



Synapse
Energy Economics, Inc.

Proposed Model and Key Assumptions

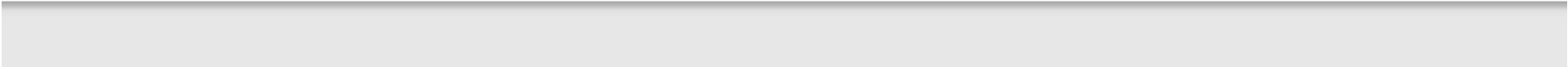
Nova Scotia FIT Rate Setting: First Technical Session

11/18/2010

Geoff Keith



The Goal

- Our goal is to establish FIT rates that:
 - Result in reasonably rapid development of community-based renewable energy projects, and
 - Do not result in windfall profits for developers.
 - Meeting this goal requires a fairly detailed cost analysis of each different project type.
- 

The Model Developed in Vermont

- The model is a Microsoft Excel workbook with three main worksheets:
 - Assumptions
 - Cash Flow
 - Tax Depreciation
- Main steps in using the model
 - Set target rate of return
 - Enter data about the project (sources of funds, costs, tax and depreciation assumptions)
 - Adjust the revenue per kWh until the calculated Internal Rate of Return (IRR) matches the target rate of return
 - Check for positive cash flow and debt service coverage
 - Adjust as necessary

The Assumptions Worksheet

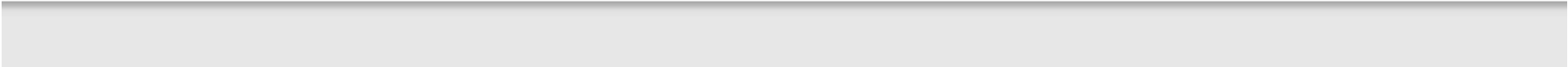
Assumptions:	
General Inflation Factor (revenue and expenses)	2.50%
% of Base Price Escalating @ Infl.	0%
Uses of Funds	
Debt Reserve	109,500
Maint. Reserve	30,000
Working Capital	14,749
Total Working Capital & Reverses	154,249
Financing Costs & IDC	155,093
Installation Cost (Hard Costs)	4,630,000
Total Uses of Funds	4,939,342
Total Project Cost (\$/kW)	3,293
Sources of Funds	
Grants	0
Debt	2,123,917
Equity	2,815,425
Total Sources of Funds	4,939,342
Grants:	
State and Federal Incentives	0
Net Value of Grants	0
Asset Life (Years)	20
Loan Life	18
Tax Rates:	
Federal Income Tax	35.0%
State Income Tax	8.5%
Income tax rate	40.53%
Capital structure:	
Debt	43.00%
Equity	57.00%
Debt costs	7.50%
Weighted Average Cost of Capital	10.14% 12.13%
Tax Rates and Incentives:	
Investment Tax Credit Discount (% of Hard Costs)	95.0%
Income Tax Basis Adjustment Factor	50.0%
Federal Income Tax Credit	
ITC Rate	30.0%
ITC Realization Period (years)	1
ITC Amount	
Total Amount	1,319,550
Percent Realized	100.0%
Total Amount Realized	1,319,550
State Income Tax Credit	
ITC Rate	
Amount of Federal ITC Allowed	24.00%
Effective State ITC Rate	7.20%
ITC Realization Period (years)	2
ITC Amount	
Total Amount	205,850
Percent Realized	50.0%
Total Amount Realized	102,925

Assumptions:	
Operating Inputs:	
Generator Capacity (MW)	1.5
Energy Production:	
Gross Project Capacity Factor	25%
Project Availability Factor	100.00%
Loss Factor/Other Adjustments	0.00%
Net Capacity Factor	25.0%
Output in MWs	3,285
Annual Output Degradation	0.00%
Inverter Replacement (total value year 10)	0
Annual Operating Expenses:	
Maintenance Cost	See Schedule Below
Labor	
Hours of Labor	0
Labor Rate (\$/hour)	0
Payroll Overhead Adder	0.0%
Property Tax	
Amount	EBITDA x WACC x Tax Rate
Property Tax Rate	1.78%
Property Tax Depreciation rate	4.00%
Insurance	0.40%
Other Operational Expenses (lease)	4,500
Wheeling Charges	0
FERC Charges	0
ISO-NE Charges	0
Revenue Assumptions:	
RECs:	
REC and Carbon Value (\$/MWh)	0.00
REC inflation Factor	2.00%
Other Revenues (increases with inflation)	0
Base Year Energy Price (\$/MWh)	143.25
Return Metrics:	
Average Debt Service Coverage Ratio	1.62
Minimum Debt Service Coverage Ratio	1.56
Internal Rate of Return	12.13%
Maintenance Schedule	
Years 1-5	57,240
Years 6 (escalates at inflation)	50,000

The Cash Flow Worksheet

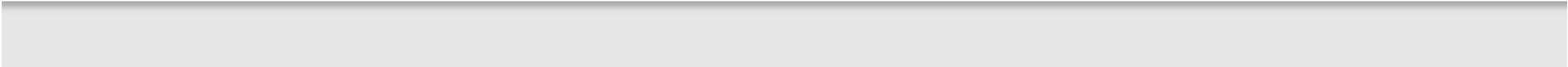
- 3 sections that calculate:
 - Revenue (from energy sales)
 - Expenses (O&M, insurance, taxes)
 - Debt repayment
- 2 sections that analyze:
 - Annual net cash
 - Annual tax impacts
- Final calculation of:
 - Total annual return (\$)
 - Internal Rate of Return (%)

- For each input consider:
 - Is a single value appropriate for all five *technologies*?
 - Is a single value appropriate for all seven *ownership types*?

- Target rate of return for projects
 - Rate of inflation assumed for the period of the contracts (e.g., for use in inflating O&M costs)
 - If some portion of the FIT rate escalates, is the escalation rate fixed or indexed?
- 

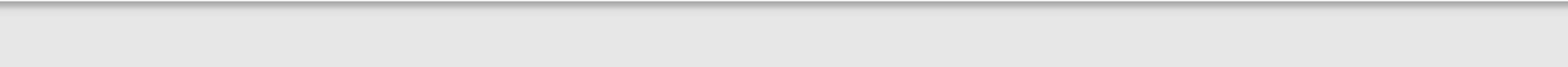


Inputs for Project Costs

- Equipment and labor (“installed costs”)
 - O&M costs
 - Financing costs
 - Interest during construction
 - Required reserve escrows
 - Property taxes and insurance
 - Interconnection costs
 - Should these be technology specific?
- 

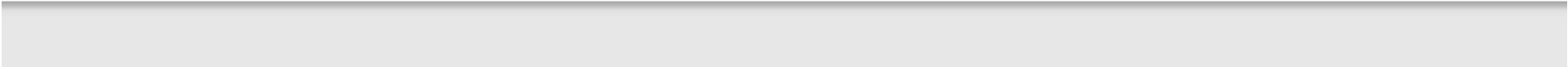


Inputs for Sources of Funds

- Debt/equity structure of the project
 - Assumptions about debt:
 - Type of debt
 - Interest rate
 - Duration of the loan
 - Grants and/or subsidies
- 

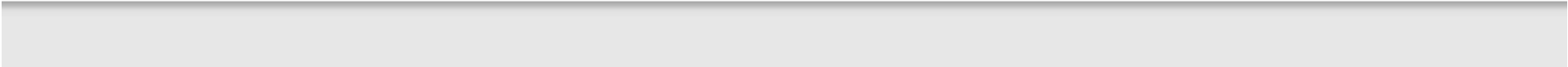


Resource-Specific Assumptions

- Asset Life
 - Major capital additions
 - Capacity factor
 - Output degradation
 - Interconnection issues
 - Others... you tell us
- 



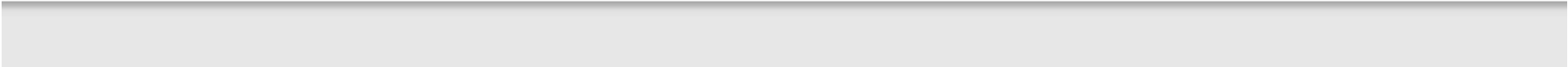
Final Thoughts

- There is a lot of good work out there to build on.
 - We've got a lot of work to do to take that work and apply it to community-based renewable energy in Nova Scotia.
 - There are many opportunities for us to tell you what we are thinking and for you to give us input.
 - Stay tuned for announcements of web postings.
- 



Remember...

The model we will post shortly is the final version used *in Vermont*. It has not yet been revised in any way. It is being posted so that you can comment on the general approach and structure. As we begin tailoring the model to the Nova Scotia COMFIT program, we will release updated versions for review.



Geoff Keith

Associate

Synapse Energy Economics

gkeith@synapse-energy.com

www.synapse-energy.com

