Future Exploration 3
Example: steps 4-7

Exploring the future: Scenario Analysis

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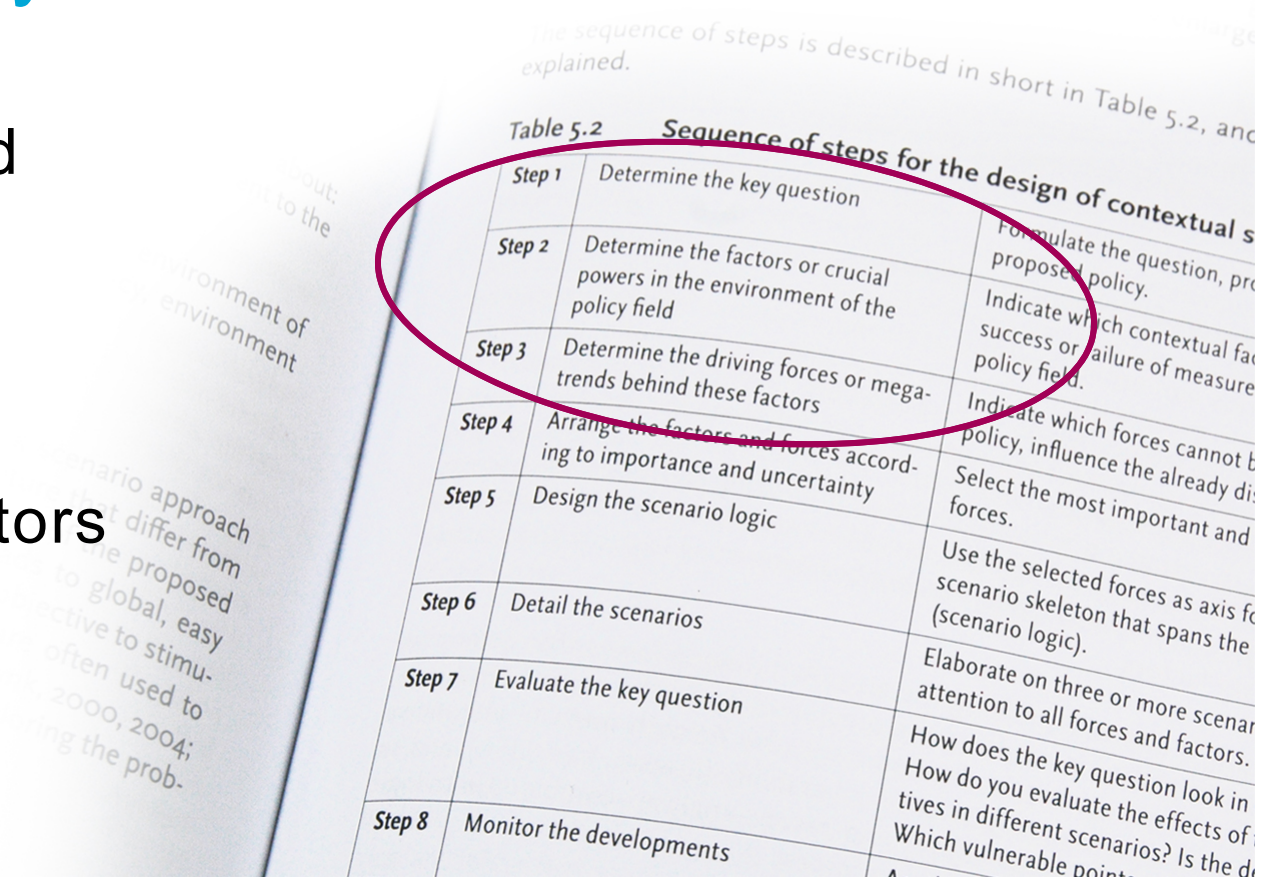
Challenge the future

Scenario Analysis

Structured method

Step 1-3

- Key question
- Contextual factors
- Driving forces



explained.

Table 5.2 Sequence of steps for the design of contextual s

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Step 6	Detail the scenarios	Elaborate on three or more scenar attention to all forces and factors.
Step 7	Evaluate the key question	How does the key question look in How do you evaluate the effects of tives in different scenarios? Is the d
Step 8	Monitor the developments	Which vulnerable point

Work progress

- List of 10-20 contextual factors. √
  - Influence on system performance indicated √
- Driving forces identified √
- Variety of driving forces wide enough √

- Relevance of driving factors for exploring futures?

Step 4: Classify driving forces

- Uncertainty
  - What assumptions are being made?
  - Likelihood that an assumptions fails?

- Impact
  - What if ……?
  - How do values of criteria change?

You need arguments for classification……

		Uncertain	
		Low	High
Impact	Low		
	High		

You need arguments for classification……

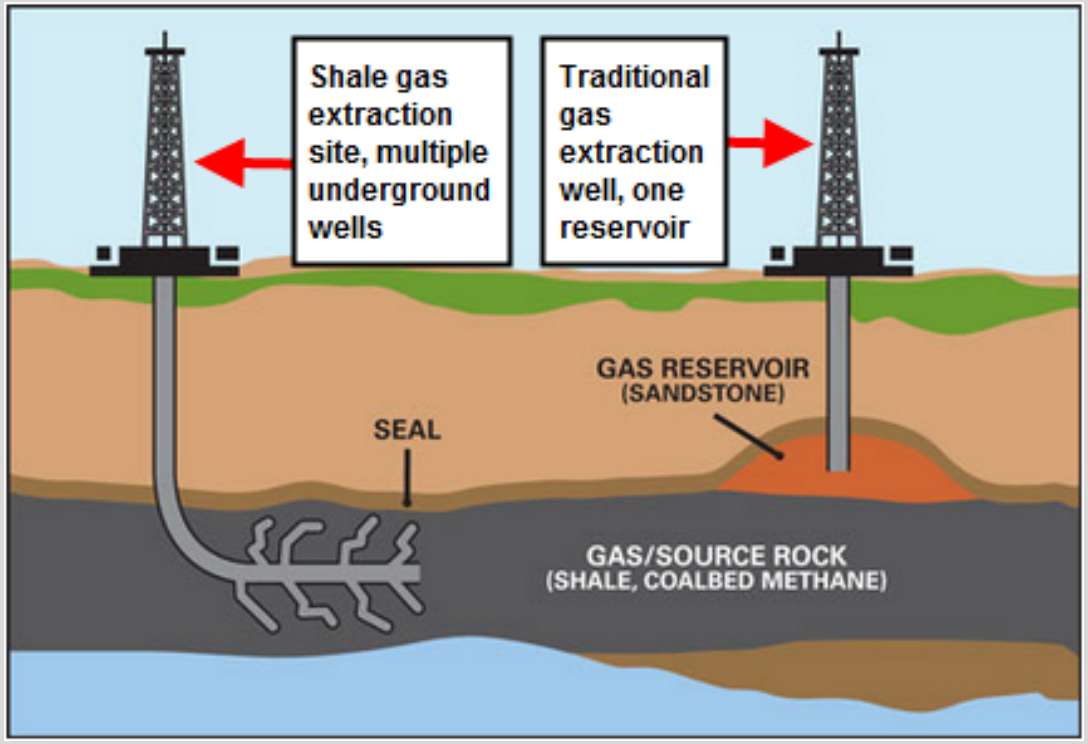
		Uncertain	
		Low	High
Impact	Low		
	High		German economy

You need arguments for classification……

		Uncertain	
		Low	High
Impact	Low		
	High	German economy	

Example……

		Uncertain	
		Low	High
Impact	Low	Aging population	Power EU
	High	Nuclear safety German economy	Innovation Shale gas in USA



Source: greenplanetethics.com

Critical driving forces

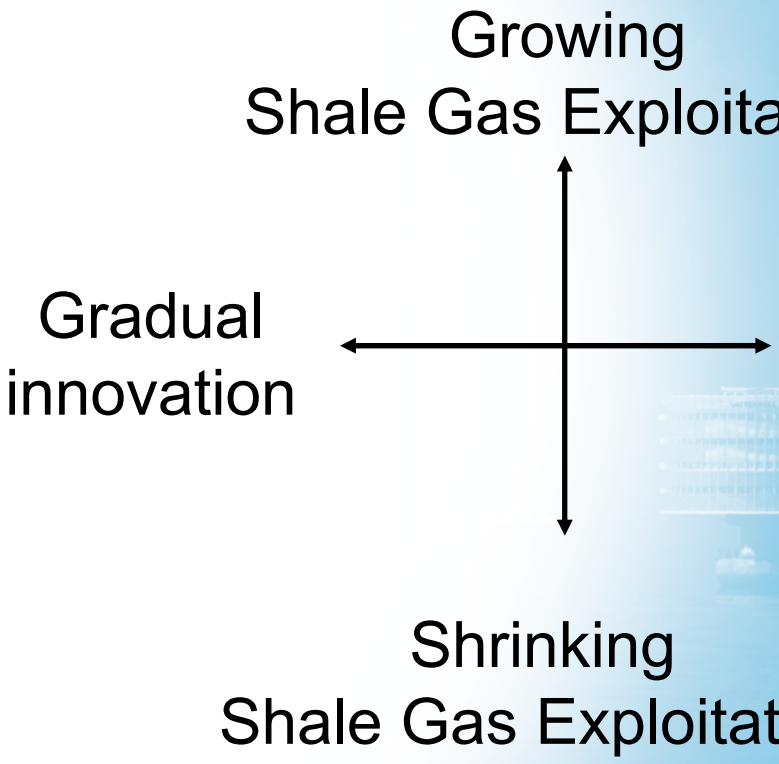
D1: Innovation

- Gradual / Disruptive

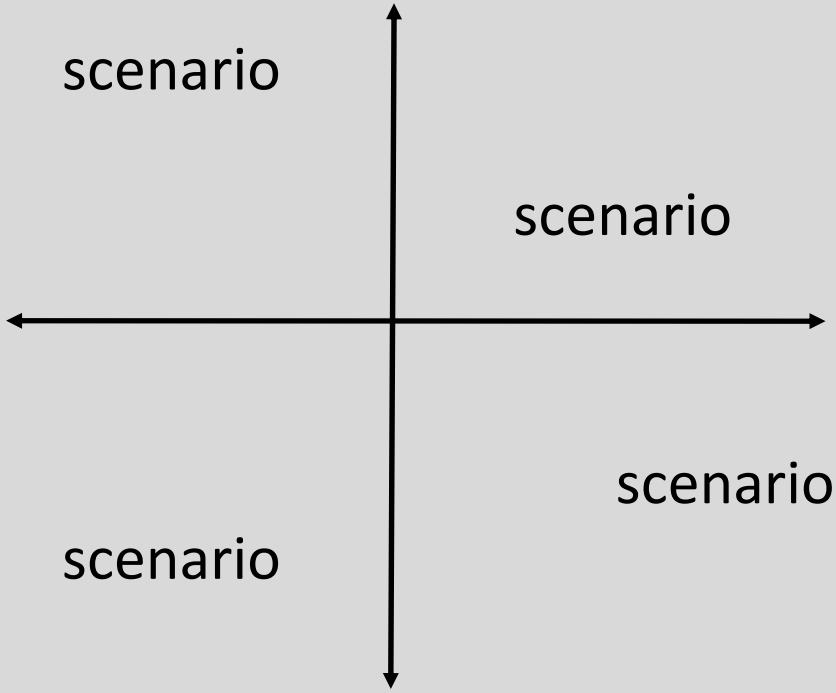
D3: Shale Gas USA

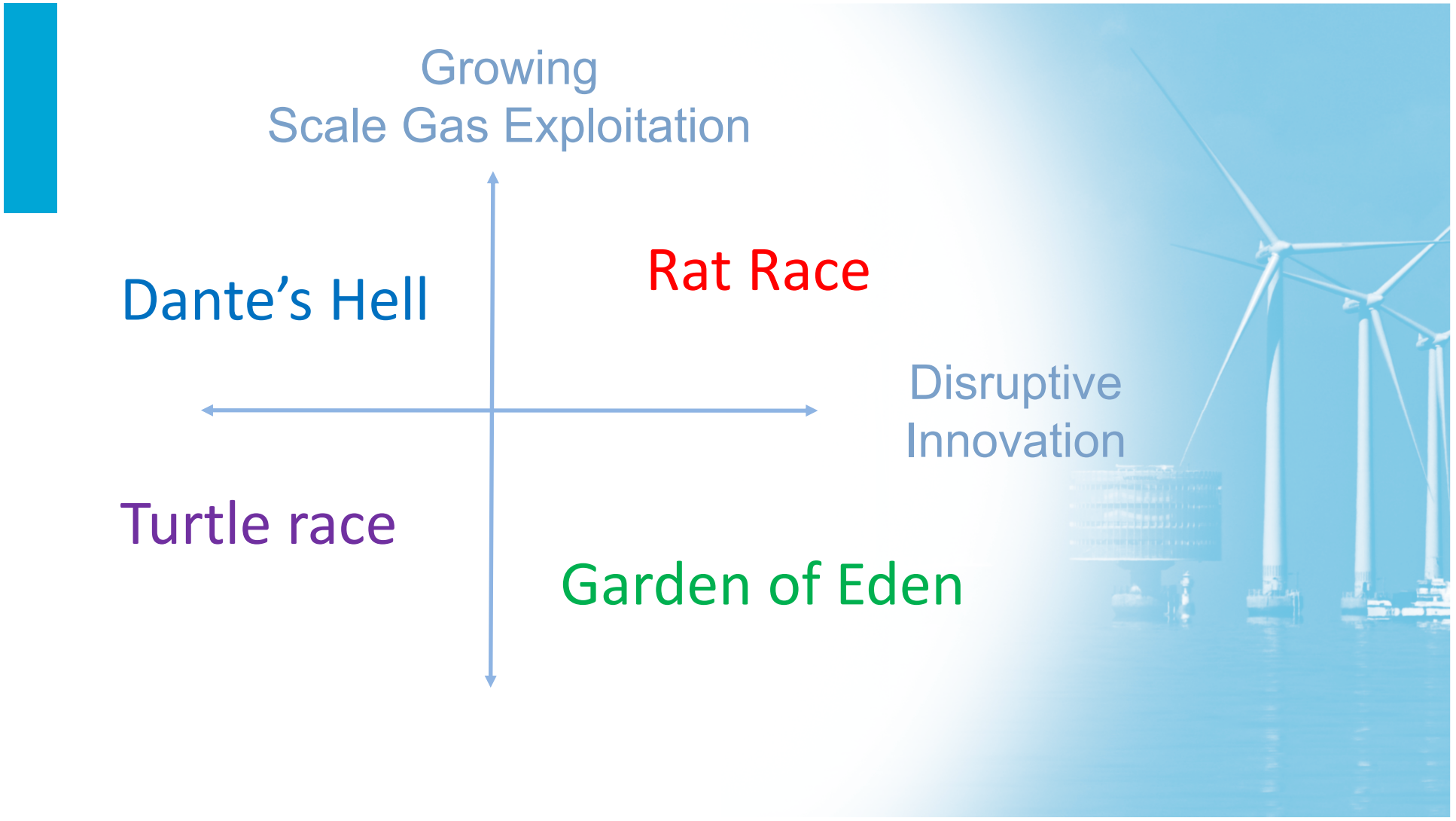
- Growing / Shrinking

Step 5: Scenario Logic



Step 6: Detail scenario




Growing
Scale Gas Exploitation
Dante's Hell
Rat Race
Disruptive
Innovation
Turtle race
Garden of Eden

Rat Race……

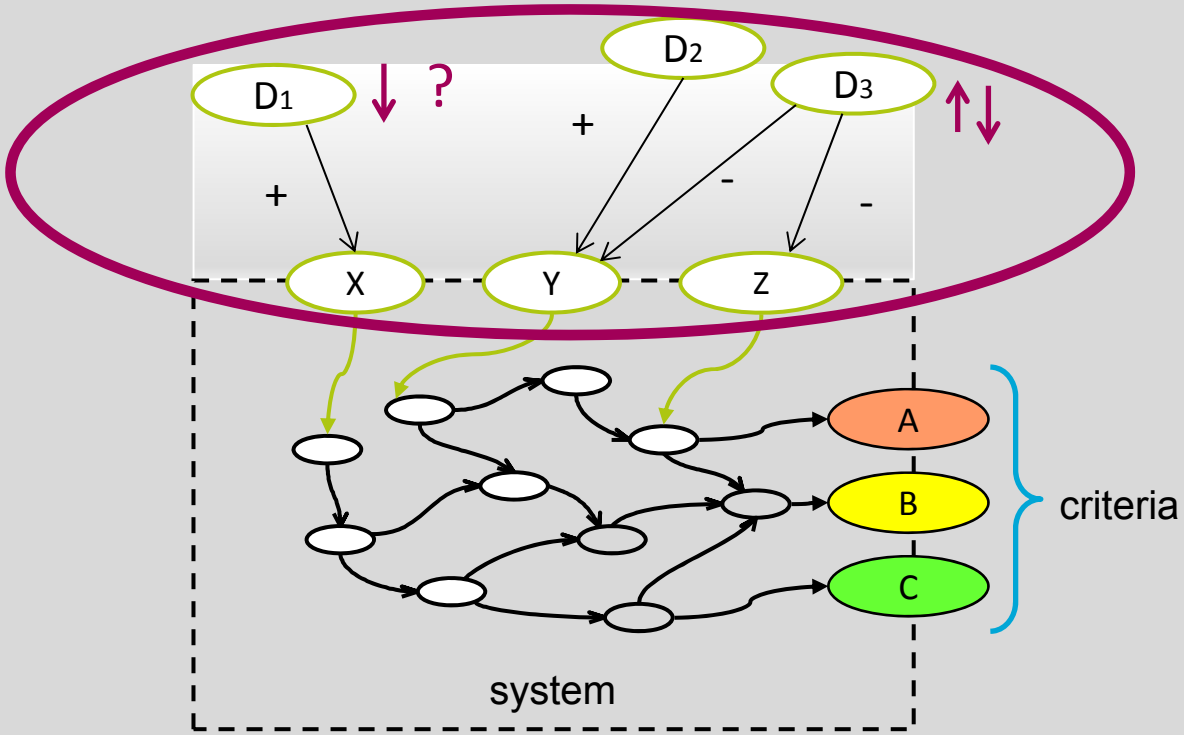
Scale gas exploitations sears. Threat to environment.

Energy prices in USA drop. Threat to EU industry.

Innovative use of hydrogen gas enables cheap storage of wind energy. Large scale implementation.

Green image and decreasing prizes of non-fossil energy in EU. Competitive edge for EU?

More than 2 context scenario's



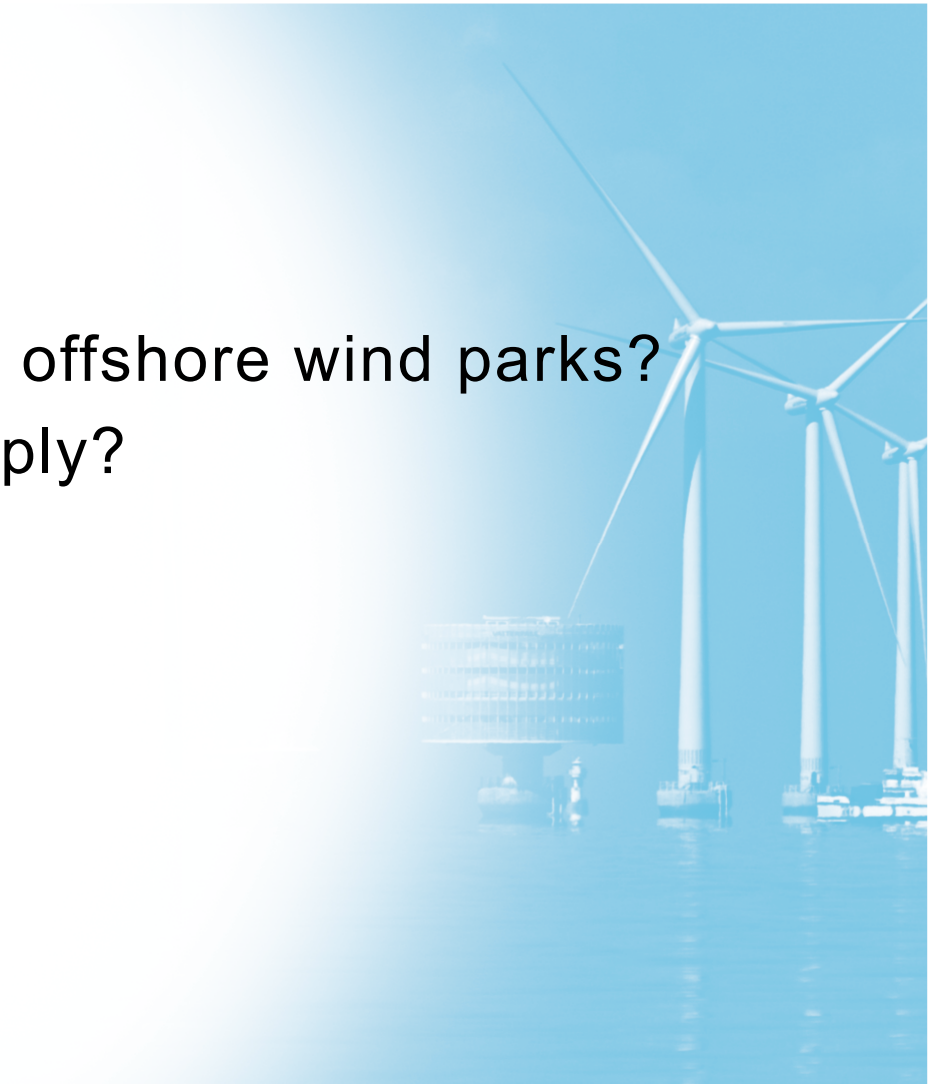
Step 7: Evaluate the key question

- Investigate effects of scenario's on
    - Effectiveness of means
    - Valuation of system performance

- Then, go back to step 1 and answer the questions

Step 1: Key question

- availability of locations for offshore wind parks?
- reliability of electricity supply?
- affordability of electricity?



Future developments may affect……..

- Availability of offshore wind mill locations?
  - Spatial planning & reservations needed in all scenario's
  - Slow rate of building wind mill parks best in 3 scenario's
- Reliability of electricity supply?
  - More important for short term than long term considerations
- Affordability of electricity?
  - Price of electricity is main concern in all scenario's!

Conclusions?

Strategic behavior of client, stakeholders?

Effectiveness of the different means M1, M2, M3…..

Make qualitative concequences table.

Knowledge gaps?

Have you found relationships between critical variables that are not well understood?

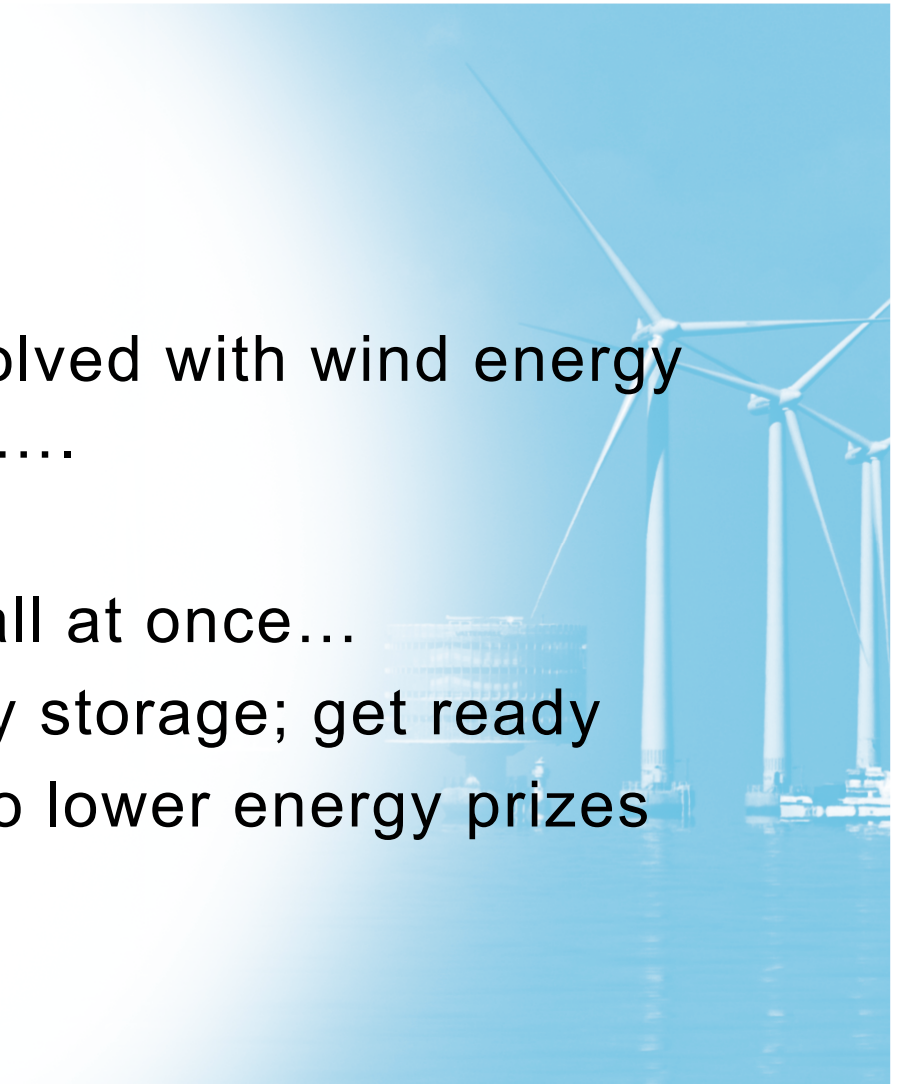
Recommendations…..

Many obstacles and risks involved with wind energy expansion in 3 of 4 scenarios….

>> Do not give out locations all at once…

>> Invest in innovation energy storage; get ready

>> Invest in EU cooperation to lower energy prizes

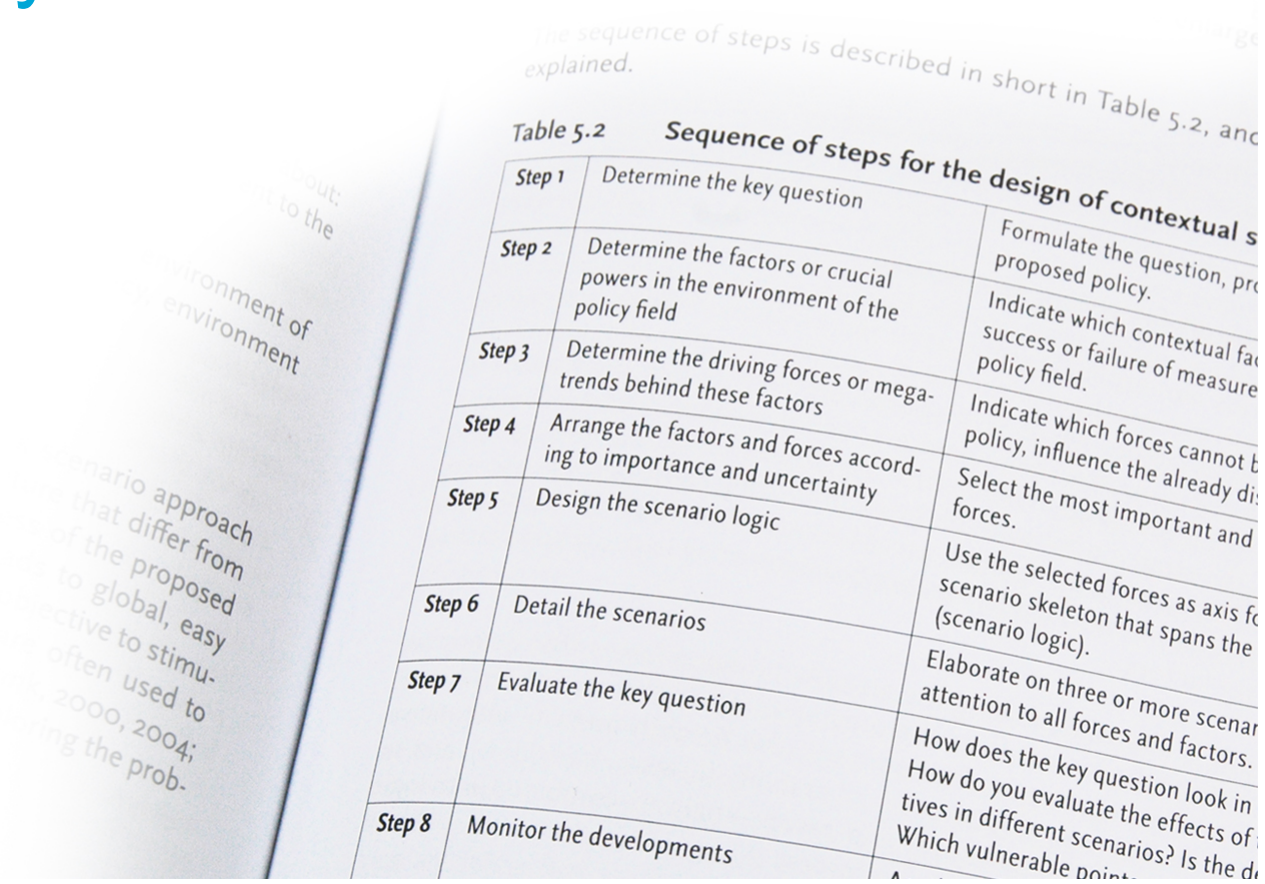


Knowledge gap

What is the preferred order
to allocate zones for wind mill parks?

- What objectives are suited for ranking?
- Quantify! Multi-criteria analysis!
- Outcome of sensitivity analyses for different futures?

Scenario Analysis



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Thank you for your attention!