From Factory to Field:
Developing Utility-Scale PV Projects

Silicon Valley Photovoltaics Society
July 20, 2011
Agile Energy, Inc.

- Developer of utility scale (>10 MW) solar projects
  - Currently focused on North America
  - PV and CPV only, primarily ground-mount
- Headquarters in San Bruno, CA
- Principals – Glen Davis & Rob Morgan (previously with AES, Ausra)
  - Co-founders have over 45 years of collective power experience, including >$5bn in project and corporate financing
  - Currently 13 people, 16 by end of 2011
- Backed exclusively by Good Energies, Inc.
  - $37mm committed over two rounds (12/09 and 6/11)
  - Investment funds development activities and company growth
- Future expansion
  - Other technologies
  - Beyond North America
Development Within the PV Value Chain

Factory

Poly-Silicon → Ingots & Wafers → PV Cells → Modules → BOS → Project Development

Field

Construction → O&M
Anatomy of a Solar Project

- Site Owner
  - Land Agreement
- Power Grid
  - Interconnect Agt
  - EPC Contract
- EPC Contractor
  - Equip Contracts
- Equipment Suppliers
  - Permits & Tax
- Government Agencies

- Project Lenders
  - Loan Agts
  - Cash Grant and Loan Gty
- US Gov’t
  - Tax Equity Agt
  - Sponsor Equity Agt
- Tax Equity
- Owner

- Power Customer
  - PPA
  - O&M Contract
  - Insurance Policies
  - Loan Agts

- Solar Power Project
  - Insurance Companies
  - O&M Contractor
  - Project Lenders
  - US Gov’t
  - Tax Equity
  - Owner

Skip Ahead
Site Selection & Land Agreement

- Solar resource
- Site characteristics
- Proximity to interconnection point
- Ownership
- Option term
- Lease, purchase or right-of-way
- Cost
- Restoration
Interconnection Agreement

Queue position
MW capacity
Interconnection studies
Network upgrade costs
Interconnection costs
Deposits
Schedule
Notice to proceed
EPC Contract

Cost
Supplier contracts
Installation schedule
Performance guarantees
Credit
Labor force (union?)
O&M
Equipment Contracts

- Technology selection
- Cost
- Efficiency
- Delivery schedule
- Bankability
- Performance guarantees
- Warranties
- Credit
Permits and Tax

Permits
Jurisdiction
Process
Schedule
Species
Land use

Cultural/archeological
Mitigation requirements

Tax
Sales tax
Property tax
County tax
Local benefits
Change in law
Loan Agreements

Pricing
  Fees
  Tenor
Coverage ratios
  Reserves
Syndication
  Forebearance

Back to Anatomy
Cash Grant and Loan Guarantee

Cash Grant
- Cost basis
- Stranded MACRS
- Deadline/expiration

Loan Guarantee
- Application costs
- Selection
- Negotiation
- Terms
- Expiration
Tax Equity Agreement

Availability
Cost
Structure
Commitment to fund
Sponsor Equity Agreement

Developer or 3rd party
Construction equity
Timing of funding
Security
Contingent equity
Insurance Policies

Cost
Scope
Special risks
Renewal

Warranty coverage
O&M Contract

- EPC contractor
- Third party or sponsor
- Performance risk
- Delivery scheduling
- Cleaning program
- Data collection
Power Purchase Agreement

Winning a PPA
Price & term
Technology
Schedule milestones
Delivery guarantees
Liquidated damages
Security deposits
Curtailment
Assignment

Back to Anatomy
U.S. UTILITY PV PROJECT DEVELOPER TAXONOMY

- European PV Developers
  - Acciona
  - Enfinity
  - Phoenix Solar
  - Juwi Solar

- Pure Play U.S. PV Developers
  - FRV
  - Iberdrola
  - Gestang
  - Opde
  - Enxco
  - Axipower
  - Axiopower
  - Glenmont
  - SolarZenergy
  - SNYX Energy
  - SECP
  - Foreign
  - Foster & Partners
  - ARK
  - Lincoln

- Divisions of Other Corporate Parents
  - American Capital Energy
  - Agile Energy
  - Abengoa
  - AES
  - Kaiser Solar
  - Blue Energy
  - Posco
  - Siemens
  - Yingli
  - SolarReserve
  - SolarReserve
  - SolarReserve
  - SolarReserve
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- Joint Ventures
  - Senvion
  - Sharp
  - Recurrent Energy
  - MEMC

- Foreign Entrants
  - Sempra Generation
  - Duke Energy
  - PSEG Solar Source LLC
  - FPL

- Utility Affiliates
  - NRG
  - Competitive Power Ventures, Inc.
  - Invenergy

- Independent Power Producers
  - Sharp
  - SunEdison

- Upstream Entrants
  - Sunpower
  - Solon
  - Solyndra
  - Sharp
  - BP Solar
  - MEMC

- JV Entrants
  - NextEra Energy Power
  - SolarReserve

For more information contact Shayle Kann, Managing Director, Solar Research at kann@gtmresearch.com
# PV Developer Trends

*December 2009 through today*

<table>
<thead>
<tr>
<th>Company Type</th>
<th>Trend</th>
<th>Notable Entrants</th>
<th>Notable Exits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream Suppliers</td>
<td>↑</td>
<td>Sharp, MEMC, BP Solar, LDK, Soitec, Amonix</td>
<td>Suntech</td>
</tr>
<tr>
<td>Independent Power Producers</td>
<td>↑</td>
<td>NRG</td>
<td>None</td>
</tr>
<tr>
<td>CSP Crossovers</td>
<td>↑</td>
<td>Solar Reserve, Tessera, Solar Millennium</td>
<td>Tessera</td>
</tr>
<tr>
<td>Other Corporations</td>
<td>↑</td>
<td>Meridian, Total, Samsung</td>
<td>None</td>
</tr>
<tr>
<td>Utility Affiliates</td>
<td>↔</td>
<td>PSEG</td>
<td>EME</td>
</tr>
<tr>
<td>Regulated Utilities</td>
<td>↔</td>
<td>AEP?</td>
<td>None</td>
</tr>
<tr>
<td>Pure PV Developers</td>
<td>↓</td>
<td>Fotowatio (now exiting)</td>
<td>Cleantech America, NextLight, Recurrent, US Solar, Axio</td>
</tr>
</tbody>
</table>
# Future of US Utility Scale PV

<table>
<thead>
<tr>
<th>Potential Driver</th>
<th>Comment</th>
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<tbody>
<tr>
<td>RPS Expansion</td>
<td>33% in CA is bright spot</td>
</tr>
<tr>
<td></td>
<td>Otherwise, mostly static</td>
</tr>
<tr>
<td></td>
<td>Potential backsliding (NJ, OH)</td>
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<tr>
<td>Grid Parity</td>
<td>Positives</td>
</tr>
<tr>
<td></td>
<td>• Module and BOS costs</td>
</tr>
<tr>
<td></td>
<td>• System efficiencies</td>
</tr>
<tr>
<td></td>
<td>Negatives</td>
</tr>
<tr>
<td></td>
<td>• Increasing cost of capital</td>
</tr>
<tr>
<td></td>
<td>• Expiring 30% ITC (2017)</td>
</tr>
<tr>
<td></td>
<td>Unknown - Cost of natural gas</td>
</tr>
<tr>
<td>Resource Adequacy</td>
<td>• Coal plant retirement</td>
</tr>
<tr>
<td></td>
<td>• Load growth</td>
</tr>
<tr>
<td></td>
<td>• Permitting challenges</td>
</tr>
<tr>
<td></td>
<td>• Energy storage</td>
</tr>
</tbody>
</table>

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**Grid Parity Positives**
- Module and BOS costs
- System efficiencies

**Grid Parity Negatives**
- Increasing cost of capital
- Expiring 30% ITC (2017)

**Unknown**
- Cost of natural gas
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