Integrator Business Model I

Juris Kalejs, PhD, Chief Technology Officer

email: jkalejs@americancapitalenergy.com; Tel: 978-905-3136 (O); 781-492-1122 (C)
www.americancapitalenergy.com

DOE/Sandia PV Systems Integrator Workshop; San Jose, CA, March 31-April 1, 2010

Topics

- Company Profile
- Business Strategy
- Reliability Implications

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Company Profile

www.AmericanCapitalEnergy.com

- Founded 2005 by former RWE Schott Solar executives with over 60+ years of experience (partners Art Hennessey, Tom Hunton)
- A leading national independent large-scale solar photovoltaic (PV) system integrator and project developer
- Specialize in roof- and ground-mounted commercial projects of >500 kW and utility-scale PV installations
- Over 25 MW of projects completed; 35 MW+ under contract and/or construction in 2010

Business Strategy

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- Experience and strong National Marketing and Sales presence
- Solutions – diversity in financial models and agnostic in PV technology
- Flexibility in new markets: Utility-scale PV
- Customer Satisfaction – enhanced by experienced and knowledgeable engineering - know customer hot buttons for risk aversion

Enter: Reliability parameters and Data!

Business Strategy – Know Funding Options in U.S.

- Purchase
  - Customer agrees to buy the system outright
- Power Purchase Agreement
  - ACE and finance company owns the system and sell power to the customer
    - -Customer has no up front costs.
- Lease
  - - Leasing company owns system and charges monthly fee to customer
    - -Customer has the option to buy system at later date.

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Reliability – Key Elements for Customers

To manage customer risk profile and expectations, need to demonstrate several key competencies:

- Knowledge of technology limitations
- Track record for technology
- Confidence in field data

Reliability – Key Elements for Customers

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Entry phone call to plant completion is all about managing the customers expectations

(I) Project scoping: ACE and proposed technology track records, manufacturers' data, price vs technology trade-offs (predicted energy delivery)

(II) Site Development– design, interconnect (substations, transmission line, land prep, etc)

(III) Construction and commissioning

First concerns are for cost, financial returns

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Key Elements for Customers: (I) Project Scoping: Reliability Data

Cost implications arise from reliability of inputs to performance models (taken from PVWATTS)

- Module Nameplate rating
- Inverter/transformer efficiency
- Module mismatch
- Diodes and connections
- DC wiring
- AC wiring
- Soiling
- System availability

Bottom line: 15-20% power reduction from nameplate module power rating

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Reliability Data (I) – Managing Risk: Technology Limitations

- Up-to-date technology parameters
- Back up data/consistency for manufacturers' claims
- Comparative studies, e.g.,
  - C-Si vs thin films
  - Inverter performance parameters
  - Roof mount vs ground mount
- Managing O&M expectations

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Reliability Data (I) – Managing Risk: Module Track Records

- Years in extreme (high heat, high humidity) outdoor conditions
- Accelerated testing of components
- Manufacturers’ data: e.g., cell temperature coefficients, degradation characteristics

Reliability Data (I) – Managing Risk: Plant/Field Experience

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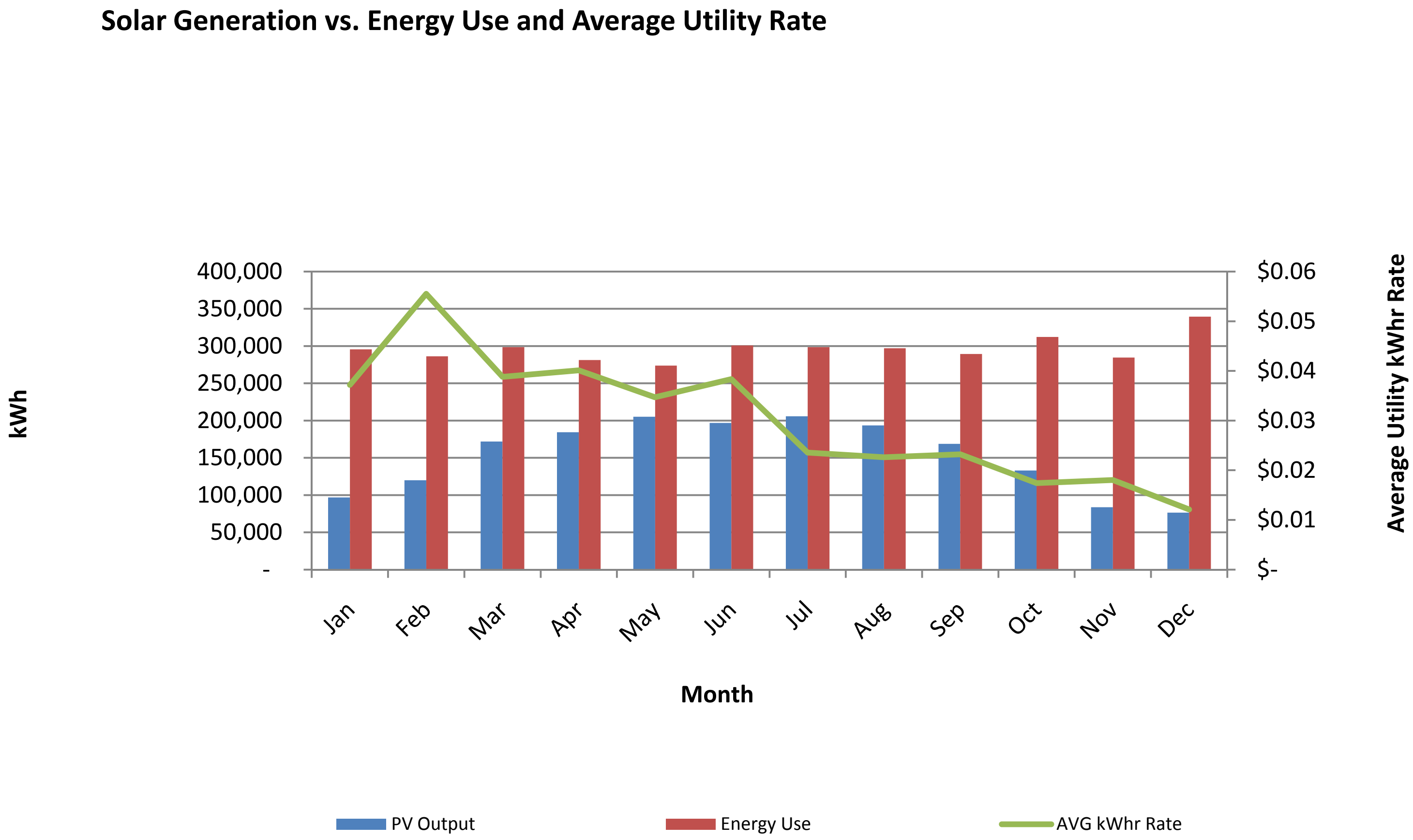
- Monitoring/instrumentation
- Metrology – sensors and calibration: design vs real time
- Data collection – utility grade meter vs predictive performance models
  - PVWATTS, more version 2 requests
- Interactive grid models

Need to convince customer these are realistic!

Reliability Data (I) – Managing Risk: Track Record (PVWATTS)



Key Elements for Customers

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(II) Site Development: Managing Customer Expectations, Step by Step to PV Plant Completion

Externalities to construction start-up: permitting examples , reliability issues (R) :
- 3-6 months, concurrent activities

1. Interconnect/electrical design and scoping (transmission line, substation access)*
2. Local impact statement (seismic, noise, environmental, glare)*
3. Wetlands
4. Cultural (archeological)
5. Soil erosion
6. Sediment control (grading , berms)
7. Environmental site assessment (brownfields-contaminated soil disposal)
8. Civil engineering (grading , ground mount prep, access, etc) (R)

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* For commercial roof top arrays ; (R) - Indicates reliability implications

Key Elements for Customers

(II) Site Development: Managing Customer Expectations, Step by Step to PV Plant Completion

Externalities to construction start-up (continued):

9. Conduit requirements , roof penetration issues(R)*
10. Buried vs surface runs; metal vs plastic (R)
11. Codes and standards (PE stamps)*
12. Data acquisition systems (DAS) (data ports, functionalities) (R) *
13. DC- and AC-side electrical system integration and interfaces (communications software and protocols, hardware stability) (R)*

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* For commercial roof top arrays; (R) - Indicates reliability implications

Key Elements for Customers

(III) Construction and commissioning: Managing Customer Expectations, Step by Step to PV Plant Completion

Construction elements (R):

1) ACE engineering expertise - design, inspections

2) Procurement knowledge – tight component specs

3) Subcontractors

4) Overall project knowledge and ACE expertise

5) O&M expectations – module, inverter warranties are first line of defense, no information on available on 10-20 year real costs for system repair and maintenance

Not documented: Benefits of labor force training (contractor responsibility, is solar experience required (?), NABCEP)

Company Profile/Projects
Atlantic City Convention Center

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- 2.36 Megawatts
  - Over 13 ,000 modules, U.S. largest rooftop solar array
  - 6 mo. timeline from start to finish in December, 2008
- Power Purchase Agreement (PPA) with PETCO Energy, NJ
  - Project cost: $18 million
  - NJ State renewable energy credits helped make project financially viable