Helping Utilities Make Smart Solar Decisions

Distributed PV and Third-Party Financing 101 for Utilities

August 8, 2013
Helping Utilities Make Smart Solar Decisions

Logistics

• Recording & slides will be sent to all registered attendees and available on the Resource Library within 2 business days
• Submit questions in the chat window at any time
• Questions will be answered at the end of the webinar.

Upcoming SEPA Events:
• **September 19**: Webinar: Solar Value Basics and Net Energy Metering: What It Is….and Isn’t
• **October 21-24**: Solar Power International, Chicago, IL
Speakers

Kristian Hanelt
SVP Renewable Capital Markets
Clean Power Finance

Eran Mahrer (Moderator)
VP Research & Strategy
SEPA
Electricity Is a Universal Expense

**Cartoon Text:**

**Left Panel:**

What's this giant withdrawal from our account? Did you buy a car?

**Right Panel:**

No, I paid the electric bill.
The Next Wave of Consumer Financing

Market Opportunity

56 Million U.S. Households Will Refinance Their Electricity for the 1st Time

<1% of the Market Has Been Penetrated

MORTGAGE FINANCING
$2 Trillion
Annual Market

AUTO FINANCING
$90 Billion
Annual Market

EDUCATION FINANCING
$26 Billion
Annual Market

ELECTRICITY FINANCING
$6 Billion
Annual Market (E)

People are Going Solar...

...Not to Be Green, but to Save Green

Middle-Class Family Paying $200/Month for Electricity

Goes Solar: New Monthly Electricity Payment Is $150

Saves $600/Year on Electricity

Middle-Class Families Can Save Money With Third-Party Financed Solar
What is Third-Party Solar Financing?

Basic Premise
Homeowners Contract with a Third-Party PV Equipment Owner and Pay for the Power the System Produces or Pay a Monthly Lease for Use of the Equipment

Homeowners Have Various Financing Options
- Prepay (Pay Up Front for Projected Electricity Production)
- $0 - $1000’s Down Payment
- Escalators

Contracts Are Usually for 20-25 Years

Average Homeowner Offsets 70% of Electricity with Solar*

Homeowners Prefer to Finance Their Systems Because...
- Familiar Payment Structure
- Little to No Upfront Cost
- No Payback Period
- Immediate Savings
- Hassle-Free
- Performance Guarantee

*Offset % varies by market
Third-Party Financing’s Effect on Solar Adoption

Number of Annual U.S. Grid-Connected PV Installations

- Utility
- Non-Residential
- Residential

Broader Use Of Solar Financing

% Financed

Source: IREC, U.S. Solar Market Trends 2012 (July 2013)
Compelling Macro Fundamentals For Residential Solar

Projected System Cost, Investor Yield and ITC Levels

- Projected System Cost
- Investor Target Yield
- ITC Levels

*Assumes a 3.5% Escalator for PPA and Utility Rates

PPA Rates vs. Future Utility Rates*

- Increasing Investor Returns
- Declining System Costs
- Decreasing Federal Incentives

Sustained Opportunity to Sell Power at Lower Prices than Utilities

*Assumes a 3.5% Escalator for PPA and Utility Rates
**Favorable Post-ITC Economics: System Costs**

**CA: Conservative Scenario**

**Economics Post 30% ITC**

Assuming a Constant Utility Rate of $0.20/kWh, Constant 8% Yield, and Decreasing System Cost (per McKinsey Study), Economics Will Be Viable When ITC Drops from 30% to 10% in 2016 and Onwards

<table>
<thead>
<tr>
<th>YEAR</th>
<th>ITC LEVEL</th>
<th>DEPRECIATION</th>
<th>PRODUCTION (kWH/kW)</th>
<th>UTILITY RATE ($/kWH)</th>
<th>SAMPLE YIELD</th>
<th>SYSTEM COST ($/W)</th>
<th>SAMPLE FUND PURCHASE PRICE</th>
<th>DELTA</th>
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</thead>
<tbody>
<tr>
<td>2013</td>
<td>30%</td>
<td>Bonus</td>
<td>1450</td>
<td>$0.200</td>
<td>8.00%</td>
<td>$4.40</td>
<td>$4.73</td>
<td>$0.33</td>
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<tr>
<td>2014</td>
<td>30%</td>
<td>Normal</td>
<td>1450</td>
<td>$0.200</td>
<td>8.00%</td>
<td>$4.20</td>
<td>$4.40</td>
<td>$0.20</td>
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<tr>
<td>2015</td>
<td>30%</td>
<td>Normal</td>
<td>1450</td>
<td>$0.200</td>
<td>8.00%</td>
<td>$3.40</td>
<td>$4.40</td>
<td>$1.00</td>
</tr>
<tr>
<td>2016</td>
<td>30%</td>
<td>Normal</td>
<td>1450</td>
<td>$0.200</td>
<td>8.00%</td>
<td>$3.30</td>
<td>$4.40</td>
<td>$1.10</td>
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<tr>
<td>2017</td>
<td>10%</td>
<td>Normal</td>
<td>1450</td>
<td>$0.200</td>
<td>8.00%</td>
<td>$3.24</td>
<td>$3.21</td>
<td>($0.03)</td>
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<tr>
<td>2018</td>
<td>10%</td>
<td>Normal</td>
<td>1450</td>
<td>$0.200</td>
<td>8.00%</td>
<td>$3.20</td>
<td>$3.21</td>
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</table>
Favorable Post-ITC Economics: Utility Rates

CA: Scenario with Escalating Utility Rates

Economics Post 30% ITC

Assuming Utility Rates Increase at 2.5%, Constant 8% Yield, and Decreasing System Costs (per McKinsey Study), Economics Remain Healthy Despite Decrease in ITC from 30% to 10%

<table>
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<tr>
<th>YEAR</th>
<th>ITC LEVEL</th>
<th>DEPRECIATION</th>
<th>PRODUCTION (kWH/kW)</th>
<th>UTILITY RATE ($/kWH)</th>
<th>SAMPLE YIELD</th>
<th>SYSTEM COST ($/W)</th>
<th>SAMPLE FUND PURCHASE PRICE</th>
<th>DELTA</th>
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<tbody>
<tr>
<td>2013</td>
<td>30% Bonus</td>
<td>1450</td>
<td>$0.200</td>
<td>8.00%</td>
<td>$4.40</td>
<td>$4.73</td>
<td>$0.33</td>
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<tr>
<td>2014</td>
<td>30% Normal</td>
<td>1450</td>
<td>$0.205</td>
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<td>$4.20</td>
<td>$4.53</td>
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<tr>
<td>2015</td>
<td>30% Normal</td>
<td>1450</td>
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<td>$3.40</td>
<td>$4.65</td>
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<td>2016</td>
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<td>1450</td>
<td>$0.215</td>
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<td>$3.30</td>
<td>$4.78</td>
<td>$1.48</td>
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<tr>
<td>2017</td>
<td>10% Normal</td>
<td>1450</td>
<td>$0.221</td>
<td>8.00%</td>
<td>$3.24</td>
<td>$3.58</td>
<td>$0.34</td>
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<tr>
<td>2018</td>
<td>10% Normal</td>
<td>1450</td>
<td>$0.226</td>
<td>8.00%</td>
<td>$3.20</td>
<td>$3.68</td>
<td>$0.48</td>
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Small (<10kW) PV System Cost in Germany and California ($/W)

Source: BSW-Solar, California Solar Initiative Filings, JPE, Bloomberg New Energy Finance
# Prevalence of Loans in the Financing Mix

<table>
<thead>
<tr>
<th>Loans Increase But Don’t Replace PPAs/Leases</th>
<th>Loans</th>
<th>PPAs/Leases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetize ITC?</td>
<td>Maybe</td>
<td>Yes</td>
</tr>
<tr>
<td>Monetize MACRS?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Monetize State Credits?</td>
<td>Maybe</td>
<td>Maybe</td>
</tr>
<tr>
<td>Includes Maintenance, Monitoring, Performance Guarantee?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Residual Value Drives Lower Monthly Payments?</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Trajectory of U.S. Residential Solar Installations

More U.S. Homes With Solar Installed

Solar Homes Installed
Residential Third-Party Financing Is Now More Available

Top 10 solar states (per capita)
- Arizona
- Nevada
- Hawaii
- New Jersey
- New Mexico
- California
- Delaware
- Colorado
- Vermont
- Massachusetts

Source: GTM Research - "U.S. Residential PV Financing: The Vendor, Installer and Financier Landscape, 2013-2016"
Third-Party Financing Business Models

Lead Generation → Consumer Sales → Financing → Installation → Monitoring → O&M

Source: GTM Research - "U.S. Residential PV Financing: The Vendor, Installer and Financier Landscape, 2013-2016"
Third-Party Tax Equity Providers for U.S. Renewables

New Entrants

Active

Expected Exits

Non-Financial Players

Note: Does not include IPPs that self-monetize tax credits.
Source: Bloomberg New Energy Finance
How Third-Party Financing Works – Step 1

- **Origination and Construction**
  - Solar Professional
    - Designs System
    - Generates Proposal
  - Solar Finance Company
    - Checks Consumer Credit
  - Investor
    - Reserves Capital

- **Underwriting**

- **Ongoing Operations**
How Third-Party Financing Works – Step 2

Origination → Construction and Underwriting → Ongoing Operations

Solar Professional
- Demonstrates Completion
- Agrees to Warranties

Solar Finance Company
- Transacts Purchase

Investor
- Owns System with or without partnership with Finance Company
How Third-Party Financing Works – Step 4

**Origination and Construction**
- Bills and Collects Payment
- Distributes Payment
- Provides Customer Service
- Performs Maintenance (As Needed)
- Deploys Responders (As Needed)

**Underwriting**

**Ongoing Operations**

**Solar Professional**
- Services Warranties
- Performs On Call Maintenance

**Solar Finance Company**
- Bills and Collects Payment
- Distributes Payment
- Provides Customer Service
- Performs Maintenance (As Needed)
- Deploys Responders (As Needed)

**Investor**
- Earns Returns
## Multiple Sources of Value for Solar Asset Owners

### ~8% Return

<table>
<thead>
<tr>
<th>Source</th>
<th>Counterparty</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Receivable</td>
<td>Homeowner Down Payment</td>
<td>Consumer, Immediate</td>
</tr>
<tr>
<td>Gov’t Receivable</td>
<td>Homeowner Prepayment</td>
<td>Consumer, Immediate</td>
</tr>
<tr>
<td></td>
<td>Homeowner Lease / PPA Payments</td>
<td>Consumer, 20 - 25 Years</td>
</tr>
<tr>
<td>Upfront Rebates</td>
<td>State Government</td>
<td>&lt; 1 Year</td>
</tr>
<tr>
<td>Cash Grant / Investment Tax Credit</td>
<td>U.S. Government</td>
<td>&lt; 1 Year</td>
</tr>
<tr>
<td>Accelerated Depreciation</td>
<td>U.S. Government</td>
<td>5 Years</td>
</tr>
</tbody>
</table>
A Compelling Asset Class for Investors: High Risk-Adjusted Return

Consumers Overwhelmingly Pay Their Electric Bills

*Pricing Is for Prime Consumers
# Broad Stakeholder Benefits of TPO

<table>
<thead>
<tr>
<th>INVESTORS/SYSTEM OWNERS</th>
<th>SOLAR PROFESSIONALS</th>
<th>CONSUMERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derive Long-Term Revenue Stream and Tax Benefits</td>
<td>Expand Pool of Potential Customers</td>
<td>Lock in Low Electricity Prices for 20-25 Years</td>
</tr>
<tr>
<td>Achieve High Risk-Adjusted Returns with Low Risk</td>
<td>Selling Familiar Service Model, not Technology or Hardware</td>
<td>Increase Control Over Electric Bills with No Hassle</td>
</tr>
<tr>
<td>Provide Competitive Products for Customers</td>
<td>Sell More Solar and Grow Businesses</td>
<td>Save Money on Major Monthly Expense</td>
</tr>
</tbody>
</table>
Implications for Utilities

The Situation:
- Solar Is Popular and Trending Toward Mass Adoption
- Solar Is Sustainable in the Short and Long Term
- Solar Is a Great Asset Class with Significant Benefits for Investors

The Problem:
- Third-Party Financed DG Solar Poses Strategic and Operating Challenges for Regulated Utilities
  - i.e. Fewer Customers Using Less Electricity
  - Utilities Will Have to Cope with Increasing Grid Penetration of DG Solar and Energy Management Technologies

The Solution:
- Work Together
- Explore New Business Models for Regulated Utilities & Wholesale Power Companies to Benefit from Solar
Distributed PV and Third-Party Financing 101 for Utilities

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Eran Mahrer (Moderator)  
SEPA

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