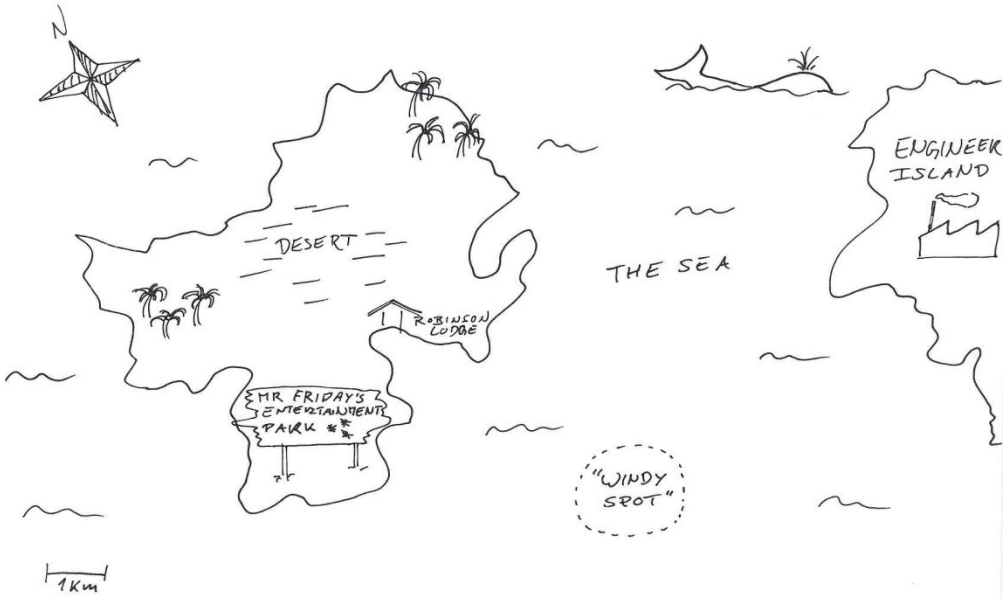


E.ON Inhouse Consulting
Example Case Interview: Robinson

This is an example case study to help you prepare for your interviews at E.ON Inhouse Consulting. Go through the first chapter to practice – ideally with a partner who can challenge your thinking and give feedback. Find the solution in the second chapter.

Content

Can you help Mrs. Robinson? (1/2)

Part 1:

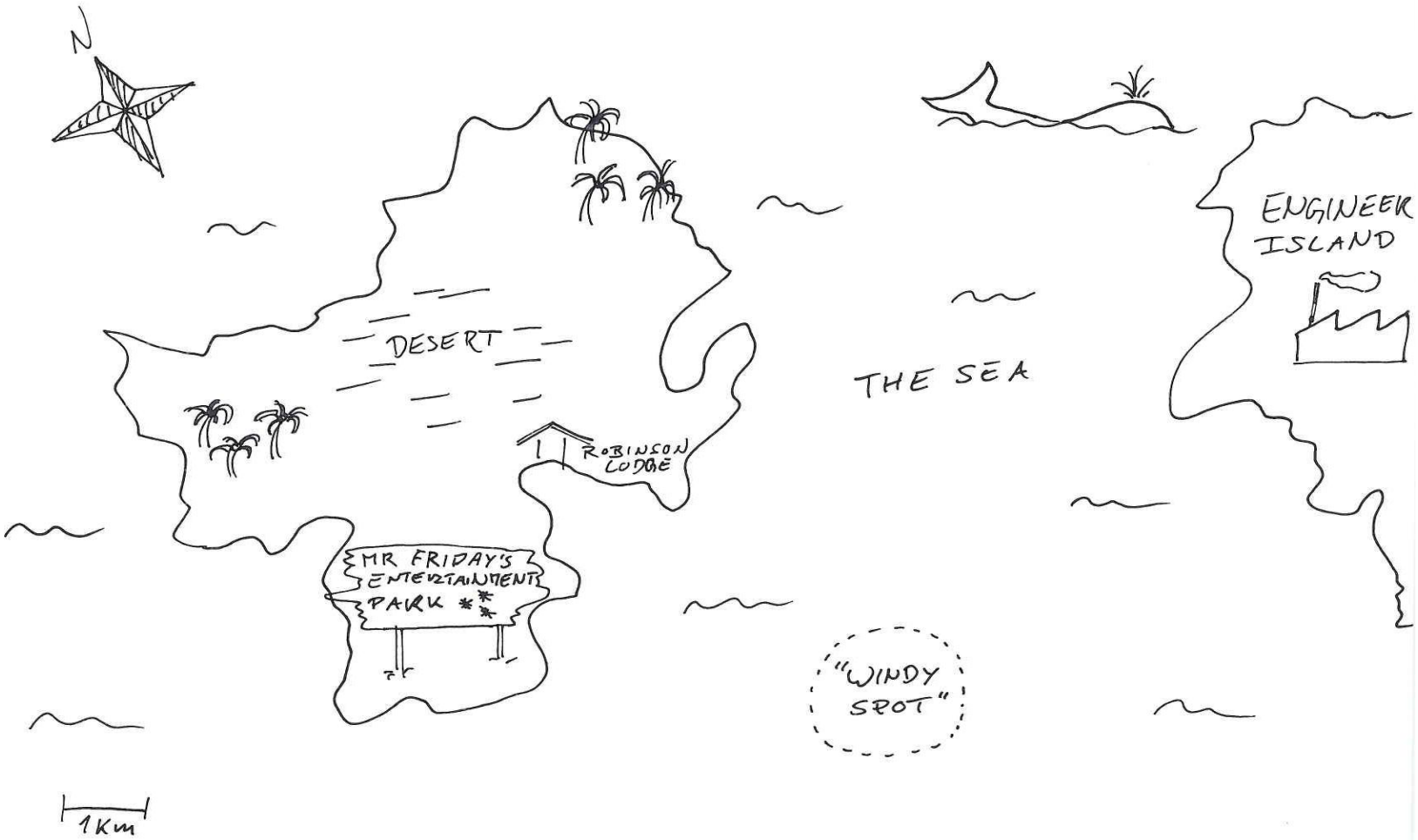
*Mrs. Robinson and Mr. Friday live on an island [**see Handout 1**]. Their only access to civilization and trade are the inhabitants of the neighboring island, a people of excellent engineers (they also have electricity). The island is quite large with a small desert in the middle, surrounded by stormy sea. Mr. Friday has found a treasure some time ago and now lives off this fortune; he has build a private entertainment park near the shore requiring 1000x more energy than a normal household – but he has no electrical power yet! Mrs. Robinson is far less wealthy than Mr. Friday, but she has a great entrepreneurial spirit, know-how and enough money to invest. She is keen to supply Mr. Friday with power to earn some of his Euros. Her equipment suppliers are the neighboring engineer islanders; but she has access to neither fossil nor nuclear fuels.*

How much power is needed?

What are the options for Mrs. Robinson?

What does she need to consider in her decision making generally?

Handout 1: The Island



Can you help Mrs. Robinson? (2/2)

Part 2:

What factors could influence the technology decision (except for CAPEX required)?

Part 3:

Suppose now that Mrs. Robinson's engineering suppliers on the neighboring island only make a reasonable offer on wind power technology.

How should she decide between offshore and onshore systems given the following information? [use Handout 2]

Part 4:

Suppose now that Mrs. Robinson's finds out about potential differences in O&M cost.

[use Handout 3]

Conclusion:

What is your recommendation for Mrs. Robinson?

Handout 2: Onshore vs. Offshore

KPI	Unit	Offshore	Onshore
Time horizon	Years	10	10
Load factor	%	60%	25%
CAPEX wind turbine	EUR/kW	1,500	1,000
CAPEX sea cable	EUR/kW	500	.
Demand	MWh/year	5,000	5,000
Price	ct/kWh	10	10

REMINDER:

- 1000 kW = 1 MW
- Load factor = running time / total time
- Output = capacity x time [kWh = kW x h]

Handout 3: Onshore vs. Offshore – New Information

KPI	Unit	Offshore	Onshore
Cost of O&M	ct/kWh	5	2

Content

Solution (1/4)

Part 1:

How much power is needed?

- Mr. Friday needs in the area of ~5000 MWh of power (1000 x 5000 kWh, which is roughly the European average for a household)

What are the options for Mrs. Robinson?

- Mrs. Robinson could build up renewable generation with a suitable transmission and storage system, mainly: Wind power onshore, Wind power offshore, Hydro power, Solar PV, Concentrated solar power, Biomass

What does she need to consider in her decision making generally?

- Need to consider invest per capacity, output (demand), price and O&M cost
- Need to consider technology risks
- Need to consider whether Mrs. Robinson could just install an interconnector from neighboring island

Solution (2/4)

Part 2:

What factors could influence the technology decision (except for CAPEX required)?

- Mrs. Robinson should consider external factors influencing the output and the stability/risk of systems
  - Wind power onshore: How much wind is there? How many hours per year?
  - Wind power offshore: How much wind is there? How to solve foundation issue? Where is site exactly/accessibility? Need transmission.
  - Hydro: Are there suitable sites: Rivers, waterfalls, tidal power, etc. ?
  - Solar PV: Is there sufficient sunlight? Can use diffuse light. Which technologies feasible: Thin film / conventional mono-crystalline silicon? [deep knowledge – nice-to-have only]
  - Concentrated solar power: Direct sunlight available? E.g. in desert. Need transition cable. (Has storage solution integrated.)
  - Biomass: Sufficient fuels available in a sustainable way?

Solution (3/4): Onshore vs. Offshore

	KPI	Unit	Offshore	Onshore	Comment
Information	Time horizon	Years	10	10	
	Load factor	%	60%	25%	
	CAPEX wind turbine	EUR/kW	1,500	1,000	
	CAPEX cable	EUR/kW	500	.	
	Demand	MWh	5,000	5,000	
	Price	ct/kWh	10	10	
Side calc. 1	Running hrs	hrs/year	5,256	2,190	= 24h * 365d * Load factor
	Approx. running hrs	hrs/year	5,000	2,000	Rounded for easier calc.
Capacity needed	Capacity installed	kW	1,000	2,500	= Demand / Running hours * 1,000
Side calc. 2	Price	EUR/MWh	100	100	= Price in ct/kWh * 1000 / 100
Earnings	Revenues	EUR/year	500,000	500,000	= Price * Demand
	Invest	EUR	2,000,000	2,500,000	= Capacity * Sum of CAPEX
	Depreciation	EUR/year	200,000	250,000	= Invest / Time horizon [linear]
	Profit after deprec.	EUR/year	300,000	250,000	= Revenue - Depreciation
New information	Cost of O&M	ct/kWh	5	2	Mainly maintenance (offshore includes ship), driven by production (wear), not capacity
Side calc. 3	Cost of O&M	EUR/MWh	50	20	= Cost in ct/kWh * 1000 / 100
	Cost of O&M	EUR/year	250,000	100,000	= Cost in MWh * Demand [= Output]
Earnings	Profit after O&M	EUR/year	50,000	150,000	= Revenue - O&M cost - depreciation

Solution (4/4)

Conclusion:

What is your recommendation for Mrs. Robinson?

- Top-down summary of findings and most critical areas
- Reference to risk of maintenance in offshore windparks (hard during some times of the year, need ships etc.)

E.ON Inhouse Consulting GmbH

Brüsseler Platz 1
D – 45131 Essen

energize-your-career-econ@eon.com
www.eon.com/econ

Managing Director: Dr. Nanna Rapp
Registered Office: Essen
District Court: Essen HRB 24332