WASTE HEAT TO POWER

DOE; Pacific CHP; Northwest CHP; California Stationary Fuel Cell Collaborative

Project Financing Considerations

Wally McOuat
HMH Energy Resources, Inc.
100 Larkspur Landing Circle, Suite 213
Larkspur, CA 94939
415.925.2900

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Today’s Topics

- Is the project financeable?
- What are the financing options to consider?
  - Private sector projects
  - Public sector projects
- Comparison of options
  - Advantages/disadvantages of each
  - How to choose among options

- CANNOT COVER IT ALL !!!
Some Key Issues in Financing

- Cash flows
- Creditworthiness
- Risk mitigation
- Security
- “Project financing” v. general credit
Potential Financing Alternatives
For Private Sector Projects

- Capital outlay
- Loans
- Operating lease
- Off balance sheet financing
Capital Outlay

- If possible, easiest and least complicated. But…
- Internal competition for funding
- Opportunity costs; high hurdle rates
- Energy savings not mission of company
Loans and Leases

- Conventional loan
  - Normal banker’s issues (credit condition, etc.)
  - How fits into corporate financial strategy
  - Usually only medium-term at best

- Operating leases ("true" leases)
  - Lessor retains true ownership
  - Lessor gets tax benefits (easily accomplished)
  - Credit issues still important; equipment value
Another private party invests and owns project
- Finances, develops and operates project
- Sells energy to the host site

Host party has limited obligations
- Makes site available for development
- Agrees to buy energy from owner for long-term

Complex, lots of issues (beyond today’s scope)
Third-Party Owned/Financed with PPA
Simple Approach All Equity Financing

Investor/Owners

Fake Name, LLC
(Project Owner/Operator)

Host (Site Lessor; Energy Purchaser)

Utility (or ESP)

Contractor(s)

Site Lease & Power Purchase Agreement

Standby & Net Metering

EPC Contract

O&M Contract

100%

Ownership

Contract/agreement

EPC = Engineer, Procure & Construct
Major Financing Decision for Public Sector Projects

- **Public financing**
  - Public sector provides 100%, usually tax-exempt
  - Retain all benefits, all risks
  - Long-term agreements few and clear

- **Private financing**
  - Private sector provides 100%, usually taxable
  - Public sector buys energy outputs from Project
  - Public gets benefits from discounts, rents, bonuses
Potential Public Financing Options

- Capital outlay (simple, but competition for funds)
- Bonds (likely revenue bonds, not GO’s)
  - Longest term (some up to 30 years)
  - Critical mass needed (not small, lone project)
  - Issuing authority
  - Political; voter approval may be required
  - Details are beyond today’s scope
  - Check with counsel and financial advisor
- COP’s may work better in many cases (see counsel)
Lease-Purchase Financing

- Private party provides 100% of financing
  - Form of transaction is a lease but substance of transaction is an installment purchase
  - Financing is 100% tax-exempt if
    - project qualifies and
    - transaction is properly structured

- Twist: non-appropriations clause often used

- Many energy projects financed this way
  - Easy, quick and inexpensive to procure and close
  - Ready cadre of financial institutions
  - Very cost-effective for many projects
Lease-Purchase Financing
Simple Approach

Financial Institution
(Project Owner/Lessor)

Equipment Lease &
Financing Agreement

Host (Equipment Lessee)

Standby & Net
Metering

Utility (or ESP)

Contractor(s)

Development
Agreements
Lease-Purchase Financing
With Energy Purchase Structure

Financial Institution
(Project Owner/Lessor)

Equipment Lease &
Financing Agreement

Special Purpose Entity (SPE)

Equipment Rent

Turnkey Contractor

Development Agreements

Site Lease &
Energy Purchase Agreement

Energy Purchases

Host (Land Lessor &
Energy Purchaser)
Lease-Purchase Financing
Cogeneration at UCSC (1)

- Bondholders
  - Revenue Bonds
  - Interest & Principal
- Bank of California (Trustee)
- Bank of America (Credit Support)
  - Letter of Credit (LOC)
- California Alternative Energy Source Financing Authority (CAESFA; Issuer)
  - Equipment Lease & Financing Agreement
  - Equipment Rent
  - California Energy Facilities Corporation (Non-profit SPE; Developer)
    - Development Agreement (3)
    - Site Lease & Energy Purchase Agreement (2)
  - UCSC Cogeneration Associates, Inc. (Builder & Operator)
  - UCSC (Land Lessor & Energy Purchaser)
    - Energy Purchases
    - Reimbursement Agreement

Notes:
1. Summary of documents
2. Titled ‘Lease’ but rent limited to metered energy priced at PG&E rates less fuel & O&M costs
3. Deferred ‘Developer Fee’ never paid
Summary of Lease Purchase Financing

Advantages
- Lower cost of power than with PPA, in most cases
- Long term is possible (15 to 25 years)
- Very quick to procure & close (less than 1 month)
- Closing costs are very low (often < $20k)
- Host site retains full control over all design aspects
- Normal choices on procurement process

Disadvantages
- Implicitly uses up debt capacity (even if not debt legally)
- Host site assumes full risk, for most practical purposes
Third Party Financing Options

- Operating lease (few tax benefits; not optimal)
  - Few tax benefits to private owner
  - Not often used for public sector energy projects

- Use of power purchase agreement (PPA)
  - Optimal use of private “tax benefits”
  - Very common approach; established precedents
Third Party Financing With PPA

- Third-party designs, constructs, finances, owns & operates the energy project
- Private operator sells power to site per long-term power purchase agreement (PPA) at fixed price (x ¢/kWh)
- Host site leases space (“Premises”) to project’s owner
- Third party gets “tax benefits” of owning project
- Utility or ESP provides supplemental & back-up power
Private Ownership with PPA
Simple Approach With Lender

Investor/Owners

Fake Name, LLC (Project Owner/Operator)

Host (Site Lessor; Energy Purchaser)

Utility (or ESP)

Lender

Loan Agreement

Site Lease & Power Purchase Agreement

EPC Contract

O&M Contract

Contractor(s)

100%

Ownership

Contract/agreement
Private Ownership with PPA
Developer Uses Lease Financing

Institution

Project Owner/Lessor

Owner of SPE (some equity)

Fake Name, LLC (Project Lessee/Operator)

Public Host (Site Lessor; Energy Purchaser)

Utility (or ESP if on DA)

Contractor(s)

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Ownership

Contract/agreement

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Financing Agreements; Site Sublease; Etc.

Site Lease

Power Purchase Agreement

Standby & Net Metering

EPC Contract

O&M Contract
Public Host’s Major PPA Obligations

- Take and use outputs delivered by project
  - Only to extent of host loads when energy is delivered
  - Must take/use before use from any other source
  - Special PURPA rules for cogen and CHP – thermal take obligation
- Pay the contract price for such energy on a timely basis
  - Starting price determined by bid process (normally)
  - Future escalation usually by formula
Developer’s Major PPA Obligations

- Must deliver energy as promised
  - Type, condition & delivery points are specified
  - Obligation may be firm (cogen thermal) or best efforts (electricity)
  - Performance standards per contract

- Operate and maintain plant at no cost to public entity
  - Reimburse any extra costs incurred by host site
  - Pay all standby costs, special facilities charges, etc.
Major PPA Deal Points (Partial List)

- Various design & construction issues
- Energy pricing (initial and annual escalation)
- Demand provided by project may differ from expectations
- Various metering and billing issues
- Developer failure to perform
- Lender rights
- Host’s rights to purchase project
- Developer obligations on termination or expiration
- Business aspects of force majeure
- Others (numerous)
Pros/Cons of Private Ownership

■ Advantages
  ■ No capital outlay
  ■ Transfer of most technical & operating risk
  ■ Solely performance based (if done correctly)

■ Disadvantages
  ■ In most cases, more costly electricity than tax-exempt financing
  ■ Procurement and negotiations are not easy
  ■ Less Host control of design (some Hosts may like this)
  ■ Future bumps in the road may require substantial Host time

■ Misnomer: income tax “benefits”
When Is PPA Approach Appropriate?

- Project not eligible for tax-exempt financing
- Public entity unwilling to take technical or performance risk of the technology
- Capital not available or site has better projects
- Cases where cost penalty of privatizing is low
- Achieve “green” objectives with no capital and minimal risk
Some "Heads Up" on PPA Deals

- Complex, despite what advocates may tell you
- Many contracts (relevant even if you’re not a party)
- No deep pocket to guarantee you long-term
- Must understand where/how you can stand firm
- Parties can and do change over term of agreements
- Every "bump" in road over long-term is likely a hassle
  - Lots of parties/contracts...lots of perspectives...
"It all comes down to one’s perspective — I, personally hope we get priced right out of the market."
Energy Policy Act of 2005: Assistance for Public Financing (Sample)

- Net metering required to be considered for renewable DG
- Renewable Energy Production Incentive (REPI)
  - Reinstated (had expired)
  - $0.019/kWh (escalates annually) for first 10 years of output
  - Only available to projects owned by public sector entities
  - Solar is in preferential first tier
  - Subject to annual appropriations by Congress (mostly for renewables)
- Clean Renewable Energy Bonds (CREB’s)
  - Cooperatives and public power systems
  - $800 million; filing intent due April 26, 2006
- Too many special rules/provisions to list
Federal Tax Incentives: Private Owners

- **Tax credits (ETC, PTC)**
  - Energy tax credit (ETC)
  - Production tax credit (PTC)
  - Tax credits generally more valuable than depreciation
  - Credits are “non-refundable” – must have tax liability to use
  - Energy Policy Act (‘05) increased from 10% to 30% of net (i.e., post-rebate) eligible costs through 2007

- **Depreciation**
  - Modified accelerated cost recovery system (MACRS)
  - Generally 5 year category (6 year write-off)
## Energy Investment Tax Credits (ETC)

<table>
<thead>
<tr>
<th>Technology</th>
<th>Corporate: Broadly defined</th>
<th>Individual: PV, solar water</th>
<th>Corporate / Individual</th>
<th>Corporate: No cap Individual: $2,000 cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Technologies</td>
<td>30% through 12/31/2007</td>
<td>10% thereafter (corp only)</td>
<td>Corporate only</td>
<td>No cap</td>
</tr>
<tr>
<td>Geothermal</td>
<td>30% through 12/31/2007</td>
<td>10% thereafter</td>
<td>Corporate only</td>
<td></td>
</tr>
<tr>
<td>Fuel Cells</td>
<td>30% through 12/31/2007</td>
<td>Zero thereafter</td>
<td>Corporate / Individual</td>
<td>Capped at $1000 per kW</td>
</tr>
<tr>
<td>Micro-turbines</td>
<td>10% through 12/31/2007</td>
<td>Zero thereafter</td>
<td>Corporate only</td>
<td>Capped at $200 per kW</td>
</tr>
</tbody>
</table>
## Production Tax Credit

<table>
<thead>
<tr>
<th>Source</th>
<th>Rate</th>
<th>Duration</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>1.9 c/kWh</td>
<td>5 yrs</td>
<td>12/31/2005</td>
</tr>
<tr>
<td>Wind</td>
<td>1.9 c/kWh</td>
<td>10 yrs</td>
<td>12/31/2007</td>
</tr>
<tr>
<td>Geothermal</td>
<td>1.9 c/kWh</td>
<td>10 yrs</td>
<td>12/31/2007</td>
</tr>
<tr>
<td>Biomass</td>
<td>1.9 &amp; 0.9 c/kWh</td>
<td>10 yrs</td>
<td>12/31/2007</td>
</tr>
<tr>
<td>Landfill/MSW</td>
<td>0.9 c/kWh</td>
<td>10 yrs</td>
<td>12/31/2007</td>
</tr>
<tr>
<td>Small hydro</td>
<td>0.9 c/kWh</td>
<td>10 yrs</td>
<td>12/31/2007</td>
</tr>
<tr>
<td>Nuclear</td>
<td>1.9 c/kWh (are other limits)</td>
<td>8 yrs</td>
<td>12/31/2020</td>
</tr>
</tbody>
</table>

PTC for solar expired at end of 2005
State and Local Incentives (Vary by Technology)

- Rebates (vary from State to State)
- Property tax exemptions (huge benefit)
- Sales tax exemptions
- Net metering
- Waiver of standby charges
- Expedited permitting
Various Energy Incentives
Putting them Together

- Something to get you more dazed & confused: You can’t get the full benefit of all the tax & rebate benefits!
- A few of the rules:
  - The Federal ETC basis is reduced by any rebate
  - The Federal MACRS basis is reduced by any rebate and 50% of the Federal ETC value
  - Can’t get both ETC & PTC (30% ETC is better for PV)
  - California depreciation basis is reduced by rebates
# Renewable Energy Incentives

## Putting Them Together – 500 kW (California!!)

### California rebates; Federal ETC:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross project cost ($7/watt)</td>
<td>$3,500,000</td>
</tr>
<tr>
<td>Rebate ($2.80/watt)</td>
<td>($1,400,000)</td>
</tr>
<tr>
<td><strong>Net Installation Cost</strong></td>
<td>$2,100,000</td>
</tr>
<tr>
<td>Federal energy tax credit (30%)</td>
<td>($630,000)</td>
</tr>
<tr>
<td><strong>Cost After Rebate and Tax Credit</strong></td>
<td><strong>$1,470,000</strong></td>
</tr>
</tbody>
</table>

### Federal Depreciation (5-yr MACRS):

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basis (cost net of rebate)</td>
<td>$2,100,000</td>
</tr>
<tr>
<td>50% ETC basis reduction</td>
<td>($315,000)</td>
</tr>
<tr>
<td><strong>Depreciable basis</strong></td>
<td>$1,785,000</td>
</tr>
<tr>
<td>Taxpayer's marginal Federal tax rate</td>
<td>35%</td>
</tr>
<tr>
<td><strong>Value of Federal depreciation (after 5 yrs)</strong></td>
<td><strong>$624,750</strong></td>
</tr>
</tbody>
</table>

### Net Cost at Yr 6 (Initial cost - Tax benefit)

<table>
<thead>
<tr>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$845,250</strong></td>
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</tbody>
</table>

### State Depreciation (12-yr straight line):

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basis (cost net of rebate &amp; state tax credit)</td>
<td>$2,100,000 x 8.84%</td>
</tr>
<tr>
<td>Taxpayer's marginal State tax rate</td>
<td>8.84%</td>
</tr>
<tr>
<td><strong>Value of State depreciation</strong></td>
<td><strong>$185,640</strong></td>
</tr>
</tbody>
</table>

### Initial cost less 12-year tax savings

<table>
<thead>
<tr>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$659,610</strong></td>
</tr>
</tbody>
</table>
Renewable Energy Economics

Note: Includes estimate of rebates & incentives plus cost of equity/debt
Rough guide only!
Cautions Not Meant to be Unfriendly

- Engineering, operating and economic tension:
  - Not always aligned, particularly with heavy TOU tariffs
  - What is true objective of DG project?
  - Would management do project other than to save money

- Small may be beautiful but at what price?
  - Energy industry still dominated by economies of scale
    - Capital costs: may be < 1¢ per kWh effective for large plant
    - Operating costs including fixed: may be < 0.7¢ per kWh
    - Fuel efficiency: new plants may be < 8,000 Btu/kWh
  - Delta can be 2¢–5¢/kWh (industry fights over 0.001¢/kWh)
  - Enormous economic advantage (policy issues are another topic)
Cautions Not Meant to be Unfriendly

- Few plants < 5 MW really save owners any money
  - Exception: site on very expensive secondary tariff
  - Exception: capital cost is zero or ignored
  - Problem: most sites apply no rigorous accounting

- Myth of multiple units and enhanced reliability
  - Extremely minimal enhancement (other ways to achieve)
  - Loses economies of scale (capital and operating)

- Sizing to thermal rather than electrical loads
  - May appear rational thermodynamically
  - Often leaves very expensive (20+¢/kWh) electricity on the table
Final Thoughts

- PPA pricing may be very competitive for private hosts but is quite high relative for public sector hosts in most cases
- Sizing and net metering: over 30% of days are off-peak even in afternoon (California = S/S/H)
- Diverse portfolio is a good hedging strategy against volatile electricity / natural gas prices
- Window: capitalize on rebates/tax incentives in 2006/07
- Take a long-term view of energy in general and prices

But, experts’ long-term price forecasts always wrong. There’s a better way: consider out-sourcing the forecast to more reliable predicting agency...