The Business Model of Leasing PV Solar Panels

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March 10th, 2015
Background

The Solar Boom

- Growth in Capacity for U.S.
  - 2.3 GW in 2010
  - 12.1 GW in February 2014
  - Grown more than 5x in 4 years

Picture Courtesy of DOE
Drivers of the Solar BOOM

- Drop in the cost of photovoltaics
- Governmental policy
- Rising energy prices
- Improving economy
- EMERGENCE OF LEASING COMPANIES
The Growth of Leased Systems

![Graph showing the growth of leased solar systems in California, Arizona, Colorado, and Massachusetts from Q1 2009 to Q3 2012.](Image)

- **California**: 8.7%, 10.7%, 15.2%, 12.6%, 18.8%, 20.7%, 23.5%, 22.1%, 35.7%, 44.9%, 42.6%, 56.7%, 64.4%, 73.3%, 74.4%
- **Arizona**: 2.6%, 10.5%, 6.3%, 10.9%, 14.3%, 14.9%, 12.5%, 18.4%, 27.4%, 37.0%, 55.3%, 65.8%, 78.8%, 86.1%, 91.3%
- **Colorado**: 7.8%, 21.9%, 31.7%, 46.9%, 61.2%, 50.5%, 57.1%, 80.3%, 77.7%, 80.6%
- **Massachusetts**: 20.2%, 17.2%, 22.4%, 26.5%, 35.2%, 46.1%, 58%
California Dominates U.S. Solar Market

- ~607,000 homes with PV systems in 2013
Governmental Support for Solar³

DOE Forrestal Building Rooftop
Federal Tax Drivers

- Federal Investment Tax Credit (ITC)
  - PV owner can get 30% tax credit
  - Expires at the end of 2016
- Modified Accelerated Cost Recovery System (MACRS) a.k.a. Depreciation
  - Can depreciate over 5 years instead of full lifetime
  - Only applies to leased systems
State Level Drivers

- California Solar Initiative (CSI)
  - Gives estimated performance-based incentives
  - Designed to diminish over time
CSI-backed PV Installations
California Drivers for PV

- Tiered electricity pricing
  - The more energy used, the higher the rate
  - Many never exceed Tier 2
  - High energy consumers have more incentive to install PV systems

![Graph showing tiered electricity pricing](Picture Courtesy of Climate Policy Initiative)
Drivers for PV

- Net Metering Programs
  - Sell back excess electricity generated
  - Runs the meter backwards
  - Prevents higher tier usage
Price and Value Converge\textsuperscript{5}
Still not enough to purchase these systems

- Upfront cost still too expensive for many
- Difficult to figure out full tax benefits
- Installation challenges
  - Permitting
  - Interconnection
Leasing - Homeowner

- Solar becomes a service for homeowners
  - Little to no upfront cost
  - Leasing co. handles installation & maintenance
  - Overall bill savings (10-20% typically)
  - No tax benefits for homeowners

- Enables many to have PV systems
- Not available nationwide
Leasing – Third Party Owner

The leasing company and its investors receive:

- Tax benefits
- Rebates
- Monthly lease payments
How a Solar Lease Works

Main Characters

*Self-owned systems involve two main actors*

- Offset electricity bill
- Excess generation

- PV system & maintenance

*Leased systems add two more*

- $ lease payments
- Tax Credits, % of Cash Flows
- Tax Equity Finance

Utility → Home Owner → Leasing Company → Investor

Policy and Government Support Underpins Each Relationship

Picture Courtesy of Climate Policy Initiative
Target Homeowner

- Has a good credit score
- High energy consumer
- Cannot afford upfront cost to purchase PV
- Has no plans to relocate
  - Typically 20 year lease
Target Investor

- Can provides lots of capital
- Has high tax liability
  - Tax Equity Investor
  - Limited number invest in renewables

Result:

- Receives tax credit
- High ROI
Lease vs. Purchase

- Service
- Short term gains
- No upfront cost
- Decreases home value
- Don’t have to think about it

VS.

- Home Investment
- Long term gains
- Higher monthly savings
- Improves home value
- Tax benefits
Net Present Value of PV Systems\(^5\)
Leasing Company Roles

- Lead generation
- Sales
- Financing
- Accounting
- Installation
- Maintenance
- Legal
Leasing Business Models

- Fully-integrated
  - e.g. SolarCity and Vivint

- Partner model financiers
  - e.g. SunPower

- Semi-integrated installers
  - e.g. Sungevity

- Semi-integrated financiers
  - e.g. Sunrun and NRG
How Leasing Companies Fill their Roles

<table>
<thead>
<tr>
<th>Lead-Gen</th>
<th>Sales</th>
<th>Financing</th>
<th>Installation</th>
<th>Monitoring</th>
<th>Module Supply</th>
<th>Active Markets</th>
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Picture Courtesy of Greentechmedia
High Fixed Costs

- From legal, accounting and financing
- To be profitable:
  - Aggregate systems into funds
  - Can spread out fixed cost over a wider net
  - Requires quick, large-scale deployment
  - Keeps lease payments low
Challenges of Leased System

- Decreased home value
  - Homebuyers are turned off by leases
  - SolarCity claims 95% of lease transfers occur without any problems

- Split Incentives in tenant buildings
  - Tenants get the benefits
  - Property owners get the burden

- Fast growth leads to mistakes
Effect on the Grid

- Variations in voltage on distribution feeders
  - Due to variability of generation
- 114-126V range required by ANSI
- Voltage regulators are overworked
  - Leads to shorter lifespans
- New electronics are being explored
Growth of Traditional Loans

- Companies adding loans to their business model
- Offer similar service as leased systems
- Customer owned systems

* New residential solar financiers

Panel Courtesy of Greentechmedia
Conclusions

- Leasing turns solar into a service, not investment
  - Not without its challenges

- Leasing has opened the door for small scale solar systems
  - Aided by government policy, energy prices, etc.

- Future of leasing is unclear
  - ITC expiring soon
  - Shift to traditional loans has already begun
Thank you!

- Any questions or comments?

Bibliography
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3. whitehouse.gov
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6. Greentechmedia.com