Climate change adaptation in the energy sector: an interview study in European companies and public organisations

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ToPDAd project

- The Tool-supported Policy Development for regional Adaptation (ToPDAd) research project is funded by the European Commission (FP7)
    - objective: finding the best strategies for businesses and regional governments to adapt to the expected short term and long term changes in climate

- ToPDAd does this through delivery of state-of-the-art socioeconomic methods and tools for an integrated assessment of regional adaptation strategies

- The project will give policy and decision makers in European regions the tools necessary to make informed decisions on how to adapt to climate change, avoiding maladaptation

- It concentrates on the tourism, transport and energy sectors, from which the energy sector is emphasised in this presentation

Introduction

- This study provides important information on the needs of potential users of the climate change adaptation toolset to be developed by ToPDAd
  - Preliminary results of the first stakeholder interviews

- This is the first step in creating understanding of the collective action and principal-agent problem in climate adaptation:
  - Surveys are used to create a database of attitudes, decision rules and network influences for several categories of agents involved in climate adaptation decisions and/or actions, to understand the information needs of these agents in forming strategies of climate change adaptation

- The intent of the network and agent research is to better understand how stakeholders (agents) make use of scientific and economic information in their decisions on adaptation
- We then to use this understanding in the design of the ToPDAd information base and models to help inform effective decisions on adaptation throughout the network of relevant agents

Stakeholder/agent categories

We divide agents into two sub-networks, the governance
and governed organisations
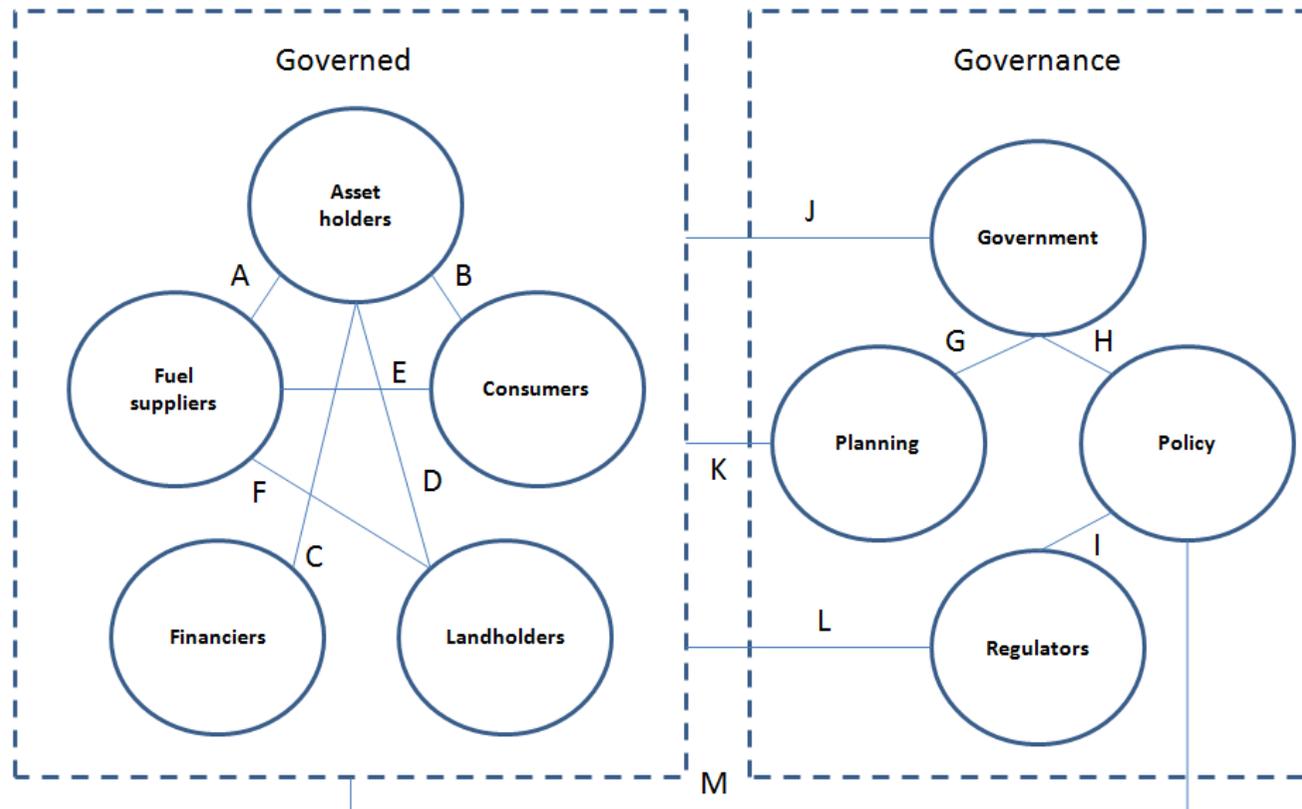
Functions of agents in the networks*

A. **Fuel suppliers** provide the primary fuel to **asset holders**, and asset holders create demand for that fuel

B. **Consumers** create demand (intermediate or final) for the services of the **asset holders**

C. **Financiers** provide investment capital for the **asset holders** (with investment decisions reflecting partially a concern over vulnerability to climate change)

D. **Landholders** may rent out the land on which **assets** are based (as in many windfarms), and take decisions on land use that influence climate risks to assets (e.g. from run-off)

E. **Consumers** may directly consume fuel, and so act as competitors to the **asset holders**, and create demand for that fuel

F. **Landholders** may be a provider of fuels such as biomass to the **fuel suppliers**

G. **Government** officials set the strategy for and oversee the operations of the **planning** process

H. **Government** officials set the legal framework for, and oversee the operations of the **policy** process

I. **Policy makers** establish the aims of the regulators, and the regulators provide the legal sanctions against **Governed agents** who fail to comply with the regulations specified in policy

J. **Government** interact with **Governed** through formation of political alliances, lobbying, etc

K. **Planning** interact with **Governed** through approval or denial of projects under the purview of the planning authorities, as well as being a potential avenue for resources for adaptation measures

L. **Regulators** interact with **Governed** through the legal sanctions (fines, etc) on actions, as well as being a potential avenue for resources for adaptation measures

M. **Policy** interact with **Governed** by establishing the societal aims of actions and projects, as well as being a potential avenue for resources for adaptation measures

*as shown on the previous slide*

Methodology

- Gathering information on the needs of stakeholders was identified as an important step when developing tools for climate change adaptation related decision-making
  - Public and private organisations operating in the energy sector were interviewed
  - The interviews were recorded and analysed
  - Organisations interviewed are located in Austria, Finland, France, Germany, the Netherlands, Spain, Switzerland or in the UK, although some of them have Europe-wide activities

- 25 questions were posed to the stakeholders covering their current and planned adaptation strategies, as well as ideas regarding policy, scientific and tool support

- In the initial survey, 15 organisations were interviewed, with a focus on individuals in the organisations with knowledge of the adaptation response of their agent category

Distribution of respondents according to the agent/stakeholder categories
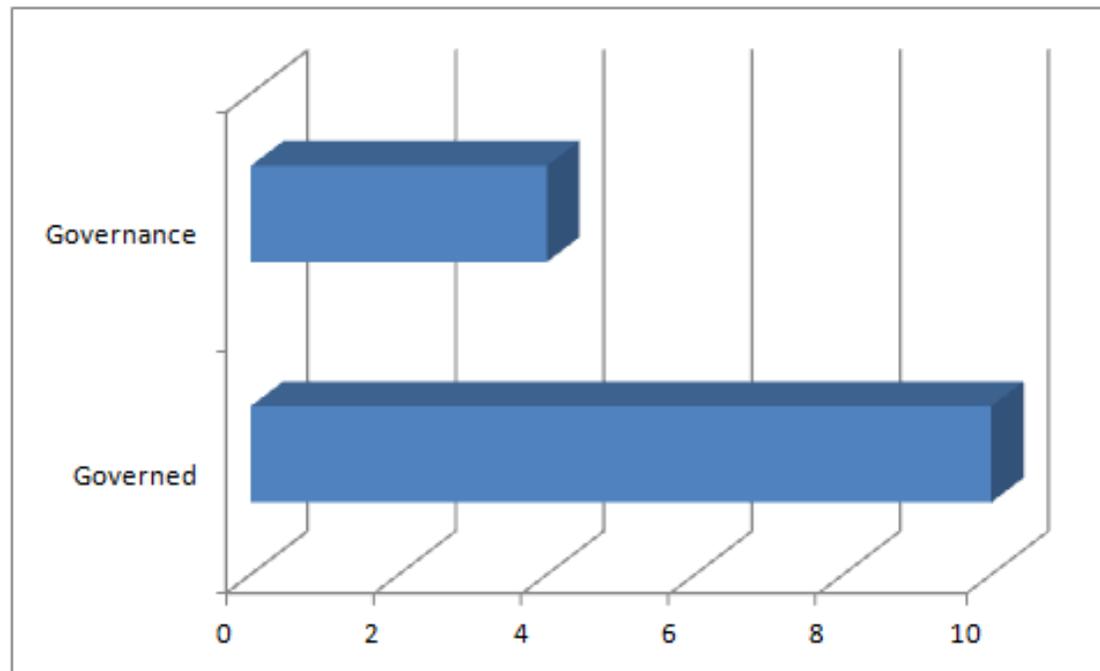
Distribution of respondents according to the agent/stakeholder categories
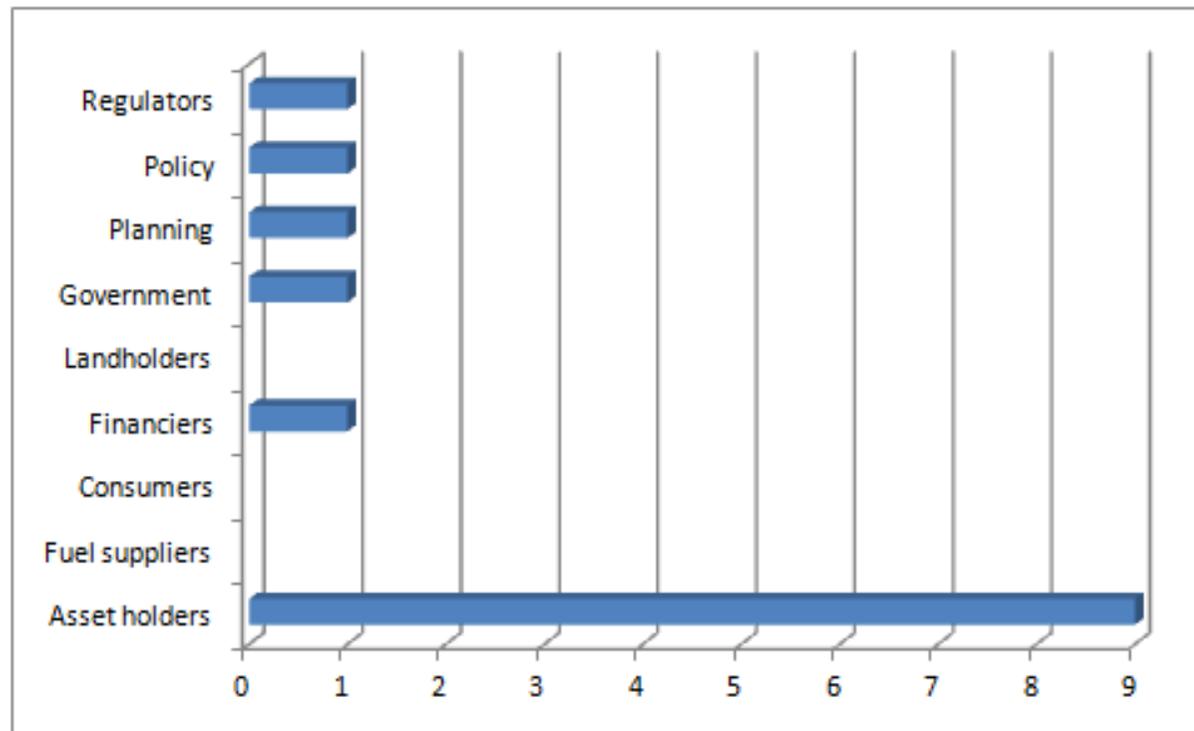
Results

How do you perceive the risks and benefits of climate change to your realms of responsibility?

- **1A. How will climate change affect your operations?**
  - 1Ai. Negative effects?
  - 1Aii. Positive effects?

- **1B. What is the time scale of your concern?**
  - 1Bi. Are these effects of concern primarily in the short term (next 20 years)?
 - 1Bii. Are these effects of concern primarily in the long term (>20 years)?

- **1C. Does variability or long term averages dominate your decisions?**
  - 1Ci. Is a shift in variability of climate significant in your decisions?
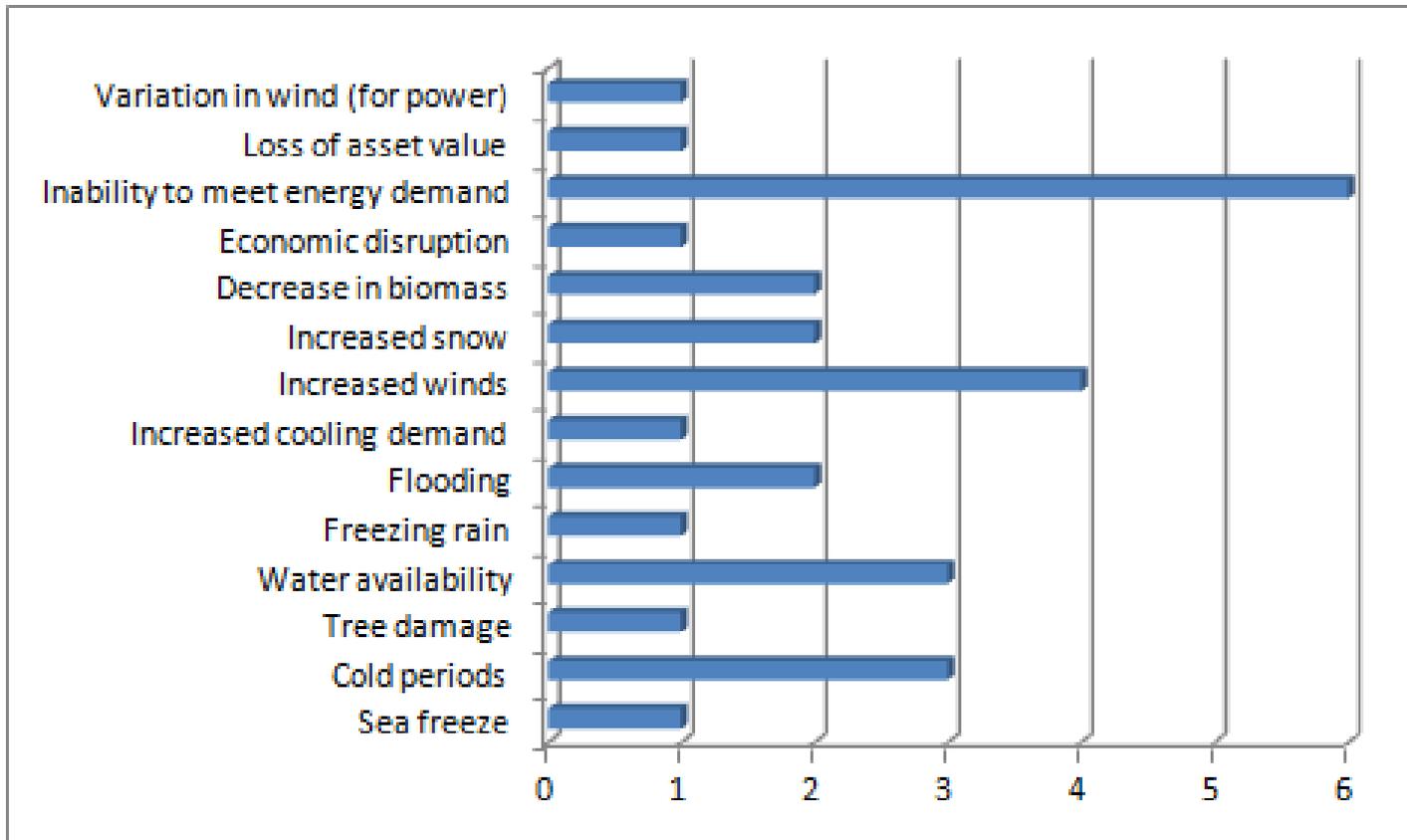 - 1Cii. Is a shift in long term average climate significant in your decisions?

Are decisions influenced more by information on variability of climate or long-term trends?
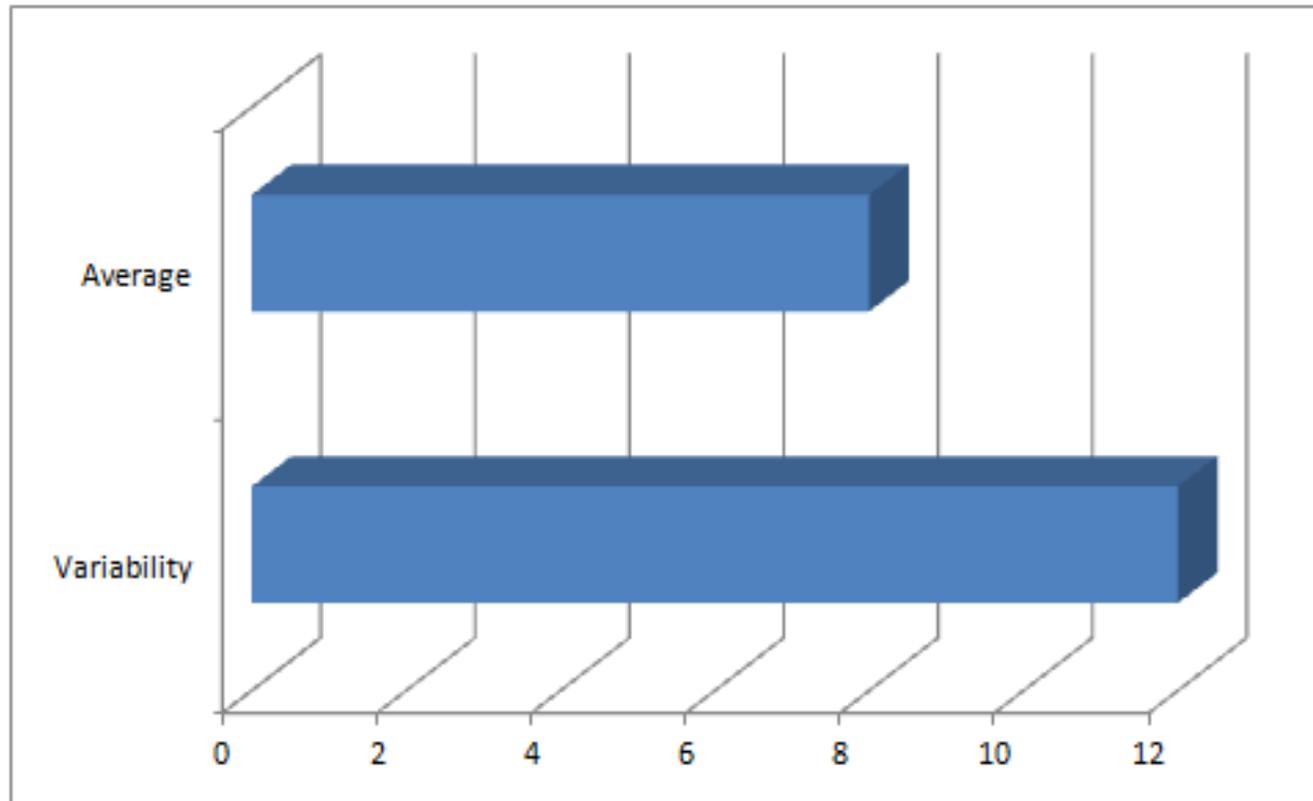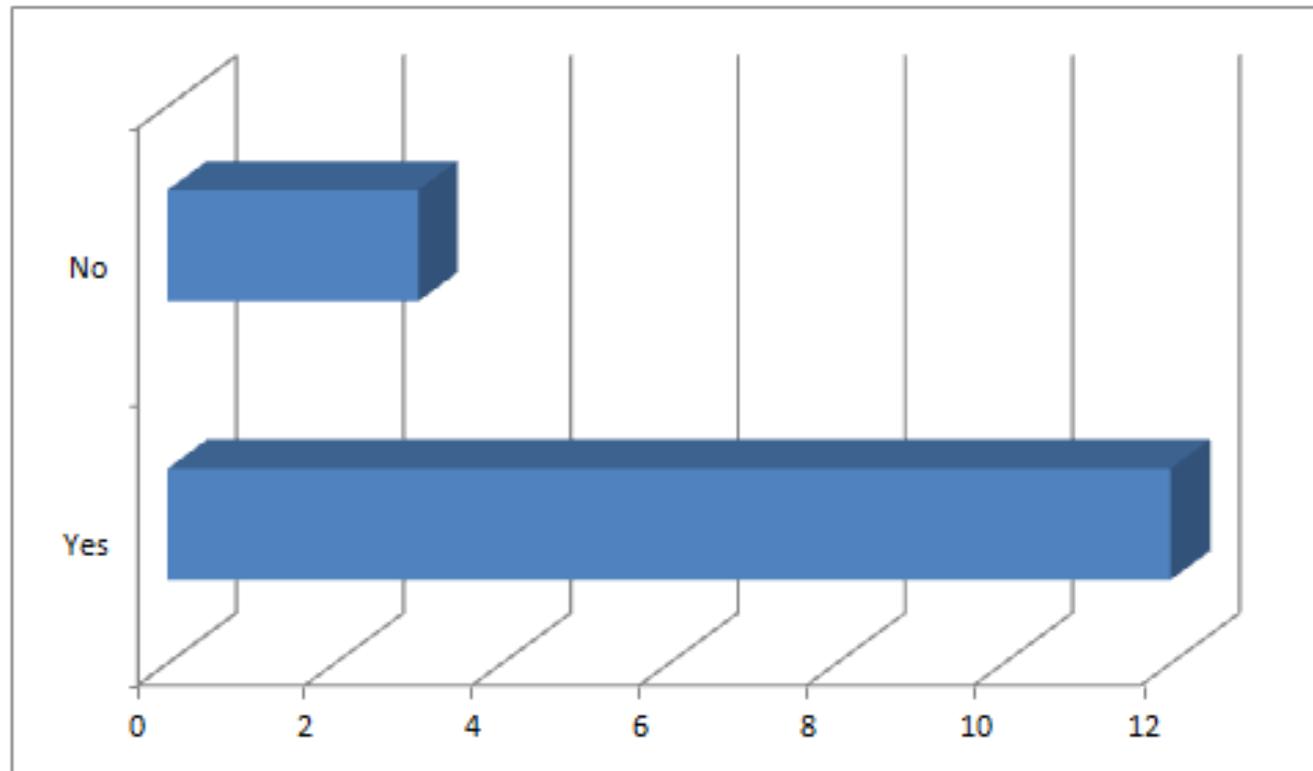
Does climate change carry any benefits/opportunities for your organisation?
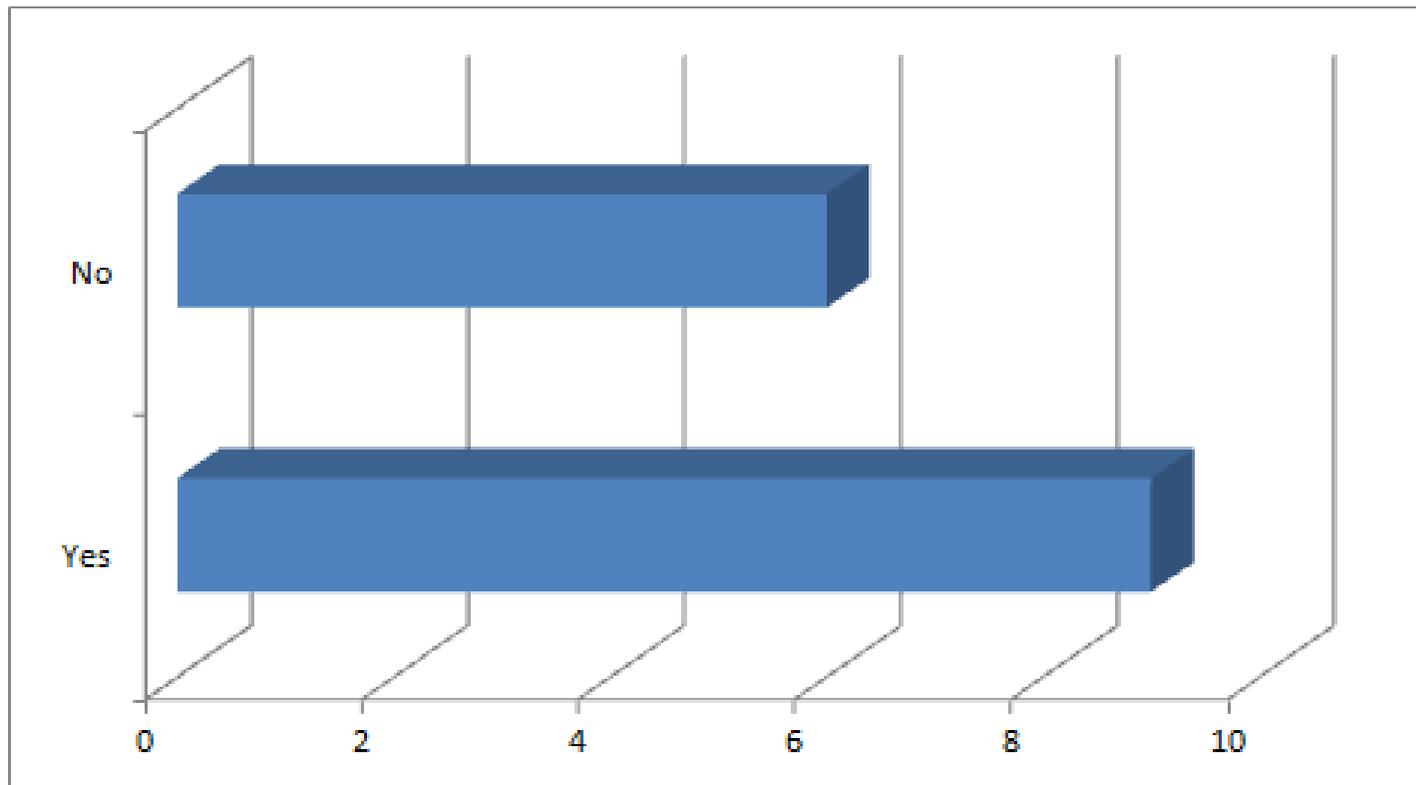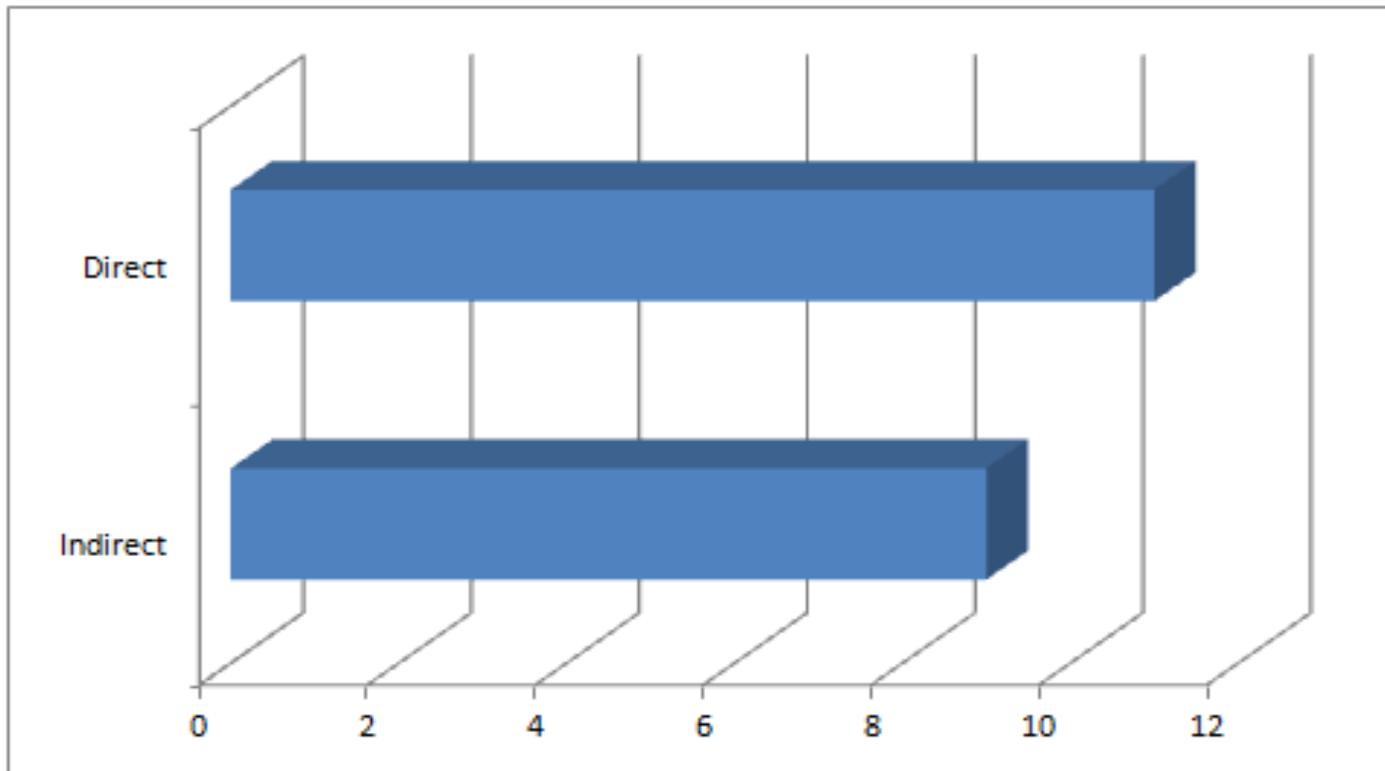
Which climate change impacts are of significant concern?

Do you have a need for additional information on climate change and/or impacts from outside your organisation?

Are the impacts on your organisation primarily direct or indirect*?

*indirect effects are when the initial damage is to another organisation in the economy, but passes through to the interviewed party due to the mutual interrelationships among the various sectors of economy.
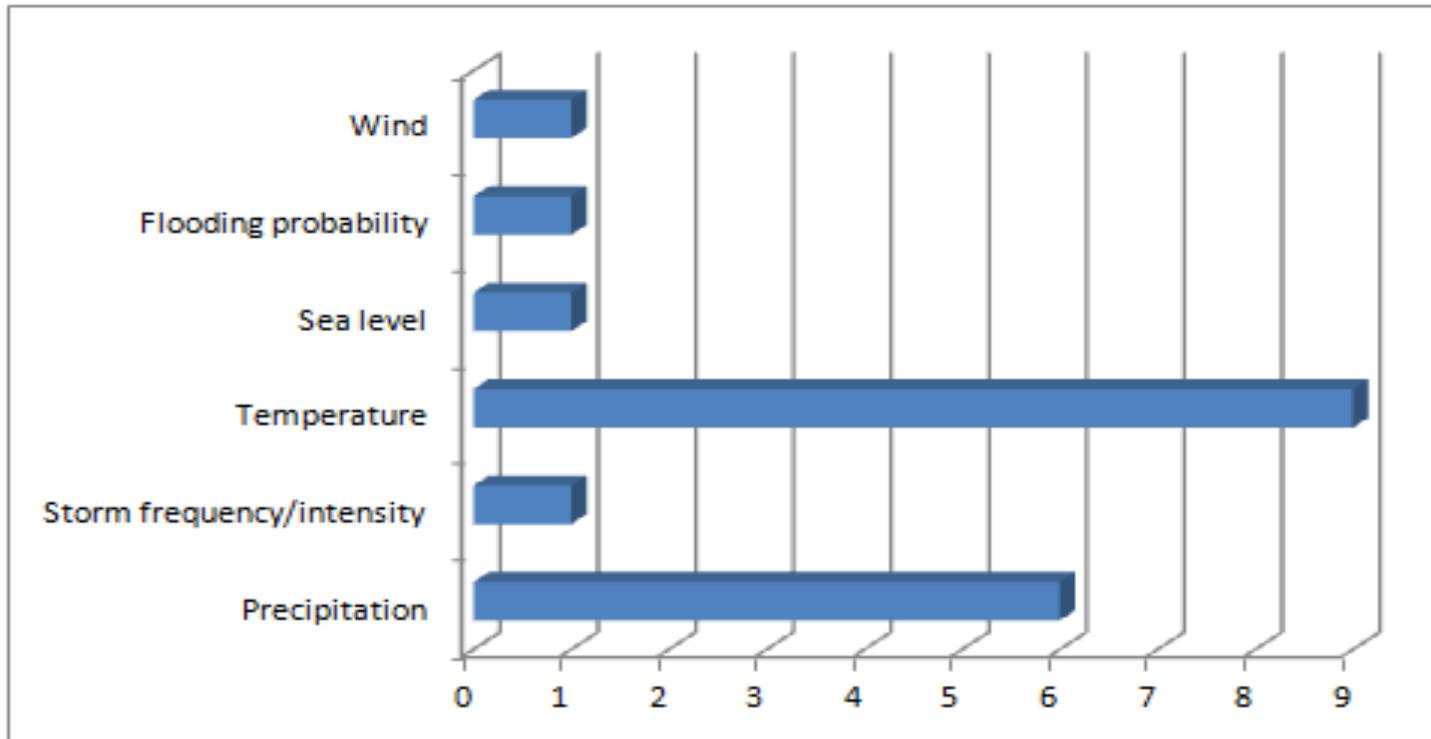
Results

What information do you feel would help you take more reliable decisions on adaptation?

- 2A. Do you have a need for additional information about climate change parameters?

- 2B. If yes, which parameters are most relevant to help you take decisions?

- 2C. What additional support tools (data, models, etc) would improve your ability to obtain needed information?

- 2D. What support from the science field would help you better understand your vulnerability and take decisions on adaptation?
    - 2Di. Information?
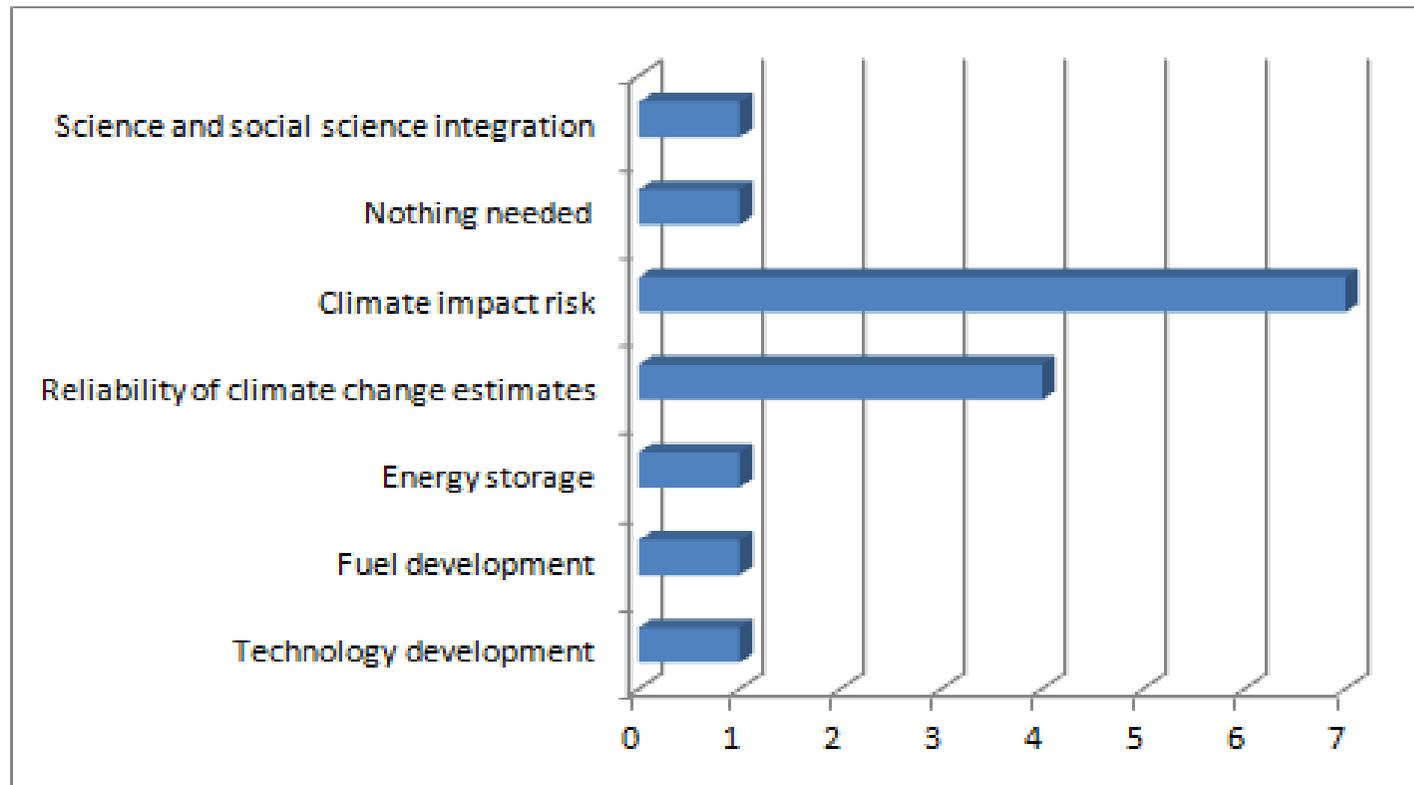   - 2Dii. Decision support tools?

Climate parameters of importance in taking adaptation decisions

Do your adaptation decisions require support from outside organisations?
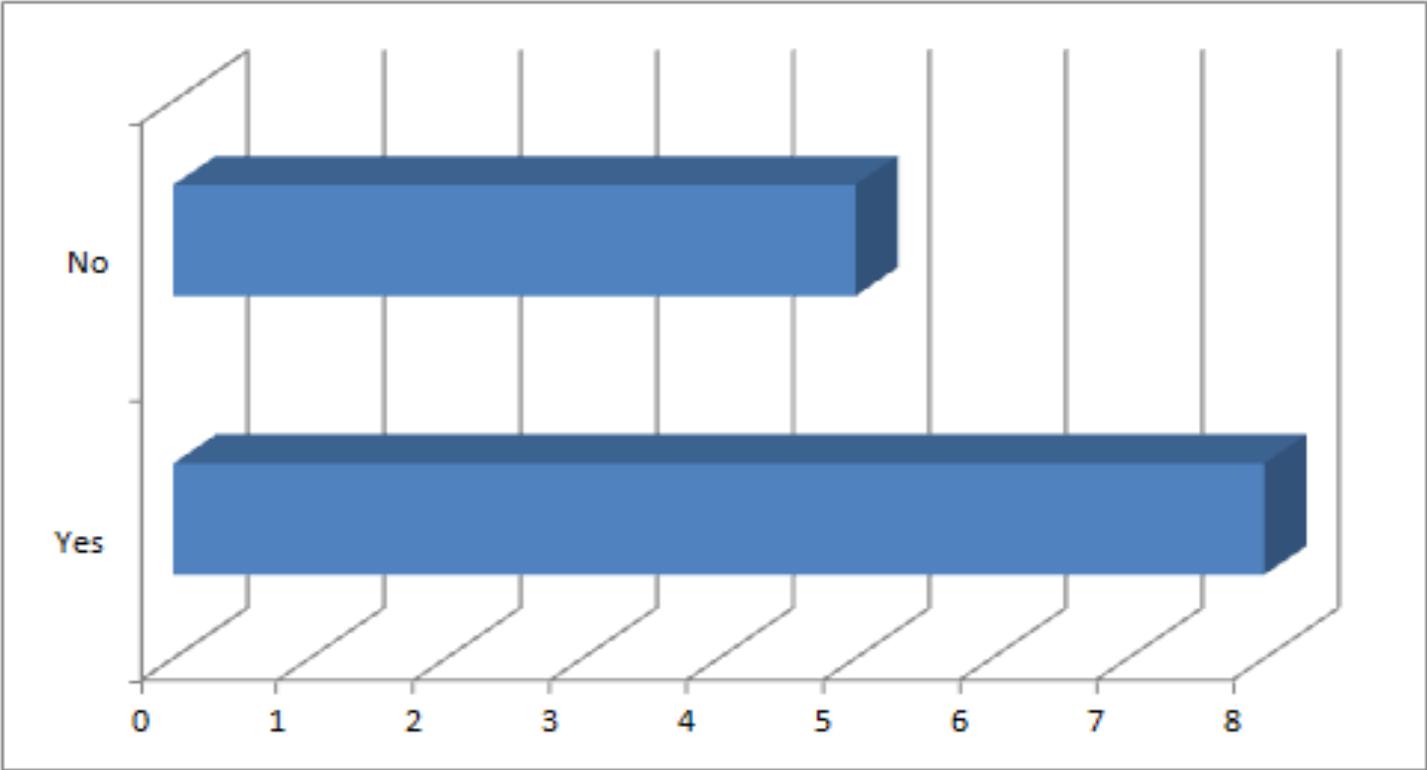
Primary support needed from the science community to better inform decisions

Results

What is your institutional capacity to generate and/or use that information?

- 3A. Do you have strategies to cope with climate shifts?
  - 3Ai. What measures are available to you to reduce vulnerability?
  - 3Aii. Do your decisions require selection between alternative measures?
  - 3Aiii. Can you currently support these decisions with your institutional capacity, or is there a need for external support?
- 3B. How are your adaptation strategies identified and assessed?
- 3C. Do you have the institutional capacity to monitor climate change as it evolves over the next several decades?
- 3D. What support from Governance (local, state or EU level) would help you to identify, assess and/or implement your adaptation strategies?
- 3E. What existing decision support tools (including scientific models) have you identified as being examples of useful, best practice?
- 3F. Consider the case in which a new decision support tool with state of the science capabilities were available.
  - 3Fi. Would you use it, or would someone else (e.g. a specialist) in your organisation have responsibility for its use?
  - 3Fii. How often would such a decision support tool be useful (daily, monthly, annually, decadally)?
  - 3Fiii. What would need to be the output from such a decision support tool if it were to significantly improve your decisions on vulnerability and adaptation?

Primary support needed by Governance agents to allow effective adaptation planning and implementation by Governed agents
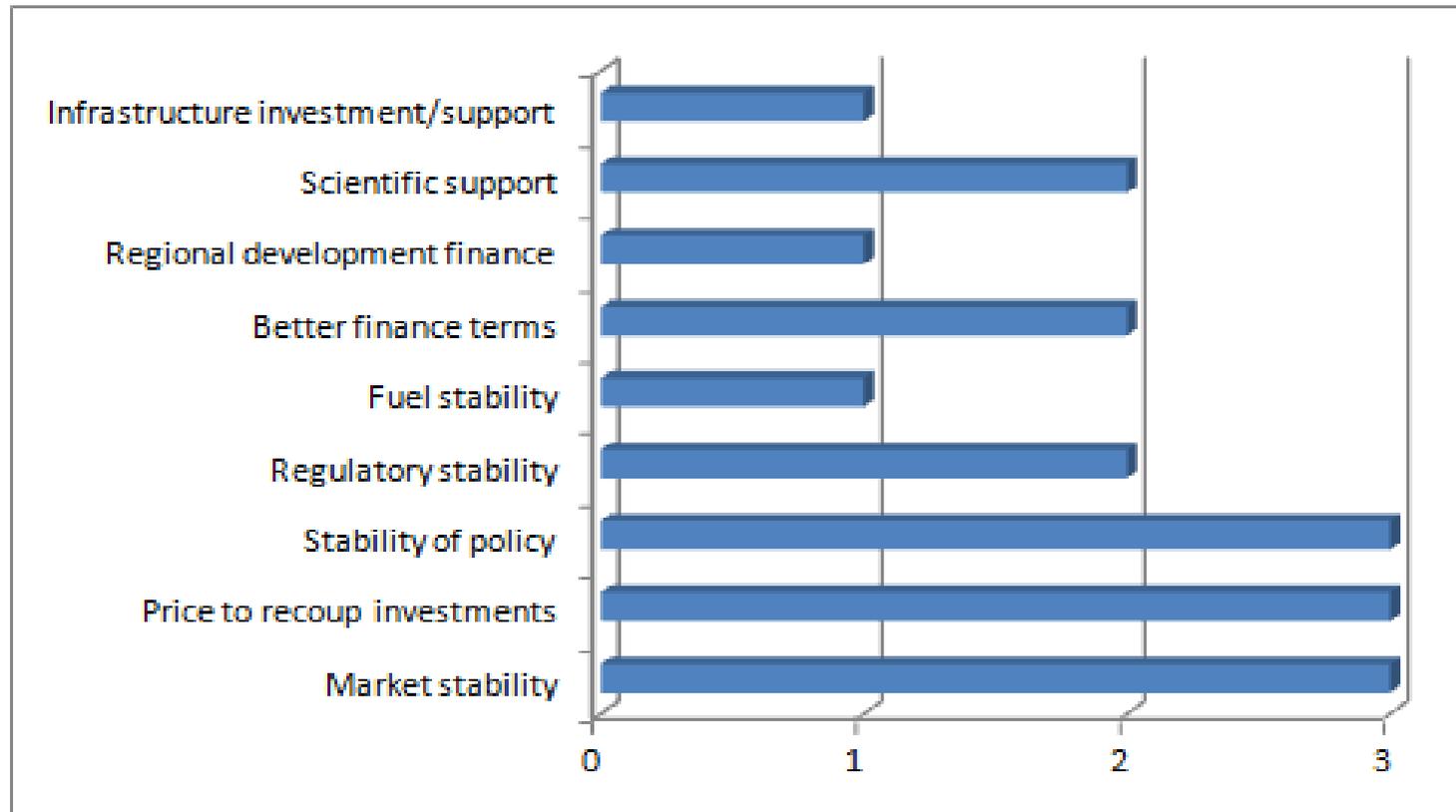
Primary question or assessment a decision support tool must address
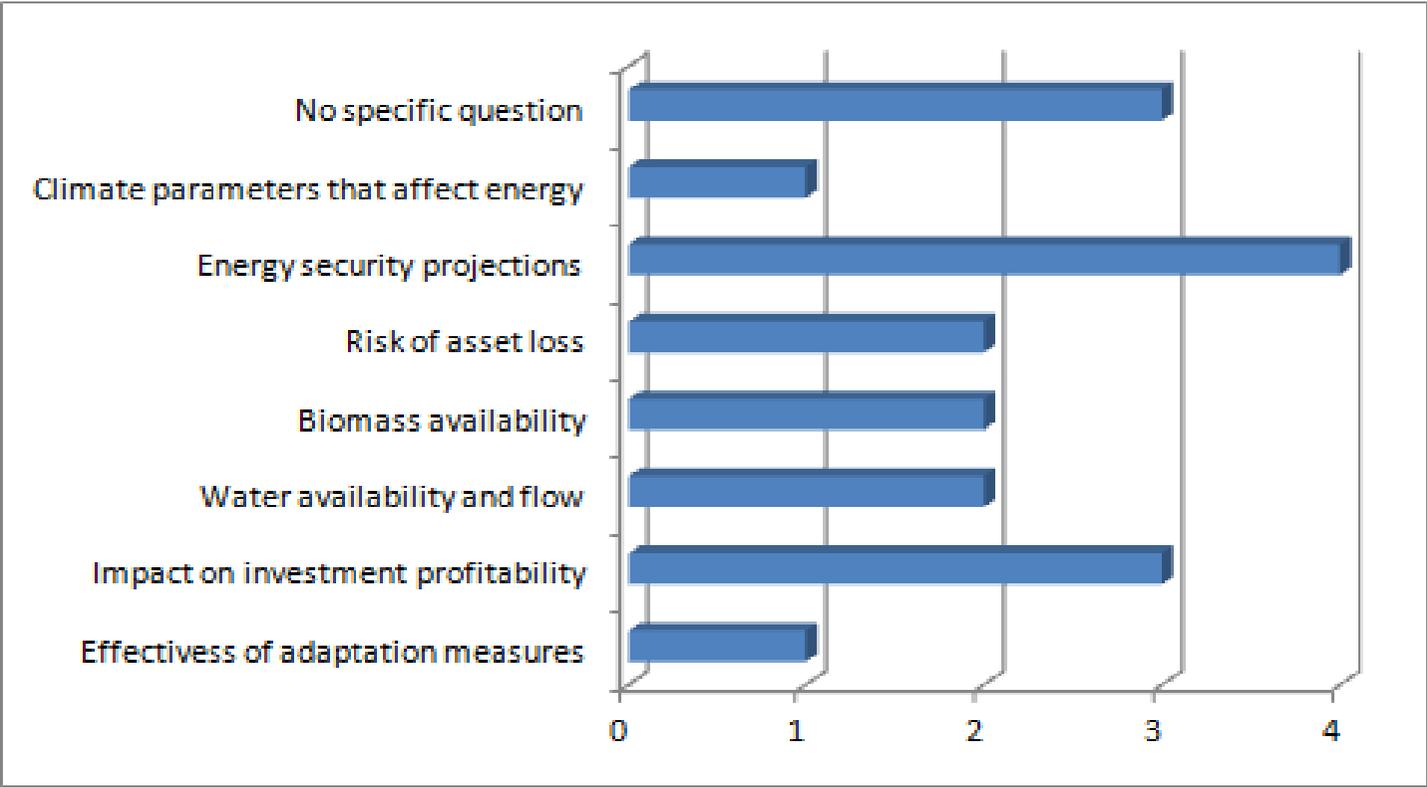
Discussion

- We note first that survey respondents are drawn disproportionately from the Governed sector of Figure 1

- This sampling was deliberate at the current stage of the study because the design of the decision support system must at least meet the needs of asset holders/managers

- In future, we will conduct a much wider survey to try to get a better understanding of the needs of all agent categories

Conclusions (1/2)

Several conclusions emerge from the study, which provide insights into the decision support required by agents:

- Agents are slightly more interested in variability of climate than in long-term (average climate) trends.
- Approximately 60% of agents perceive climate change as presenting not only risks but benefits to their operations.
- Primary negative impacts are inability to meet energy demand (from an imbalance of supply and demand due in part to cold weather), increased winds and water availability
- 80% of agents believe that increased reliable scientific information is required to improve their decisions

Conclusions (2/2)

- Indirect and direct impacts on the operations of an agent are almost equally significant
- Climate parameters of most importance are temperature and precipitation
- Slightly more than half of agents require external support and collaboration with other organisations in assessing or implementing adaptation measures
- Stability of government policy to allow for recouping of investments* (or at least reliability of investment risk decisions) is of primary concern by asset holders/managers
- Scientific information required to improve decisions is primarily around issues of probabilistic climate risks and the reliability of those estimates
- The specific questions to be answered by a decision support tool are quite broad in scope, and highly dependent on the agent

*to regain money spent through subsequent profits

Implications for the development of the climate change adaptation toolset

- Decision support for energy should focus firstly on the balance of demand and generation capacity
- While longterm change in climate and extreme events must both be assessed, the toolset must focus firstly on the latter
- Assessment results must include some components of uncertainty and credibility analysis
- Results must be placed within a context of stability of policies, identifying adaptation strategies that are robust under a range of policy scenarios
- Assessments should reflect both benefits and losses in each sector resulting from climate change
- The toolkit should have some capacity for use in collective decisions by stakeholders interacting through Governed and Governance networks

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