

# *Residential and commercial solar*

## New models fuel expanding markets

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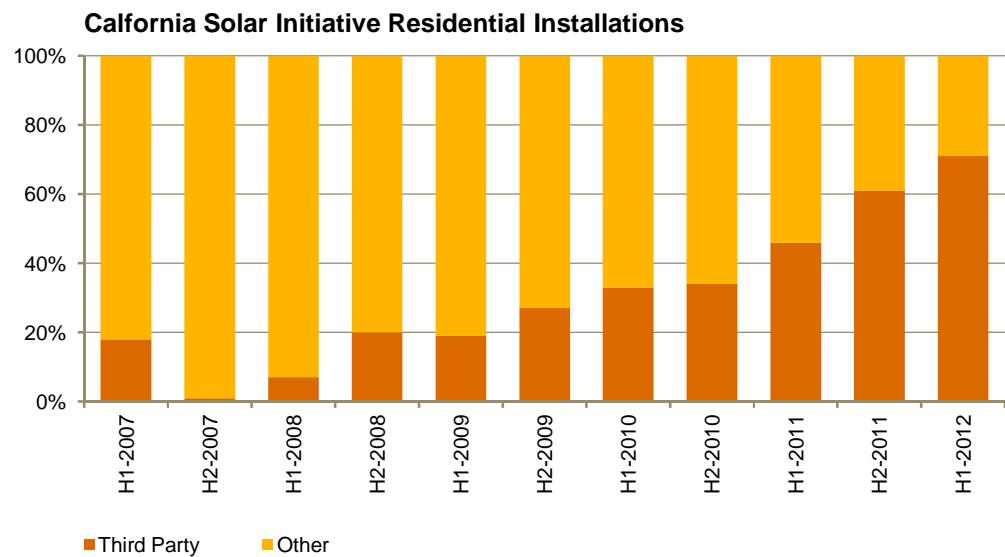
With construction of some of the world's largest solar power plants, utility-scale solar in the U.S. has accelerated in the past two years, while the residential and commercial markets have experienced a quieter revolution. Declines in component and system pricing have improved the economic drivers for residential and commercial buyers and expanded the potential market. However, to achieve higher penetration into the U.S. residential and commercial markets, both a renewed focus on total installation costs and new business models will be required.

Today, suppliers serve the residential and commercial photovoltaic (PV) power markets through four primary channels:

- Direct ownership: whereby individual homeowners or businesses directly purchase PV systems for their properties
- Solar leasing/PPA: whereby a third party installs and owns a PV system at a host (individual or business), and sells the power to the host via a power purchase agreement, operating lease or capital lease. Often, the third party owner maintains the installation and guarantees an annual output for the system
- Community-owned solar power: whereby individuals or companies can "buy-in" to offsite solar generation through direct ownership or lease of an installation that is not co-located with the end users/owners
- Election into utility-owned PV generation: whereby individuals or companies can elect to buy PV-generated power from utility-owned PV power plants

### **Top investors target the residential solar leasing model**

To address the growing residential opportunity, many of the world's leading PV manufacturers have opened new business units and launched financing and hardware product solutions for the market. More importantly, the channel used to serve the residential market has shifted quickly in the past three years. In H1 2009, third party ownership with leases represented less than 20% of the California residential PV installation market, while in H1 2012 solar leasing claimed >70% market share<sup>1</sup>.



<sup>1</sup> California Solar Initiative, "Current Working Data Set", [http://www.californiasolarstatistics.ca.gov/current\\_data\\_files/](http://www.californiasolarstatistics.ca.gov/current_data_files/), accessed September 12, 2012, PwC analysis.

<sup>2</sup> California Solar Initiative, "Current Working Data Set", [http://www.californiasolarstatistics.ca.gov/current\\_data\\_files/](http://www.californiasolarstatistics.ca.gov/current_data_files/), accessed September 12, 2012.

The proliferation of the residential solar leasing model has garnered the attention and contribution of top tier investors. In the last 12 months, top investors – including Morgan Stanley and US Bancorp – have joined traditional investors in backing more than \$1.7 billion in funds for U.S. residential solar leases. Among the transactions since 2011, several leading vertically integrated manufacturers have launched in-house U.S. residential solar leasing programs. In Q2 2012, one leading U.S. vertically integrated PV firm estimated that its residential solar lease program could generate 20% to 25% of its global business within the next two years.

While rapidly growing, the solar leasing model requires new operational functionality and presents new potential risks. Third party owners – either pure play or dedicated business units – need to manage portfolio risks and financing, expand monitoring and maintenance operations, design new sales force training, minimize customer acquisition costs, and target pricing strategies to successfully address the new distributed residential solar lease opportunity. Additionally, any update on the fair market value of solar systems may change the value that can be claimed under the 30% U.S. Investment Tax Credit (ITC) and accelerated depreciation rules.

***Expanding community-owned solar installations make PV power accessible to new owner***

Despite their growth, both the direct ownership and solar leasing models fail to reach many potential residential customers. Most renters, condo-owners and homeowners with non-optimal properties for PV installations have historically been unable to access PV-generated power through these models. However, recent large-scale pilot programs for community-owned solar are providing new opportunities to this previously untapped segment of the market.

In one example, a developer sells or leases a portion of a central PV-generated power system (up to 500kW in past programs, now expanding up to 2 MW) to individual utility customers. The utility consumers then receive a credit on their utility bill for the correlated portion of energy generated from the system, while the developer earns his return from the sale and/or lease revenue from the system. This program solicited a quick oversubscription by individuals and businesses, suggesting robust interest from this segment. In California, Senate Bill 843 proposed legal structures to enable similar programs for California residents seeking ownership in renewable resources, including solar PV. However, the bill did not receive a vote before the California State Legislature adjourned for the year. Nonetheless, the introduction of the bill may represent the first steps in an effort to enable access to centrally-generated, individually-owned solar power plants.

Both the opportunity and risk of community-owned solar programs are high. Robust interest in community-owned solar offers a new route to rapidly expand residential and commercial PV ownership while leveraging lower installation, maintenance and customer acquisition costs. Additionally, community-owned solar installations may be placed in preferred locations within a utility's territory to optimize renewables integration. However, utilities – which risk reduced revenues and more limited control over PV generation assets – may face new challenges to economically maintain reserves and transmission facilities to serve all end users in high demand periods.

**Balanced capabilities will define the leaders in evolving residential and commercial markets**

As the diverse and discontinuous U.S. residential and commercial solar markets expand, a wealth of opportunity awaits innovative businesses. To succeed, new operational models are required, with an eye towards optimizing operational efficiency in a lower margin, highly competitive environment. Additionally, a complete and detailed understanding of financing structures, portfolio risk, and tax-based incentives for these new asset classes is essential to balance the opportunity and risk.

**Contact**

**Johanna Schmidtke**

Manager

(415) 498-6947

johanna.schmidtke@us.pwc.com