



SUSTAINABLE
ENERGY
DEVELOPMENTS

POWERING YOUR FUTURE WITH WIND



Project Economics

- ✓ **Look at Unleveraged Economics first**
 - ✓ **Key Metrics - Payback, IRR, Total Project Savings Net Present Value**
- ✓ **Financing Tools are available if certain economic metrics are exceeded**
 - ✓ **10% IRR**
 - ✓ **8 Year Payback**
- ✓ **No one should tell you what a good payback is.**



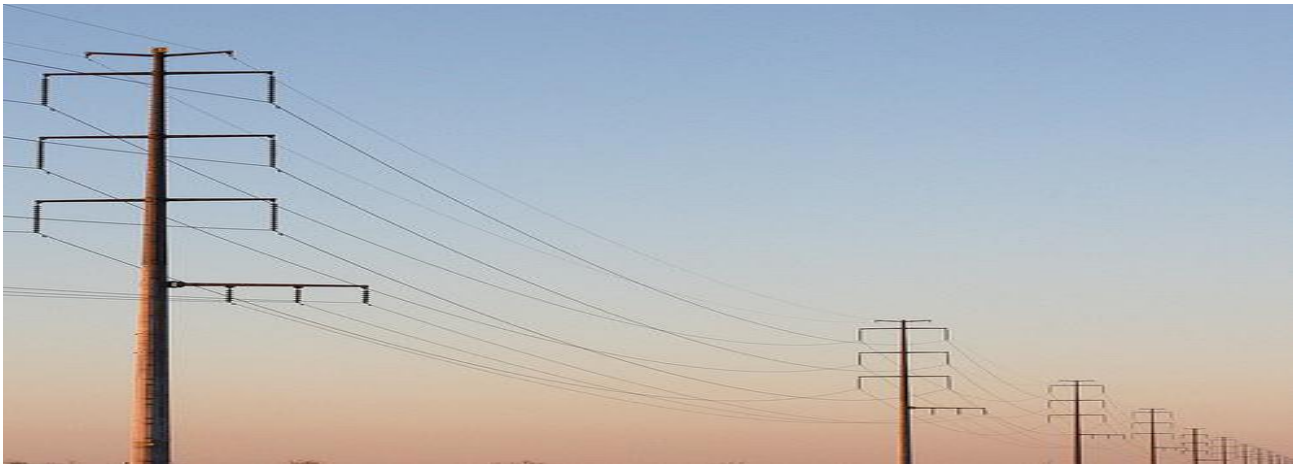
Economic Inputs

- Annual Energy Production
 - Incorporates final siting
 - Appropriately Modeled
 - Net of Losses
- Wind Generated Electricity Value
 - Net Metering
 - Standard Interconnection
 - Stand By Rates
- Capital Costs
 - Buildability
 - Interconnection
 - Cost of Permitting
- Grants and Incentives
- Tax Implications
 - Tax Credits/Grants
 - Depreciation
 - State Sales Tax
 - Property Tax
- Operations and Maintenance Cost
- Insurance Costs



Utility Derived Cost

- SED determined that the average cost of electricity for this account is \$0.0726 per kilowatt hour (kWh).
- The GFP used 8,159,400 kWh of electricity during 2008.
- Net Metering Implications



Capital Costs

Split Into 2 Main Categories

Design – Includes all costs associated with permitting and designing the project.

Construction – Includes turbine purchase, civil, electrical and mechanical construction as well as project management and contingency



Design Costs

Gonnella Frozen Products	(1) 900kW	(2) 900kW	(3) 900kW	(1) 1.5MW
1.0 Project Milestones				
1.1 Progress Report	\$1,950	\$3,900	\$5,850	\$2,580
1.2 PA DCED Final Report	\$1,950	\$3,900	\$5,850	\$2,580
2.0 Permitting Toolbox				
2.1 Ambient Sound Assessment	\$3,520	\$3,520	\$3,520	\$3,520
2.2 Avian and Wildlife Study	\$8,150	\$8,150	\$8,150	\$8,150
2.3 Shadow Flicker	\$1,940	\$1,940	\$1,940	\$1,940
3.0 Public Outreach				
3.1 Public Forums and Hearings	\$6,420	\$9,120	\$11,820	\$8,220
4.0 Permits and Regulatory Filings				
4.1 Building Permit Filed	\$11,250	\$14,250	\$17,250	\$14,250
4.2 Local Zoning, Special Permit	\$13,420	\$16,800	\$17,760	\$15,160
4.3 Jurisdictional Agency Comment	\$3,530	\$3,530	\$3,530	\$3,530
4.4 PA DEP Filing	\$3,860	\$3,860	\$3,860	\$3,860
4.5 FAA Filed	\$835	\$1,370	\$1,370	\$835
5.0 Interconnection Application	\$8,970	\$11,970	\$14,970	\$9,970
6.0 Project Design				
6.0 Civil Design Site Planning	\$9,780	\$13,340	\$16,060	\$10,500
6.1 Civil Design Geotechnical	\$8,560	\$13,000	\$15,890	\$10,000
6.2 Civil Design Structural	\$13,280	\$21,000	\$25,890	\$15,500
6.3 Electrical Design	\$10,220	\$17,000	\$22,890	\$12,720
6.4 Communication Design	\$3,060	\$4,280	\$5,220	\$3,280
6.5 Select and Hire Contractors	\$11,160	\$14,150	\$16,470	\$11,710
7.0 Capital Cost Estimates	\$2,940	\$3,220	\$4,100	\$3,220
8.0 Green Marketing	\$2,480	\$2,480	\$2,480	\$2,480
9.0 Project Financing	\$4,280	\$5,240	\$5,240	\$4,560
10.0 Project Management	\$16,720	\$23,680	\$29,280	\$26,400
11.0 Travel Costs	\$6,300	\$8,400	\$10,500	\$6,300
Total Design	\$154,575	\$208,100	\$249,890	\$181,265



Construction Costs

Gonnella Frozen Products	(1) 900kW	(2) 900kW	(3) 900kW	(1) 1.5MW
Wind Turbine Equipment				
Sub Total	\$1,516,138	\$3,032,275	\$4,548,413	\$2,555,000
Civil Construction				
Sub Total	\$250,500	\$463,475	\$656,450	\$405,000
Electrical Installation				
Sub Total	\$220,000	\$342,500	\$496,500	\$291,000
Mechanical Installation				
Sub Total	\$218,000	\$341,500	\$469,000	\$393,000
Commissioning/Construction Control				
Sub Total	\$22,500	\$37,500	\$52,500	\$45,000
Other				
Sub Total	\$285,714	\$514,975	\$768,481	\$489,800
Total Construction Costs	\$2,512,851	\$4,732,225	\$6,991,344	\$4,178,800



Total Capital Costs

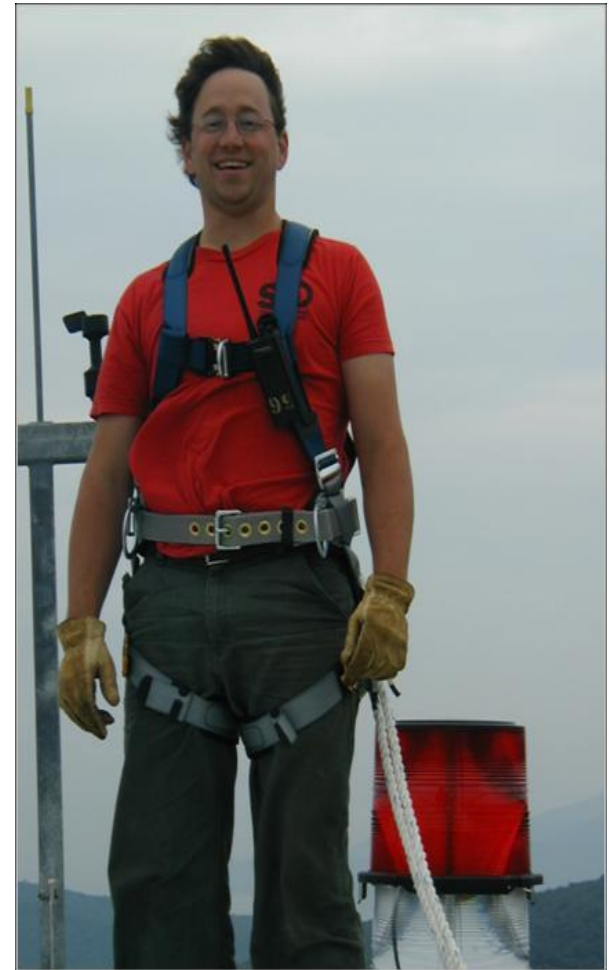
Gonnella Frozen Products	(1) 900kW	(2) 900kW	(3) 900kW	(1) 1.5MW
Total Construction	\$2,512,851	\$4,732,225	\$6,991,344	\$4,178,800
Total Design	\$154,575	\$208,100	\$249,890	\$181,265
Total Project Cost	\$2,667,426	\$4,940,325	\$7,235,825	\$4,360,065



O & M

Critical for Project Long Term Success

	(1) 900k	(2) 900kW	(3) 900kW	(1) 1.5MW
Year 1 Scheduled O & M	\$18,000	\$36,000	\$54,000	\$18,000
Year 3 Scheduled O & M	\$30,664	\$57,920	81,770	\$54,667.50
Yearly Maintenance Reserve	\$24,375	\$48,750	73,125.	\$61,250
Year 1 Insurance Cost	\$9,000	\$18,000	\$27,000	\$15,000



Economics

Assumptions Used in Baseline Economic Models

- I. GFP will pay cash down for 100% of the project cost
- II. Operation, Maintenance and Insurance costs will increase with standard inflation of 3%
- III. Renewable Energy Credit (RECs) value of \$0.02/kWh will be applied for 20 years of operation based on current market rates
- IV. Maximum State Grants Applied
- V. Federal tax credits, currently available, have been applied



Economics

Scenario	Wind Turbine	Payback	IRR	20 Year Savings
1	(1) PowerWind 900kW	9.29	8.9%	\$ 785,926
2	(2) PowerWind 900kW	10.10	7.9%	\$ 1,544,538
3	(3) PowerWind 900kW	11.75	6.1%	\$ 1,900,959
4	(1) GE XLE 1.5MW	8.21	10.7%	\$ 1,848,866



Economics

Sensitivity Analysis Related to Changes in Electricity Cost

Scenario 1

Escalation Rate	Payback	IRR	20 year savings
0 %	12.41	3.9%	\$ 232,665
3%	9.29	8.9%	\$ 785,926
5%	8.20	11.8%	\$ 1,293,513

Scenario 2

Escalation Rate	Payback	IRR	20 year savings
0%	13.69	3.1%	\$ 414,690
3%	10.10	7.9%	\$ 1,544,538
5%	8.88	10.7%	\$ 2,581,112

Scenario 3

Escalation Rate	Payback	IRR	20 year savings
0%	16.95	1.2%	\$ 274,829
3%	11.75	6.1%	\$ 1,900,959
5%	10.18	8.8%	\$ 3,392,847

Scenario 4

Escalation Rate	Payback	IRR	20 year savings
0%	10.62	5.5%	\$ 641,452
3%	8.21	10.7%	\$ 1,848,866
5%	7.31	13.6%	\$ 2,956,604



Economics

Sensitivity Analysis Related to Changes in AEP

Scenario 2

Percentage	AEP (kWh)	Payback	IRR
75%	2,520,255	16.68	2.0%
80%	2,688,272	14.80	3.4%
85%	2,856,289	13.27	4.6%
90%	3,024,306	12.03	5.8%
95%	3,192,323	10.98	6.9%
100%	3,360,340	10.10	7.9%



Economics

Sensitivity Analysis Related to Changes State Level Funding

Scenario 2

% of Grant	Grant	Payback	IRR
0%	\$0	14.31	3.7%
10%	\$100,000	13.92	4.1%
20%	\$200,000	13.51	4.4%
30%	\$300,000	13.11	4.8%
40%	\$400,000	12.69	5.1%
50%	\$500,000	12.27	5.5%
60%	\$600,000	11.85	6.0%
70%	\$700,000	11.42	6.4%
80%	\$800,000	10.99	6.9%
90%	\$900,000	10.54	7.4%
100%	\$1,000,000	10.10	7.9%



Economics

Sensitivity Analysis Related to REC Value

Scenario 2

REC	Payback	IRR
\$0.00	14.11	4.1%
\$0.01	11.84	6.1%
\$0.02	10.10	7.9%



Financing

- **Examine the Range of Ownership**
 - **Self Ownership**
 - **Flip/Hybrid Ownership**
 - **Third Party Ownership**
- **Make Decisions Based on allocation of risk**
 - **The more you take the more you make**
- **Project Leverage**
- **Debt and Equity Options**

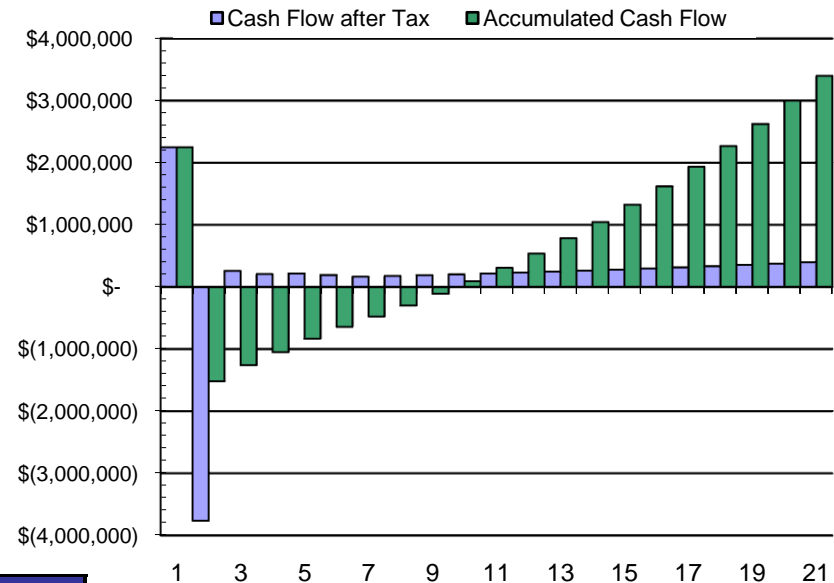


Financing and Ownership

Self Ownership

Projected Financed
using Line of Credit
paid off over a year

Financial Summary



Results

Internal Rate of Return	20.3%
Payback (years)	8.55
NPV at 5.5%	\$ 1,354,280
Lifetime Net Savings	\$ 3,398,258
Lifetime Energy Output (kWh)	67,206,800
Average Lifetime Cost/kWh of Grid Power	\$ 0.170
Lifetime Fixed Cost/kWh of Wind Energy	\$ 0.065

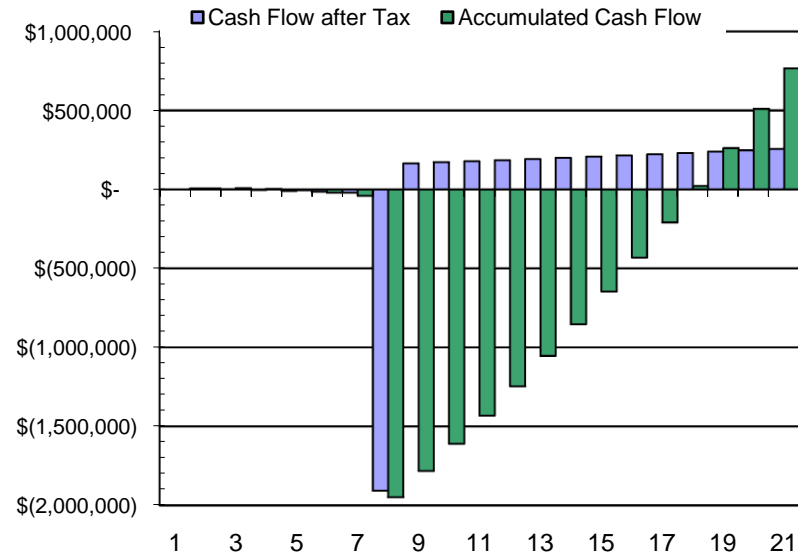


Financing and Ownership

Flip Ownership

Project Flipped to GFP
after Depreciation has
expired for \$2million

Financial Summary



Results

Internal Rate of Return	5.1%
Payback (years)	9.90
NPV at 5.5%	\$ (67,305)
Lifetime Net Savings	\$ 766,899
Lifetime Energy Output (kWh)	67,206,800
Average Lifetime Cost/kWh of Grid Power	\$ 0.097
Lifetime Fixed Cost/kWh of Wind Energy	\$ 0.063

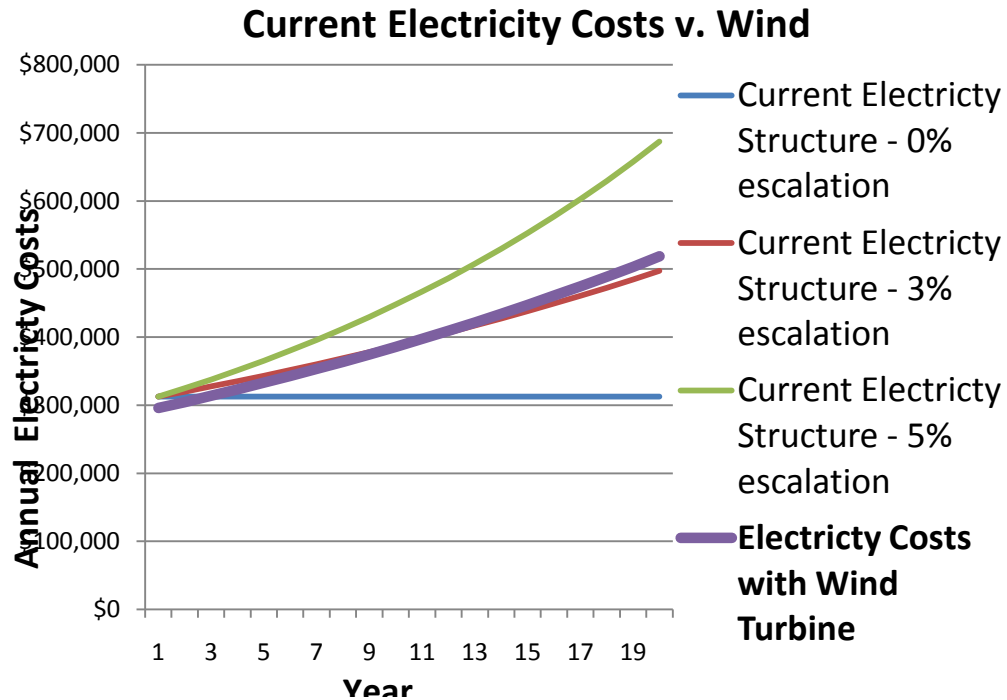


Financing and Ownership

3rd Party Ownership

Third Party Ownership Energy Savings with \$.088/kWh PPA Escalating at 3%

Benefit to Gonella @ 0%	-\$1,695,604
Benefit to Gonella @ 3%	-\$10,268
Benefit to Gonella @ 5%	\$1,509,538

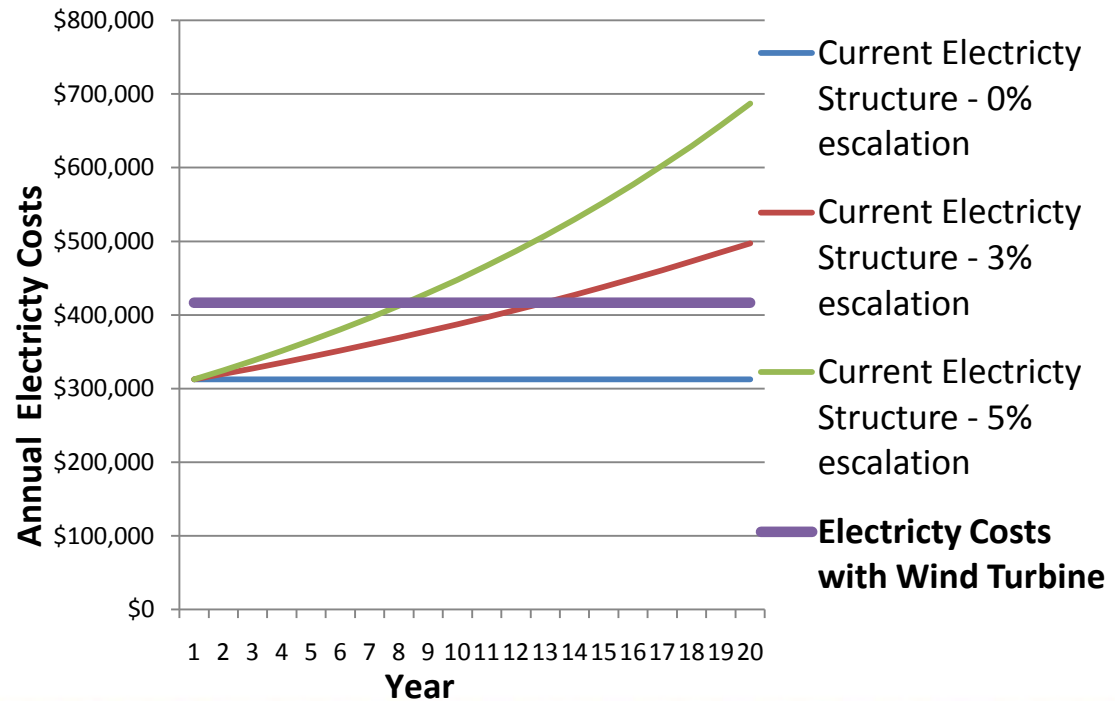


Financing and Ownership

3rd Party Ownership

Third Party Ownership Energy Savings with \$.124/kWh PPA at a Flat Rate

Current Electricity Costs v. Wind




Benefit to Gonella @ 0%	-\$2,083,411
Benefit to Gonella @ 3%	-\$398,075
Benefit to Gonella @ 5%	\$1,121,731

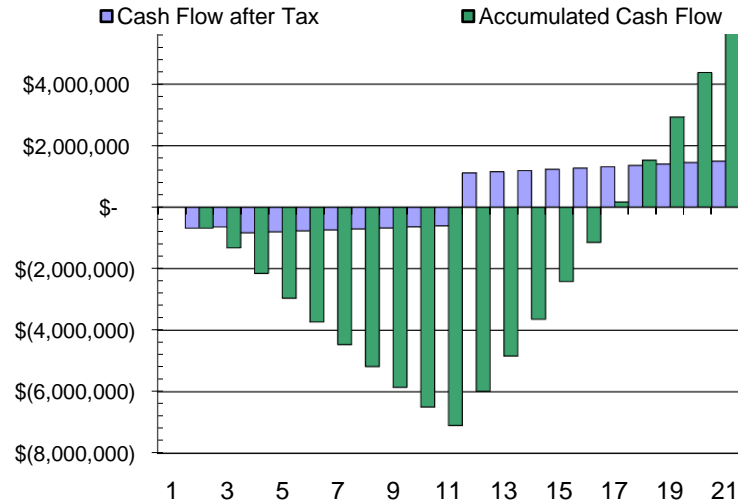


Wind Development Financing Scenario - 1

- Project Scenario 2
- Williams College Own Project 100%
- No Tax Solution is obtained
- Project is Debt financed at 5% over 10 Years
- Power is sold on the margin directly to the grid.

	Escalation Rate	IRR	Payback
<i>Energy Escalation</i>	0.00% 	#DIV/0!	0.00 Years
<i>Energy Escalation</i>	3.00%	5.98%	15.87 Years
<i>Energy Escalation</i>	5.00%	12.71%	13.25 Years

Financial Summary

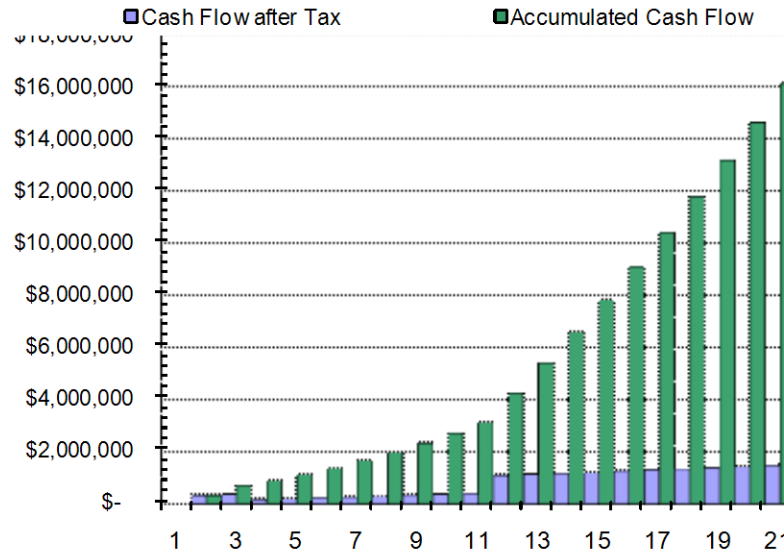


Wind Development Financing Scenario -

2

	<i>Escalation Rate</i>	<i>IRR</i>	<i>Payback</i>	<i>Total Lifetime Savings</i>
<i>Energy Escalation</i>	0.00%	#DIV/0!	0.00 Years	\$6,587,955
<i>Energy Escalation</i>	3.00%	#DIV/0!	0.00 Years	\$16,114,993
<i>Energy Escalation</i>	5.00%	#DIV/0!	0.00 Years	\$23,820,151

Financial Summary



Wind Development Financing Scenario -

3

	Total
CFD Contract Price	\$ 19,839,400
Current Electricity Structure - 0% escalation	\$ 19,839,400
Current Electricity Structure - 3% escalation	\$ 22,743,649
Current Electricity Structure - 5% escalation	\$ 24,953,784
<i>Benefit to WC @0%</i>	\$ -
<i>Benefit to WC @ 3%</i>	\$ 2,904,249
<i>Benefit to WC @ 5%</i>	\$ 5,114,384



Thank you For Your Time and Consideration

Kevin M. Schulte
Chief Executive Officer
Founder and Owner



**SUSTAINABLE ENERGY
DEVELOPMENTS INC.**

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