Wind Power

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Oakland Wind Data Results

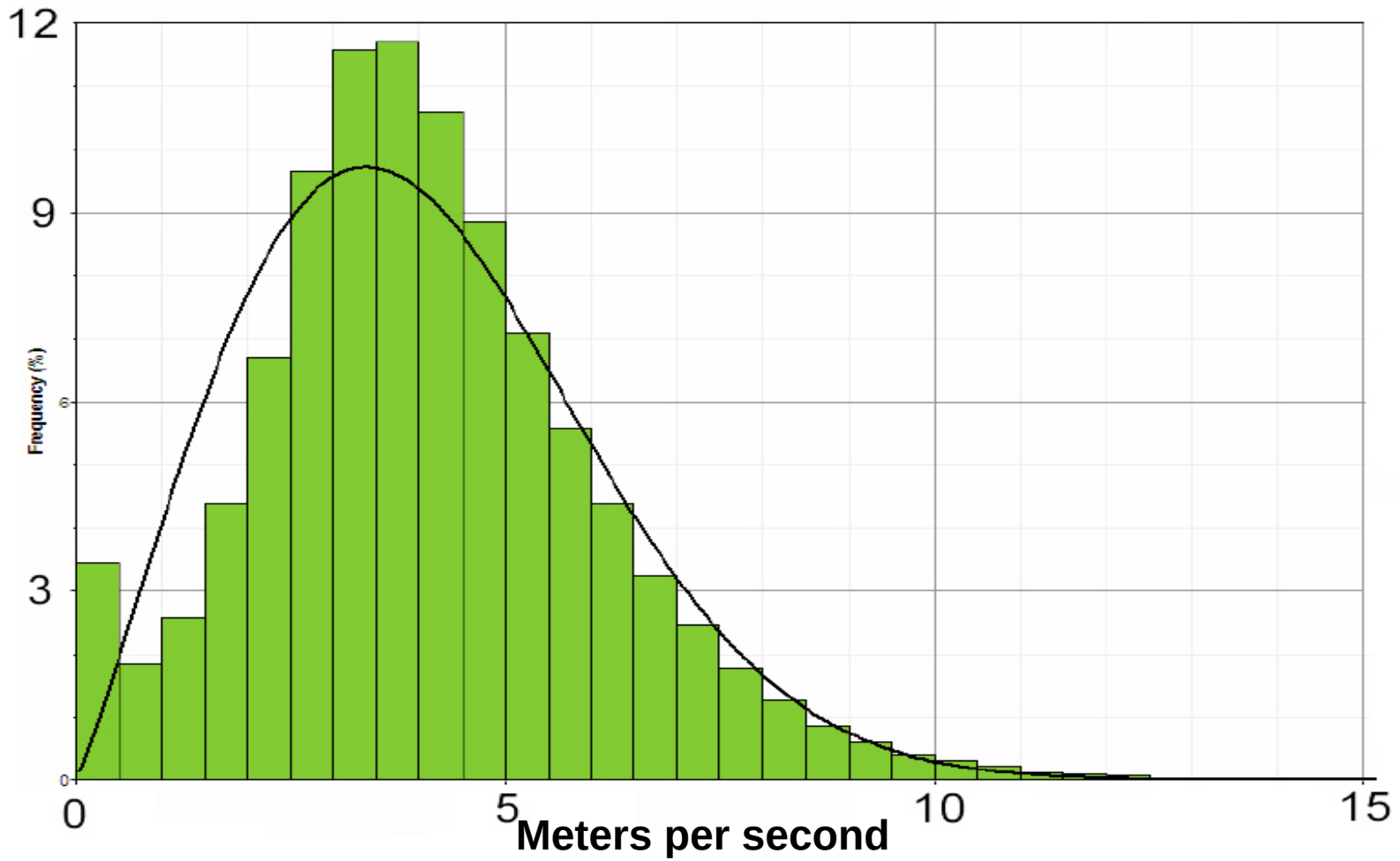
- **Wind Speed Study Results**

(Meteorological Tower Data Compilation and Analysis)

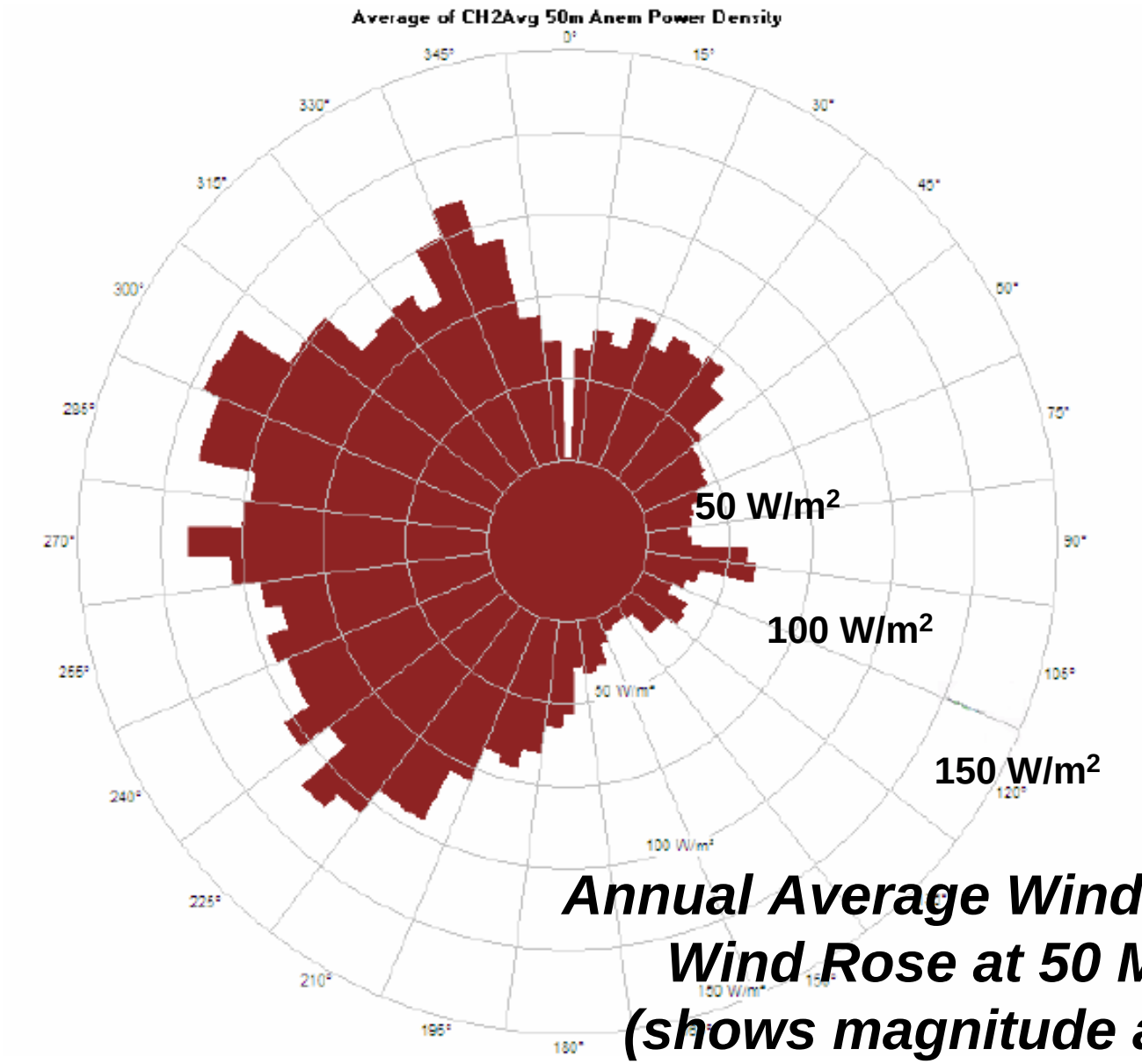
- **Feasibility Study Results**

Oakland Wind Data Results

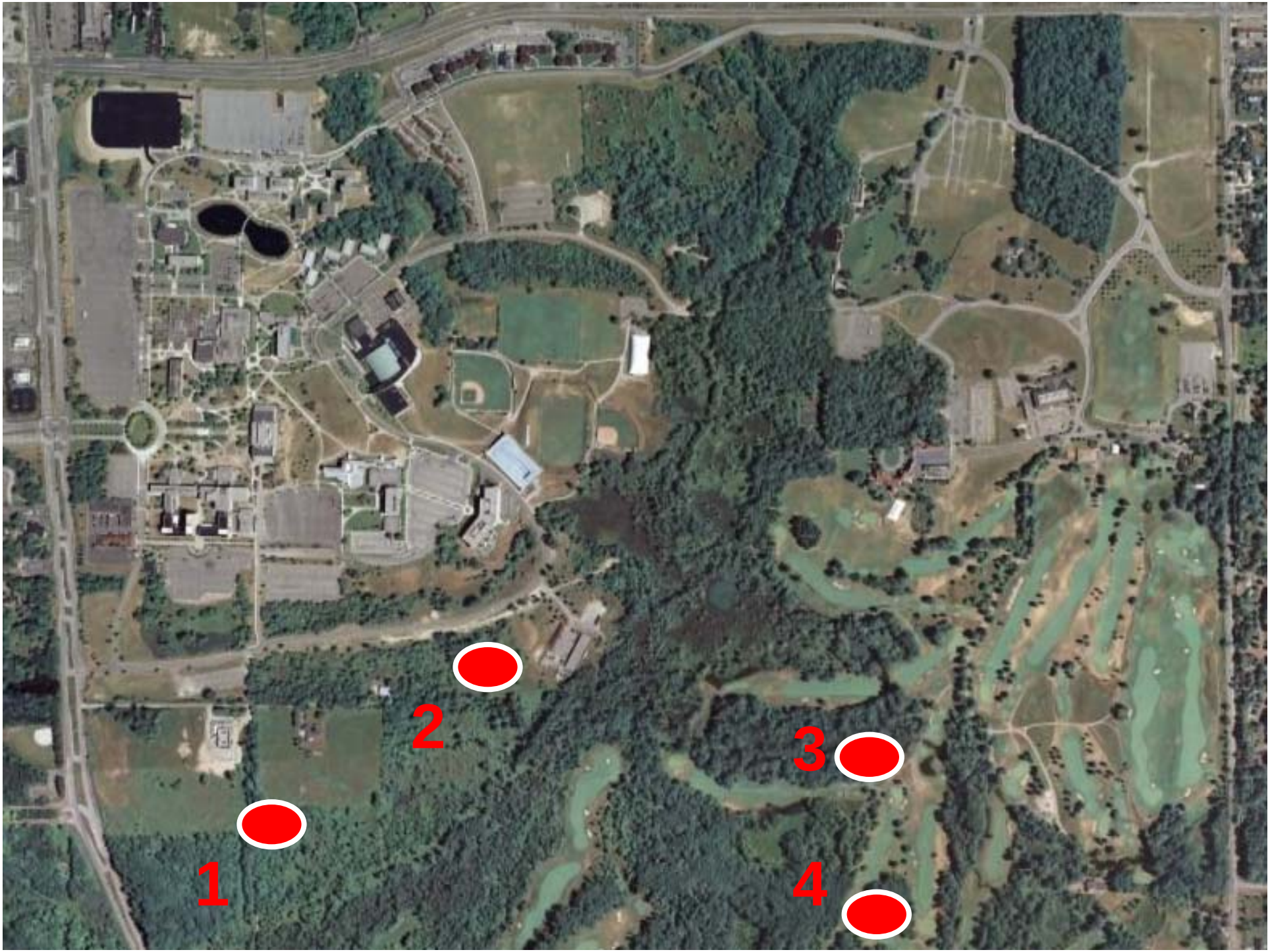
Height	Wind Speed	Method
30 m	3.0 m/s	measured
40 m	3.6 m/s	measured
50 m	4.1 m/s	measured
75 m	5.2 m/s	calculated
80 m	5.4 m/s	calculated
100 m	6.2 m/s	calculated



Wind Speed Frequency Distribution at 50 Meters (percent time for each wind speed)



Annual Average Wind Power Density Wind Rose at 50 Meter Height (shows magnitude and direction of annual wind power potential)


1
2
3
4

(artist's rendering: courtesy of Khales Dahr & Jim Leidel. This is not the actual, proposed location.)

AAER Wind Turbine

1,500 kW each

77 meter blade diameter

100 meter tower

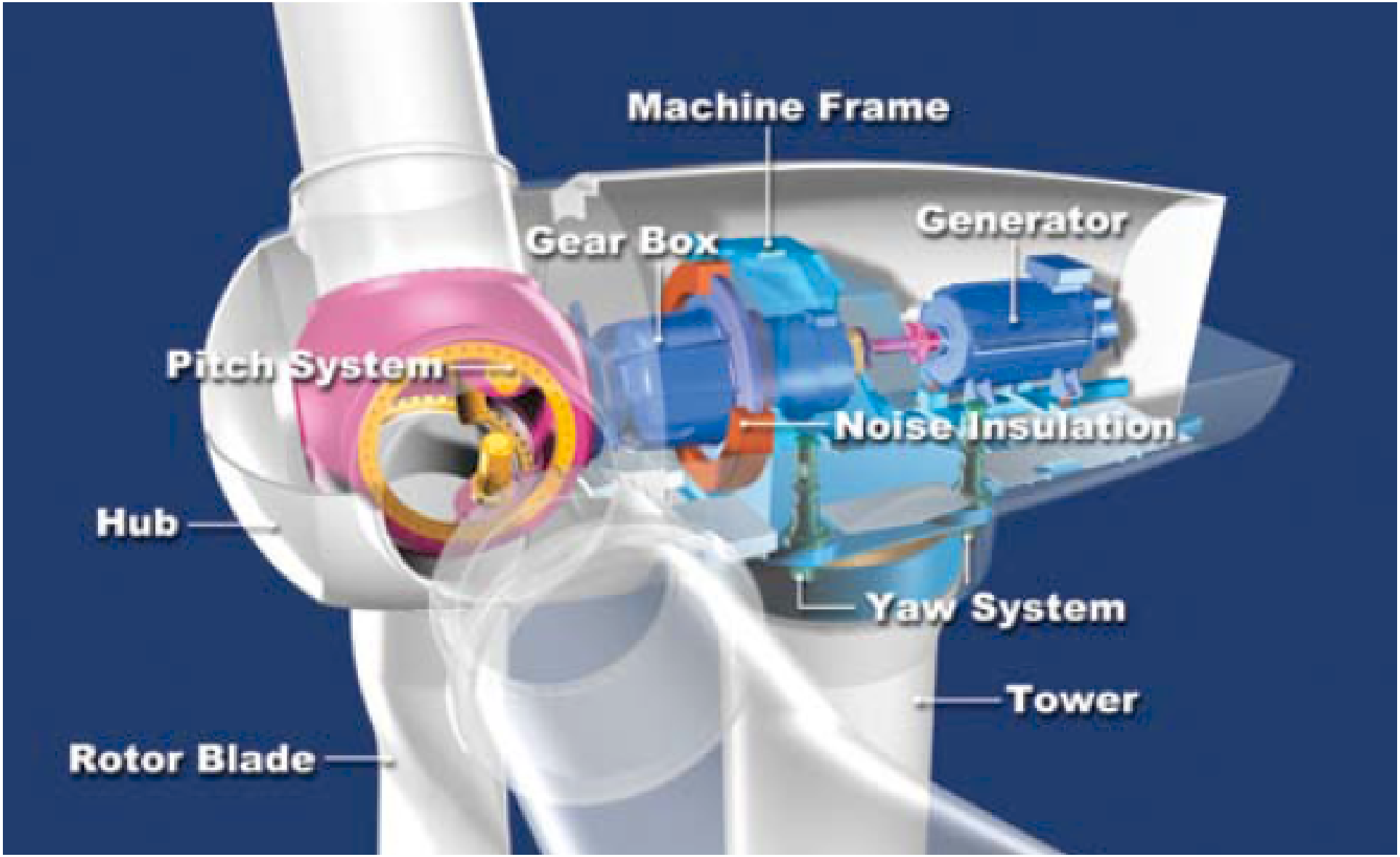


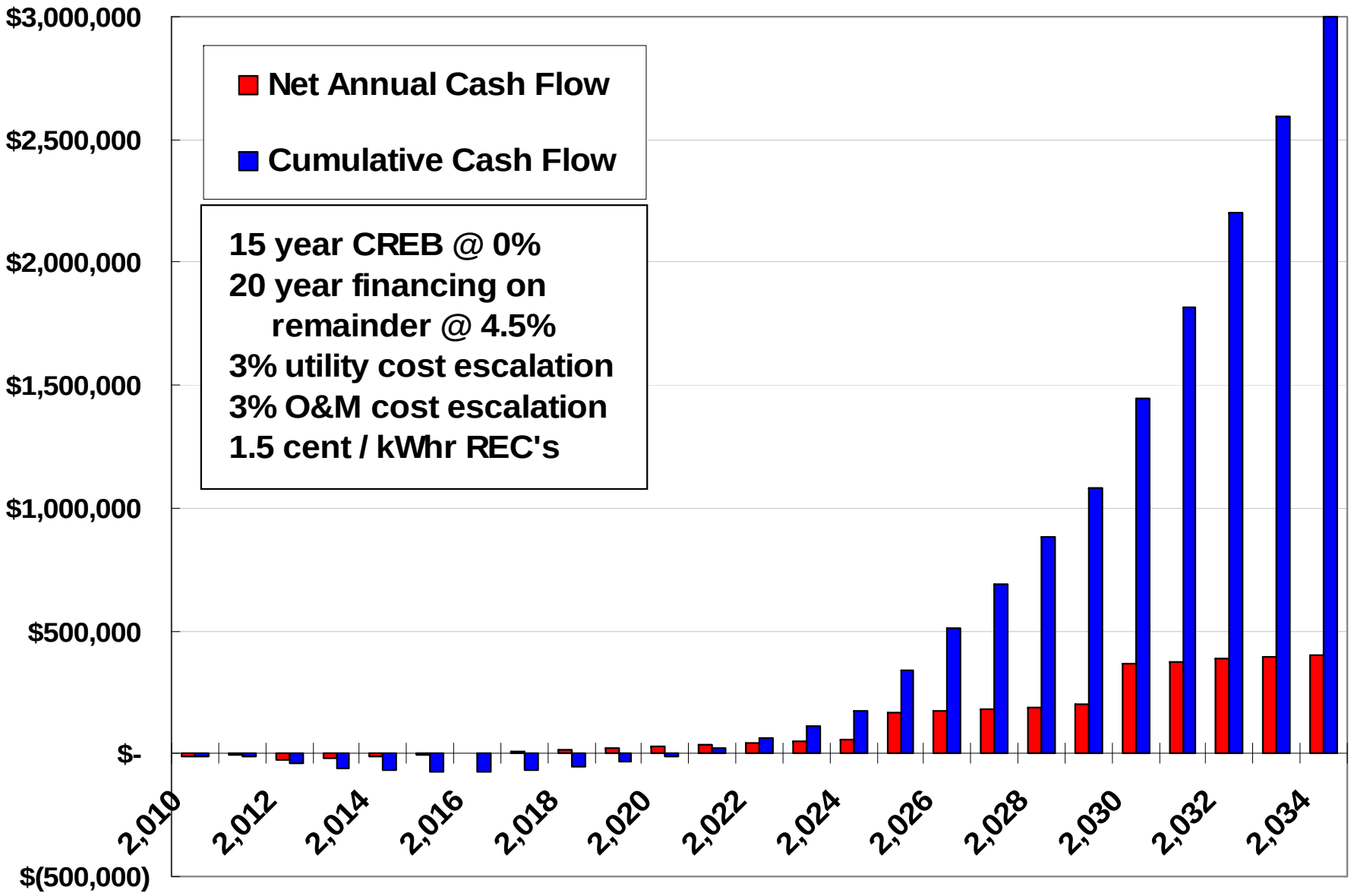
Illustration of turbine components

One 1.5MW Wind Turbine Installed at Site #1

AAER 100m Tower at Location 1	**$**	**3,500,000**	
Subtotal	**$**	**3,500,000**	
Owner Contingency	**$**	**210,000**	**6%**
Total Installed Cost	**$**	**3,710,000**	
Cost per MW Installed	$	2,473	

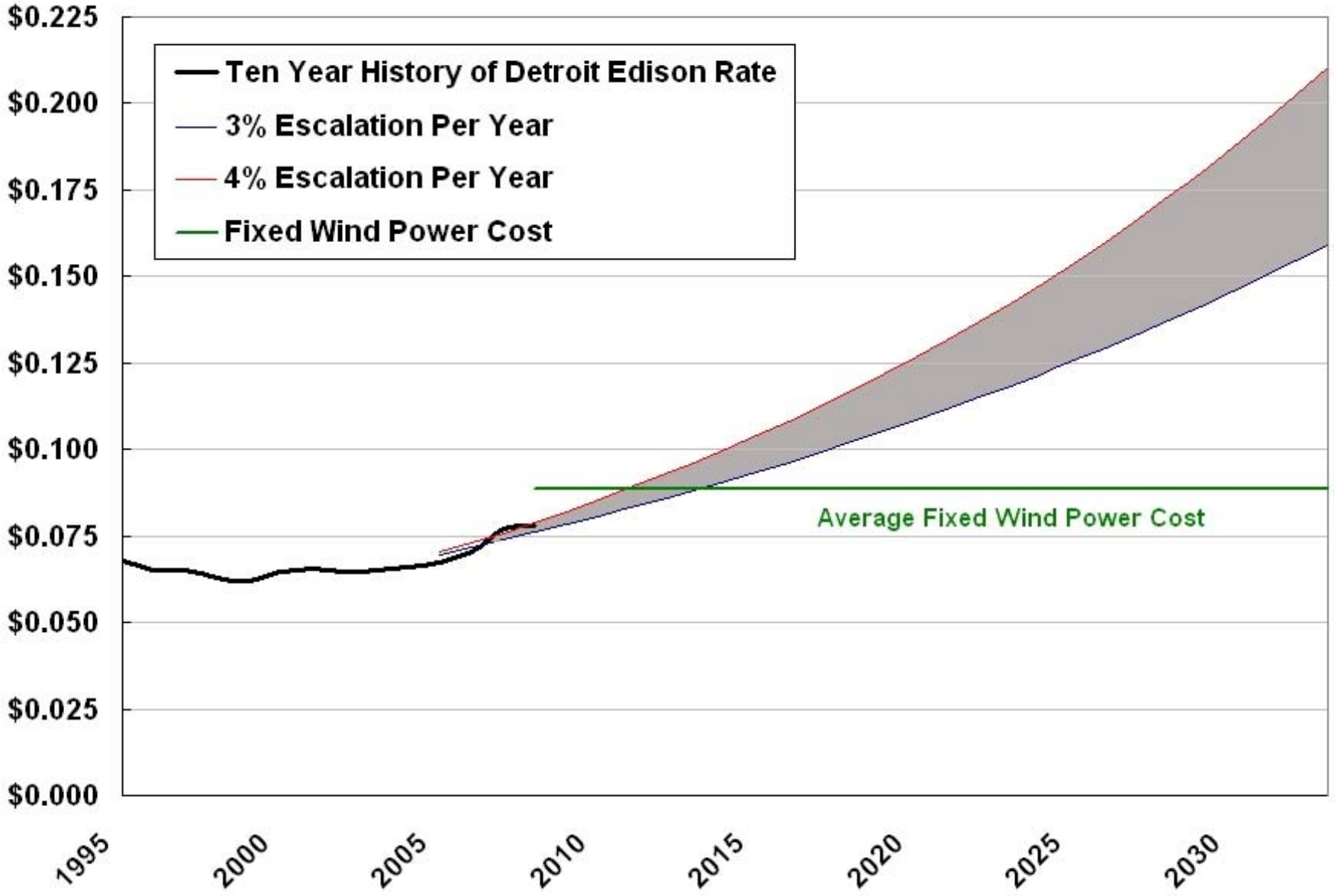
Two 1.5MW Turbines Installed at Sites #1 and #2

AAER 100m Tower at Location 1	$	3,500,000	
AAER 100m Tower at Location 2	$	3,500,000	
Two Turbine Crane Economy	$	(100,000)	
Subtotal	$	6,900,000	
Owner Contingency	$	414,000	6%
Total Installed Cost	$	7,314,000	
Cost per MW Installed	$	2,438	



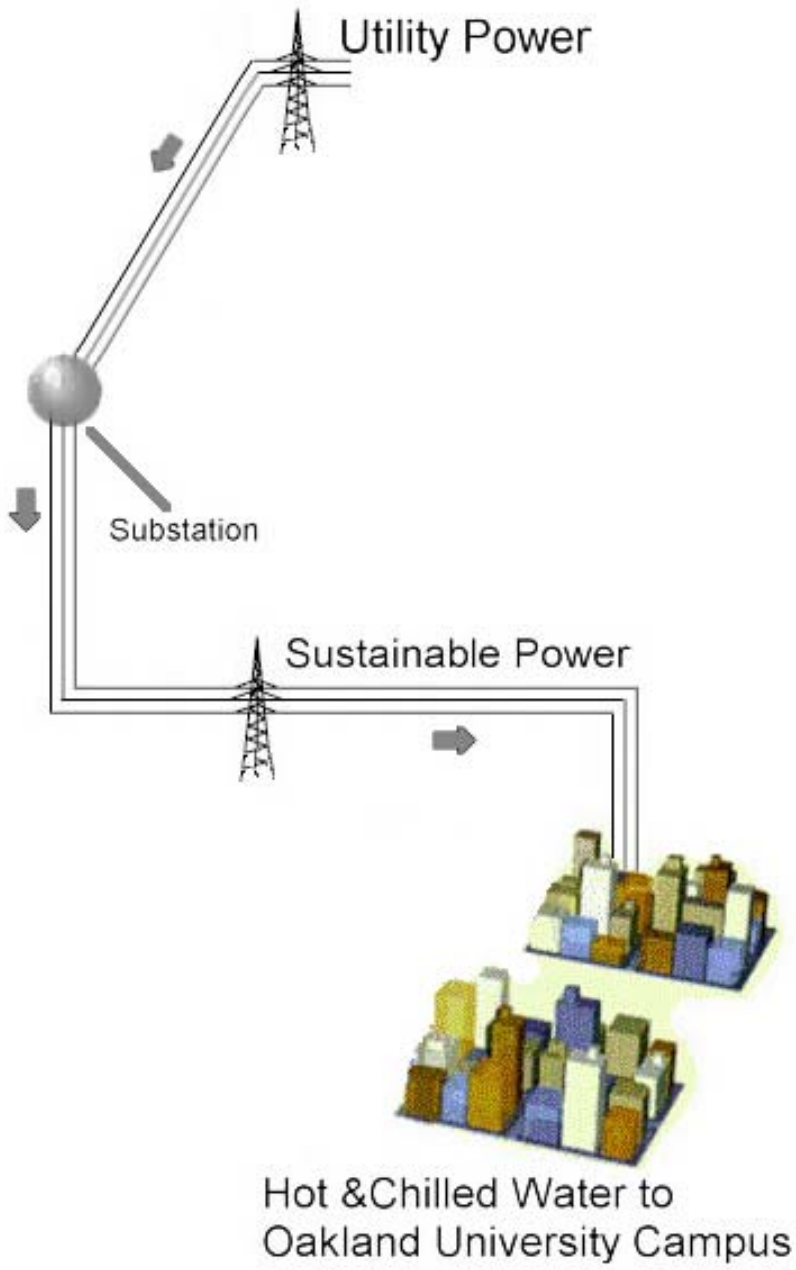
Net Annual and Cumulative Cash Flow Over 25 Year Project

(construction in 2009, beginning operation in 2010)

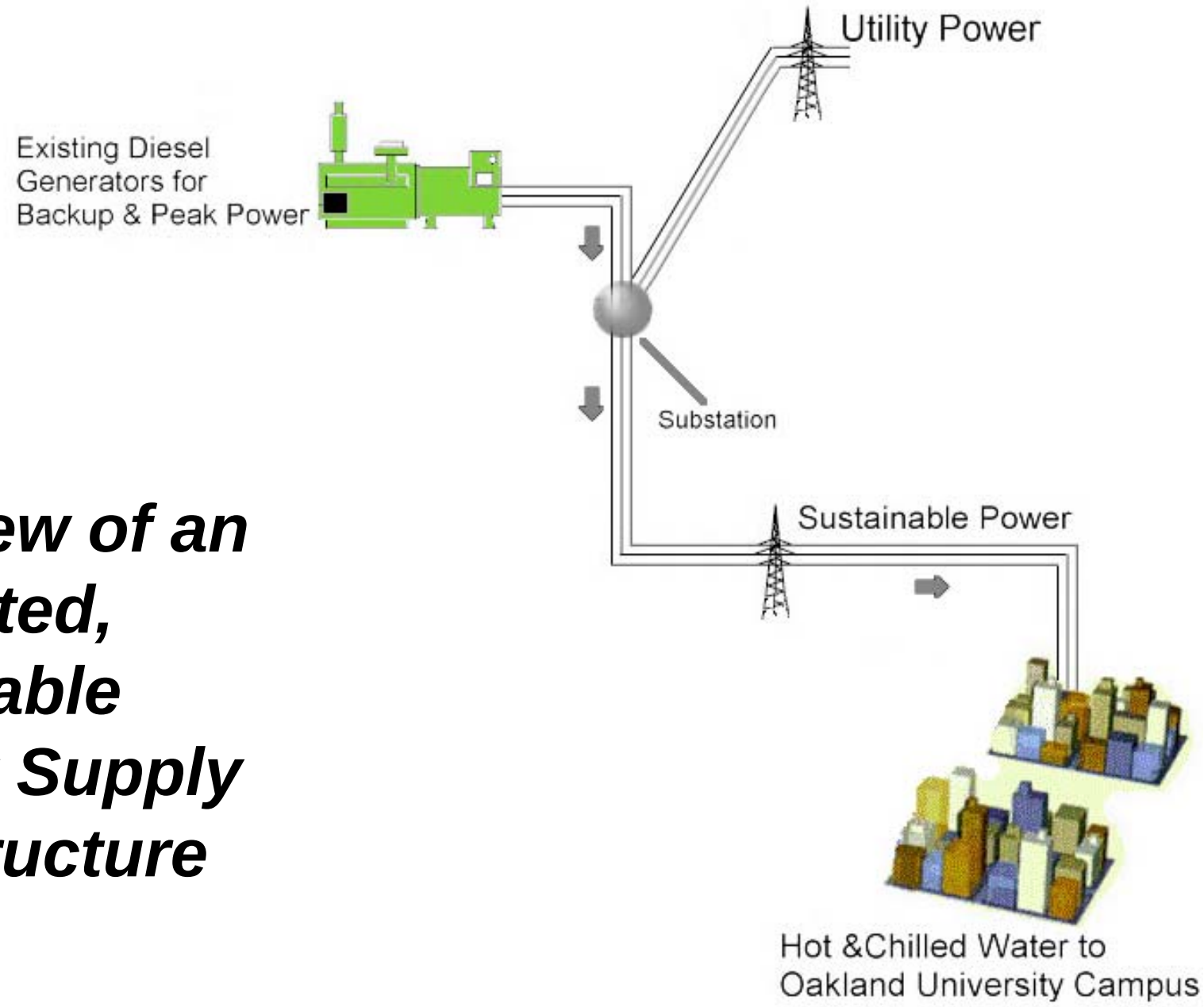


Projected Unit Cost of Electricity Over 25 Year Project

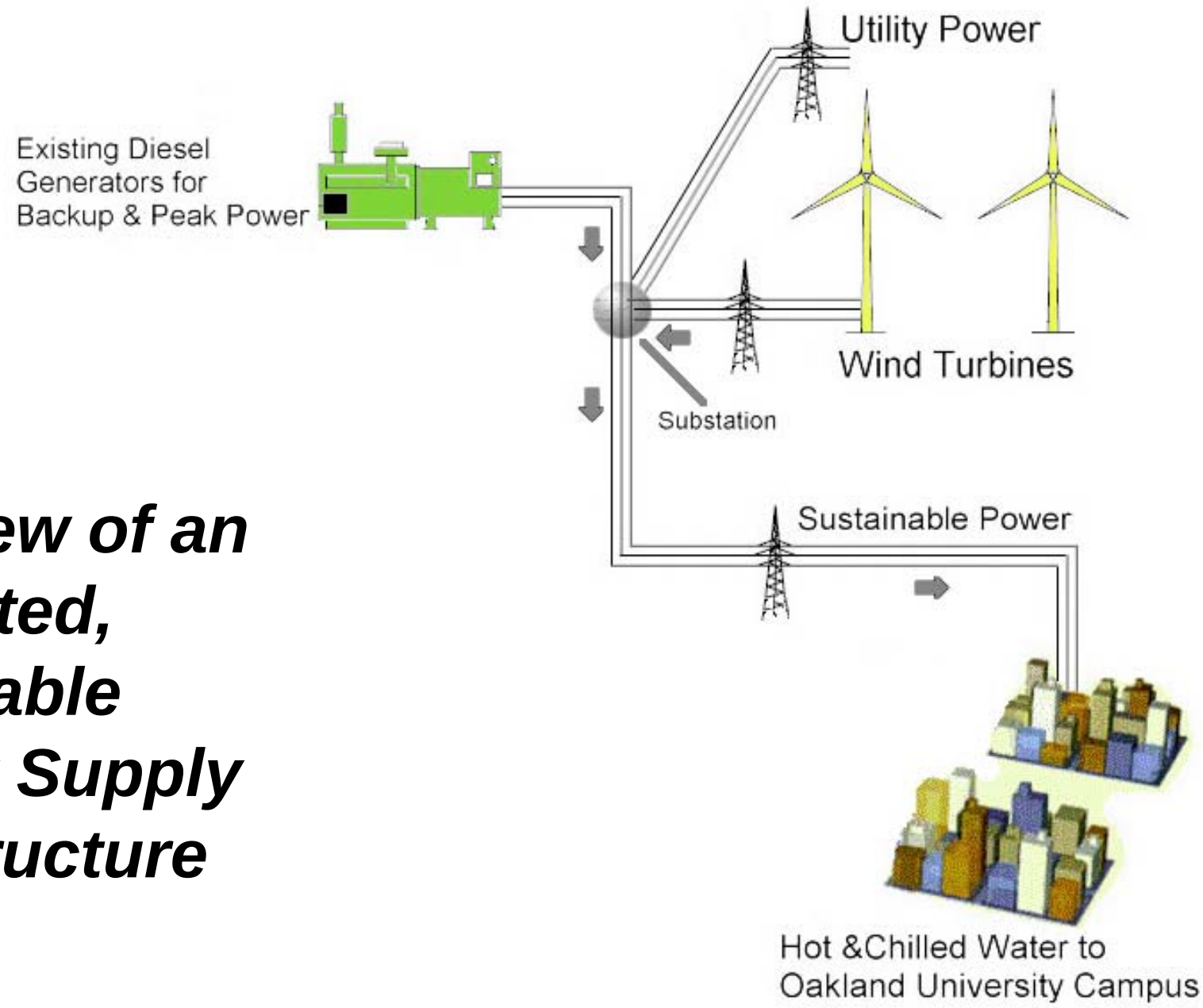
Overview of an Integrated, Renewable Energy Supply Infrastructure



Overview of an Integrated, Renewable Energy Supply Infrastructure



Overview of an Integrated, Renewable Energy Supply Infrastructure



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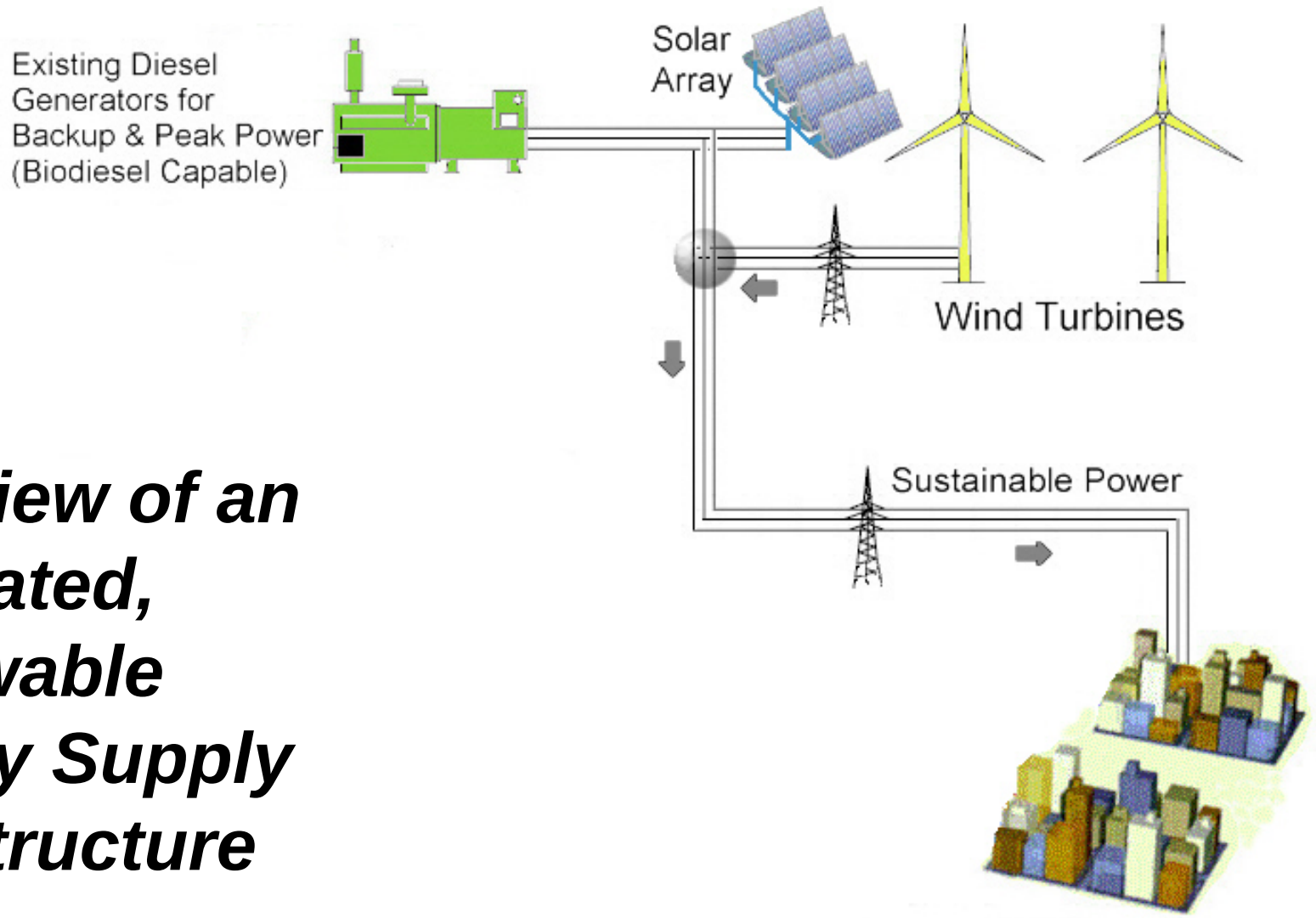

Overview of an Integrated Renewable Energy Supply Infrastructure

	Existing Fossil Fuel Mix		Proposed Renewable Energy	
	Thermal (Heating)	**Electrical**	**Thermal (Heating)**	**Electrical**
Central Heating Plant (natural gas)	100%		20%	
Detroit Edison		95%		20%
Diesel Generators		5%		10%
Biomass Boiler Plant			80%	50%
Wind Power				20%
Totals	100%	100%	100%	100%

Proposed Funding Sources

1. **Sale of Renewable Energy Credits**
2. **$1.5M Clean Renewable Energy Bond**
3. **Investigate grant opportunities**
4. **Leveraged lease**
5. **Issue 15 to 20 year bonds**
6. **Enter into one or more bank qualified debt arrangements**
7. **Public / private partnership arrangement**

Recommendations

1. **Select the project financing method**
   a. **Issue 15 to 20 year bonds**
   b. **Enter into bank qualified debt arrangements**
   c. **Combine with biomass project – 3rd party "owned & operated"**
2. **Hire a design/build firm**
   a. **Create high resolution wind map of campus**
   b. **Detailed engineering and construction documents**
   c. **Environmental study & any needed approvals**
3. **Establish a utility interconnect agreement with DTE**
4. **Offering of REC's should be made to interested parties to solicit pricing and potential customers interested in a bilateral contract.**
5. **Enter into Call Contracts Against the Euro or Canadian Dollar**

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A Sustainable Energy Option for the Future of Oakland University