the path to clean energy

Technology Innovation & Quality Improvement

Construction
- Construction Equity
- Construction Debt
- Vendor Financing (?)

Project Finance
- Tax Equity
- Permanent Debt
- Sponsor Equity

6+ Year
- Equity
- Refinanced Debt
Monetizing Tax Advantage
Project Performance 2011

100% Depreciation
30% ITC – Cash Grant

<table>
<thead>
<tr>
<th>Sale Lease Back</th>
<th>Partnership</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>System is owned by the bank and leased back to the project sponsor</td>
<td>System benefits flow to tax equity and debt investors then ‘flip’ to sponsor</td>
<td>Complete equity ownership</td>
</tr>
</tbody>
</table>
Importance of Quality

• Larger systems are attracting lower NO risk capital
• Systems will have more complex power interaction with the grid
• Large systems will FAIL resulting in review of quality
• 25+ years is a VERY long time
Monetizing Quality Assurance

• Translate technical Challenges
  – Lower degradation
  – Higher yield
  – Project level impacts

• Investment Challenges
  – Bank book acceptance
  – Predict long term production
  – Independent Engineer education
PV System Performance

Analysis of financial impact of increased performance
Who benefits from high performance?

• Over-performance has little benefit for debt/tax equity
• Debt/Tax Equity viewed as risk assurance for the future
  – Fills reserve accounts
  – Raises confidence for future re-financing options
• Disappointing to sponsor
  – Higher yield would have meant more money
• Independent Engineer too conservative?
  – 3 years of data isn’t enough but to complain
  – Weather resource is complex and a 2 year dataset may not be indicative

<table>
<thead>
<tr>
<th></th>
<th>Debt</th>
<th>Sponsor</th>
<th>Tax Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnership</td>
<td>No</td>
<td>Complicated</td>
<td>No</td>
</tr>
<tr>
<td>Sale-Lease Back</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cash Deal</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Planned Performance

Impact of increases to underwritten yield due to QA and Innovation
Case Study
Increase Production during Operation

• Assumptions
  – Quality Assurance and technology program
  – Guarantees 1% yield increase
  – 12,500 kWp (50,000 250W module)
  – Costs $1/module ($50k)
  – PPA Levelized at $130/MWh
  – 15% Cost of Capital

• Analysis
  – IRR: 60+% for 20 years
  – Simple Payback: <2 years
  – $30k/year; $200k Net Present Value
  – **NO GO?**
NO Go?

• Investment Challenges
  – Debt & Tax Equity convinced NO net negative potential consequence
    • NO/Limited benefit if systems are meeting DSCR
    • Potential for negative impact is rarely 0
  – Sponsor has to be convinced to focus resources
    • Outside the business plan
    • Activation energy too great
    • Investment is at risk for many years
    • Does not build pipeline or sell product
    • NPV $200k versus Development Fee profit of $5,000k+

• Technology Challenges
  – Predictability of performance is challenging
  – 20 years is a very long time
  – Potential of negative impact
Implications of performance

<table>
<thead>
<tr>
<th>Yield</th>
<th>100%</th>
<th>101%</th>
<th>102%</th>
<th>103%</th>
<th>105%</th>
<th>109%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development Fee</td>
<td>5,300</td>
<td>5,900</td>
<td>6,500</td>
<td>7,000</td>
<td>8,800</td>
<td>10,400</td>
</tr>
<tr>
<td>% Increase</td>
<td>10%</td>
<td>20%</td>
<td>31%</td>
<td>51%</td>
<td>95%</td>
<td></td>
</tr>
</tbody>
</table>

12.5 MW System
Base Yield: 1950 kWh/kWp
7% Unlevered Return

- Day 0 is extremely important
- Predictability, viability, and solid sponsorship is essential.
- Every 1% increase in yield increases the project profitability 10%
- 3% increase in yield is worth MILLIONS of dollars on day 0
- Increases in Development Fee goes directly to sponsor
Conclusions

• Performance is extremely important
• Quality MUST lead to better performance -- Under-performance is universally unacceptable
• Over performance is marginally valuable for operating assets
• Higher underwritten performance dramatically impacts profitability
• Sell products to good stewards. Good product is a result of the construction and care
• Technology needs to focus on predictability of performance
• Quality Assurance and Innovation need to focus on pre-operational assets
• Standards and Protocols are essential for accurate modeling to increase and yield
• Spend the money to identify, procure, AND DEFEND quality
Thank YOU!

David Williams
Chief Risk Officer

dwilliams@cleanpath.com