Introduction to Project Finance Analytic Methods

Renewable Energy and Project Development and Financing for California Tribes

Sacramento, CA

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Why?

- Use a model to create your business case
  - Convince yourself
    - The key is to ask questions of the model
  - Reduce uncertainty
  - Run sensitivity “what if” scenarios
  - Negotiate the PPA
  - Prepare the business plan
  - Work with investors

Fundamental Tool

- Spreadsheet to create pro forma
- Forecast horizon of at least 10 years
- Many different flavors but essential elements include revenue, expenses and analytic metrics including:
  - Life cycle costs
  - Net present value
  - Internal rate of return
  - Debt service coverage ratio

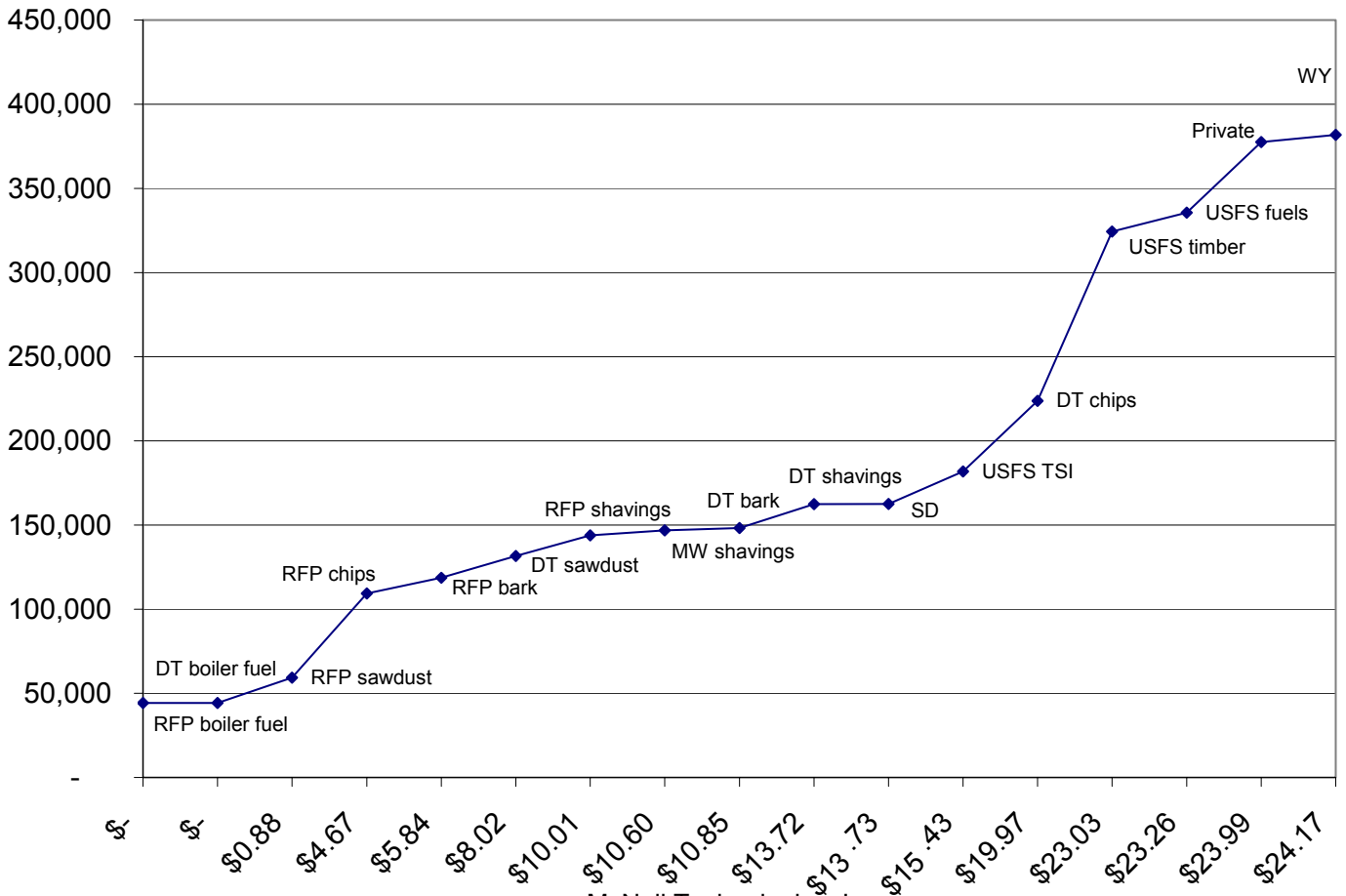
Topic Areas for Project Analysis

- Resources
- Engineering
- Economic
- Financial metrics
- Sensitivity analysis
- Employment

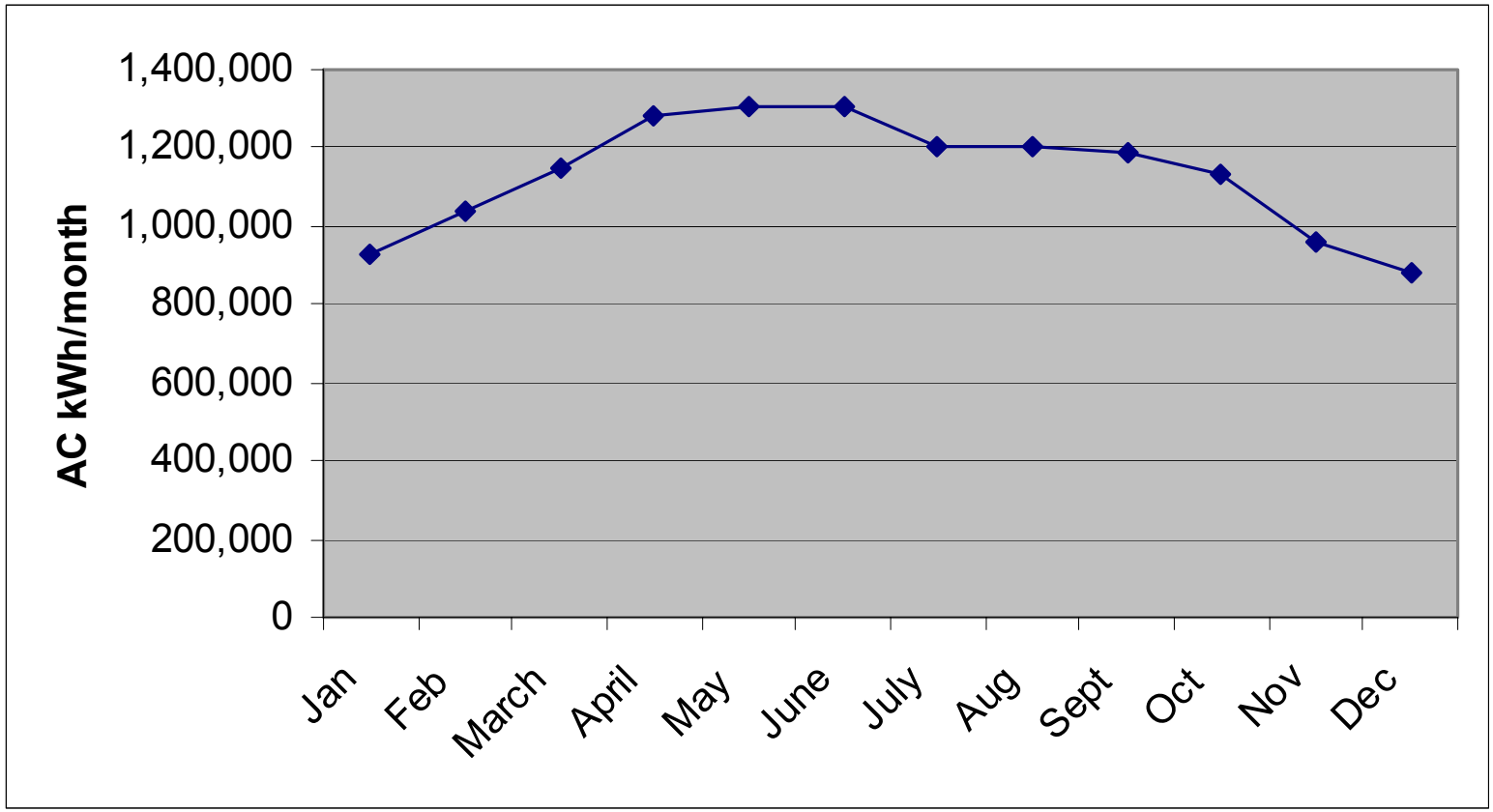
Resource Assessment

- First and necessary step for all renewables
- Need to understand
  - Quantity
  - Availability including
    - Seasonal fluctuations
    - Daily profiles
    - Extremes
  - Delivered cost
    - Contract terms

Biomass Supply Curve, blended incremental costs, $/green ton/yr.



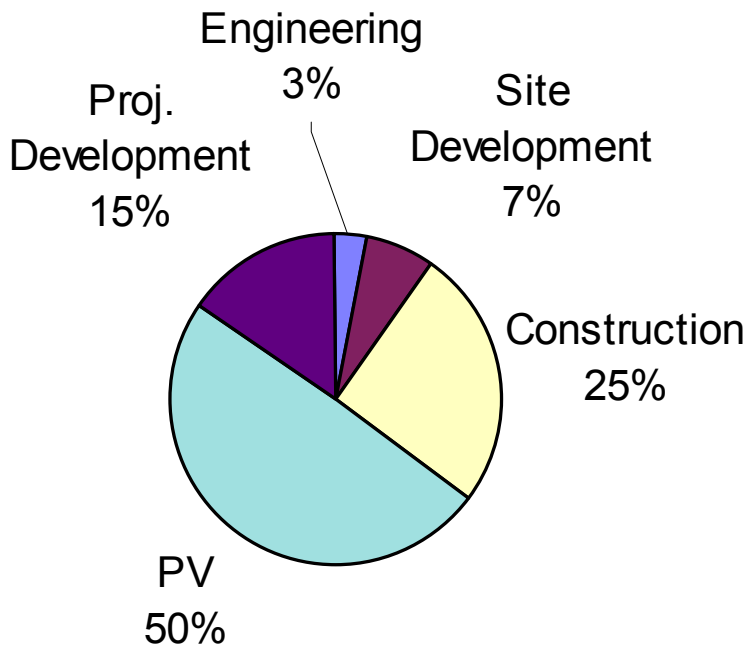
Solar Output, Southern CA



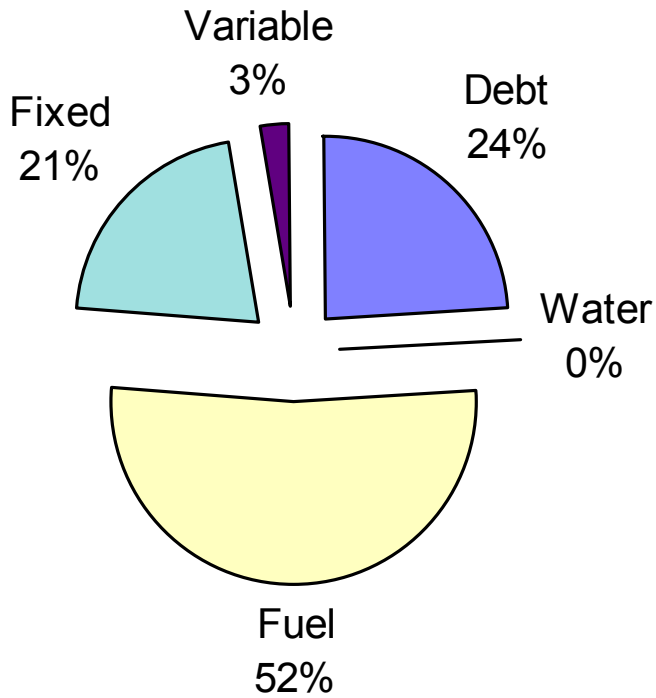
Engineering Inputs

- Capital Costs
  - Estimates, budgetary quotes, firm quotes
  - Delivery schedules
- Operating Costs
  - Work with vendor to refine estimates

Capital Costs, 5MW PV



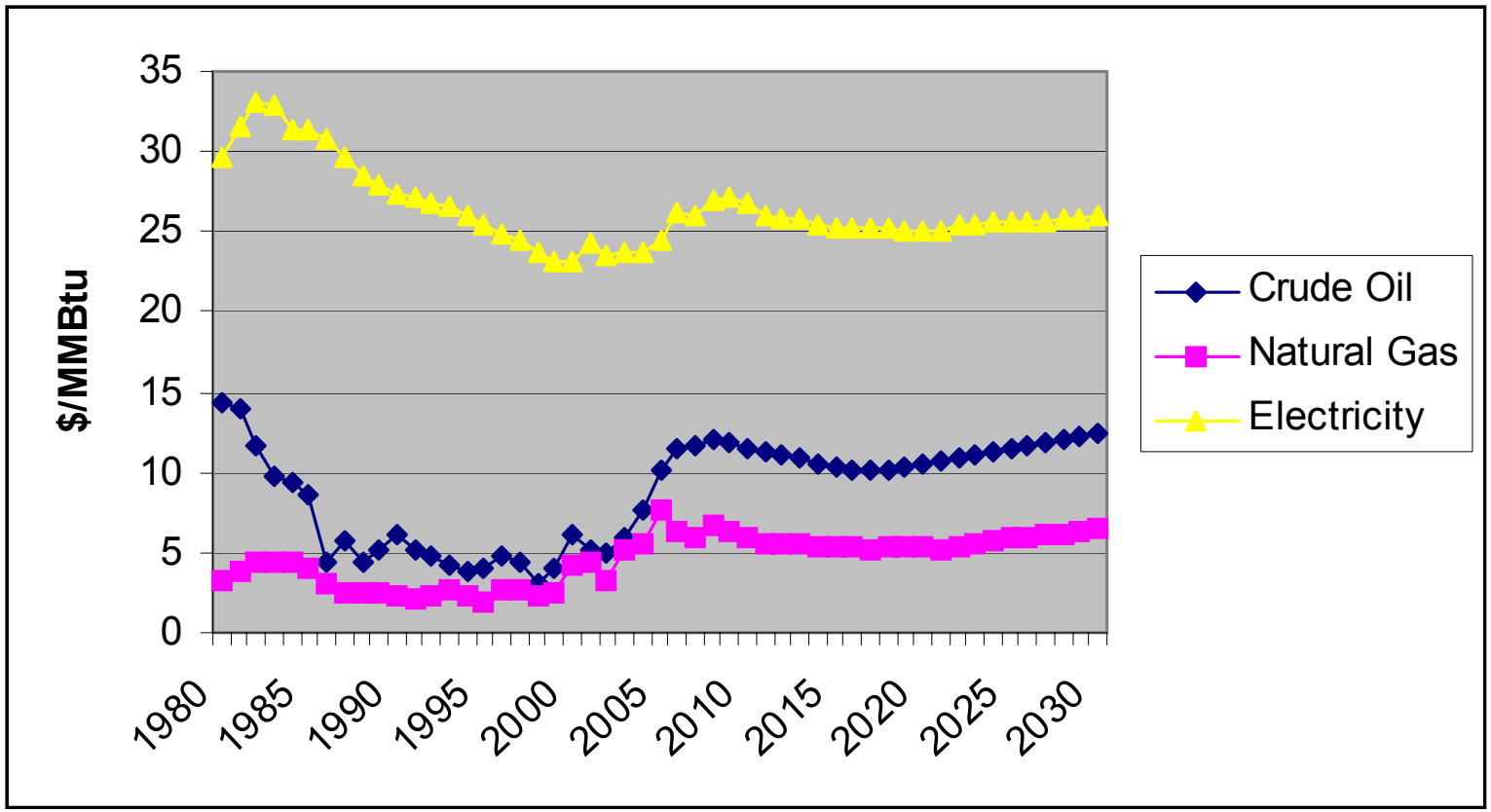
Representative Annual Operating Costs, Biopower



Economic Inputs

- Inflation rates
  - Federal Reserve Board forecast, headline vs. core inflation
  - http://www.philadelphiafed.org/econ/spf/
- Energy escalation rates
  - DOE / EIA forecast
- Discount rate
  - Internal discussion
- Debt / equity ratio (negotiation)
  - 80:20 to 50:50
- Debt (interest) rate
  - LIBOR plus 2-3 pts, varies with credit worthiness

Energy escalation, 2008 US DOE Annual Energy Outlook



Important Concepts

- For most renewable energy projects cash flow is poor in first years of operation, necessitating project finance structure
- Project finance strives to maximize various income flows, both revenues and monetization of tax benefits

Representative Federal / State Incentives

- Production tax credit
- Investment tax credit
- Accelerated depreciation (MACRS)
- Biomass fuel production grant (authorized, not appropriated)
- Loan guarantees
- Renewable portfolio standards
- Renewable energy certificates
- Carbon credits
- Employment training (most states)

Financial Metrics

- Lifecycle cost
  - favors the long term
- Payback
  - Ease of use, misleading in practice
- Net present value
  - “Best” tool for project comparison
  - Internal rate of return is similar but may give confusing results
- Minimum debt service coverage ratio
  - Lenders most important metric

Heat Only Example

- 165,000 sq. ft. aquaculture facility
- ~$200,000 annual natural gas bill for heating
- Price volatility
- Desire for renewable energy (biomass)
- Biomass fuel is less expensive than natural gas

Aquaculture Facility

Heat Analysis Approach

- Determine peak and annual thermal loads
  - Create scenarios
- Peak load determines maximum biomass unit size for capital costs
  - Retrofit, size for 80-90% of peak, retain old system to meet peak
- Determine economic inputs
- Perform life cycle cost calculations

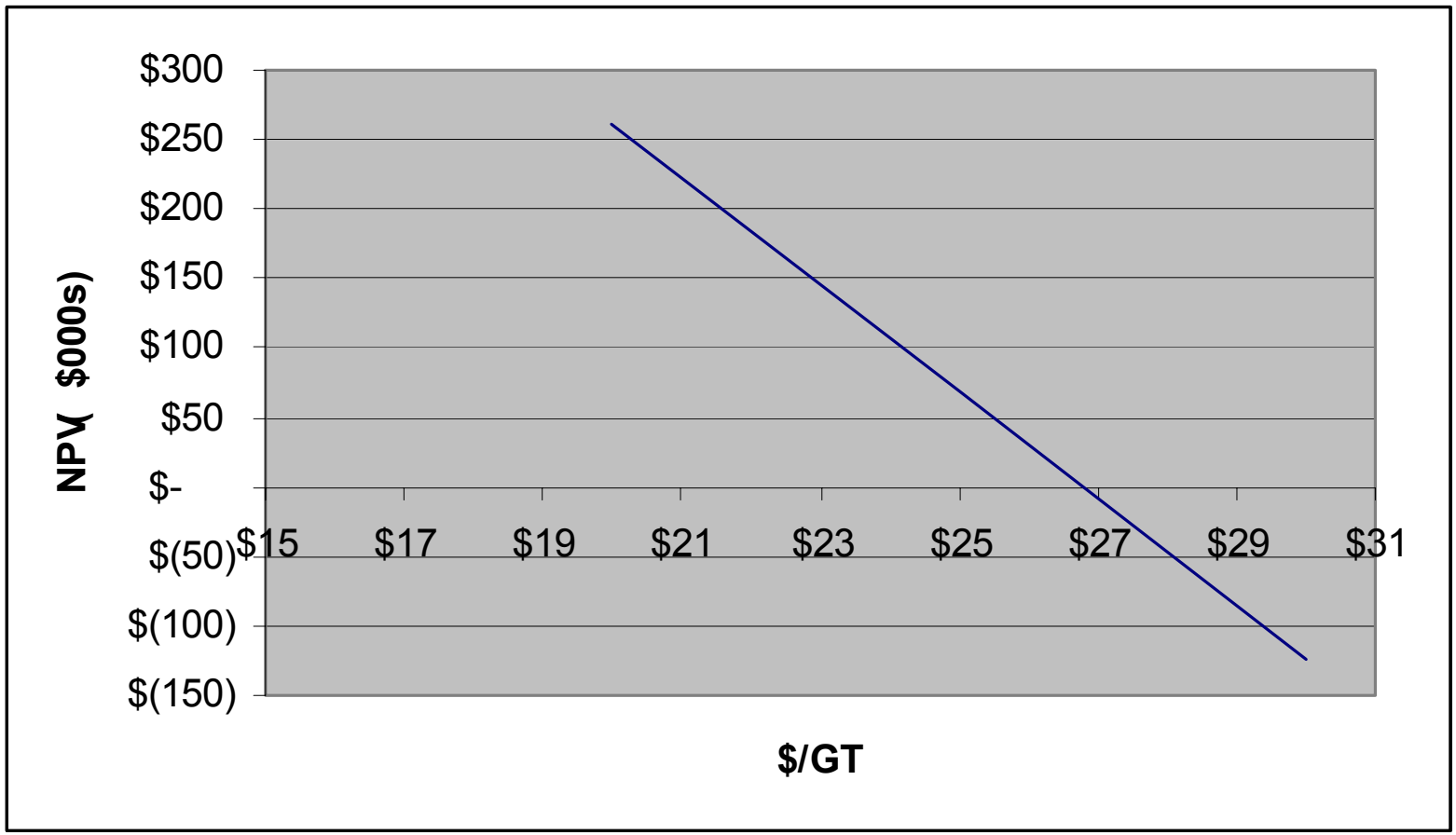
Economic Inputs

Category	Units	Value	Reference
Annual inflation rate	%	2.8%	DOE/EIA
Natural gas escalation	%	2.9%	DOE/EIA
Debt rate	%	5.0%	Assumption
Discount rate	%	10.0%	Client
Equity	%	20%	Client
Loan term	years	10	Assumption

Analytic Results, biomass thermal

Performance Metrics		
Natural gas levelized cost	$/MMBtu	$16.71
Biomass levelized cost	$/MMBtu	$ 11.15
Net present value	$	$ 840,795
Simple payback	years	15

NPV @ Different Biomass Prices

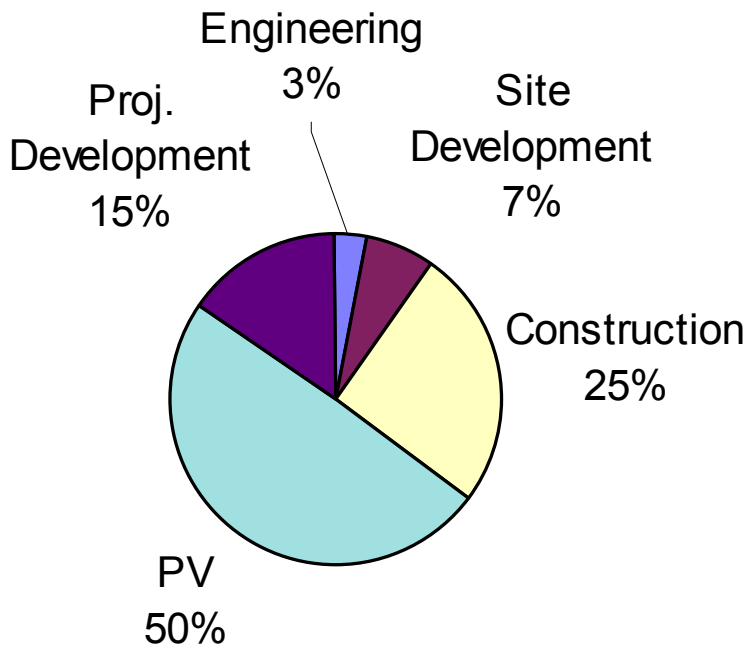


PV Example

- 5MW, ~30 acres
- Single-axis tracking
  - ~35% greater solar output than flat mount,
  - small incremental cost
- Grid connected
- Multi-crystalline modules
- ~$50 million, installed

Springerville, AZ 8MW

Capital Costs, 5MW PV



Itemization, Project Development

Project related expenses			%
Development costs (5%)	$	411,945	27%
Development fees (2%)	$	164,778	11%
Owners G&A (2.5%)	$	205,973	14%
Constructor mobilization (1%)	$	82,389	5%
Interest during construction (2/3 yr., 8%)	$	435,014	29%
Lender Fee (1.5%)	$	123,584	8%
Project placement fee (1%)	$	82,389	5%
Funded debt reserves (6 month debt service)			
Total project related expenses	**$**	**1,506,072**	

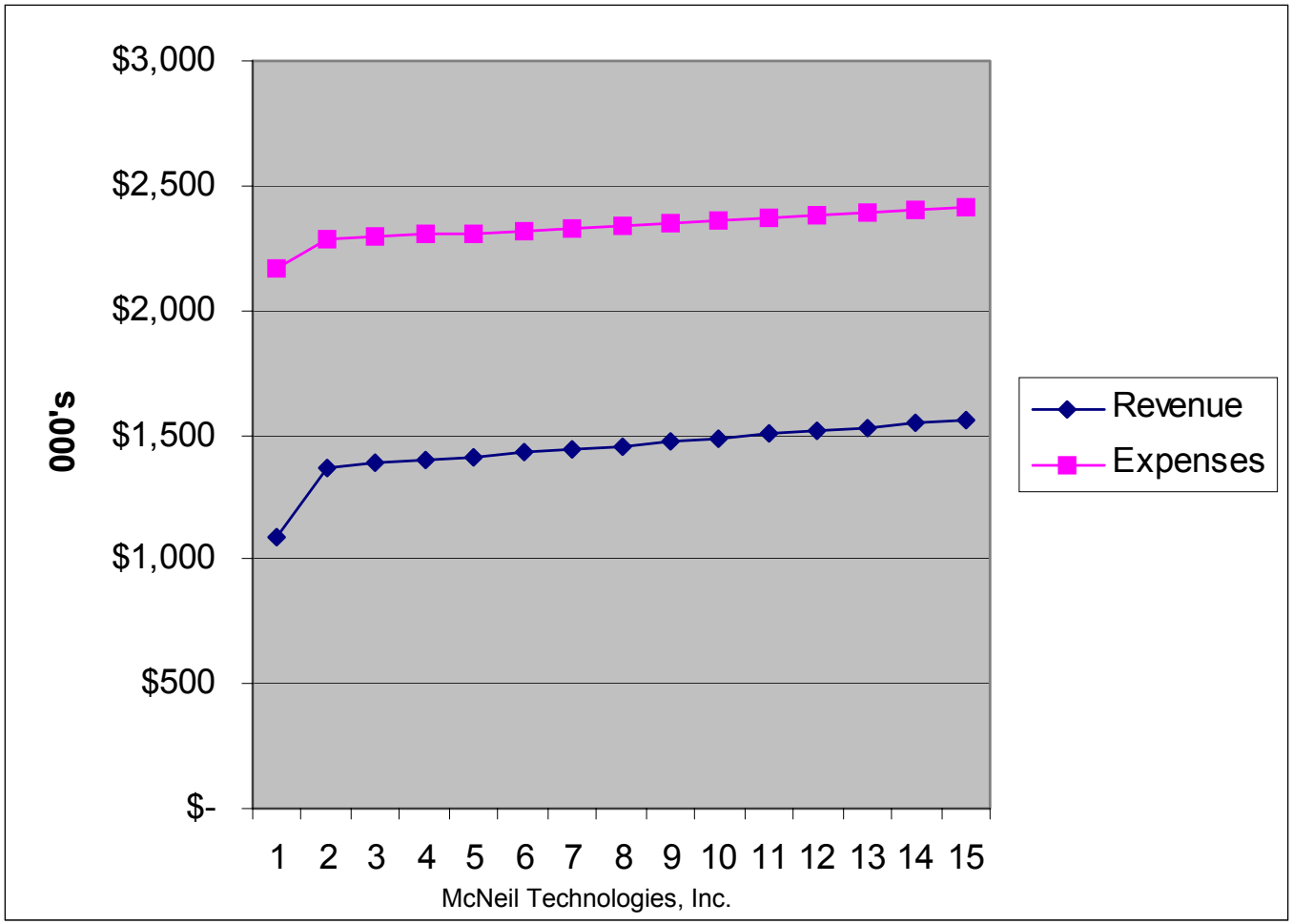
Economic Inputs

Category	Value
Income Tax Rate (0=Tribal, 44=private state and federal)	44
General Inflation/Escalation Rate	2.8
Debt Rate	0.08
Discount Rate (eff. owners equity rate)	12
Depreciation Method	5 yr. MACRS
Investment Tax Credit*	30%
Debt Repayment Term	15
Equity %	40%
Debt %	60%
Initial Ownership	
Joint venture partner	99%
Tribe	1%
Years 7-10 ownership	
Joint venture partner	5%
Tribe	95%
* 50% ITC reduction for depreciable basis	

Scenarios

- Base case
  - Electricity sales @ $0.10 / kWh
  - Two ownership models (Tribal and JV)
- What if
  - Solve for required selling price to meet defined investment criteria

Base Case Results, Annual Cash Flow, 5MW



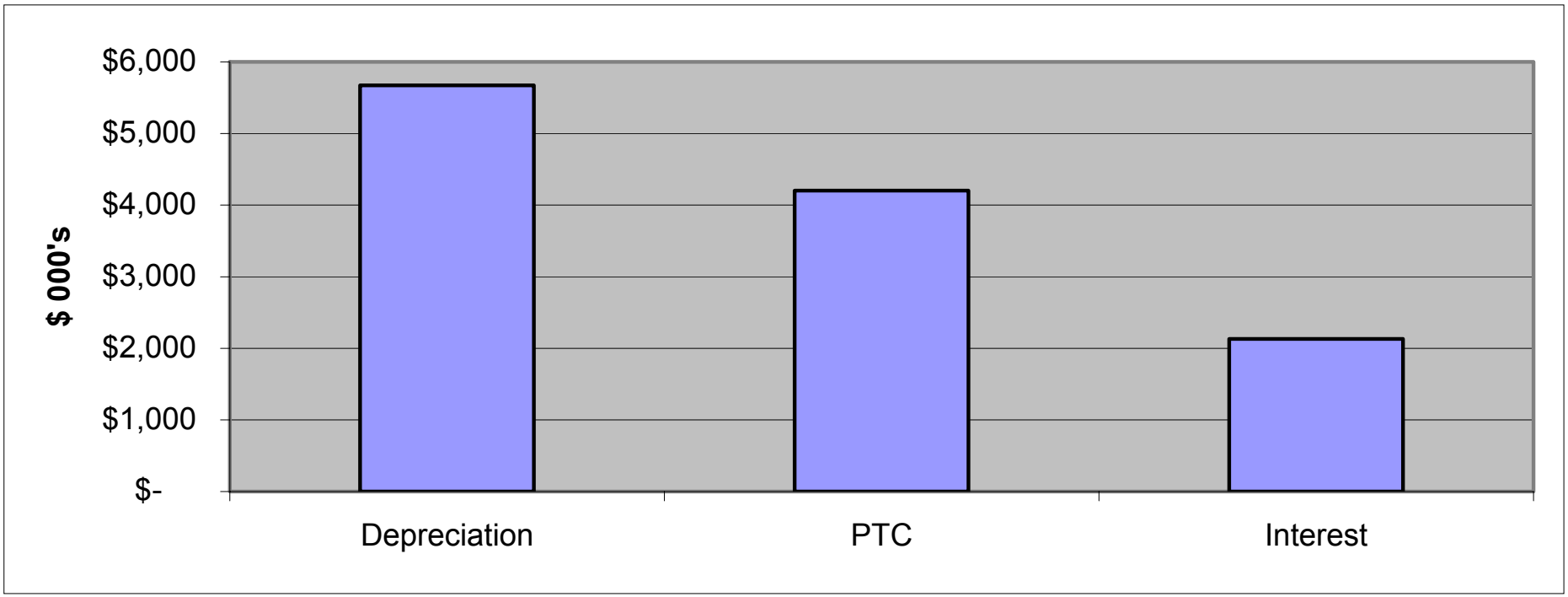
Summary of 5MW PV Scenarios

	Base		Required	
Metric	**Tribal**	**JV**	**Tribal**	**JV**
Selling Price	$ 0.10	$ 0.10	$ 0.33	$ 0.19
Minimum debt service coverage ratio	53%	53%	219%	119%
Average debt service coverage ratio	55%	55%	232%	125%
After-Tax IRR on Equity				
Tribal project alone	<0	N/A	12%	N/A
Tribe return with JV partner (7th yr. change)	N/A	<0	0	69%
JV Partner return	N/A	19%	0	36%
Net Present Value $ million)				
Tribal project alone	($2.2)	N/A	0	N/A
Tribe return with JV partner	N/A	($1.4)	N/A	$2.5
JV Partner return	N/A	$0.9	N/A	$3.5

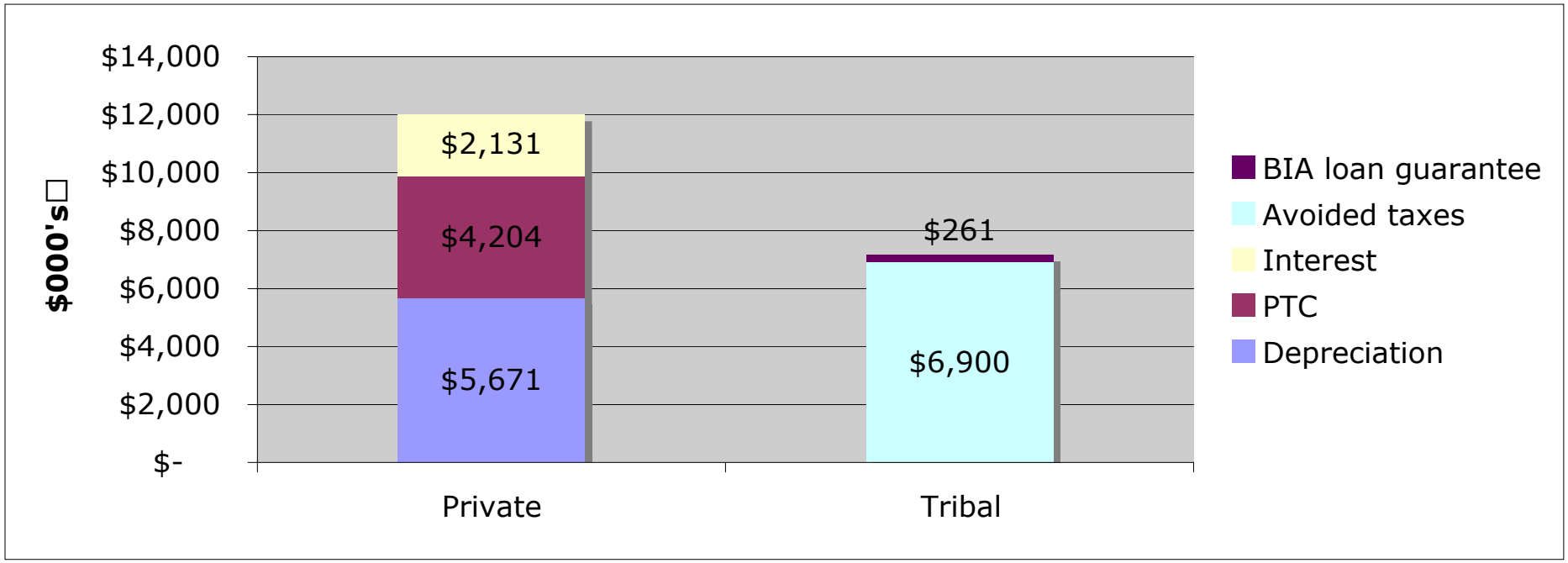
Illustrative Example, 10MW Wind Farm

- 35% capacity factor
- $1,800 kW ($18 million investment)
- Tax rate, ~40%
- 70:30 debt / equity
- 5 year MACRS
- PTC, $0.02/kWh
- LCOE, Real, $0.0689/kWh (calculated)
- DSCR, 1.4
- 1st Year selling price, $0.0777/kWh
- After tax IRR ~35%

Simplified After Tax Effects, NPV ~$12 million



Comparison, NPV ~$12 private vs. ~$7 Tribal



Local Economic Impact

Category	Units	Value
Annual electricity purchases	kWh	22,226,310
Wind cost	kWh	$ 0.055
Biomass cost	kWh	$ 0.080
Wind / Biomass differential	kWh	$ 0.025
Annual cost difference	$	$ 555,658
Annual local biomass purchase	$	$ 1,148,173
Annual local labor	$	$ 676,350
Local purchase $	$	$ 1,824,523
Multiplier		1.2
Estimated local "value"	$	$ 2,189,428
Annual Wind vs Biomass value	$	$ 1,633,770
NPV over 20 years @10%	$	$ 15,911,356

Thank you

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Finance and Accounting Terms

- Amortization – The debt retirement in regular installments over a period of time.
- Cash Flow – An accounting statement - the statement of cash flows - that shows the amount of cash generated and used by a company in a given period, calculated by adding non-cash charges (such as depreciation) to net income after taxes. Cash flow can be attributed to a specific project, or to a business as a whole. Cash flow can be used as an indication of a company's financial strength.
- Debt – An amount of money, goods or services borrowed and owed by one party to another
- Debt service coverage ratio (DSCR) – The amount of cash flow available to meet annual interest and principal payments on debt. Calculated as net operating income/total debt service. Lenders often require DSCRs in the 1.25 to 1.5 range.
- Debt/equity ratio – A financial ratio indicating the relative proportion of equity and debt used to finance a company's assets.

Finance and Accounting Terms (2)

- Depreciation – Term used with reference to the fact that assets with finite lives lose value over time. In accounting, depreciation is a term used to describe any method of attributing the cost of an asset across the useful life of the asset. Since it is a non-cash expense, it increases free cash flow while decreasing reported earnings.
- Discount rate – The interest rate used to discount or calculate future costs and benefits so as to arrive at their present values. This is also known as the opportunity cost of capital investment. Discount rates are usually based on government bonds or market interest rates for cost of capital whose maturity is about same as the time period as the project being evaluated.
- Discounted cash flow (DCF) – A valuation method used to estimate the attractiveness of an investment opportunity. DCF analysis uses future cash flow projections and discounts them (most often using the weighted average cost of capital) to arrive at a present value, which is used to evaluate the potential for investment. The purpose of DCF analysis is just to estimate the money you'd receive from an investment and to adjust for the time value of money.

Finance and Accounting Terms (3)

- EBITDA – Earnings Before Interest, Taxes, Depreciation and Amortization. Also commonly referred to as cash flow. Removes non-cash charges, such as depreciation and amortization, to get a cleaner view of the cash-flow-generating ability of a company.
- Equity – Stock or any other security representing an ownership interest. In general, you can think of equity as ownership in any asset after all debts associated with that asset are paid off. For example, a car or house with no outstanding debt is considered the owner's equity since he or she can readily sell the items for cash.
- Escalation rate - The rate of change over time of a value such as energy costs.
- Fixed costs – Costs that do not change as sales activity goes up or down (e.g, rent, equipment payments, insurance, debt, labor)
- Inflation rate – The rate at which the general level of prices for goods and services is rising, and, subsequently, purchasing power is falling.
- Interest rate – The monthly effective rate paid (or received, if you are a creditor) on borrowed money. Expressed as a percentage of the sum borrowed.

Finance and Accounting Terms (4)

- Internal rate of return (IRR) – The rate of growth a project is expected to generate. While the actual rate of return that a given project ends up generating will often differ from its estimated IRR rate, a project with a substantially higher IRR value than other available options would still provide a much better chance of strong growth. IRRs can also be compared against prevailing rates of return in the securities market. If a firm can't find any projects with IRRs greater than the returns that can be generated in the financial markets, it may simply choose to invest its retained earnings into the market.
- Life cycle costs – All the components of costs associated with buying, owning and using a physical product or service over the total lifetime of that product.
- Loan term – The amount of time over which a borrower is expected to repay the loan.
- Net present value (NPV) – NPV compares the value of a dollar today to the value of that same dollar in the future, taking inflation and returns into account. If the NPV of a prospective project is positive, it should be accepted. However, if NPV is negative, the project should probably be rejected because cash flows will also be negative.
- Payroll - The total amount paid to employees for a certain period.

Finance and Accounting Terms (5)

- Present value - The amount that a future sum of money is worth today given a specified rate of return. An investment that earns 10% per year and can be redeemed for $1,000 in five years would have a present value of $620. In other words, $620 today is worth $1,000 in five years.
- Principal - The amount borrowed or the amount still owed on a loan, separate from interest.
- Pro forma – The presentation of financial information such as a balance sheet, income statement or forecasted cash flows where the amounts are hypothetical. These are typically presentations of future expected results based on assumptions and actions to be taken
- Tax rate – The rate at which a business or person is taxed on income. Essentially the percent of income that goes towards taxes.
- Variable costs – A cost that changes in proportion to a change in a company's activity or business. Chemicals for water treatment is an example.
- Working capital – The amount of capital or current assets available for use in operating the business. Commonly calculated as the amount by which current assets exceed current liabilities.