RELIABILITY ON BANKABILITY

CONSERVATIVE, NOT NECESSARILY QUALITY

PV MODULE RELIABILITY WORKSHOP

FEBRUARY 2015
WHY PROJECT FINANCE?

CASH REQUIRED
- LOW Capital
- INCREASE number of projects
- LOWER risk through portfolios

TERM
- Solar life-expectancy challenge for equity investors @ scale
- Spread equity across several projects

NON-RECOUPSE
- Equity shares technical and economic risks
- LIMIT downside
POWER OF LEVERAGE

ALL EQUITY
- CASH: $20 million
- IRR: 12%
- 20-year NPV: ~$0
- ALL risk on equity
- REASONABLE returns
- LARGE capital commitment

50/50
- CASH: $10 million
- IRR: 15%
- 20-year NPV: $2.3 mln
- LIMIT risk on equity
- Medium capital commitment

20/80
- CASH: $4 million
- IRR: 20%
- 20-year NPV: $3.6 mln
- LITTLE risk on equity
- SMALL capital commitment
- HIGH IRR
- HIGH NPV
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<thead>
<tr>
<th><strong>NOBEL WORK</strong></th>
<th><strong>20/80</strong></th>
<th><strong>MODEST</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>DOUBLE ENERGY!!</strong></td>
<td><strong>STANDARD PROJECT</strong></td>
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<tr>
<td><strong>TECHNOLOGY RISK: HIGH</strong></td>
<td><strong>DEBT: STANDARD</strong></td>
<td><strong>DEBT: EXTENDED 20 YRS</strong></td>
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<td><strong>LIMITED WARRANTY</strong></td>
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<td>★ HIGH Capital Commitment</td>
<td>★ HIGH returns</td>
<td>★ EXCEPTIONAL returns</td>
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<td>★ BROADEN Geo-market</td>
<td>★ MEDIUM risk on equity</td>
<td>★ INCREASED value</td>
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<td>★ HIGH Risk (20 years)</td>
<td>★ SMALL capital commitment</td>
<td>★ IDENTICAL capital</td>
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<td>★ SHRUNK Investor Pool</td>
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<td>★ IDENTICAL technical risk</td>
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CERTAINTY

TECHNOLOGY

- MOST of revenue to service bank debt
- Technology needs to be consistently performing for life of bank debt
- Equity makes most money years AFTER debt is paid (year 15 on)
- Technology needs to be consistent reliable income – Toll Bridge

WARRANTY

- Problems with Technology fall to warranties
  - FIRST, identifying a problem. Centralized architecture means identifying individual module claims is difficult
  - SECOND, claiming a warranty has manufacture discrepancy
  - THIRD, an awarded claim and a paid claim are not the same

BALANCE SHEET

- Volatile manufactures
- Life-expectancy shrinking for large companies
- Cultural influence: Chinese industrial project debt

Most of revenue to service bank debt
IN-STABILITY 2014
FUNCTION VS. COEFFICIENT
CONSERVATISM VERSUS QUALITY

SPONSOR

- A – B – C, A Always, B Be, C Closing
- Sponsors make NO money without funded project
- Development fee is at risk with no project
- COST

LENDER

- Acceptable portfolio performance possibly attributed to underestimation
- NEW technologies increase transaction costs from Independent Engineers
- Insufficient time for latent defects
- ‘TOP TIER’ eases credit committee discussion

OUTCOME

- Lender leads conservative stakeholder
- NEW technology upsets program
- Evolutionary changes “Just like the last one”
- Conservative performance estimation
- Warranties important but underlying technology
Hope is NOT lost. Advances in applied science are critical for the successful adoption of solar in new markets, broaden investor pools, and lowering conservative assumptions.

- Understand role of debt
- Parallel advances with finance
- Understand warranty implications and power of decades of leverage
- Reliability, quality, and consistency may have dramatic impact on economics
- NEW technology must have a commercialization plan including project finance.
Conclusions
ALIGNING ‘CONSERVATIVE’ & Quality

Knowledge of Quality
Over conservative assumptions

- Project Finance is here to STAY
- Stakeholders will tend to levered project structures which require consistent and reliable economics
- Projects will tend to use comfortable technology because of a sense of reliability and comfort
- Paradigms will be questioned with continual technology failures, companies dissolving, and manifesting latent defects
- Consistent independent standards will provide a platform for comparison of features and long-term reliability standards
- Quality requires stakeholders to be informed, create desire, and facilitate Demand.