Renewable Energy project Development, Finance and Business Planning

Introduction to economic and financial analysis

3-4 May 2016, Rabat, Morocco

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Introduction to economic and financial analysis
Project Profitability Analysis

- Economics play a dominant role in the decision whether the developers and the financing institutions will invest in a Renewable Energy (RE) project or not.
- RE projects must be presented in economic terms in order to help the investors /financiers to make their decisions.
- Profitability analysis is the method used for assessing financial feasibility of a project.
- **Life Cycle Cost Analysis** (LCCA) is used for project profitability analysis because it takes into account the entire life of a project and the time value of money.

Economic and financial basic concepts
Life Cycle Cost Feasibility Analysis

- LCCA considers all costs, revenues and savings incurred during the service life of the project.
- It compares the relative merits of competing project implementation alternatives.
- Helps the decision maker to accept or reject a project and prioritise accepted projects.

To evaluate the profitability of a RE projects we use

Life Cycle Cost Indicators

We need to understand some financial basic concepts to calculate LCC indicators of a RE Project

Introduction to economic and financial analysis
Financial Basic Concepts

- CAPEX & OPEX
- Cash flows
- Inflation
- Interest rate
- Discounting and discounting rate
- Weighted Average Cost of Capital
- Depreciation of assets
- Cash-flows of a project

Economic and financial basic concepts
CAPEX & OPEX

Capex Capital expenditures	Opex Operating expenses
The funds that a business uses to purchase major physical goods or services to expand the company's abilities to generate profits	Ongoing costs that a company pays to run its basic business.
Costs incurred for buying the income producing property.	Costs associated with the operation and maintenance of an income producing property.
Cannot be fully deducted in the period when they were incurred. Tangible assets are depreciated and intangible assets are amortized over time.	Operating expenses are fully deducted in the accounting period during which they were incurred (one year).

Economic and financial basic concepts
Cash-flows of a project

- Cash flow is the movement of money into or out of a business, project, or financial product
- Sources of cash-flows
  - Cash flows from operating activities: money generated by a company's core business activities (example revenues from electricity selling to consumers).
  - Cash flows from investing activities: from the selling of the baying of assets
  - Cash flows from financing activities: lending, borrowing, etc.
- Revenue is the total amount of money the business receives from its customers for its products and services.
- Cash-flow of a project = **(+)** Total revenues of the project

  (–) Total expenses

Economic and financial basic concepts
Inflation

Definition

- Inflation rate is the annualized percentage change in a general price index (normally the consumer price index) over time.
- The consumer price is the average of selected goods and services representing the main needs of the households
- High inflation reflects a reduction in the purchasing power per unit of money
- Data on inflation are officially provided by the statistical institutes

Country / Region	Inflation rate 2014
Sweden	-0,2
Morocco	0,4
France	0,5
Lebanon	0,7
Germany	0,9
Oman	1,0
West Bank and Gaza	1,7
Iraq	2,2
Saudi Arabia	2,7
Algeria	2,9
Mauritania	3,5
Tunisia	4,9
Turkey	8,9
Egypt, Arab Rep.	10,1
Sudan	36,9
Arab World	2,8
World	2,6

Source: WB

The financial and economic evaluation of projects is usually made without considering inflation when this one is not galloping !

Economic and financial basic concepts
Inflation

Causes of inflation

- Demand pull inflation
- Cost Push Inflation
  - Rising wages
  - Import prices: imported
  - Raw Material Prices
  - Profit Push Inflation
  - Declining productivity
  - Higher taxes
- Imported inflation
  - Increase of imported prices
  - Local money devaluation
- Monetary policy
  - Printing more money
  - Local money devaluation

Inflation expectations

- Spiral of inflation :
  - Poverty increase
  - **Inflation Spiral**: Inflation > Salaries' increase > demand increase > prices' increase
  - **Inflation Spiral :** Money mass increase > less confidence in the local money > demand on goods > prices' increase
  - **Inflation Spiral :** Money mass increase > less confidence in the local money > foreign currency exchanges > Local currency devaluation increase of imported prices

Economic and financial basic concepts
Interest rate

- A borrower can borrow from a lender **assets** or **money**.
- Interest is charged by lenders as compensation for the loss of the asset's use. In the case of lending money, the lender could have invested the funds instead of lending them out.
- Interest rate is the amount charged, by the lender to the borrower for the use of assets or money, expressed as a percentage of the borrowed amount (principal),
- Interest rates are typically noted on an annual basis, known as the annual percentage rate (APR).
- Nominal interest rate: without taking into account the inflation
- Real (or actual) interest rate = Nominal interest rate – inflation

Economic and financial basic concepts
Interest rate

- The interest can be calculated using the **simple interest formula** :

  Simple Interest = P x I x N

  P: principal

  I: annual interest rate

  N:number of years

- Or using the **compound interest formula**:

  Compound Interest = P x [(1 + I) ^{N} - 1]

  You pay the interest on the principal and on the cumulated shares of interest of the months before

Economic and financial basic concepts
Interest rate

- **Example**: calculate simple and compound interest in the following case:

  Borrowing $1000

  at a 6% annual interest rate

  for 8 months

- **Results**

  - Simple interest : (1000 x 6% x 8/12) = 40 $
  - Compound interest

Principal	1000	USD							
Annual interest rate	6,0%								
	m1	**m2**	**m3**	**m4**	**m5**	**m6**	**m7**	**m8**	**Total**
Interest	5,000	5,025	5,050	5,075	5,101	5,126	5,152	5,178	40,707
Calculated by the formula									40,707

Economic and financial basic concepts
Discounting and discounting rate

- Assume that there is no inflation
- What will be your preference if you are asked to choose between :

1) Having 10000 $ **immediately** and

2) Having one of the following amounts **into 3 years** (2019) ?

Options	At end of 2019 ($)
Option 1	10 612
Option 2	11 576
Option 3	12 597
Option 4	13 310
Option 5	15 209
Option 6	17 280
Option 7	21 970

- Please write your choice in a small paper, without discussing with your colleague
- Justify your choice

Economic and financial basic concepts
Discounting rate

- Discounting reflect the preference of the economic agent for the present compared to the future
- Discounting is the act of determining how much less one unit of money is worth tomorrow.
- Discounting is used to compensate the Agent for the shortfall and the future risk
- The Agent requires remuneration from such future cash flows as a fraction t, named **discount rate**.

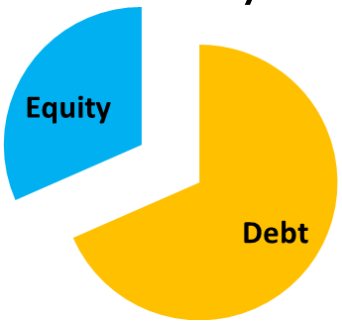
Discount rate	Options	At end of 2019 ($)
2%	Option 1	10 612
5%	Option 2	11 576
8%	Option 3	12 597
10%	Option 4	13 310
15%	Option 5	15 209
20%	Option 6	17 280
30%	Option 7	21 970

Economic and financial basic concepts
Discounting rate

- Discount rate will depend on the type of Agent:
  - households (rich, poor, medium class)
  - Private investor
  - Public investor
- Discount rate will depend on the country
  - Level of country risk
  - Cost of the financial resources in the country
  - etc.
- **For an investor**, the discount rate generally reflects the **cost of capital**, so it will take **the market interest** rate for a comparable term increased possibly with a **risk premium** (financial market)

Economic and financial basic concepts
Weighted Average Cost of Capital

- An investment is financed by Equities and Debts:



- Weighted Average Cost of Capital (WACC) measures the average cost the financial resources used to finance a given investment
- It can be used as a reference for the acceptable discounting rate for a given investor
- WACC formula:

$$WACC = \frac{D}{D+E} K_d + \frac{E}{D+E} Ke$$

Where D is the total debt, E is the total shareholder's equity, K_e is the cost of equity, and K_d is the cost of debt.

Economic and financial basic concepts
Weighted Average Cost of Capital

Example: Discuss what would the WACC for a wind farm project in the following cases:

:

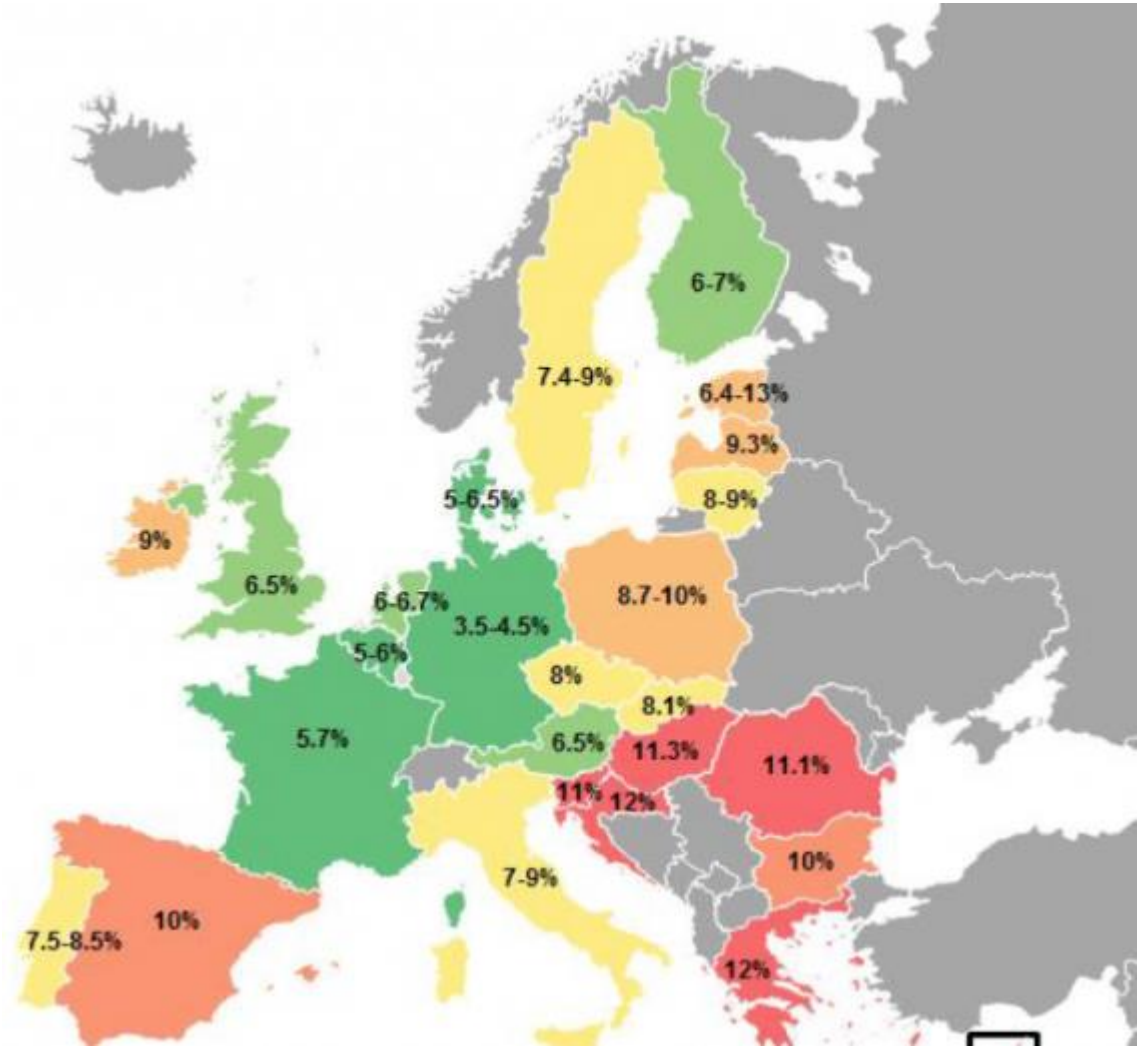
- *A* Moroccan private investor who invests in Morocco
- The State of Morocco when getting a soft loan from donors with an interest rate of 3% to develop wind farms in Jordan
- A big German investor who develops a wind farm in Germany

Economic and financial basic concepts
Weighted Average Cost of Capital

Example :

WACC estimations

onshore wind – EU 28 (2014)



Source:

Economic and financial basic concepts
Depreciation of assets

- Depreciation is a method of allocating the cost of **an asset over its useful life**
- Businesses depreciate long-term assets for both tax and accounting purposes.
- For accounting purposes, depreciation indicates how much of an asset's value has been used up
- For tax purposes, businesses must depreciate these assets in accordance with **national rules** about how and when the deduction may be taken based on what the asset is and how long it will last.

Economic and financial basic concepts
Depreciation of assets

- The national rules define mainly the number of years of ~~the~~ each type of assets over which the depreciation is done; ex of Jordan:

Buildings (depending upon its nature)	4% to 10%	10 to 25 years
Furniture and fixtures	2.5% to 15%	7 to 40 years
Plant and machinery	10% to 25%	4 to 10 years
Intangible Assets (patents, trademarks, know-how, licences, copyrights, etc)	According to IFRS	
Ships	20%	5 years

Economic and financial basic concepts
Depreciation of assets

- For project analysis, sometimes we use the technical life time as the depreciation period
- When a depreciable asset is sold, the business recognizes gain or loss based on net basis of the asset. This net basis is cost less depreciation (**or residual value**)
- **Examples**

	Investment ($)	Depreciation period (ys)	Annual Depreciation ($)
Land	5 000 000	40	125 000
Car	30 000	5	6 000
Wind turbine	15 000 000	20	750 000
Study	500 000	3	166 667

Introduction to economic and financial analysis
Profitably indicators

- Net Present Value (NPV)
- Payback period
- Internal Rate of Return (IRR)
- Profitability Index
- Levelized Cost Of Energy (LCOE)
- Profitability conditions
- Sensitivity Analysis

Economic and financial basic concepts
Net Present Value (NPV)

- Present value is a way to take into account the losses of the value of a cash-flow in the future based on the discount rate
- For a cash-flow Cf_i expected from an Investment I, during the year *i*, its Present Value is :

$$\frac{CF_i}{(1+t)^i}$$

t: The discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.) or the opportunity cost of capital

Economic and financial basic concepts
Net Present Value (NPV)

- Net Present Value (NPV): Sum of Net Discounted cash flows of a project

$$NPV = -I + \sum_{1}^{n} \frac{CF_i}{(1+t)^i}$$

i: The year of the cash flow

t: The discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.) or the opportunity cost of capital

CF_i: cash flow of the year *I*

n*:* The observation period of the project

An investment is not profitable if NPV < o

Project is not profitable if NPV < o

Economic and financial basic concepts
Net Present Value (NPV)

- If CF_i are constant (= CF)

$$NPV = -I + \frac{CF}{Ka}$$

Ka = **Cost Recovery Factor**

$$Ka(t,n) = CRF = \frac{t.(1+t)^n}{(1+t)^n - 1}$$

- Cost Recovery Factor is the **minimum acceptable fraction** investment to be covered yearly by the cash-flow of the project. In fact, for NPV = 0, **Ka = CF/I**

Economic and financial basic concepts
Net Present Value (NPV)

- **Example** :

- Use Excel formula to Calculate, **the NPV** and the **Cost Recovery Factor** for the 2 following projects:

Project 1

Ivestment 750 000 USD
Discout rate 8%

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Total
Cash flows	- 100 000	- 30 000	200 000	300 000	450 000	300 000	350 000	200 000	1 670 000

Project 2

Ivestment 750 000 USD
Discout rate 8%

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Total
Cash flows	300 000	250 000	150 000	200 000	20 000	- 25 000	365 000	184 217	1 444 217

- Do the same thing with a discount rate of 6% an 9%. What is the conclusion ?

Economic and financial basic concepts
Net Present Value (NPV)

- **Results of the example :**

Discount rate = 8%

	Total CF	NPV	CRF	CF/I
Project 1	1 670 000	318 551	0,174	0,278
Project 2	1 444 217	318 551	0,174	0,241

Discount rate = 9%

	Total CF	NPV	CRF	CF/I
Project 1	1 670 000	263 155	0,181	0,278
Project 2	1 444 217	283 374	0,181	0,241

Discount rate = 6%

	Total CF	NPV	CRF	CF/I
Project 1	1 670 000	440 519	0,161	0,278
Project 2	1 444 217	395 527	0,161	0,241

Economic and financial basic concepts
Payback period

Simple payback period (SPB)

- Number of years required to recover the initial investment
- Investment cost / annual average cash flow (I/CF)
- Simple pay back period is used to get a first idea about the project profitability

- Project is not profitable if : SPB > 1/ka
- But, Average cash flow is not reflecting the reality, since the cash-flows are not discounted

Economic and financial basic concepts
Payback period

Discounted payback period (DPB)

- Take in account the losses of the values of the cash-flows
- Number of years required to recover the initial investment from the discounted cash-flows
- DPB = Investment cost / annual average discounted cash flow

- A project is not profitable if the DPB > n, n is the observation period of the project
- The DPB is always > SPB

- **Example**: Calculate the SPB and DPB for the example given for the NPV

Economic and financial basic concepts
Payback period

- **Results of the example:**

	SPB		DPB	
	DR= 8%	DR= 9%	DR= 8%	DR= 9%
Project 1	3,59	3,59	5,62	3,95
Project 2	4,15	4,15	5,62	3,87

	1/ka		n	
	DR= 8%	DR= 9%	DR= 8%	DR= 9%
Project 1	5,75	5,53	8	8
Project 2	5,75	5,53	8	8

Economic and financial basic concepts
Internal rate of return (IRR)

IRR of the whole project

- IRR is the discount rate that makes the NPV equal to zero, using the whole investment and the whole cash-flows generated by the project
- The project is not profitable if its IRR is higher than the WACC. Not profitable if IRR > WACC
- Otherwise, the project will generate a negative NPV and it should therefore not be carried out because it would lead to an impoverishment of the investor.
- The IRR is an indicator that pleases particularly to financiers because it gives the image of potential returns from the project **by comparing** it to those that would be obtained by placing the funds corresponding to the initial investment *I* during the project period *n* years at a rate of interest **equal to the WACC**.

Economic and financial basic concepts
Internal rate of return (IRR)

IRR of the investor

- The project is seen from the strict point of view of the investor (equities' shareholders)
- The calculation is the same thing of the Project IRR but using
  - The **equities** amount instead of the investment
  - The net cash flows of the project **after the reimbursement of the principal** of the debt
- This indicator is the main one for the investment decision of the investor
- From the point of view of the shareholders, the project is not profitable if the investor IRR is higher than cost of the equities

$$\mathbf{IRR < K_e}$$

Economic and financial basic concepts
Internal rate of return (IRR)

- **Example :**

Project 1

Ivestment 750 000 USD
Discout rate 8%

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Total
Cash flows	- 100 000	- 30 000	200 000	300 000	450 000	300 000	350 000	200 000	1 670 000

Project 2

Ivestment 750 000 USD
Discout rate 8%

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Total
Cash flows	300 000	250 000	150 000	200 000	20 000	- 25 000	365 000	184 217	1 444 217

- Equities: 40% of the investment. The shareholders expect a return rate on their equities of 22%.
- Debt : 60% of the investment on 7 years, 1 year grace, interest rate 7%

Use Excel formula to Calculate, the IRR for the projects and for the investors and discuss the investment decision

Economic and financial basic concepts
Internal rate of return (IRR)

Project Cash-flows

project CF	Y0	Y1	Y2	Y3
Project 1	- 750 000	- 100 000	- 30 000	200 000
Project 2	- 750 000	300 000	250 000	150 000

Y4	Y5	Y6	Y7	Y8
300 000	450 000	300 000	350 000	200 000
200 000	20 000	- 25 000	365 000	184 217

Investors' Cash-flows

Investor CF	Y0	Y1	Y2	Y3	Y4
Project 1	- 300 000	- 100 000	- 105 000	125 000	225 000
Project 2	- 300 000	300 000	175 000	75 000	125 000

Y5	Y6	Y7	Y8
375 000	225 000	350 000	200 000
- 55 000	- 100 000	365 000	184 217

Economic and financial basic concepts
Internal rate of return (IRR)

- **Results of the example:**

	IRR project	IRR investor	WACC	Equity cost
Project 1	15%	25%	13%	22%
Project 2	20%	60%	13%	22%

Equity effect: share = 20% instead of 40%

	IRR project	IRR investor	WACC	Equity cost
Project 1	15%	33%	10%	22%
Project 2	20%	149%	10%	22%

Equity effect: Cost = 30% instead of 22%

	IRR project	IRR investor	WACC	Equity cost
Project 1	15%	25%	16%	30%
Project 2	20%	60%	16%	30%

Loan condition effect: 15% interest rate instead of 7%

	IRR project	IRR investor	WACC	Equity cost
Project 1	15%	25%	18%	22%
Project 2	20%	60%	18%	22%

Economic and financial basic concepts
Profitability Index (PI)

- Profitability index (PI) is also known as profit investment ratio (PIR) and value investment ratio (VIR),
- It is a useful tool for ranking projects because it allows quantifying the amount of value created per unit of investment.

$$PI = \frac{PV}{I}$$

If PI > 1 then accept the project

If PI < 1 then reject the project

Economic and financial basic concepts
Profitability Index (PI)

- **Example :**

- Calculate the profitability index for the 2 projects

Project 1

Ivestment 750 000 USD
Discout rate 8%

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Total
Cash flows	- 100 000	- 30 000	200 000	300 000	450 000	300 000	350 000	200 000	1 670 000

Project 2

Ivestment 750 000 USD
Discout rate 8%

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Total
Cash flows	300 000	250 000	150 000	200 000	20 000	- 25 000	365 000	184 217	1 444 217

Economic and financial basic concepts
Profitability Index (PI)

- **Results of the example**:

	DR=6%	DR=8%	DR=9%	DR=15%	
Project 1	1,59	1,42	1,35	0,99	**<1**
Project 2	1,53	1,42	1,38	1,15	

Economic and financial basic concepts
Levelized Cost Of Energy (LCOE)

- The LCOE is the ratio of lifetime costs to lifetime energy generation, both of which are discounted back to a common year using a discount rate.

$$LCOE = \frac{Total\ Life\ Cycle\ Cost}{Total\ Lifetime\ Energy\ Production}$$

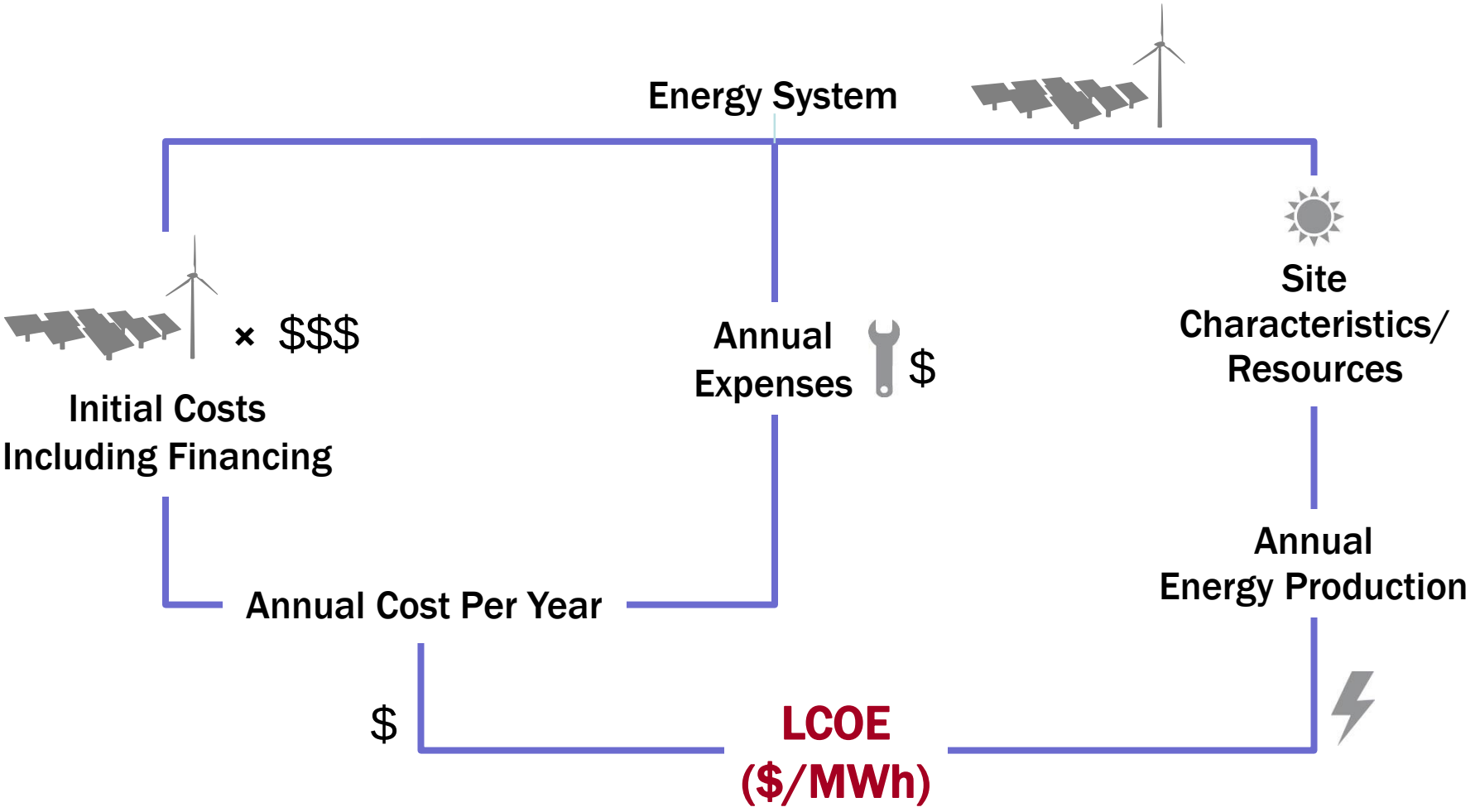
$$LCOE = \frac{\sum_{t=1}^{n} \frac{I_t + M_t + F_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{E_t}{(1+r)^t}}$$

I_t :investment expenditures in the year t
M_t :operations and maintenance expenditures, year t
F_t :fuel expenditures in the year t
E_t :Energy generated in the year t
r :discount rate
n :expected lifetime of system

Most renewable energy projects have zero fuel costs

- It is given in unit of currency per unit of energy produced (ex. $/MWh).
- The LCOE varies within RE technology and depends on the selected equipment and location

Economic and financial basic concepts
Levelized Cost Of Energy (LCOE)



Source / Jason Coughlin - National Renewable Energy Lab

Economic and financial basic concepts
Levelized Cost Of Energy (LCOE)

- The LCOE is very useful in comparing technologies with different operating characteristics
- It might be helpful for the adequate selection of equipment.
- For project developers it might be a good indicator of how competitive the RE project will be compared with the existing infrastructure.

- The **lower the LCOE**, the **higher the return** for the investor.

Economic and financial basic concepts
Profitability conditions: summary

- Net present Value > 0
- Simple Payback Period < $1/K_a(t,n)$
- Discounted Payback Period < n (economic observation period)
- Internal Rate of Return of the project > WACC
- Profitability Index > 1
- LCOE lower to other technologies

Economic and financial basic concepts
Sensitivity analysis

- No project goes exactly according to plan.
- A sensitivity analysis (“What If” analysis) measures changes in key financial indicators due to variations in significant input factors.
- It involves selecting scenarios such as a “best-case” scenario, a “worst-case” scenario and the “target-case” scenario.
- This analysis is very insightful and should precede any further risk assessment
- Sensitivity analysis begins with a base-case situation, which is developed by using the most likely values for each input factor.

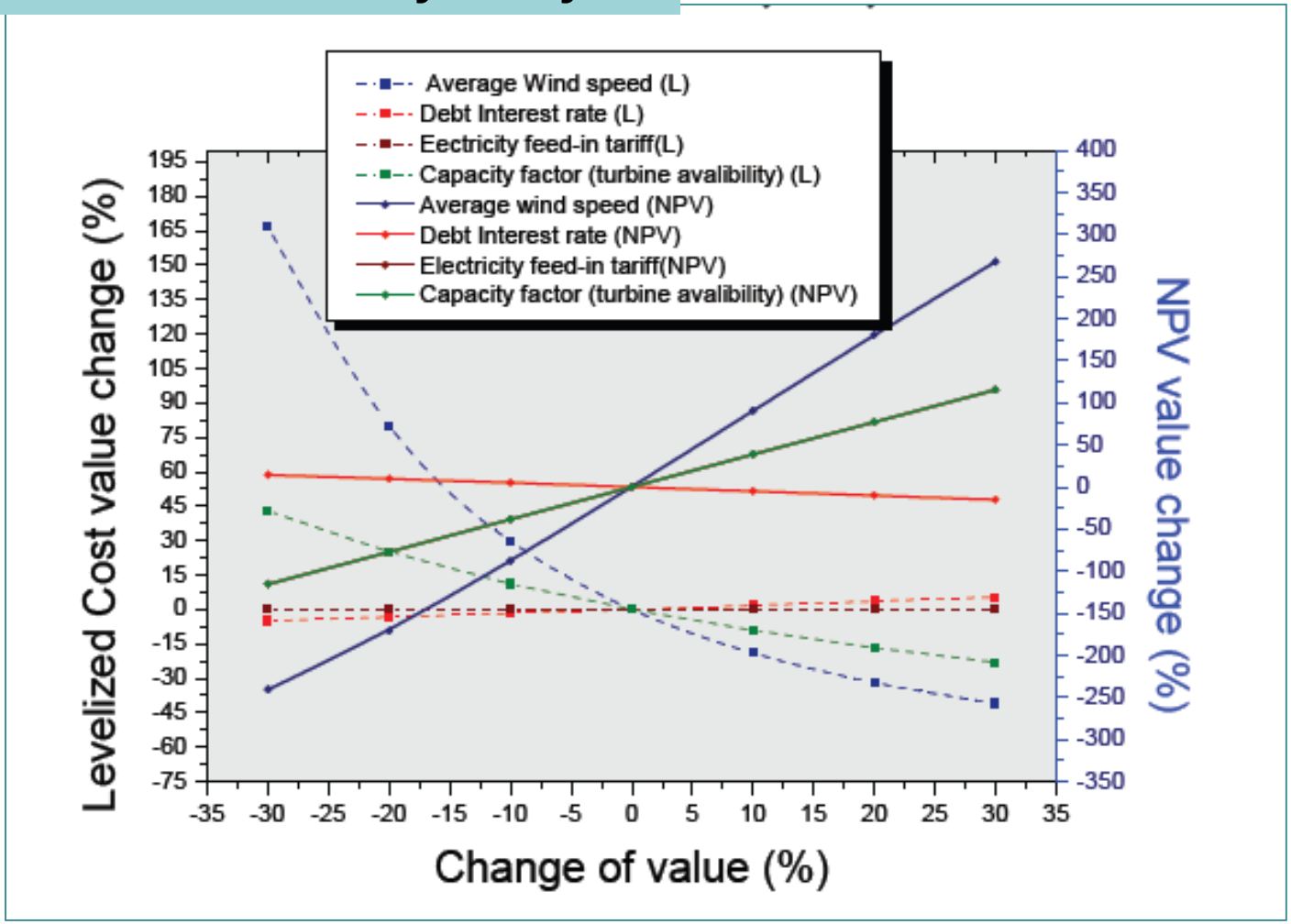
Economic and financial basic concepts
Sensitivity analysis

How to do it?

- Identify parameters that are subject to risk, such as sales price or operating expenses.
- Select a particular measure of performance, such as NPV, LCOE.
- Calculate the selected indicator using expected values for all parameters. Plot this on the horizontal axis.
- Select one risky parameter at a time and re-calculate the indicator, varying this parameter in increments. Plot the results on the diagram for each parameter.
- Because diagrams can get confusing when many parameters are subject to risk, it is often useful to construct several diagrams.

Economic and financial basic concepts
Sensitivity analysis

Example of Wind Sensitivity Analysis



Thanks

Renewable Energy project Development, Finance and Business Planning

Typology of risks and their mitigation

3-4 May 2016, Rabat, Morocco

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Typology of risks and their mitigation
Introduction

- To prepare bankable investment of RE project and ensure its successful financing, it is necessary to determine and minimise the risks of the project.
- Risks can occur at the permitting, site selection, or construction phases, as well as later in the project's operating life.
- A large number of interrelated factors influence and determine risk.

RE-project : Standard Risks + Specific risks for RE.

Typology of risks and their mitigation
Standard project risks

- **Country Risks:**

Political factors, stability, civil society processes, capital flows, strength of the legal system, war, market…

- **Financial Risks:**

Capital adequay, credit, balance sheet, changes in interest rates or exchange rates ...

- **Operationnal Risks:**

Business strategy, timing, technology, management systems, operations …

- **Business framework risks:**

Legal, policy change, regulations, costs, competition, infrastucture …

- **Force Majeure risks :**

Event beyond the control: earthquakes, drought, floods…

Typology of risks and their mitigation
Most relevant risks for RE

Risk	Comment
Fuel Supply Risk	The risk that the fuel supply will be unreliable, resulting in the inability to generate energy in a predictable and dependable manner
Performance Risk	The risk that the plant will not operate according to the contractually prescribed requirements in terms of time and quantity.
Demand Risk	The risk that the energy that has been contracted for will not be needed as anticipated
Macro-economic risks	as local currency devaluation, inflation or interest rates increase.
Environmental Risk	financial risk stemming from both existing environmental regulations and the uncertainty over possible future regulations
Regulatory Risk	The risk that future laws or regulations, or regulatory review or renegotiation of a contract, will alter the benefits or burdens to either party

Source: kfw – Fiancing RE - Instruments, Strategies, Practice Approaches

Typology of risks and their mitigation
Fuel risk for RE

Fuel Risk for RE Technologies			
RE Project Type	**Known**	**Predictable**	**Uncertain**
Biomass	Known	Predictable	
Geothermal	Known*		
Hydropower		Predictable	Uncertain
Windpower		Predictable	Uncertain
Solar Thermal Power		Predictable	Uncertain
SPV		Predictable	Uncertain
Wave-power		Predictable	Uncertain
Tidal Power		Predictable	

Source: kfw – Fiancing RE - Instruments, Strategies, Practice Approaches

Typology of risks and their mitigation
Typical RE risks / RE technologies

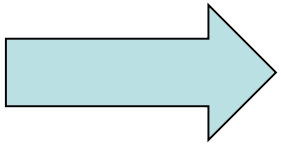
Typical RE risks of the different RE technologies	
RE type	**Key Risk Issues**
Geothermal	• Drilling expense and associated risk (e.g. blow out) • Exploration risk (e.g. unexpected temperature and flow rate) • Critical components failures such as pumps breakdowns • Long lead times (e.g. planning consents)
Large PV	• Component breakdowns • Weather damage • Theft / vandalism
Solarthermal	• Prototypical / technology risks as project sizes increase and combine with other RET e.g. solar towers
Small hydro-power	• Flooding • Seasonal / annual resource variability • Prolonged breakdowns due to offsite monitoring (long re-sponse time)
Windpower	• High upfront costs • Critical component failures • Wind resource variability • Offshore cable laying
Biomass power	• Fuel supply availability / variability • Resource price variability • Environmental liabilities associated with fuel handling and storage
Biogas power	• Resource risk • Planning opposition associated with odor problems

Source: kfw – Fiancing RE - Instruments, Strategies, Practice Approaches

Typology of risks and their mitigation
Risk management

- Risks should ideally be transferred to the party (or parties) best able to manage them.

- Solutions in order to mitigate risk:
  - Retain the risk and attempt to mitigate it internally;
  - Transfer the risk by allocating it to another party;
  - Transfer the risk to an entity whose core business is risk management (e.g. an insurance company).



- Own risk management
- Risk allocation

Typology of risks and their mitigation
Risk management

- All risks should be correctly identified, as much as possible quantified, and assessed in their consequences for the project;
- Definition of risk tolerance limits;
- Residual risks are properly allocated and managed.

Decision criteria

✓ The consequences of particular risks are catastrophic or not?
✓ The risks are controllable at the micro level or not?
✓ The consequences are reversible or not?
✓ The risks are insurable or not?
✓ How much is to pay for somebody else covering the financial damage resulting from a certain risk?
✓ How much resources will be spent to deal with all this?

Typology of risks and their mitigation
Risk management

Partners for risk allocation

- The host government, which is chiefly responsible for creating the proper legal and institutional environment in which developers will feel reasonably protected.
- The development banks: by lending to the project while taking political risk, providing partial risk guarantee (products or political risk insurance cover.
- Export Credit Agencies (ECAs), which can cover part of the commercial risk.
- Professional risk takers (like Insurance Companies)

Thanks