Putting Emission reductions into a perspective:

RETScreen: Project Evaluation Tool (Introduction)



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Investments analysis- with/without carbon revenue

Choose an appropriate financial indicator, such as IRR, NPV or benefitcost ratio, to demonstrate additionality







Objectives

- Raise awareness of RETSCreen as a free tool to help making cleaner energy decisions
- Demonstrate how the RETScreen[®] Software works
- Show how RETScreen[®] makes it easier to help identify & assess potential projects
- Identify projects for which RETScreen is useful





Typical questions for a project

Which option:

- is greenest
- is cheapest
- has highest financial yield (ROI)
- What is a wise option
- RETScreen is decision support software for clean energy projects, it helps to answer many project related questions
- About 435k RETSCreen in 222 countries, translated into 37 languages



Power projects:

- PV
- Wind
- Small scale hydro
- Tidal
- Reciprocating engine
- Fuel Cell
- Steam turbine
- Solare thermal
- And more

It is also possible to use multiple technologies



Climate database

Data from ground weather stations from all over the world

- a) Temperature,
- b) Solar radiation
- c) Humidity
- d) Wind speed

Product database

- Wind mills
- PV panels
- Engines
- Turbines



In RETScreen every single cell is explained with the help function

Wind speed - annual Measured at Wind shear exponent Air temperature - annual Atmospheric pressure - annual



Wind shear exponent

The user enters the wind shear exponent, which is a dimensionless number expressing the rate at which the wind speed varies with the height above the ground. A low exponent corresponds to a smooth terrain whereas a high exponent is typical of a terrain with sizeable obstacles. This value is used to calculate the average wind speed at the wind turbine hub height.

The wind shear exponent typically ranges from 0.10 to 0.40. The low end of the range corresponds to a smooth terrain (e.g. sea, sand and snow from 0.10 to 0.13). A wind shear of 0.25 corresponds to a rough terrain (i.e. with sizeable obstacles). The high end of the range (0.40) corresponds to a project in an urban area. A value of 0.14 is a good first approximation when the site characteristics are yet to be determined [Le Gouriérès, 1982], [WECTEC, 1996] and [Gipe, 1995].

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or				



RETScreen[®] Software

Five Step Standard Analysis 😁





Project Viability (Wind Example): Depends on Several Factors

- Energy resource available at project site (e.g. wind speed)
- Equipment performance (e.g. wind turbine power curve)
- Initial project costs

 (e.g. wind turbines, towers, engineering)
- On-going and periodic project costs (e.g. cleaning of wind turbine blades)





Project Viability (Wind Example) Depends on Several Factors - cont.

- Avoided cost of energy (e.g. wholesale electricity price)
- Financing (e.g. debt ratio & length, interest rate)



• Decision-maker's definition of cost-effective (e.g. payback period, IRR, NPV, Energy production costs)



Photo Credit: Middelgrunden Wind Turbine Co-operative



RETScreen[®] Software Financial Analysis Method

Comparison:

Base Case

- Conventional system
- Scenario 0
- In this example electricity from (
 the grid







Proposed Case

- Clean energy system
 - Scenario 1
 - Electricity from wind



Software Demo: 20 MW Wind Energy Project

Input/Output (RETScreen®)

- Project location:
- Wind speed:
- GHG emissions reduction:
- Wind turbine cost:
- RE production credit:
- GHG credit (coal plant):
- Debt term:
- Positive cash flow:
- Return on investment:

Scenario #1

- Location A
- 4.4 m/s
- 25,123 tCO2/yr
- \$1,200/kW
- \$0/kWh
- \$0/ton
- 10 years
- 42.7 years
- - 7.1%



Software Demo :Scenario 1







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Software Demo: Wind Speed & GHG Emission Reduction





Software Demo Wind Turbine Cost

Scenario # 1b

Reduced Investment Cost: \$1,000/kW

Positive cash flow: 16.5 years

IRR 6.5%





Software Demo RE Production Credit

Scenario # 1c

RE production credit \$0.025/kWh

PCF:10.1 years IRR: 17.7%

Positive cash flow from the start





Software Demo GHG Emissions Credit

GHG credit: \$5/ton PCF: 7.5 years

Scenario # 1d

IRR: 20.1%





Software Demo: Debt Term

Debt term: 15 years

Scenario # 2

PCF: 5.2 years IRR: 22.8%





Thank you

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