WASTE HEAT TO POWER

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

Project Financing Considerations

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February 15, 2006

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
- Energy Policy Act of 2005 (financial/tax incentives)
- **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

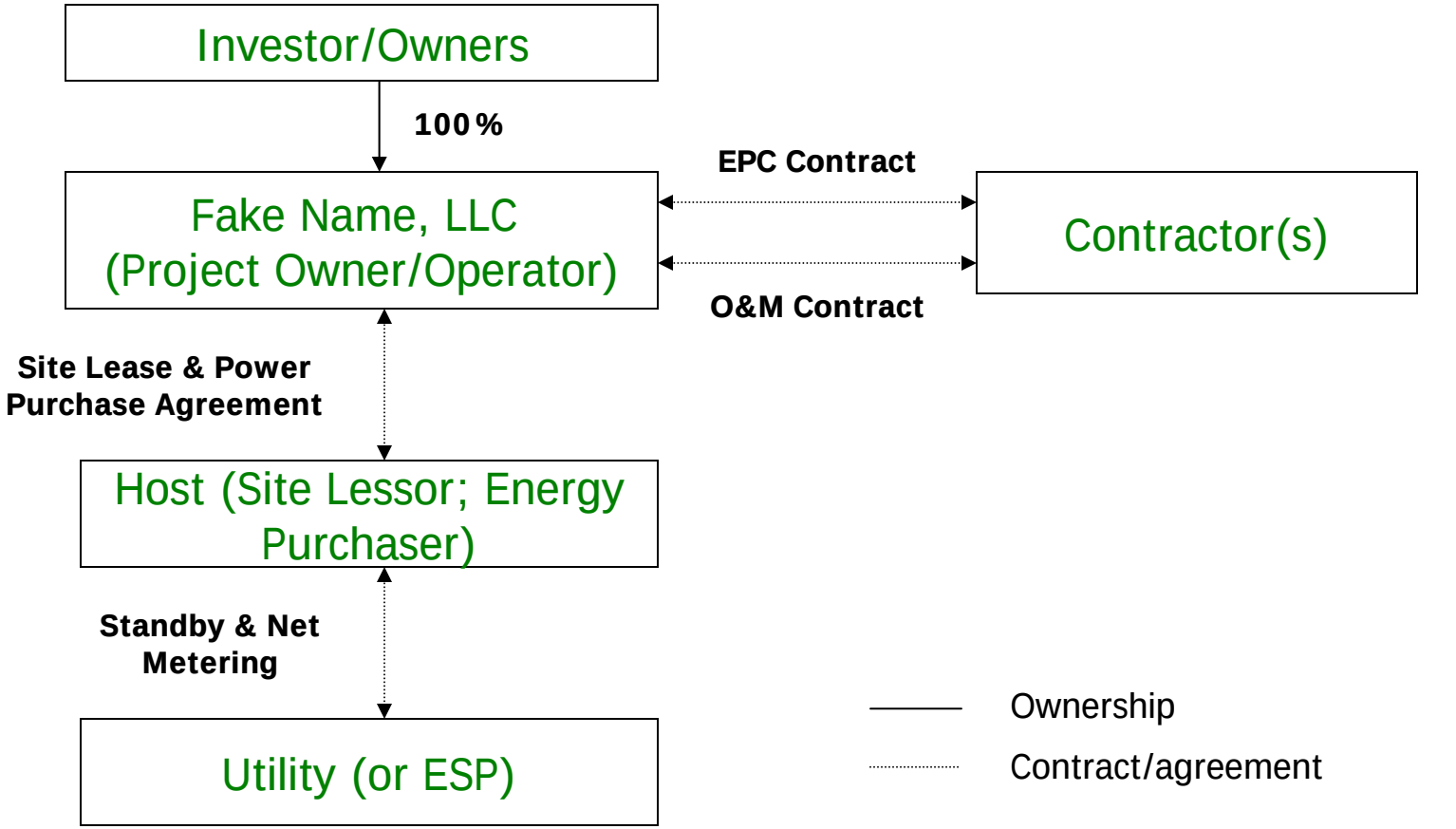
- Conventional loan
  - Normal banker's issues (credit condition, etc.)
  - How fits into corporate financial strategy
  - Usually only medium-term at best
- Operating leases ("true" leases)
  - Lessor retains true ownership
  - Lessor gets tax benefits (easily accomplished)
  - Credit issues still important; equipment value

"Off Balance Sheet" Approach

- 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



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

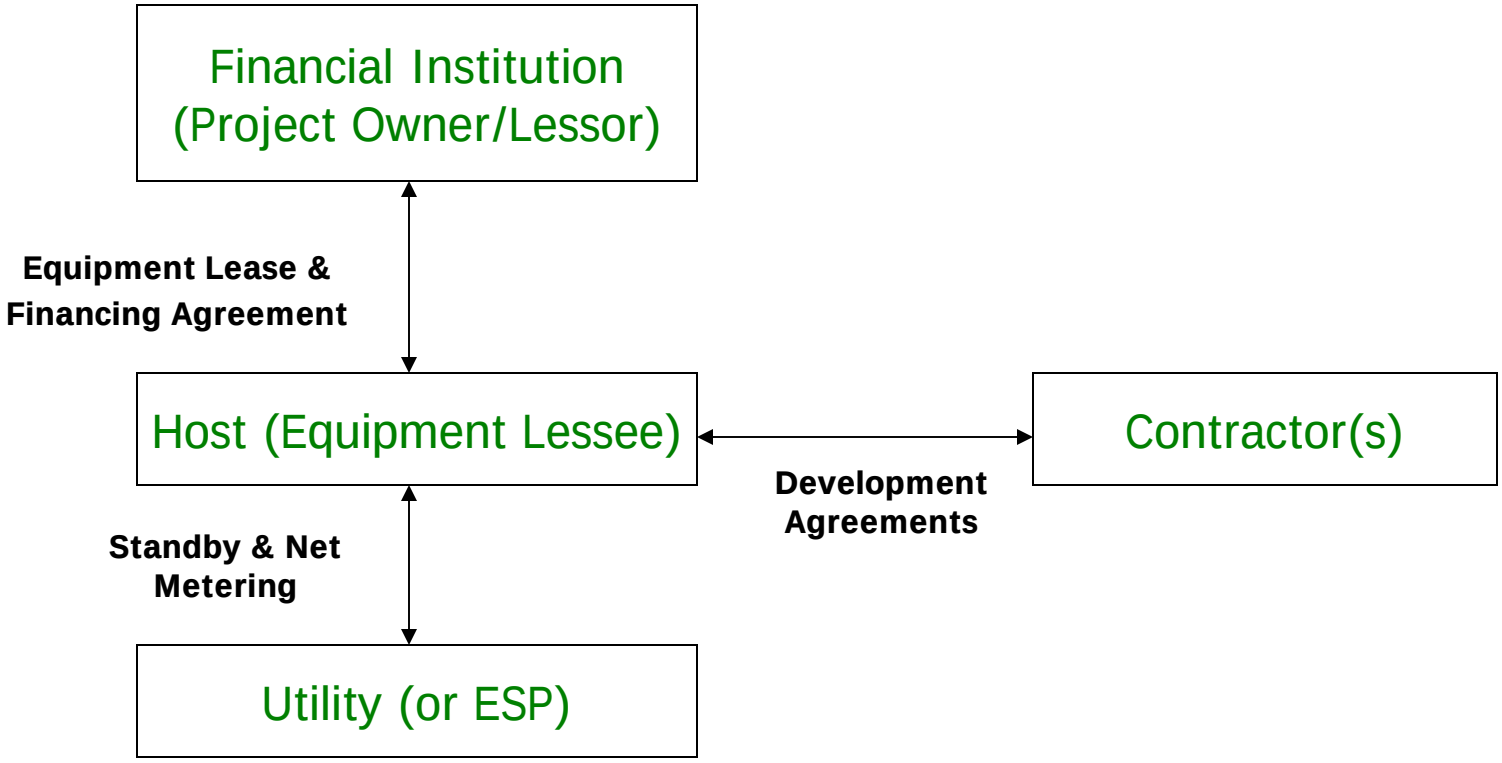
- Capital outlay (simple, but competition for funds)
- Bonds (likely revenue bonds, not GO's)
  - Longest term (some up to 30 years)
  - Critical mass needed (not small, lone project)
  - Issuing authority
  - Political; voter approval may be required
  - Details are beyond today's scope
  - Check with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

Lease-Purchase Financing

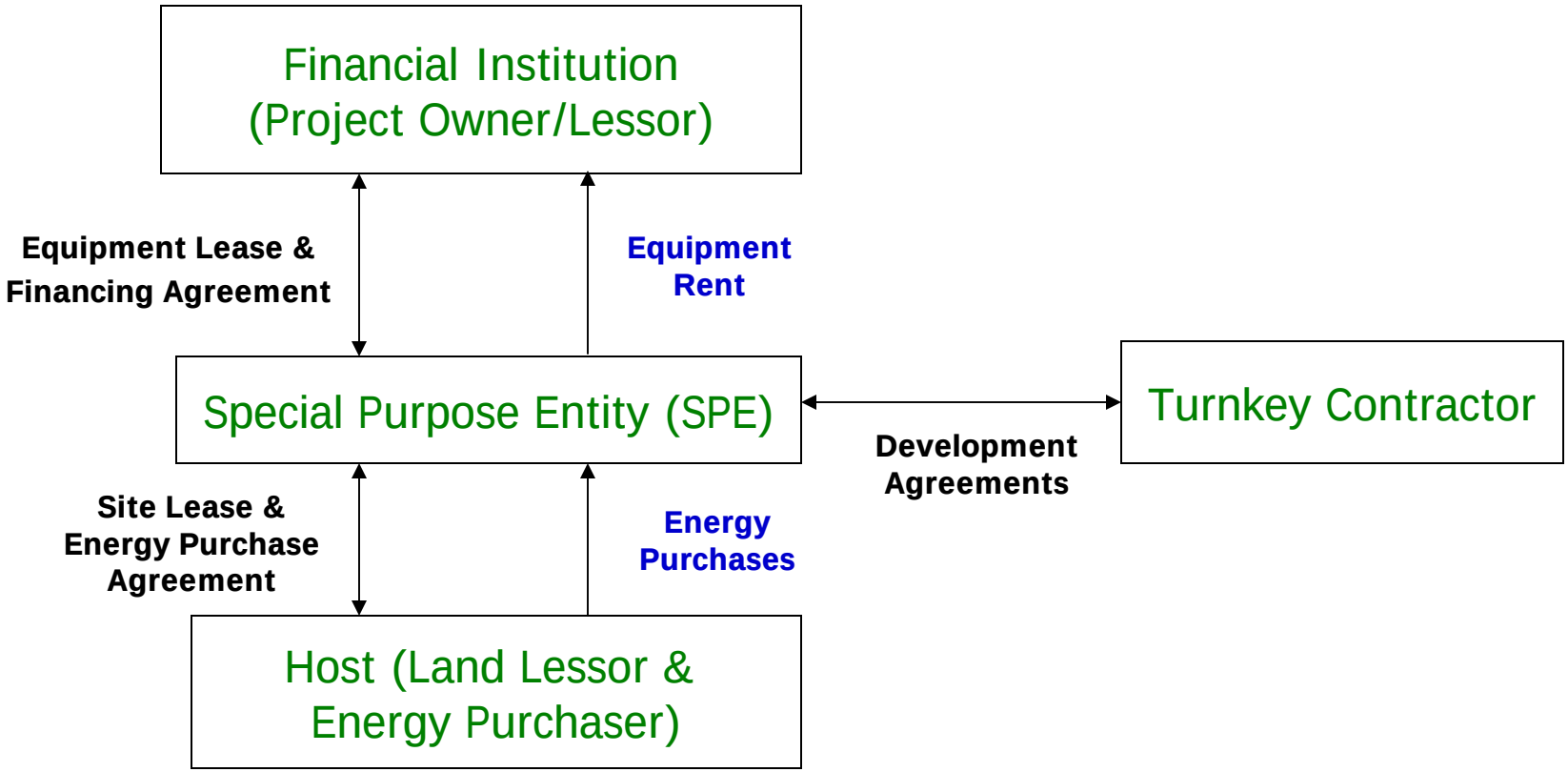
- Private party provides 100% of financing
  - Form of transaction is a lease but substance of transaction is an installment purchase
  - Financing is 100% tax-exempt if
    - project qualifies and
    - transaction is properly structured
- Twist: non-appropriations clause often used
- Many energy projects 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

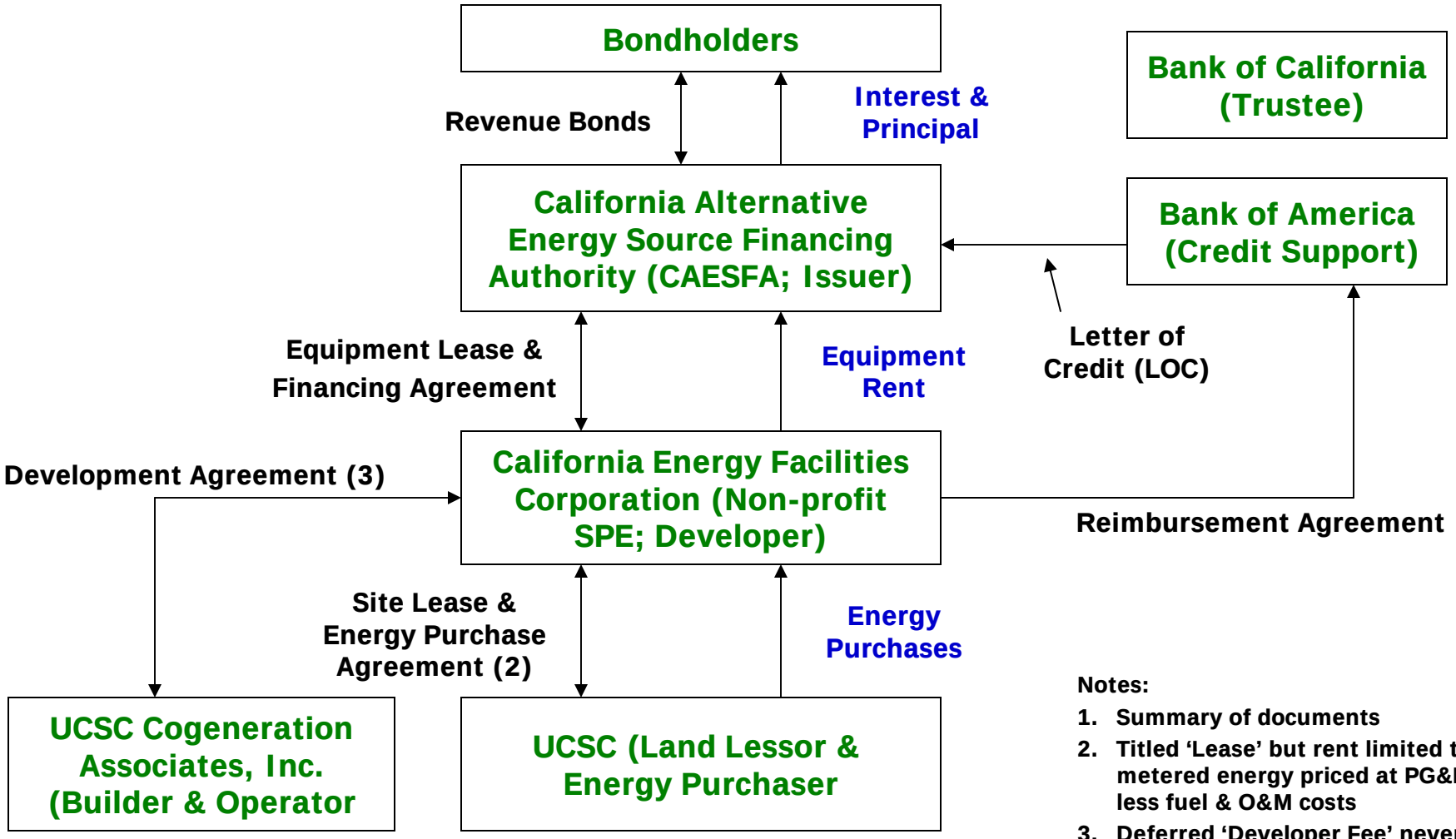


Lease-Purchase Financing
With Energy Purchase Structure



Lease-Purchase Financing

Cogeneration at UCSC (1)



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

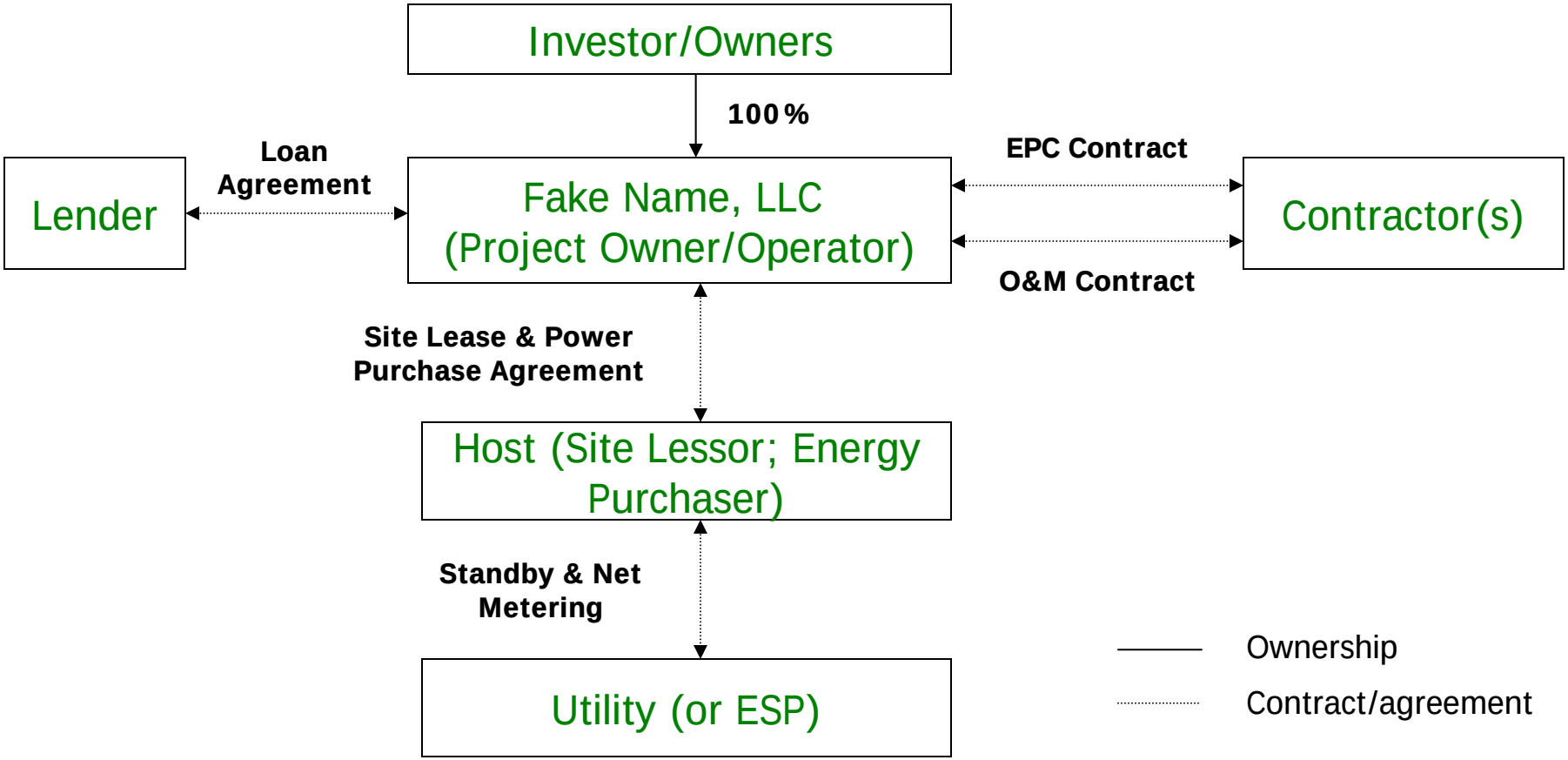
- Operating lease (few tax benefits; not optimal)
  - Few tax benefits to private owner
  - Not often used for public sector energy projects
- Use of power purchase agreement (PPA)
  - Optimal use of private “tax benefits”
  - Very common approach; established precedents

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

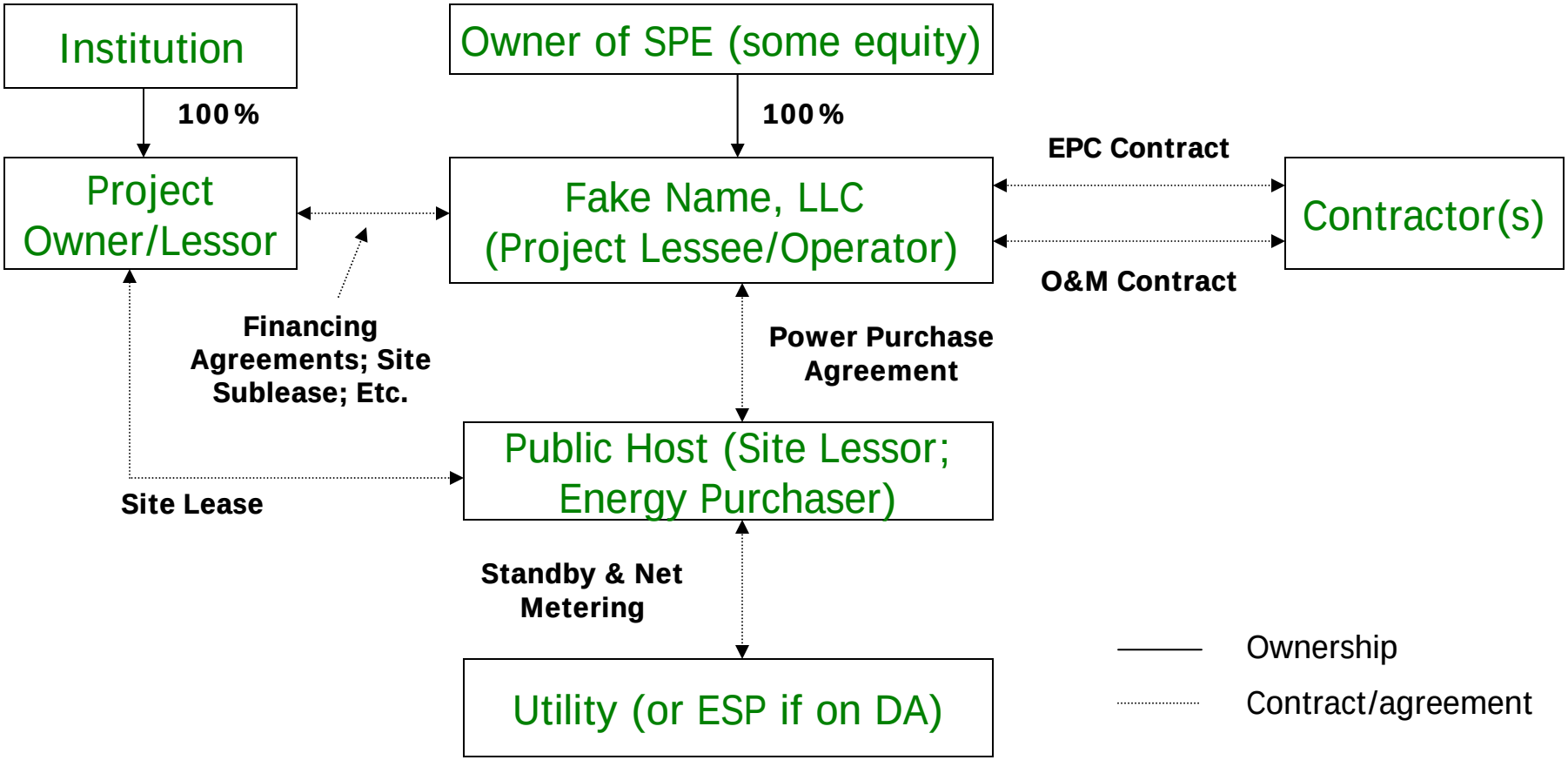
Private Ownership with PPA

Simple Approach With Lender



Private Ownership with PPA

Developer Uses Lease Financing



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)

Solar Technologies **Corporate: Broadly defined** **Individual: PV, solar water**	**30% through 12/31/2007** **10% thereafter (corp only)**	**Corporate / Individual**	**Corporate: No cap** **Individual: $2,000 cap**
Geothermal	**30% through 12/31/2007** **10% thereafter**	**Corporate only**	**No cap**
Fuel Cells	**30% through 12/31/2007** **Zero thereafter**	**Corporate / Individual**	**Capped at $1000 per kW** • **min. 30% efficiency** • **min. capacity .5 kW**
Micro-turbines	**10% through 12/31/2007** **Zero thereafter**	**Corporate only**	**Capped at $200 per kW** • **min. 26% efficiency** • **max. capacity 2 MW**

Production Tax Credit

Solar	1.9 c/kWh	5 yrs	12/31/2005
Wind	1.9 c/kWh	10 yrs	12/31/2007
Geothermal	1.9 c/kWh	10 yrs	12/31/2007
Biomass	1.9 & 0.9 c/kWh	10 yrs	12/31/2007
Landfill/MSW	0.9 c/kWh	10 yrs	12/31/2007
Small hydro	0.9 c/kWh	10 yrs	12/31/2007
Nuclear	1.9 c/kWh (are other limits)	8 yrs	12/31/2020

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

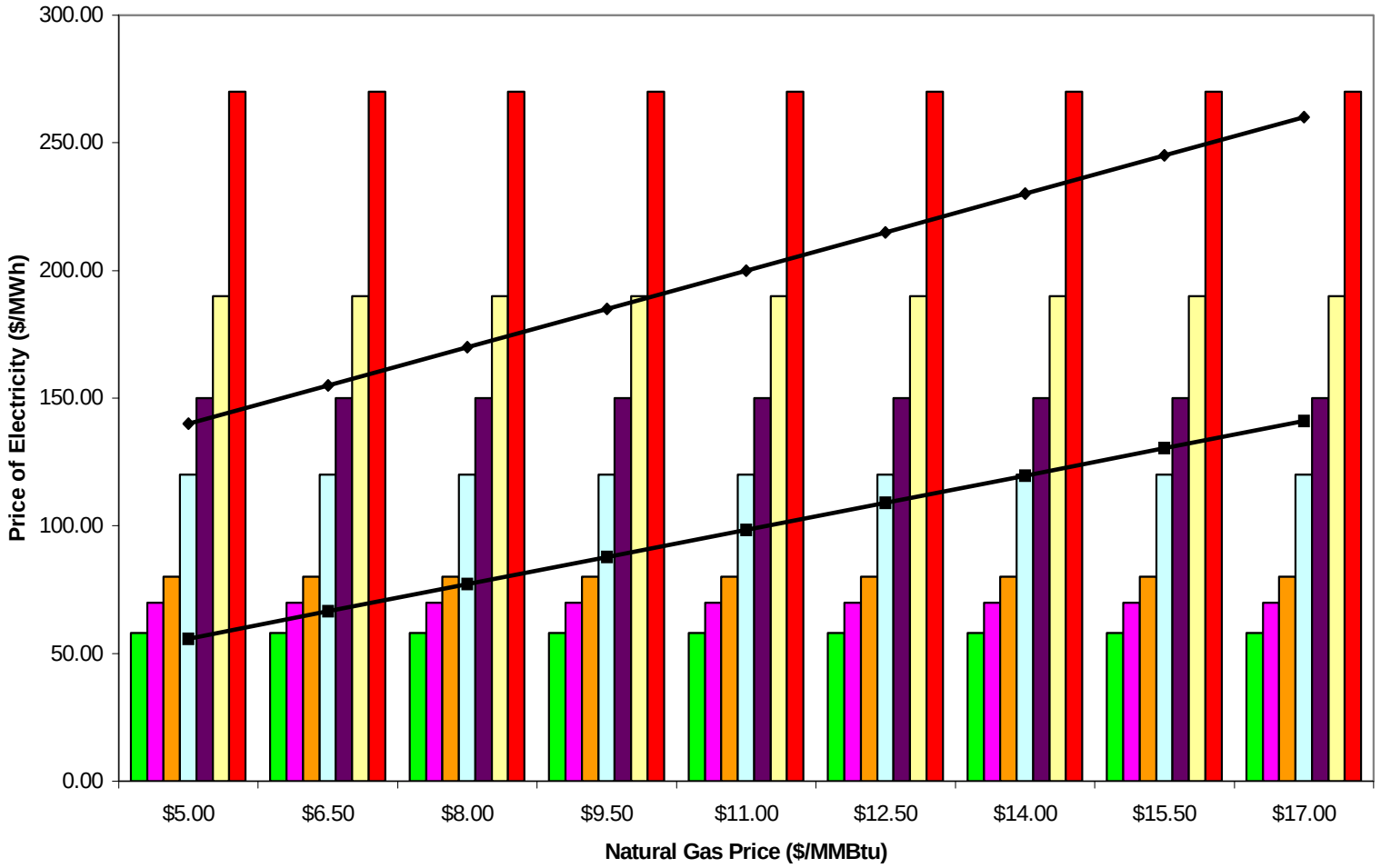
- Something to get you more dazed & confused: You can't get the full benefit of all the tax & rebate benefits!
- A few of the rules:
  - The Federal ETC basis is reduced by any rebate
  - The Federal MACRS basis is reduced by any rebate and 50% of the Federal ETC value
  - Can't get both ETC & PTC (30% 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:		
Gross project cost ($7/watt)	**$3,500,000**	
Rebate ($2.80/watt)	($1,400,000)	
Net Installation Cost	$2,100,000	
Federal energy tax credit (30%)	($630,000)	
Cost After Rebate and Tax Credit	**$1,470,000**	
Federal Depreciation (5-yr MACRS):		
Basis (cost net of rebate)	$2,100,000	
50% ETC basis reduction	($315,000)	
Depreciable basis	$1,785,000	x
Taxpayer's marginal Federal tax rate	35%	
Value of Federal depreciation (after 5 yrs)	$624,750	
Net Cost at Yr 6 (Initial cost - Tax benefit)	**$845,250**	
State Depreciation (12-yr straight line):		
Basis (cost net of rebate & state tax credit)	$2,100,000	x
Taxpayer's marginal State tax rate	8.84%	
Value of State depreciation	$185,640	
Initial cost less 12-year tax savings	**$659,610**	

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…