

Energy3 - Stage 1 Site Assessment and Project Economics

Site and Site Access

The location of the property is assessed in terms of ease of access, site topography, and proximity to local electricity lines.

An example is illustrated below

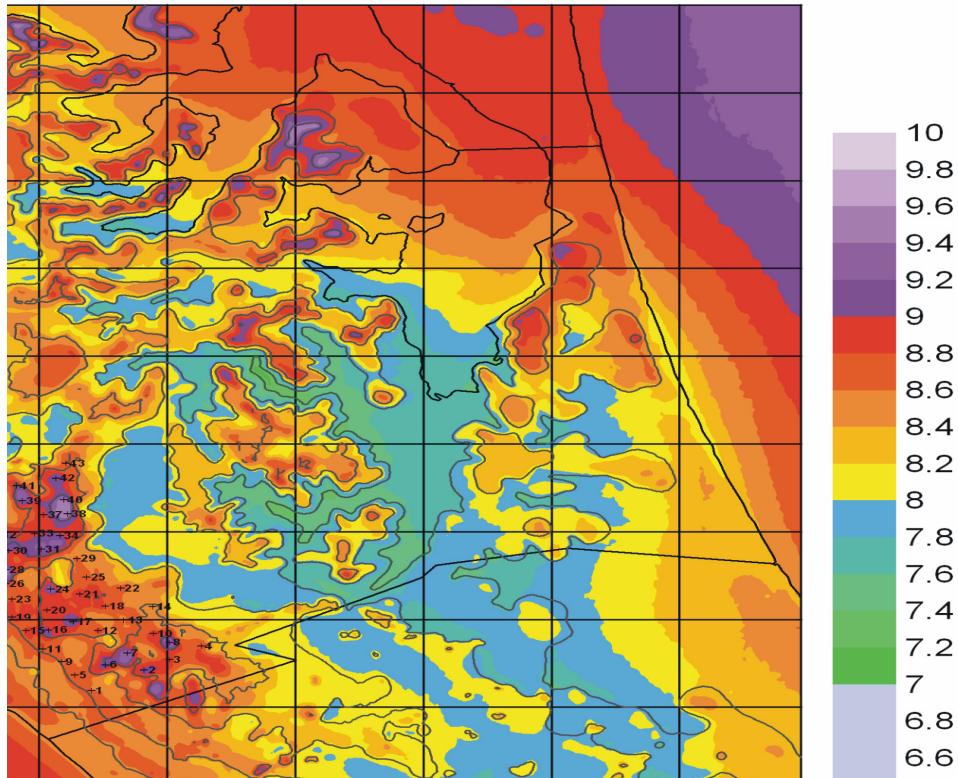


Wind Assessment

The most likely site on the property is selected and wind assessments undertaken using mesoscale modeling, or physical monitoring depending on the size of the site, the capacity of local lines and the likely characteristics of the wind resource.

A wind map is generally developed to estimate the energy potential at the site and for the turbines selected.

An example is illustrated below;



Conceptual Engineering

An estimate of long term power prices is developed for the region after taking into account transpower charges, connection costs and benefits,

Physical installation requirements and costs into the local area network are estimated

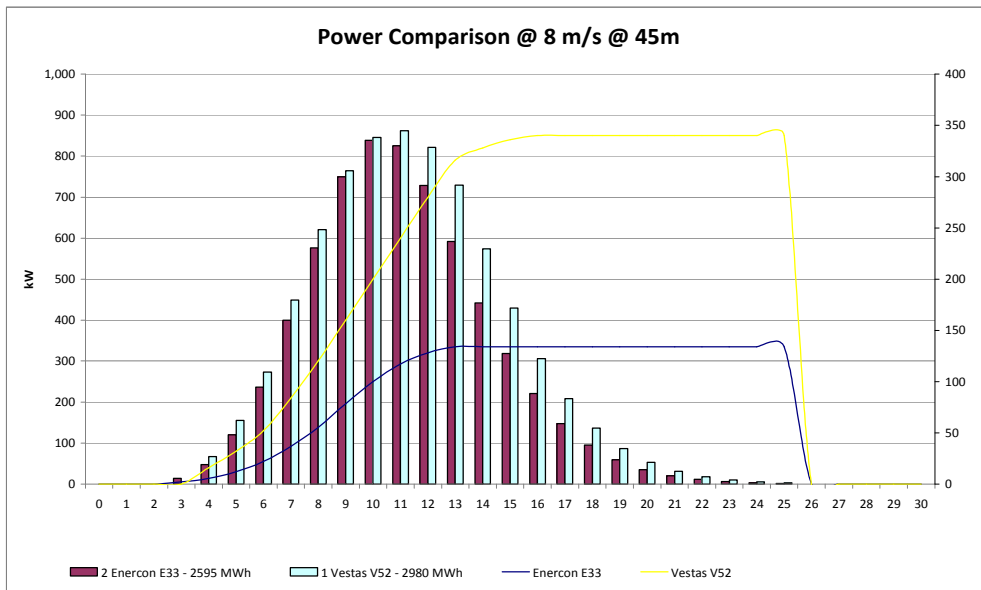
Access, logistics and installation requirements are assessed.

Turbine selection is examined from a perspective of energy yield relative to wind resources and characteristics, turbine cost, availability and delivery.

The District Plan is reviewed to understand the consenting requirements

Turbine yield are compared when alternatives are available.

An example is illustrated below;



Financial and economic Evaluation

The resultant cost and price information is used to develop an estimate of capital and operating costs, revenues and investment returns.

An example is illustrated below;

Project Summary	Project
Project Life	20 years
Wind Speed @ Hub Height	8.00 m/sec
Number of Operational Turbines	3
Installed Capacity	0.68 MW
Annual Generation	2.06 GWh
Wind farm efficiency	33.47 %
Distance to Existing Lines	2.10 km
Capital Cost	791,840 NZ\$
Installed Cost	1,173 NZ\$ / kW
Year 1 Revenue	193,008 NZ\$
Year 1 O&M	39,256 NZ\$
Year 1 Cash Flow (after O&M)	153,752 NZ\$
Cost of energy (with inflation) - LRMC	87.83 NZ\$/MWh
Internal Rate of Return (IRR) post tax	14.31 %
Carbon Displaced per year	1,288 Tonnes
Potential Value of Carbon Credits (@NZ\$15/tonne)	19,324 NZ\$

Beyond this, it is customary to test the investment returns for variability of the key inputs, such as .

- Turbine Cost
- Electricity Prices
- Wind Speed.

An example of one such sensitivity analysis is illustrated below.

Calculate		Nominal Post Tax Sensitivity (Non Shaded Cells Denote Inadequate Returns)										
		Wind Speed (m/s)										
Variance	Value	-50%	-40%	-30%	-20%	-10%	0%	10%	20%	30%	40%	50%
-50%	0.045	4.00	4.80	5.60	6.40	7.20	8.00	8.80	9.60	10.40	11.20	12.00
-40%	0.054				1.1%	3.7%	3.4%	5.1%	6.6%	7.8%	8.7%	9.5%
-30%	0.063				2.9%	5.8%	6.0%	7.9%	9.5%	10.9%	12.0%	12.9%
-20%	0.072			1.1%	4.6%	7.7%	8.3%	10.4%	12.2%	13.7%	15.0%	15.9%
-10%	0.081			2.4%	6.2%	9.5%	10.4%	12.8%	14.7%	16.4%	17.7%	18.8%
0%	0.090			3.6%	7.6%	11.2%	12.4%	14.9%	17.1%	18.9%	20.3%	21.5%
10%	0.099		0.2%	4.8%	9.0%	12.8%	16.1%	19.0%	21.4%	23.5%	25.2%	26.5%
20%	0.108		1.1%	5.9%	10.3%	14.3%	17.8%	20.9%	23.5%	25.7%	27.4%	28.9%
30%	0.117		1.9%	6.9%	11.6%	15.8%	19.5%	22.7%	25.4%	27.8%	29.7%	31.2%
40%	0.126		2.7%	7.9%	12.8%	17.2%	21.1%	24.5%	27.4%	29.8%	31.8%	33.4%
50%	0.135		3.4%	8.9%	14.0%	18.6%	22.6%	26.2%	29.2%	31.8%	33.9%	35.6%