Climate Action in Financial Institutions

Managing Uncertainty

Webinar – February 24th, 2020

Housekeeping rules

- **Participation**
  - Webinars of the Initiative aim to foster discussion;
  - Active participation is very much welcome!
- **Audio quality**
  - Participants are invited to mute their microphone, when they are not speaking.
- **Recording**
  - The webinar is being recorded;
  - The recording will be shared with Supporting Institutions of the Initiative (only);
  - Participants who would like not to be recorded can contact alice.pauthier@I4CE.org.
- **Materials**
  - All webinar materials are available on the private platform of the website;
  - The presentation was shared with participants ahead of the webinar and can be downloaded at the link included in the chat.
  - The Secretariat will prepare and circulate minutes of the webinar.
- **Any problems or questions?** Send a message via the chat function or an email to alice.pauthier@I4CE.org

Webinar Agenda

Introduction – 5 minutes

- Housekeeping rules
- Welcome remarks and presentation of the agenda

Presentation of the report Towards an alternative approach in finance to climate risks: Taking uncertainties fully into account- 30 minutes

- Introduction: Uncertainty in climate risk management
- Presentation of decision-support tools used in other sectors to manage uncertainty
- Presentation of authors' suggestions to adapt these tools to finance

Discussion – 20 minutes

- Discussants: Alexis Bonnel and Camille Laurens-Villain (AFD)
- Open discussion

Conclusion – 5 minutes

Climate Action in Financial Institutions
PRINCIPLES FOR MAINSTREAMING CLIMATE ACTION

Presentation of the report

Towards an alternative approach in finance to climate risks: Taking uncertainties fully into account

Vivian Dépoues (I4CE), Vincent Bouchet (Groupe Caisse des Dépôts & Chaire Energie et Prospérité)

I4CE
INSTITUTE FOR CLIMATE ECONOMICS
Une initiative de la Caisse des Dépôts et de l'Agence Française de Développement

Managing Uncertainty

[MainstreamClim Initiative] WEBINAR

2020-02-24

Vincent Bouchet (CDC) – Vivian Dépoues (I4CE)

> *While ignorance of uncertainty leads to error, certainty of uncertainty leads to strategy.*
>
> *E. Morin*

A discussion paper

Vivian Dépoues (I4CE) | Vincent Bouchet (Groupe Caisse des Dépôts & Chaire Energie et Prospérité) | Michel Cardona (I4CE) | Morgane Nicol (I4CE)

➔ www.i4ce.org/download/pour-autre-approche-risque-climatique-en-finance-tenir-pleinement-compte-des-incertitudes/

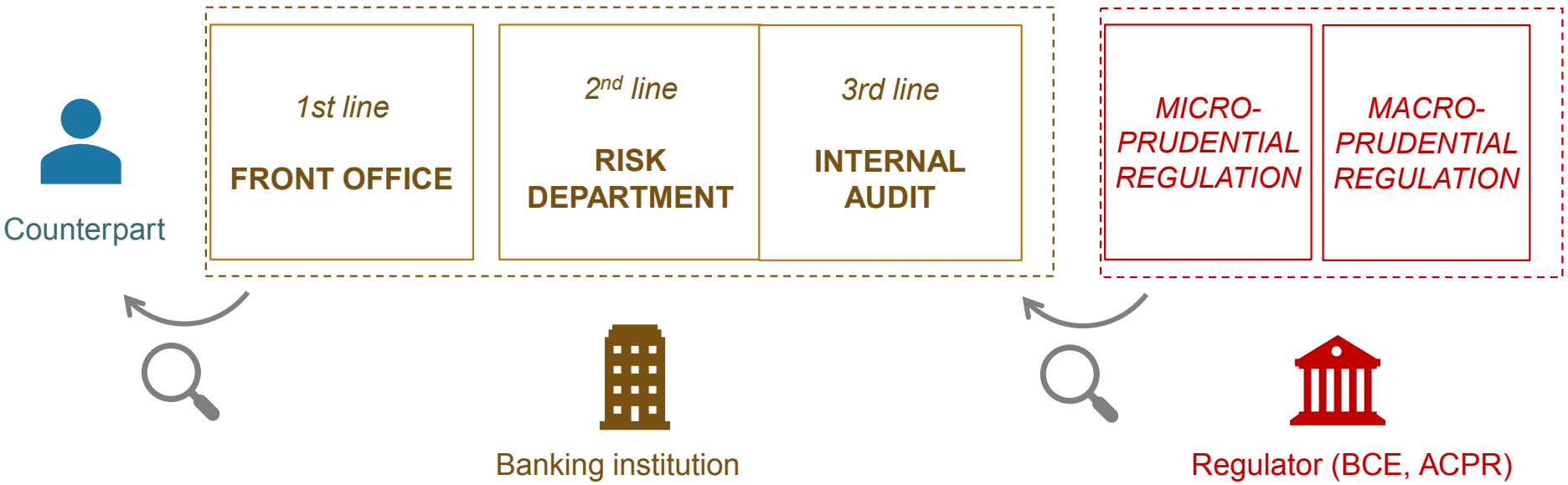
TABLE 1. SUMMARY OF THE THREE SOURCES OF RADICAL UNCERTAINTY IN THE EVOLUTION OF THE CLIMATE

Source of uncertainty	Natural variability of climate (stochastic/ontological uncertainties)	Scientific (or epistemic) uncertainties	Socio-economic uncertainties
Associated risks	Physical risks	Physical risks	Physical and transition risks
Origin and nature of uncertainty	The climate is a chaotic system with non-linear and non-deterministic behaviour. Differences from one simulation to another, even with the same model and scenario.	The climate is a complex system that we can only partially describe and represent. Modelling limit. Differences between the results of different models even with the same scenario.	Relating to the global economy's greenhouse gas emissions trajectory (what transition to low carbon?)
Outlook for changes in the level of uncertainty	Essentially non-reducible uncertainty	Uncertainties that could be reduced with the progress of modelling (both in terms of computing power and understanding of dynamics). However, scientific advances are not linear.	Depends on political and economic scenarios and their interpretation (perceived credibility) by economic actors
Time horizon at which this source of uncertainty predominates	Short term	Medium term	Long term
Ability to manage uncertainty	Known unknowns: there are certain variables and dimensions on which we know the intrinsic limitations or those linked to lack of understanding/ modelling choices of the projections made. But also unknowns, *i.e.* components of the system that could present disruptive behaviours and surprises, particularly when moving away from the common areas of variability.		Scenarios can be drawn up that can identify limits to what is possible, but not to assign probabilities

Source: authors

Inadequate traditional financial risk management approaches

Three lines of defense model:



Main risks that a banking institution faces

Credit risk. This is the risk that the borrower will default and not repay its loan in full when due

Market risk. This is the risk of fluctuations in the prices of the financial securities that make up a portfolio.

Solvency risk. This is the risk that the bank will no longer be able to pay its debts or even its deposits.

Liquidity risk. This is the risk of being unable to meet its short-term commitments (cash outflows) by using its liquid assets.

Transformation risk. This is the risk that results from an excessive imbalance between the duration of assets and the duration of liabilities.

Main decision-making processes

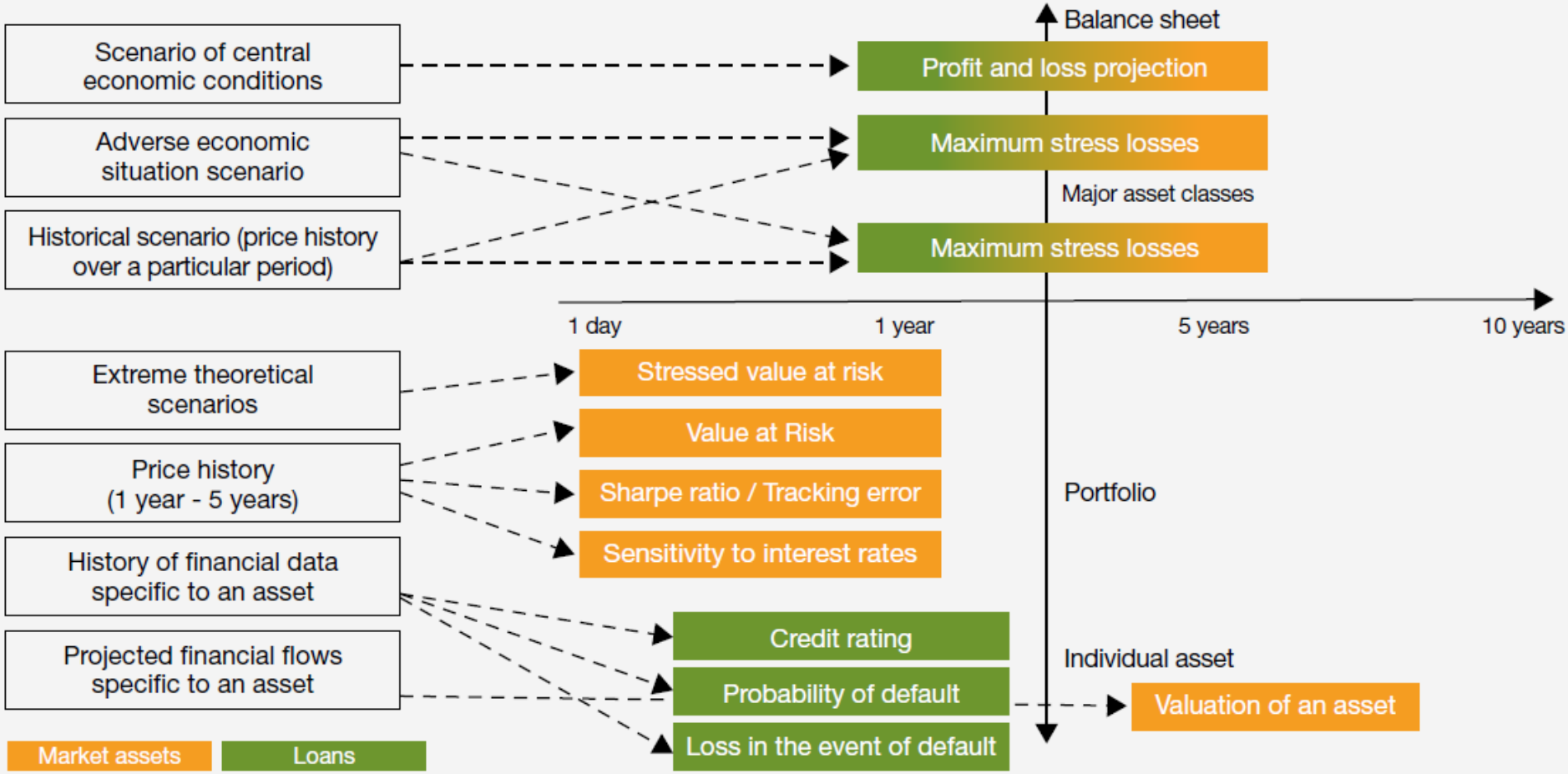
TABLE 2. SIMPLIFIED TYPOLOGY OF DECISION-MAKING PROCESSES IN THE CONTEXT OF A TRADITIONAL BANKING ACTIVITY

	Process / decision	
Level	**First line of defence**	**Second line of defence**
Banking portfolio	• Lending	• Setting a loan limit
		• Making provisions for losses (IFRS 9 standards)
	• Changing the composition of a bank loan portfolio	• Checking portfolio compliance with risk appetite framework
Market portfolio	• Increasing or reducing a position	• Setting an investment limit
	• Changing the composition of a market portfolio	• Checking portfolio compliance with risk appetite framework
Assets and liabilities	• Defining the optimal allocation between major asset classes • Defining the optimal financing of the institution	• Checking the solvency of the institution (compliance with the risk appetite framework and the regulatory ratio)
		• Checking the liquidity of the institution (compliance with the risk appetite framework and with the LCR and NSFR regulatory ratios)
		• Checking compliance with stress tests (internal and regulatory)

Source: authors

Main risk indicators

FIGURE 2. MAIN INDICATORS ACCORDING TO THE LEVEL OF ANALYSIS TO WHICH THEY APPLY AND THE TIME HORIZON ASSOCIATED WITH EACH INDICATOR



Source: authors

Difficulties in integrating climate risks into traditional approaches

‘Tragedy of the horizons’ (Carney, 2015)

Granularity and contextualisation of input data

Assigning probabilities to scenarios

Representation of disruption dynamics

Alternative approaches: learning from other sectors

General principles of exploratory approaches

- *Predict-then-act* ➔ exploring a diversity of possible futures
  - Leaving aside the desire to model risks and the possibility of optimising choices according to a likely future
  - Assessing the performance of different management options with regard to this diversity
- *How to think systematically in the face of a wide range of potentially contradictory assumptions and decision parameters*
- Non-probabilistic approaches

From scenario analysis to scalable and robust decisions

- Crafting multiple exploratory scenarios:
  - Collective (qualitative, experts-based) scenario construction
  - *Scenario discovery*
- Understanding vulnerabilities first + risks propagation
  - Under wich condition migh the assessed option fail?
  - How different policy options might behave under a variety of future conditions ?
  - Decision according to its own priorities, valuing two complementary performance criteria: adaptability and robustness.

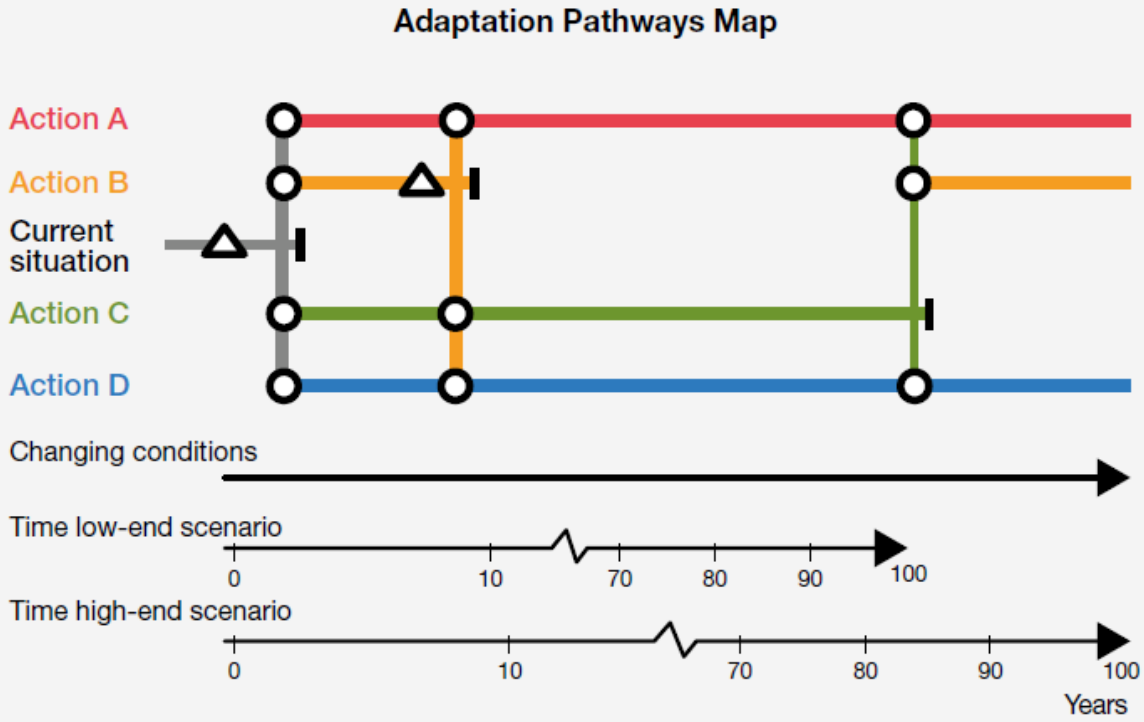
Adaptability

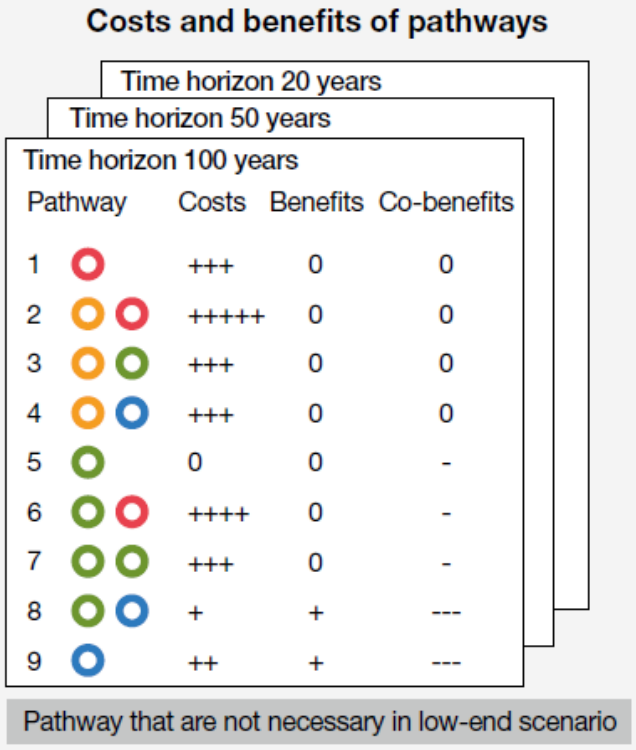
- Avoiding lock-in by by considering: the reversibility of choices and their flexibility or adaptability

  - **Real option analysis (ROA) :**
    - Assessing the costs and benefits associated with each management option envisaged
    - Difficult to implement (heavy and data-intensive analysis): particularly useful for decisions involving significant capital costs and low reversibility
    - ***Dynamic adaptation pathways*** (Haasnoot et al. 2013)
    - Sequencing decision over time and comparing sequences
    - Adaptive management; monitoring; threshold and tipping point
    - Focus on no-regret actions + keeping options open as long as possible

Adaptability

FIGURE 3. EXAMPLE OF REPRESENTATION OF ADAPTATION PATHWAYS OVER TIME



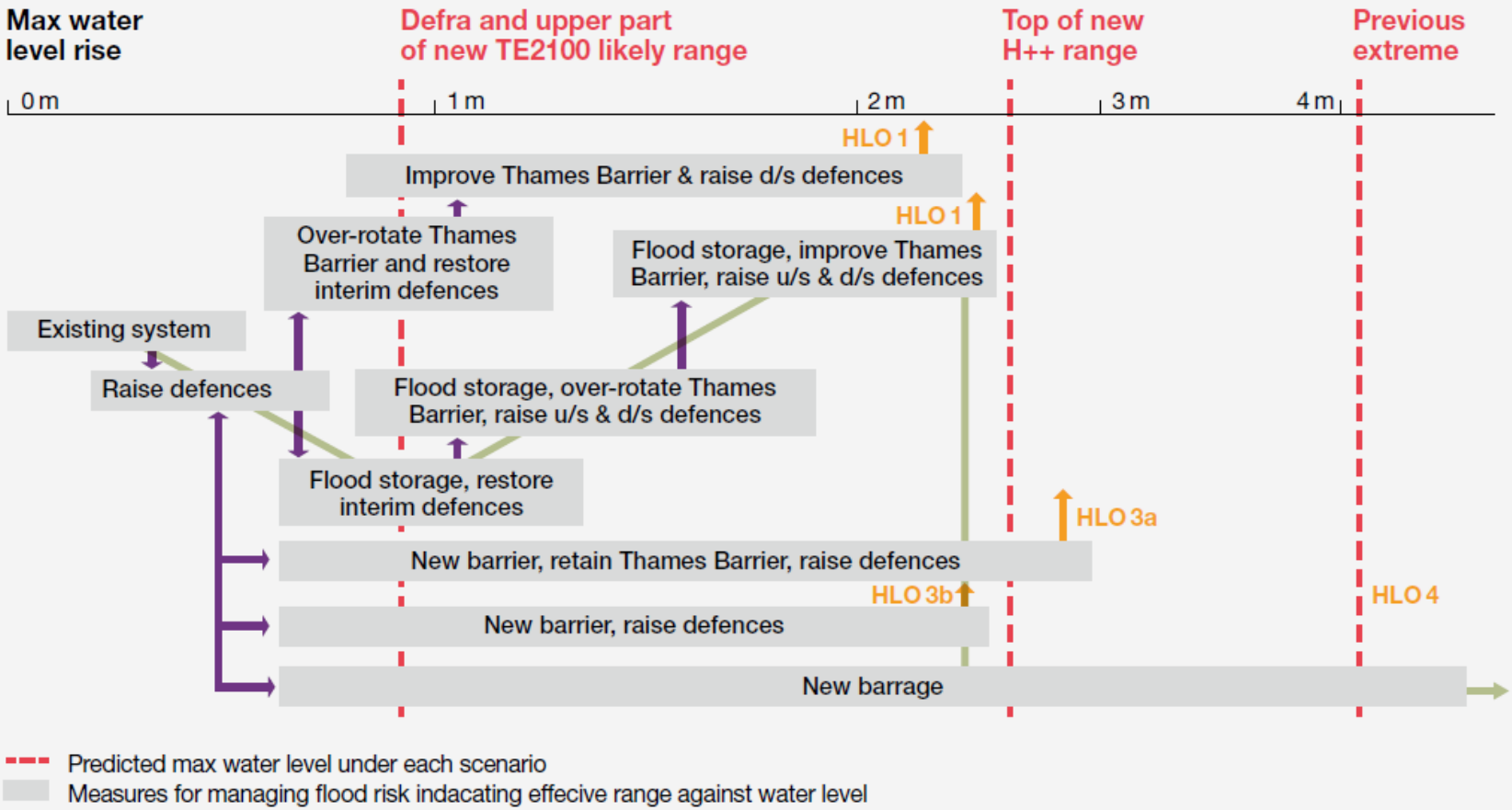


Transfer station to new policy action | Adaptation Tipping Point of policy action (Terminal) | Policy action effective | Decision node

Source: (Haasnoot et al. 2013)

9 NPV = Projected net present value + ("Value of options created - Value of options destroyed").

The Thames barrier example (London)



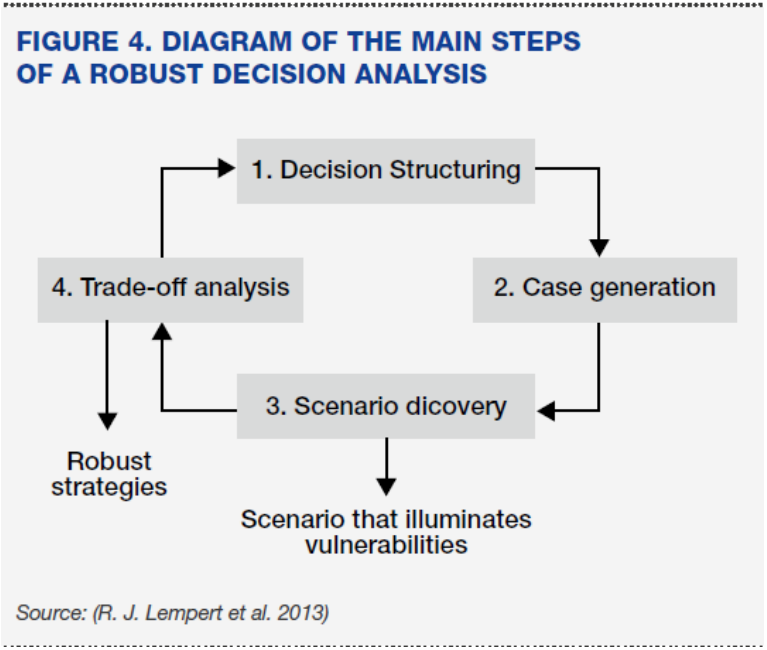
Sources : (UK Environment Agency 2012, 2016a, 2016b ; Penning-Rowsell et al. 2013 ; Ranger, Reeder, and Lowe 2013)

Robustness

- Favouring satisfactory results in a wide range of conditions and optimal results in very specific conditions.
  - Fiding among the available management options one that minimises regrets regardless of the possible futures.
  - When we can't afford not to achieve certain objectives (e.g. critical infrastructure).

Robust Decision Making (Rand Corp)

- A broad set of plausible scenarios for the future
- confront each planned decision with this wide range of possible futures
- Assessing its robustness, i.e. to what extent the option remains satisfactory regardless of the characteristics of the future
- Identifying the types of situations under which the envisaged decision would be non-efficient and highlight its weak points and vulnerabilities
- For example using a MinMax Regret criterion,



Example of application to the case of French nuclear policy

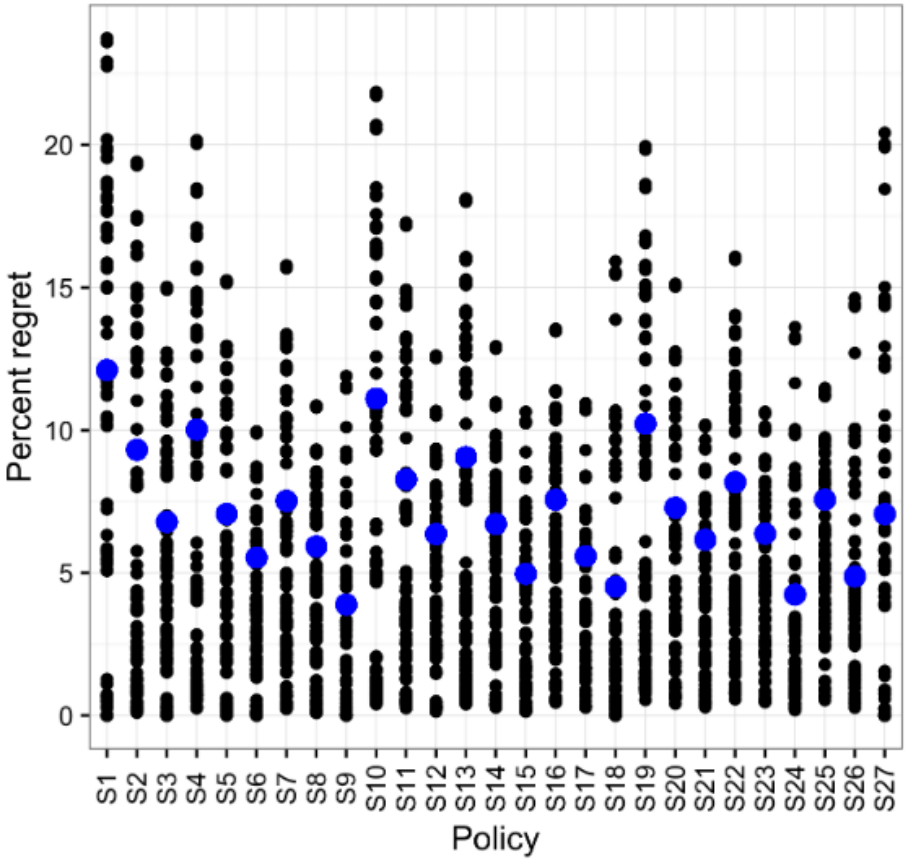


Figure 4: Regret of 27 strategies over 108 plausible states of future

Should France close (some of) its 58 reactors or should it invest to extend their life?

→ The decision depends on several uncertain factors, in particular the evolution of the cost of renewables, the real cost of refurbishing power plants, the evolution of electricity demand and the carbon price.

Towards an adaptation to finance?

Towards an adaptation to finance?

TABLE 4. APPLICABILITY OF EXPLORATORY APPROACHES TO BANKING MANAGEMENT PROCESSES

	Adaptability		Robustness
Process / decision	**Real option analysis**	**Dynamic adaptation pathways**	**Robust decision making**
Lending / investing for a specific asset (e.g. infrastructure, industrial, real estate projects)	++	++	++
Changing the composition of a bank loan portfolio	+	+	++
Modifying the composition of a market portfolio (long-term investment)	+	+	++
Defining the optimal allocation between major asset classes	++	++	++
Defining the optimal financing of the institution	+	+	+
Checking the institution's solvency	+	+	++
Checking the institution's liquidity	+	+	++
Checking compliance with stress tests (internal and regulatory)			++

Source: authors

Note: The "+"; "++" reflect the authors' subjective estimate of the relevance and feasibility of further exploring possible uses of these tools in these decision-making processes.

1. **Financing of specific assets: the only direct use**
2. **Management of stock or loan portfolios**
3. **Asset-liability management**

Discussion

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Thank you very much

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Discussants

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Discussion