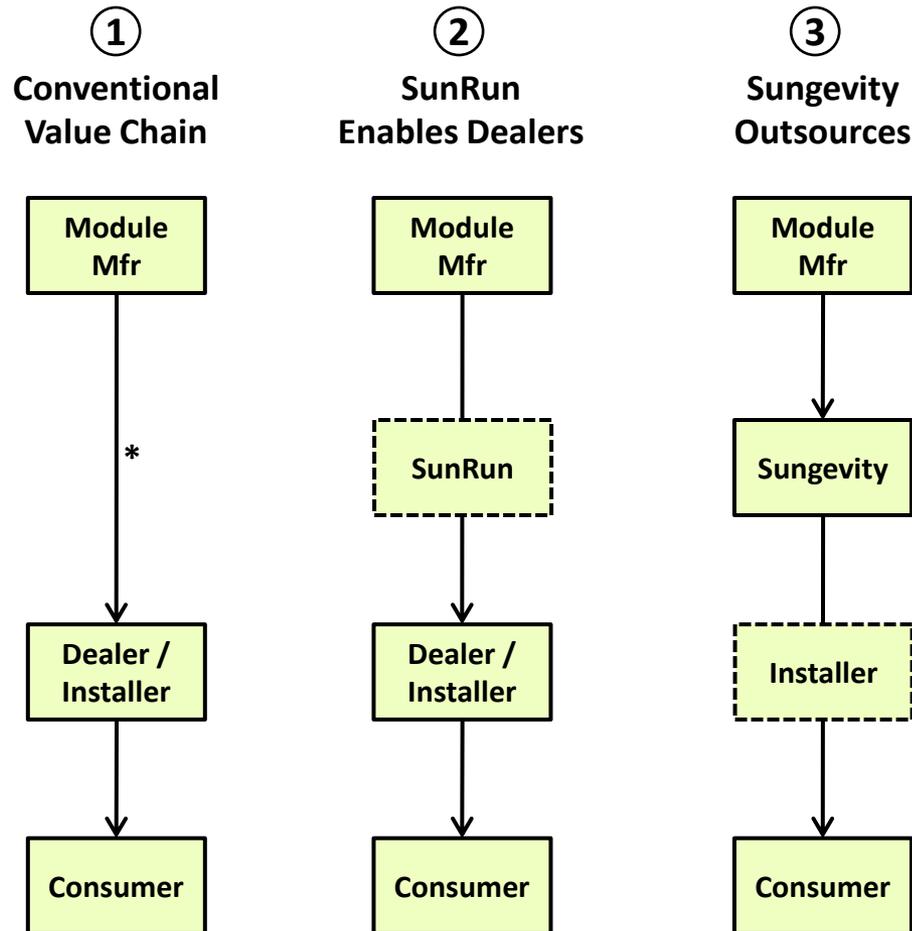
- **Going above and beyond when their products fail**
 - “We have had some problems, but they stood by their product. They pay you for your time if there is a failure.”
Co-Owner, Dealer C
 - “Back in 2001, their modules turned out to be bad. We didn’t discover this until five years later. We looked at what the warranty said, and it said we had to ship the modules back at our cost. They said, ‘You know what, we’ll pay for shipping both ways and pay you for your time.’ I know that if there is a problem they will stand behind their product.”
EVP, Dealer I
 - “We are just so damn mad at them. We hate them...[They] really turned their back on their dealer network. [They] can’t give answers as to when retrofits will be available. Now, if we want to do a replacement we have to send it back...so the customer’s system is down for about a month.”
VP, Dealer B
- **Assisting dealers with marketing**
 - “We can never do enough marketing...We mostly do direct mail and phone solicitation. If I had the money, I would probably do some TV...I’ve always struggled with having enough money to do marketing.”
CEO, Dealer L
 - “Co-op advertising is helpful.”
EVP, Dealer A
- **Building the overall business of the installer by giving them commercial and utility design and installation work**
 - Manufacturers who are vertically integrated in larger systems can build loyalty of dealers by directing design and installation work to their best residential dealers

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SunRun and Sungevity have used new, fulfillment-enabled models to complete solar system sales

Evolving Distribution Value Chain in U.S. Residential Solar

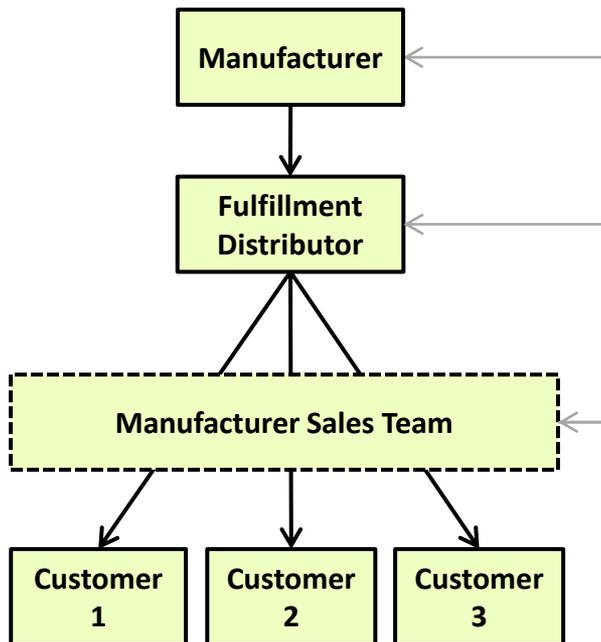


(Dashed line indicates party that is an enabler)

- ① In the conventional value chain, each participant in the chain buys the system and sells it to the next participant
- ② SunRun works as an enabler for dealers, who are able to offer leases and PPAs to their customers
 - While it is true that SunRun is technically the buyer of these systems, they really are enabling a consumer installation for their partners
- ③ Sungevity focuses on acquiring customers via the web and phone at low average cost, but outsources installation to fulfillment partners
 - Requires some scale of investment in search engine optimization and paid search advertising, as well as infrastructure to manage contract installers

Many perceive these business models to be untested, but they have been used successfully in other industries

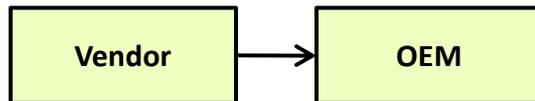
Nokia / Motorola / BD Fulfillment Distribution Model



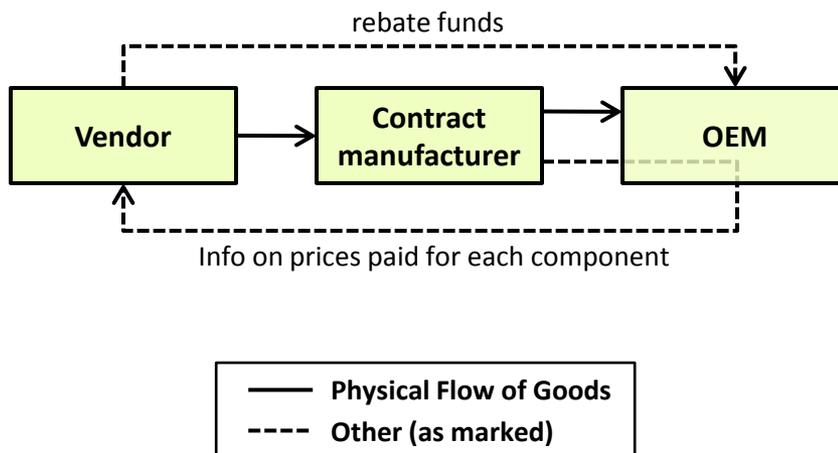
- **Some are skeptical of these fulfillment-enabled models in solar**
 - “The contractor is labor only and some materials, has no ownership, no customer referral possibilities—It’s a beat down.”
EVP, Dealer A
 - “I don’t know how they do it...there are a number of things you can’t see from space that can make or break a project, such as weather the electric service needs to be upgraded or whether the roof is concrete or clay or whatever.”
VP, Dealer H
- **The most controversial part of Sungevity’s model—generating a contract without visiting the home—will be easy to change if it proves uneconomic**
- **Overall, Sungevity and SunRun’s models are similar to subcontractor relationship used in construction for decades**
- **Nokia and Motorola have used fulfillment-based models in China for mobile phones**
 - Created sales teams that sold directly to retail shops
 - Paid distributors for warehousing and delivery services, but not sales
- **Becton, Dickinson & Company negotiates directly with large hospital groups but uses distributors to fulfill order for syringes and accessories**
- **Sears uses fulfillment-enabled model in the U.S. for its home improvement business**
 - “In our home improvement business we have 1200 salesmen [on the payroll] that go in the home to sell. The services they sell are enabled by third parties.”
SVP, Sears
- **Key lessons from other fulfillment-enabled companies:**
 - Advances in IT make these types of composite channels more feasible
 - Customers understand the idea of one company coordinating the activities of others
 - Sales force automation can identify which sales tools and sales members are most effective
 - Selling to consumers requires different skills, activities, attitudes, and IT than selling to distributors and dealers—can’t flip a switch from one model to the other

Dealers with enablement models could use pass-through discounts to lower average cost and capital intensity

Phase 1: Traditional purchase relationship



Phase 2: Extended volume purchase relationship



- Large electronics OEMs regularly use this approach

For example:

- A large mobile phone OEM buys memory chips, negotiating a healthy volume discount
- OEM wishes to use third parties (such as contract manufacturers) to enable its business
- Neither vendor nor OEM want to tell the contract manufacturer the OEM's price for the components
- Vendor agrees to rebate OEM any difference between OEM's and contractor's prices



Dealers using enablement models could use similar approach to ensure best possible pricing while simultaneously reducing capital intensity

Most successful franchise businesses share six key characteristics:

1. Need for self-motivated employees or agents

- Lots of local decisions required
- Difficult to manage from home office

2. Strong brand

- Significant investment in brand marketing
- Brand drives customers to franchisees in preference to other suppliers

3. Significant benefits to scale

4. Low incentive for free riding

- Easy to monitor quality
- Significant repeat business
- Can't shift business to categories that don't require franchise royalty payments

5. Low investment risk for franchisee (proven business model)

6. Low investment in firm-specific assets

Solar franchising has, to date, been missing some of those ingredients

- **No strong brands driving customers to franchisees, limiting the value of franchise after initial training and ramp up**
 - In a recent consumer survey only 37% of Silicon Valley residents could accurately recall any company providing systems for residential use
 - “There is not a brand out there yet in residential solar. If you did an instant recall test of the general public who might potentially be in the market for solar and asked them to name the top three installers of solar, the average person couldn’t name one.”
Executive, SolarCity
- **High cost of initial training**
 - “We ended up doing a lot of handholding of franchisees and under-scoped the need for training.”
Executive formerly with Yes! Solar Solutions
 - “For anyone to believe that you can just convert a plumber or contractor—there’s just no way. It takes new employees six months to be able to sell effectively...You need a good command of spreadsheets.”
Former Yes! Solar Solutions Franchisee
- **High incentive for free riding**
 - Franchisees can take what they learn from franchisor and then sell solar systems that do not require royalty payment
 - “We [only] have to pay a percentage of what is driven from [Solar Universe]... We deal with [other] manufacturers as well...A lot of the time a customer will request a specific brand, or we will consider the efficiency of the panel depending on the design of the roof.”
President, Solar Universe Franchisee A
 - “We started by buying directly from Yes! but the problem was they were not keeping up with the technology. We quickly realized we needed another option. Distributors also give you the option to target different customers, where different products might be required.”
Former Yes! Solar Solutions Franchisee
- **It is hard to find franchisees who can and will aggressively sell, a major stumbling block for a complicated sale like solar**
 - “We were expecting the franchisees to sell, but the sales process was more complicated than we thought...If you own a McDonalds you are not really in the sales business—people come to your store to eat. [In solar] you have to go sell.”
Executive formerly with Yes! Solar Solutions
 - “As an existing construction firm we don’t really do marketing. It is all word-of-mouth from architects and the like. We are actually hoping to learn about marketing from Solar Universe and apply some of the ideas to our other business.”
President, Solar Universe Franchisee B

Many uncertainties in solar, making it difficult to predict which business models will win

- **General supply and demand factors**
 - Rate of change of equipment prices
 - Availability of modules
 - Events pushing more (or fewer) people to consider solar (i.e. oil spills, nuclear catastrophes, offer innovations, etc.)
 - Availability of tax equity financing
- **Policy**
 - Degree to which policy supports solar
 - Degree to which policy is state or local vs. national
 - Policy stability
- **Customer preferences**
 - Share of customers who prefer lease or PPA vs. purchase
 - Share of customers who prefer in-person sales call vs. efficiency of phone/web
 - Importance of manufacturer brand
- **Business model economics**
 - Amount of advantage from scale and scope
 - Average cost of estimation inaccuracies from no-visit-before-quote vs. incremental loaded cost of sales visit
 - Benefits of being a franchisee vs. the costs (especially after initial ramp up period)
- **Capabilities**
 - Whether sub-contracted installation resources can be managed to do high quality installations cost effectively
 - Whether franchisors can find franchisees really capable of selling
 - Ability of smaller sellers to offer competitive leasing
 - Manageability of channel conflict in certain business models

Dealers can increase chances of success by mitigating risks and building on strengths

Model	Key Risks	Possible Actions*
All	<ul style="list-style-type: none"> Demand instability (various reasons) 	<ul style="list-style-type: none"> Diversify across multiple states Diversify across countries (larger companies only)
Mid-size and large conventional, integrated dealers	<ul style="list-style-type: none"> High breakeven High customer acquisition cost 	<ul style="list-style-type: none"> Subcontract installation and/or sales visits Test contract-before-visit Franchise or JV marginal locations Expand scale through distribution
Sungevity	<ul style="list-style-type: none"> Cost risk of contract-before-visit Consumer resistance to contract-before-visit 	<ul style="list-style-type: none"> Test visit-before-contract Expand scale through distribution (sell product to installers) Let installers supply hardware if desired (decrease capital intensity) Let installers source customers (decrease cost of acquisition)
SunRun	<ul style="list-style-type: none"> Higher acquisition cost than Sungevity (for SunRun-led sales) Other companies offer financing Channel conflict with partners 	<ul style="list-style-type: none"> Test contract-before-visit Evolve web tools to make SunRun easier to use than alternatives Clarify rules of engagement with partners Split into two businesses (financial wholesaler and retail) Negotiate pass through volume discounts from OEMs
Solar Universe	<ul style="list-style-type: none"> Finding franchisees who can really sell Low value of franchise after startup phase 	<ul style="list-style-type: none"> Enable franchisees <i>and</i> other dealers with solar leases (generate profits from underwriting, not franchisee royalties) Convert to technical advisor (à la EPRI) Sell training services Sell software-as-a-service (quote generation) Convert to distributor
Small dealers	<ul style="list-style-type: none"> Lack of leasing / PPA options Cost of marketing / customer acquisition Low scale 	<ul style="list-style-type: none"> Use vendors that have bundled financing solution (Sunpower, Suntech, Centro, etc.) and evaluate additional third party financing providers Decide whether to focus on marketing / origination or installation Merge with competitors

Notes: * Not all of these will work out, but it will be worth getting the data to make informed decisions.

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Generally, six reasons for downstream vertical integration:

1. Vertical market failure

- Significant resources spent avoiding “unfair” outcomes, often unsuccessfully; often the case if there are few buyers
- Acute when assets are specific to a given customer, especially if those assets are capital intensive and durable
- Highly uncertain markets make it difficult to draw up contracts that protect both parties and avoid opportunism
- High transaction frequency increases costs of market failures as more time is spent negotiating / mitigating

2. Downstream parties have more market power

- Put differently, downstream is just a fundamentally more attractive market than the one you are in
- Need to avoid overpaying
- Being in an adjacent space doesn’t mean you have capabilities to be uniquely competitive

3. Integration would create market power

- May raise barriers to entry
- May reduce number of players
- May allow price discrimination across customer segments

4. Market is immature and integration is necessary to develop it

- May need to demonstrate capabilities of new product to get market to adopt it
- May be necessary to build an integrated, easy-to-use consumer experience (i.e.: Apple with iTunes/iPod)

5. Current downstream channels have little incentive to promote products

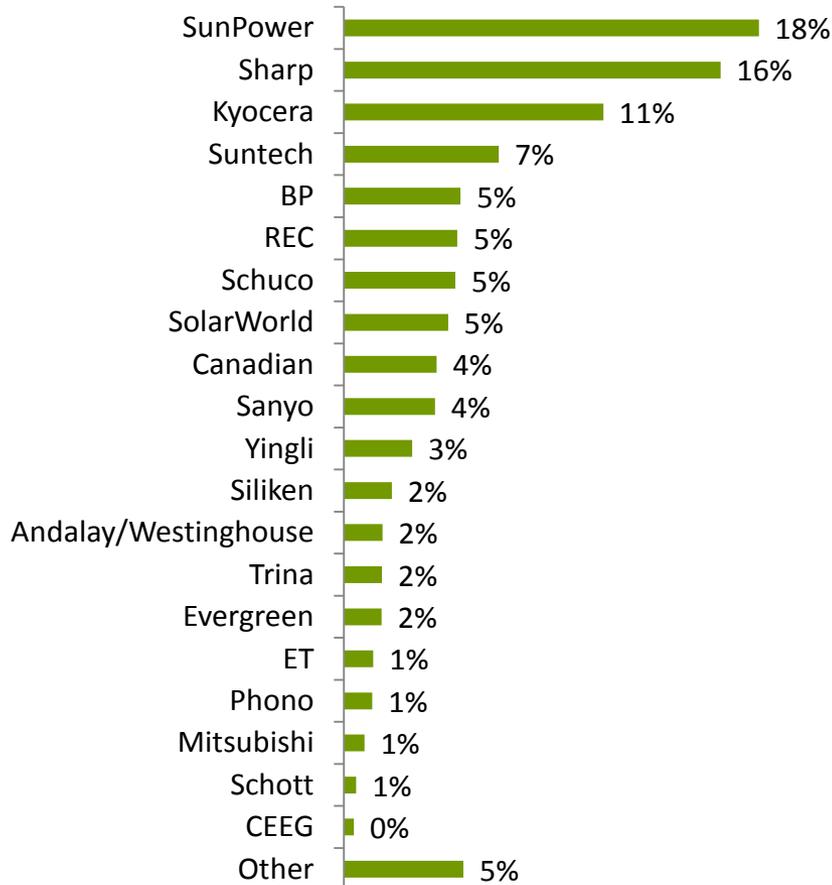
- Vast majority of business for existing distribution channels come from incumbent market leaders
- Distribution channels promote whatever is more profitable or easiest for them, which isn’t necessarily in manufacturer’s interest

6. Benefits are not available through quasi-integration (contracts, alliances, JVs, etc.)

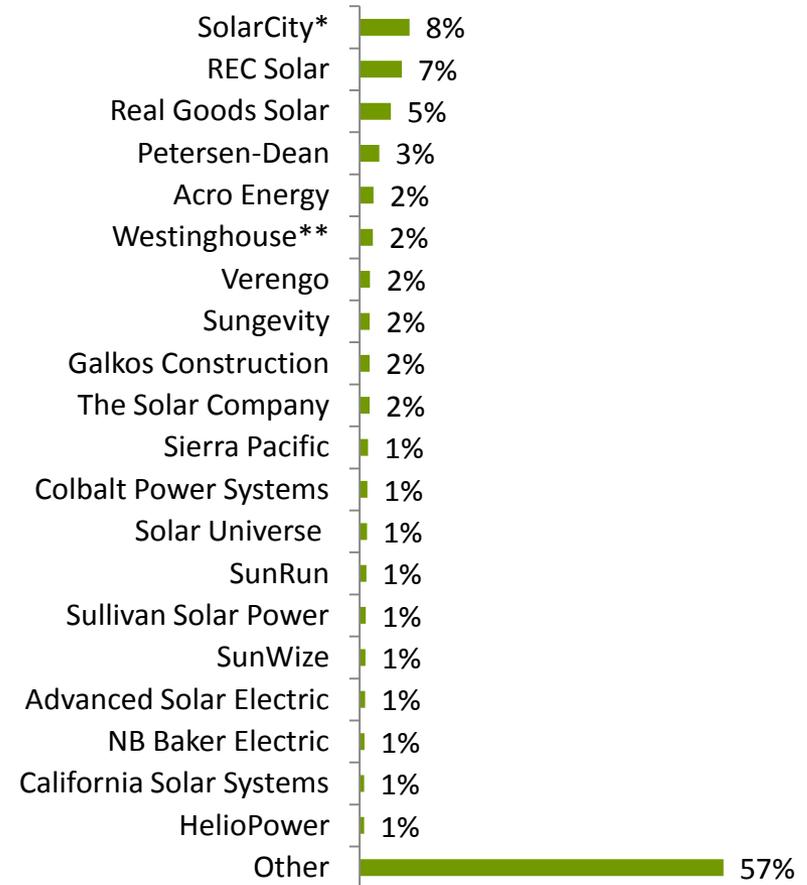
- Not worth the risk and cost of integration if same benefits can be achieved without it

Module manufacturing much more concentrated than sales, so only a few cases to consider integration

Residential Module Market Share



Residential Sales Market Share



Source: California Solar Initiative, for systems with first completion date from December 2010 through February 2011

Notes: * includes groSolar. According to SolarCity, they were intentionally delaying filing of certain incentive payment forms during the period of our analysis, reducing their apparent market share. SolarCity estimates their residential sales market share in California at approximately 15%;

** Exited residential sales market to focus on systems design.

Downstream vertical integration in residential solar unlikely

- **Module manufacturing much more concentrated than sales, so only a few cases to consider downstream integration**
 - Only four sellers achieve more than 3% market share
 - One of these is already partially owned by a manufacturer (REC). Another includes a roofing business (Petersen-Dean).
- **More attractive alternative if believe market will consolidate (especially if buyer could help catalyze it)**
- **SolarCity and RealGoods could be a path to higher share for significant manufacturers underrepresented in the U.S. residential market**
 - Trina, Yingli, Mitsubishi, and Samsung, etc.
- **In our view, the rationale for downstream integration would be:**
 - Believe consumers will be disproportionately attracted to a well-recognized brand offering the entire solution (“one neck to choke”), thereby helping the acquired downstream operation grow much faster than the market
 - Corporation has a significant and stable U.S. tax burden it wishes to reduce, has significant capital to invest in leasing (tax equity), believes such tax equity will be scarce or more expensive on the open market, and believes ITC policy framework will be long-lasting
- **We believe only Mitsubishi and Samsung could possibly qualify and that the uncertainty about policy direction makes any downstream vertical integration in the residential sector unlikely**