



Government
Office for Science

The Futures Toolkit

A set of tools to help you develop policies and strategies that are robust in the face of an uncertain future

Produced in collaboration with



SAMI Consulting

robust decisions in uncertain times

Aims of this training course

- To introduce the Futures Toolkit
- To try some of the tools
- To show how straightforward they are
- To share experience of futures work in government and elsewhere

To try some of the tools

- Seven questions
- Horizon scanning
- Driver mapping
- Scenarios
- Using **social and economic wellbeing in the future** as the topic ...and looking towards 2045

Approach

- Presentations
- Exercises
- Conversation (and chat)
- Case studies and examples from practice



today

Programme:

- 10.00 Welcome and introduction
- 10.25 Introduction to the Futures Toolkit
- 10.45 Exercise: If you could speak to someone from the future...
- 11.05 Presentation: Seven Questions in practice
- 11.15 Exercise: Horizon scanning
- 11.35 Break



today

Programme:

11.45 Discussion: Horizon scanning case study

12.10 Exercise: **Driver mapping**

13.00 Close



Thursday

Programme:

- 10.00 Welcome and introduction. Recap Day 1
- 10.15 Discussion: Driver mapping case study
- 10.30 Presentation: Introduction to scenarios
- 11.00 Exercise: [Scenarios and SWOT](#)
- 11.30 Break (self organised!)



Thursday

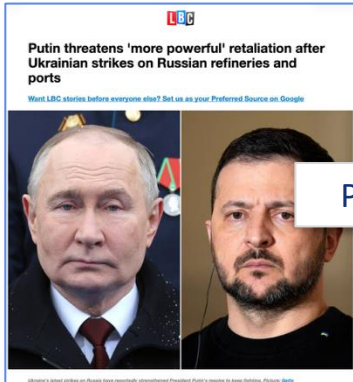
Programme:

- 12.00 Discussion: Review key lessons
- 12.15 Discussion: Scenarios case study
- 12.30 Working with The Futures Toolkit
- 13.00 Close

Learning outcomes: **you will**

- ...understand the key concepts in futures thinking and how to apply them in a UK government context
- ...be familiar with the structure and broad content of the toolkit
- ...have tried several tools
- ...know how to approach planning and running futures sessions
- ...know where to find further government resources and support

What will the future be like?



Political



Economic



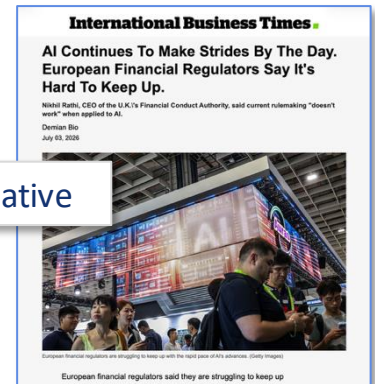
Societal



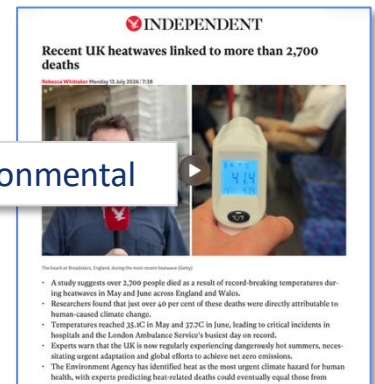
Values



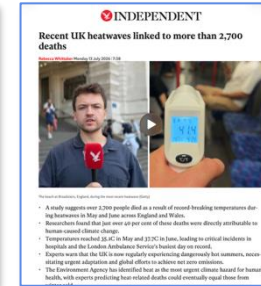
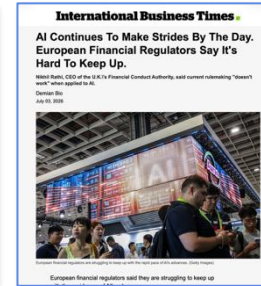
Technological



Legislative



Environmental



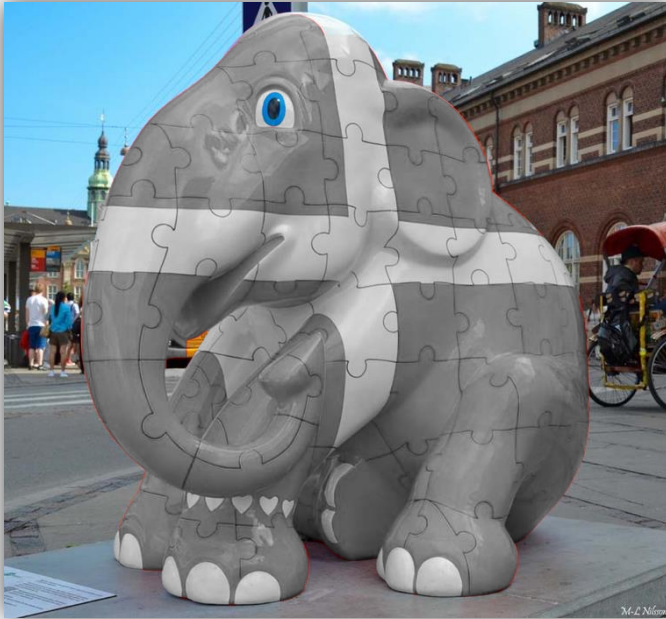
Futures thinking

- A systematic approach
- A way of thinking more deeply and strategically about what's possible
- A way of understanding and making sense of future uncertainty
- An approach for engaging a wide group of stakeholders
- A way to simplify complexity...

Simplifying complexity: Think of a number

- ...between 2 and 10
- multiply that number by 9
- add the digits together and subtract 5 from that number
- turn the new number into a letter
- think of a country that begins with that letter
- take the second letter of the country
- ...and think of an animal that begins with that letter
- think of the colour of your animal...

Simplifying complexity: Think of a number



Useful message #1:

- a lot of 'complexity' is irrelevant

Useful message #2

- hidden patterns and logics are important

Useful message #3

- futures work doesn't look for 'right' answers and does not predict what 'will' happen...
- ...it helps policy makers to **build shared models** that explore what **might** happen so they can **rehearse** appropriate policy responses to a range of outcomes



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About the Toolkit

The Futures Toolkit takes you through **12 different Futures thinking tools**, with advice on how to implement them. It also pulls these together into **a number of pathways** to meet specific objectives.

The toolkit is intended to be accessible to people who have little or no experience using these tools, as well as a useful reference for those who are more experienced and a guide for those commissioning Futures projects. It sits alongside other GO-Science Futures resources, including our [Brief Guide to Futures Thinking and Foresight](#), and our [Trend Deck](#).

We focus on how these tools can apply to policy or strategy, but they can be used in many other areas - including more operational or delivery focused contexts.

Contents

- What is futures thinking
- Futures and policy
- The scoping question
- Including diverse perspectives
- Ensuring impact
- Facilitation for Futures
- Finding your way around the toolkit
- Tools at a glance
- Pathways at a glance

What is changing?

- Delphi
- Seven Questions
- Horizon Scanning
- Three Horizons
- Driver Mapping

So what for our futures?

- SWOT
- Scenarios
- Visioning
- Futures Wheels

Now what do we do?

- Policy Stress-testing
- Roadmapping
- Backcasting

- Widening participation in futures
- Experiential futures techniques
- Other scenario-building approaches
- Glossary
- Acknowledgements

External links

- Resource bank
- Case study bank

Futures tools at a glance

WHAT is changing?

Delphi

A structured questioning tool, used to gather opinion from a panel of subject matter experts by using multiple rounds of questionnaires.

Seven Questions

A structured interview technique for gathering the strategic insights of a range of internal and external stakeholders.

Horizon Scanning

The systematic collection of insights on emerging trends and weak signals of change to identify potential threats, risks and opportunities.

Three Horizons

Helps you explore both the present and its limitations, and different potential futures.

Driver Mapping

Charts the trends and maps what you have found to see which are the most important for you to address.

SO WHAT for our futures?

SWOT Analysis

Identifies the relevant Strengths, Weaknesses, Opportunities and Threats of a policy, issue or event.

Scenarios

Compelling stories about a range of different possible futures that helps people understand what it feels like to live there and what this will mean for you, your stakeholders and your policy or strategy.

Visioning

Can be used to create a positive common vision for the future, a set of common aims for a project and to describe what the future would be like if these aims were achieved

Futures Wheels

A structured brainstorming method that helps you identify and map connections, causalities and impacts.

NOW WHAT do we do?

Policy Stress-testing

A method for testing policy, strategy or project options against a set of scenarios, trends or future events to see how well they stand up to a range of possible external conditions.

Roadmapping

Structured representations of the stages leading to a strategic goal or preferred future.

Backcasting

A tool for determining the steps that need to be taken to deliver a preferred future. It is a way of overcoming “present bias” in the way that we plan.

Delphi

The Delphi method is a structured questioning tool, used to gather opinion from a panel of subject matter experts by using multiple rounds of questionnaires. It is a systematic and qualitative method that relies on experts to highlight the future issues they think could be important. It can be used to gain consensus as well as to measure diversity of views.

Use this to...

- Gather insights at the start of a Futures process
- Identify views you will need to take into account, and areas of agreement or disagreement
- Allow experts to give their opinions freely, without any judgements, as the process is anonymised
- Refine the scope and priorities of a project
- Achieve a level of consensus around the most important issues for you to focus on

You end up with...

- A summary of your findings, including a set of priority issues around the question you are seeking to answer, as well as insight into the range of issues you will face and where there is agreement and disagreement

What to watch out for...

- A narrow range of experts or views will risk groupthink
- You will need to stay in touch with your panel members and monitor your response rates carefully

Who to involve

- One or two people to recruit the panel and organise the rounds of questions
- A panel of people with in-depth experience of the policy area, often external subject-matter experts

Number of participants

Delphi involves multiple rounds of questions, and it will work best if you have a varied, but relatively small group of about 12-16. You can do it with larger groups.

Time it takes

Ideally allow 3-6 months to enable several rounds of questions but this can be shorter, especially if your experts are willing to respond promptly.

How to include more perspectives

Bring in experts from across different disciplines.

The Approach

The Delphi method uses multiple rounds of questionnaires sent to a panel of experts to gain, refine, and structure their responses to a Scoping Question. It is particularly good when exploring issues around which there is debate or a lack of clarity.

Responses to a Delphi questionnaire are always kept anonymous, to reduce bias. Whilst rounds are usually conducted by email, there is specialist software which automates both the process and the output. Software is particularly useful when you have a large number of people you want to canvass, though it may take longer.



There are five steps:

- Step 1** → Define the scoping question
- Step 2** → Select your expert panel
- Step 3** → Ask rounds of questions
- Step 4** → Analyse the responses
- Step 5** → Write up and, potentially, run a workshop

Step 1:

What do you want to know?

Define the Scoping Question. Keep it open, and quite general. You want to give your experts space to explore the issue.

Step 2:

Select your expert panel

To keep the exercise manageable, you need around 12 to 16 experts. (An “expert” for this purpose is someone whose experience and opinion is valuable to your question. They may not define themselves as an “expert”). Aim for a mix of people with relevant expertise, drawn from different sectors if possible.

Step 3:

Ask rounds of questions

There are multiple rounds of questions.

Round 1: ask the panel members to respond to the scoping question. For example, by identifying relevant emerging issues. You want around ten ideas or thoughts from each. Give people a clear idea when you would like their responses and follow up – the more responses you get the better your result.

Create a list of all the responses. Cluster similar responses.

Round 2: circulate your new list to your panel. Ask them to identify their top ten most important issues for the policy area/project. They don’t need to rank them.

You can now prioritise the responses. Which issues appear in the top ten most frequently? Score the ideas by the number of times they occur.

Round 3: take the top issues (perhaps around 40%) and send them back to the panel. This time, ask them to rank the issues out of ten in order of importance. To add nuance, you may wish to add a second column, such as “urgency of policy response” or “quality of available data”. An example is below.

Response	Importance for the scoping question	Urgency of policy response
Issue 1	10	7
Issue 2	8	6
Issue 3	3	8

You will get back a series of ranked responses. Provided the panel is varied enough, there should be a range of views about what is most important, and what is most urgent – or you might find there is near consensus.

Step 4:

Analyse the responses

There are a number of ways of showing the results of the ranked responses. The simplest method is by analysing the responses to each issue, and calculating the mean ranking from across the respondents. Sort highest to lowest, to show a ranked table of priorities.

You could plot the responses on a chart. This will give a visual representation of how the issues cluster. Alternatively, various forms of statistical analysis are used for Delphi projects and you may wish to investigate these options further if you have the resources.

Step 5:

Write up and, potentially, workshop

Write up the exercise. Take care not to limit yourself only to the highest scoring issues – the issues with the lower scores may require further research, or they may point to areas of future controversy.

If your panel are willing to waive their anonymity, it can be useful to run a workshop to explore the factors underlying any significant differences of opinion.

Next steps

Delphi is the starting point for four of our pathways and is a useful standalone exercise. It can be helpful to repeat the exercise periodically to track how responses change over time.

Case study

The Food Standards Agency (FSA) wanted to identify what might be the key changes in the UK food system over the next 10 years. As the UK food system is complex and involves a broad range of expertise, a Delphi methodology was used. 300 participants from academia, government, industry and third sector were invited. They used an online platform for the rounds of questions and the material was coded in Excel for their analysis. This exercise resulted in a single overarching assessment highlighting key changes, opportunities and challenges to the FSA and focused their ongoing research programme for the next two years.

**Resources for this tool can be found in the
[Resource Bank](#)
Case studies can be found in the
[Case Study Bank](#)**

Pathways

The seven pathways give suggested ways to combine the tools for different purposes, though they are not prescriptive. They are:

1

Building Futures intelligence
when scoping a future
challenge

2

Creating a shared vision of
future success

3

Testing policy options with
Futures scenarios under time
constraints

4

Testing policy options with
Futures scenarios

5

Exploring dynamics of
change to understand
alternative ways that policy
might develop

6

Identifying gaps in your
knowledge about what will
be important in the future, in
order to prioritise areas for
further enquiry

7

Rigorous Futures process to
inform strategic policy
challenges

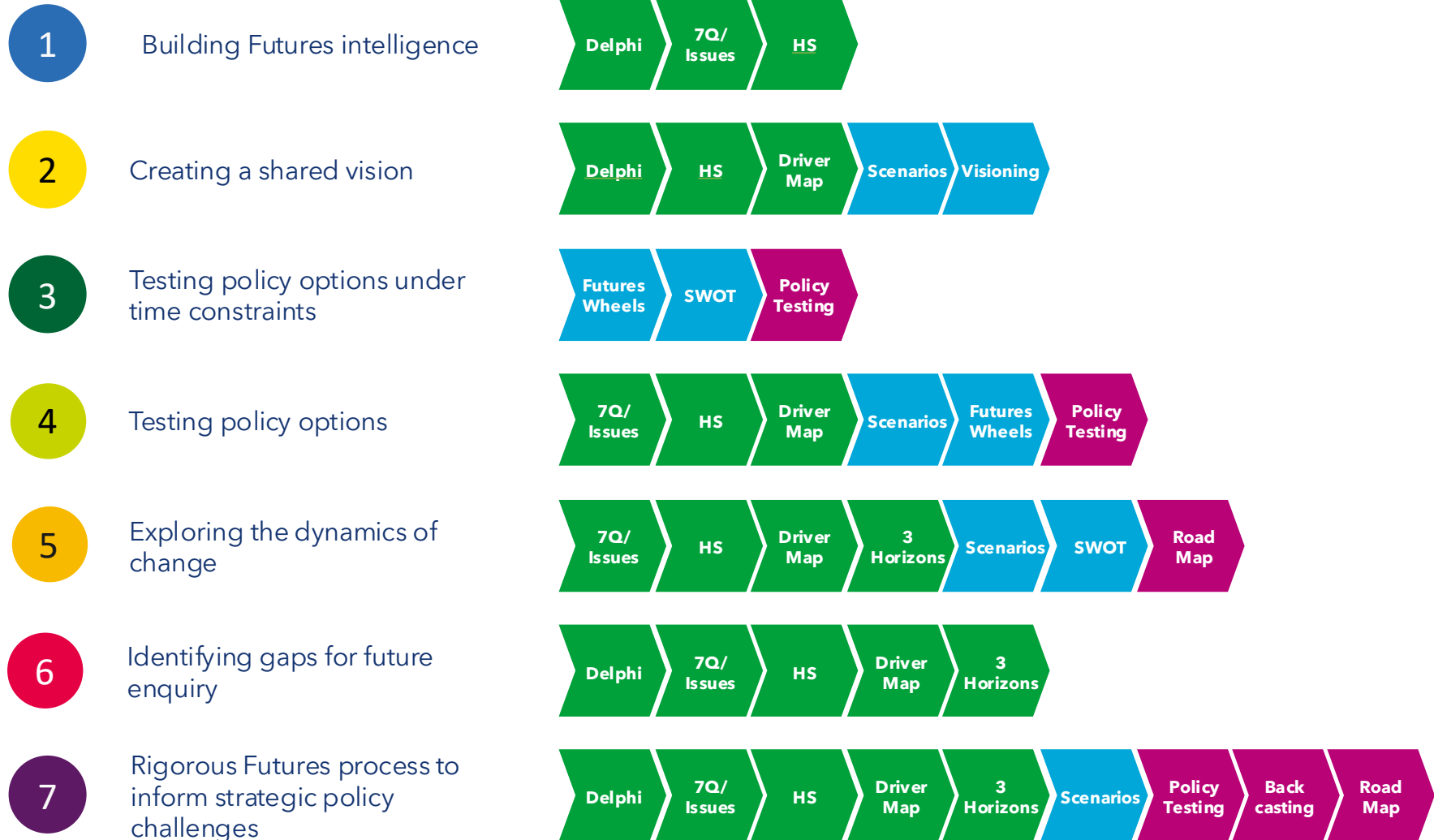
Pathways

5

Exploring the dynamics of change



Pathways



Key: WHAT is changing?  SO WHAT for our futures?  NOW WHAT do we do? 

5

PATHWAY 5 – Exploring dynamics of change to understand alternative ways that policy might develop



Use this to...

- Grow your understanding of what is driving change
- Deepen your understanding of the complexities surrounding your policy area
- Explore the impact of change on policy areas

Primary activities

Desk research, possibly interviews, workshops.

Who to involve

Internal stakeholders: senior decision makers, those with responsibility for managing a specific policy area. External stakeholders and subject experts.

Number of participants

We suggest a small team manages the project and then invites the relevant people when they are needed.

Time it takes

Variable depending on your approach and the way you allocate tasks.

The approach

This pathway can be customised easily. You can use it as a large-scale learning exercise to build understanding and discussion around the dynamics of change, or work with a small group and then communicate your conclusions.

The steps are:

- Use Seven Questions and/or Horizon Scanning to understand what is changing
- Use Driver Mapping to identify key drivers of change, then explore these further with the Three Horizons tool
- Create your own scenarios using the Scenarios tool, or use pre-existing scenarios if they are appropriate
- Use the SWOT tool to identify opportunities and threats
- Run the Roadmapping tool to identify the policy areas you may need to address going forward
- Summarise your findings so that you can communicate them more widely

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The tools

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Introduction

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 Government Office for Science Futures Toolkit Facilitation Worksheet			
DRIVER MAPPING <i>This worksheet is for you to adapt and fill in as you need it – timings and wording are suggestions only and will need to be tailored to your context.</i> Scoping question: Participants:			
Time	Topic	Content	Notes
	Pre-reading	You may wish to provide participants with outputs from horizon scanning work, or existing trends analysis, as pre-reading.	
-00:30	Set up	If face-to-face: note pads, pens, sticky notes, flipcharts, coloured dots for voting. If virtual, make sure that you have prepared your online whiteboard with a space in which to brainstorm drivers across PESTLE or your chosen categorisation; and a template of the matrix to map the drivers onto. You may choose to set up voting for the most important and uncertain drivers. You will need to be able to use breakout rooms. Display the Scoping Question prominently.	<i>If you are working virtually, you may need an introduction to the online whiteboard before you start or send a short "how to guide".</i>
00:00 (10 mins)	Introduction and agenda	Introduce yourself, the aims of the project for external participants, recap if only internal. - Explain how this workshop fits in with any wider futures process. - Then introduce the workshop, what people will do and what the outcomes will be. - Share the agenda - note we will spend time on the debrief.	Agenda: - Introduction - PESTLE approach - Brainstorm drivers - Map drivers - Next steps <i>Give people an example of a sticky note with a clear driver.</i>

Driver Mapping 1

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Glossary

Acknowledgements

Internal links

Resource bank

Case study bank

Contents

Introduction

- What is futures thinking
- Futures and policy
- The scoping question
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 Government Office for Science Futures Toolkit Facilitation Worksheet			
Time	Topic	Content	Notes
00:10 (10 mins)	Introduce the PESTLE approach	Introduce PESTLE or any alternative approaches that may be more relevant for the project, e.g. STEEPV to include values.	<i>Avoid getting hung up on minor differences – all the approaches can be used flexibly.</i>
	Brainstorm Drivers		
00:20 (30-45 mins)	Brainstorm Drivers	Ask the groups to identify what is driving change in relation to the scoping question, encouraging people to think across the global context and all PESTLE categories. - You could use previous work, such as Horizon Scanning outputs or trend analysis, as stimulus material here. - You could ask groups to concentrate on one or two PESTLE categories each, so that you reduce overlaps and cover all categories. - Your participants should write one driver on each sticky note, using a short phrase to make it very clear (“Sustained economic growth in China” is clearer than “The Economy”). - Encourage as many drivers as people can find. - You could use different colours for short, medium and longer term drivers.	<i>Divide participants into groups of 4-10 if face-to-face, 4-8 if virtual.</i> <i>If you are the only facilitator for a virtual event, limit the number of groups to two and bounce between them.</i> <i>Brainstorming rules:</i> - List drivers - Build upon each other's ideas - Don't criticise ideas - Look for quantity. <i>Show people the sample sticky note with driver again.</i> <i>Identify someone to feedback.</i>
00:50 (15 mins)	Share drivers in plenary	Each group shares their drivers in plenary, which may spark off more ideas for different new drivers. - Each group should add to what the previous group has shared, to avoid repetition - Or you could have each group visit the others' workspace	

Driver Mapping 2

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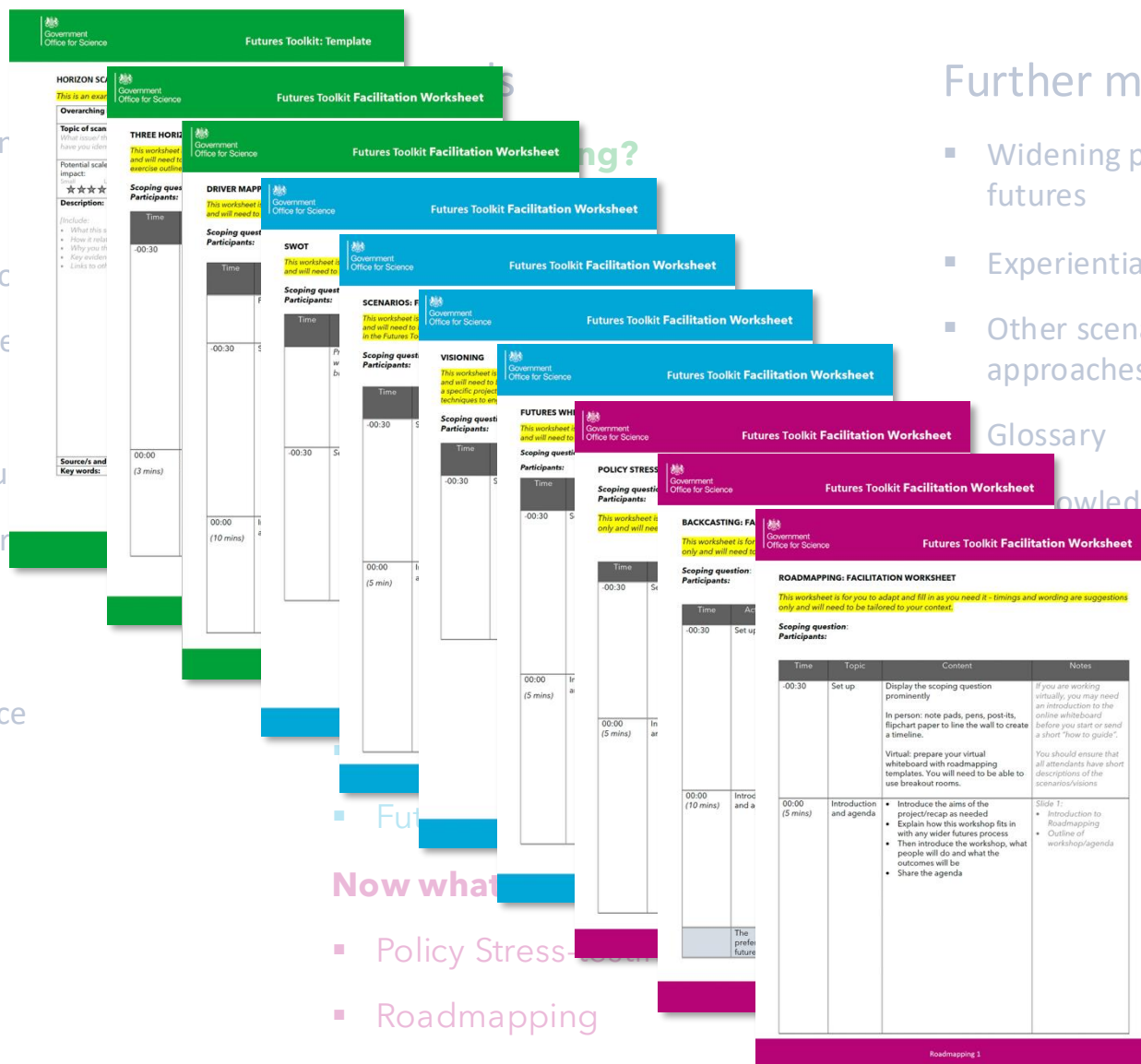
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Contents

Introduction

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- The scoping question
- Including diverse perspectives
- Ensuring impact
- Facilitation for Futures
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Glossary

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Now what?

- Policy Stress
- Roadmapping
- Backcasting



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[Home](#) > [Government](#) > [Government reform](#) > [Civil service reform](#)

Guidance

Futures toolkit for policymakers and analysts

The Futures Toolkit provides a set of tools to help you develop policies and strategies that are robust in the face of an uncertain future.

From: [Government Office for Science](#)

Published 8 July 2014

Last updated 29 August 2024 — [See all updates](#)

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Documents



[The Futures Toolkit HTML](#)

HTML



[Futures Toolkit: tools for strategic futures for policymakers and analysts](#)

PDF, 2.82 MB, 117 pages

This file may not be suitable for users of assistive technology.

► [Request an accessible format.](#)

Details

The Futures Toolkit provides a set of tools to help embed long-term strategic thinking within the policy process, and explains how to ensure they have real impact. It is intended for policy officials and analysts across government. This is the updated 2024 version.

The toolkit summarises what futures thinking is, how it can be used in policymaking and describes a series of tools that can be used by policymakers to manage in uncertainty and identify future actions. It is intended to be accessible to people who have little or no experience using these tools, as well as those who are more experienced, and a guide for those commissioning futures projects.

Experts from government and industry have contributed to its development and have provided case studies to illustrate the tools.

More [detailed case studies can be found here](#), and [resources to support each tool can be found here](#).

The toolkit sits alongside other [GO-Science futures resources](#), including our [Brief Guide to Futures Thinking and Foresight](#), and our [Trend Deck](#).

Related content

[Futures thinking and foresight: a brief guide](#)

[Horizon scanning research papers](#)

[Trend Deck 2021: Demographics](#)

[Trend Deck 2021: Governance and Law](#)

[Trend Deck 2021: Skills](#)

Collection

[Long term strategic thinking and planning: Futures thinking resources for government officials](#)

www.gov.uk/government/publications/futures-toolkit-for-policy-makers-and-analysts



today

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If you could speak to someone from 2045 who could tell you anything about social and economic wellbeing in the future, what would you like to know?

Seven Questions and the Issues Paper

Seven Questions is a structured interview technique for gathering the strategic insights of a range of internal and external stakeholders. The Issues Paper summarises the key conclusions.

The Seven Questions:

Over the time horizon of the Scoping Question...

Time-traveller

If you could spend some time with someone who knew the outcome, a time-traveller if such existed, what would you want to know? What would you identify as the critical issue for the future?

An optimistic outcome

If things went well, what would be the signs? What is your vision for success?

A pessimistic outcome

How could the environment change to make things more difficult? How could the initiative itself go wrong? What are the dangers of not achieving your vision? What would you worry about?

The internal situation

From your knowledge of the culture, organisation, systems, resources, people, how would these have to be changed to achieve the optimistic outcome?

Looking back

How did we get to where we are today? What are the successes we can build on? What can we learn from things that didn't go so well?

Looking forward

What decisions need to be made in the near term to achieve the desired long-term outcome? What needs to be done now?

The Epitaph

If you had a mandate, without constraints, what more would you need to do? What else would you wish to include?



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SEVEN QUESTIONS: sample write-up of interview

Interview from 2011 with the Chair of a Professional Services Association regarding the future of the organisation.

If you could speak to someone from 2025 who could tell you about the Association and what it is doing, what would you ask?

- How is it funded? Does it receive money from the EU?
- Is there free mobility of [profession] around the EU?
- Are the members active? How do they promote the Association internally and to others? Has [professional] education been developed and qualified?

What is your vision for the Association?

- My vision is that the Association works across the industry to develop a shared strategy for change and to develop the education and training resources it will need. I'd like to see lots of activities and drive - both from individual members and organization members.
- I'd also like to see fewer talking shops and less documentation being produced.
- This is not only important from a professional practice point of view. There's going to be a lot of calls from regulators across the EU for cost-benefit evidence and for increased focus on quality of service. I want the Association to be an acknowledged leader in practice and partnership.

What are the consequences for the Association if your vision is not realised?

- It may slowly get obsolete. We may see a drop in the number of members if they perceive we are irrelevant and not delivering for them.

What needs to change (membership, relationships, structure, for example) to make your vision a reality?

- We need to have a strategy for the Association itself and for how we can lead change across the profession. We need a strategy for helping both individual members and organization members and to support the network at a global level.
- We urgently need to address our information gathering and how we translate it into knowledge and better practice. One way is to systematise evidence-based practice. We need to gather and manage evidence urgently - our customers are already several steps ahead of us in their practice and they are noticing that we're lagging.
- We need to engage the individual members. They don't see the broad agenda and we have to help them engage with it and drive practice forwards.

Looking back, are there particular lessons - successes, failures - from the last 10 years that we can learn from?

- Our annual conferences always seem successful, but we should do an evaluation to see how they actually make a difference to working practice.

- We could learn a lot more if we followed up on the site visits to see what has actually happened with regard to quality improvement.
- We have to be better at showing the value in what we do.
- We need to support networking and the promotion of the Association.

What needs to be done now to make sure your vision is realised?

This is a challenging question.

- We have to work on different levels and to learn from experience to make sure [our practice] improves [customer experience]. How can we evaluate the sustained impact of [practice] on behalf of our customer base?
- Research has highlighted new ideas about [practice] that can help us think about what we do.
- Some [members of the profession] are still old fashioned in the way they deliver services and a challenge for us is to develop a stronger customer-centred approach across all our membership.
- We need to continue to work with the EU so that they can see the benefits of the work we are doing. However, we also need to be open to and learn from good practice globally.
- We need tools to encourage members to take responsibility for practice. We need to share good practice more - I'm not sure we have a good enough strategy at sharing.

If you had the power to make anything happen, is there anything else you would do?

- I would like a physical centre where all members could be welcome and could come for advice on strategic action planning, for networking, for learning evidence based-practice and where we promote quality and life-long learning.
- I would like to have very direct contact with governments and legislators - and given the chance to be a part of strategic decision making.

13. Strategy

We must have a dynamic plan

- 13.1. We must have a dynamic plan. It must be a living document that means something to people and not just something that is handed down from the top. This university has a great sense of community and the strategy must build on that. And we must remind people how it fits with our values.
- 13.2. It will be a disaster if we have a *fixed* strategy. It's vital that it's flexible and responsive, that it sets out the opportunities as well as the challenges and that it means we can be adaptable and nimble. Can we do that with this process - which seems to be taking too long? We need to be on the front foot.
- 13.3. The existing plan was particularly good in setting out values and aspiration but we've become too rigid in looking at KPIs as an end in themselves. The KPIs have been measured, but we've rarely reviewed them to challenge ourselves about progress.
- 13.4. What we're measuring doesn't match what we're trying to do. And we need some *qualitative* KPIs.

Does the university have the systems and processes its needs to ensure the strategy is dynamic and adaptable?



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- 10.45 Exercise: If you could speak to someone from the future...
- 11.05 Presentation: Seven Questions in practice
- ▶ 11.15 Exercise: Horizon scanning
- 11.35 Break

[1](#)[2](#)[4](#)[5](#)[6](#)[7](#)[CONTENTS](#)

Horizon Scanning

Horizon Scanning is the systematic collection of insights on emerging trends and weak signals of change to identify potential threats, risks and opportunities.



20 minutes

Horizon scanning

- Individually...
- Look for articles that highlight a trend or development that could change social and economic wellbeing in 2045
- Identify one or two things
- Come back and talk about what you found

Political
Economic
Societal
Technological
Legislative
Environmental
Values

Hint



Go global

HORIZON SCANNING TEMPLATE

This is an example of a horizon scanning template; please adapt to your needs.

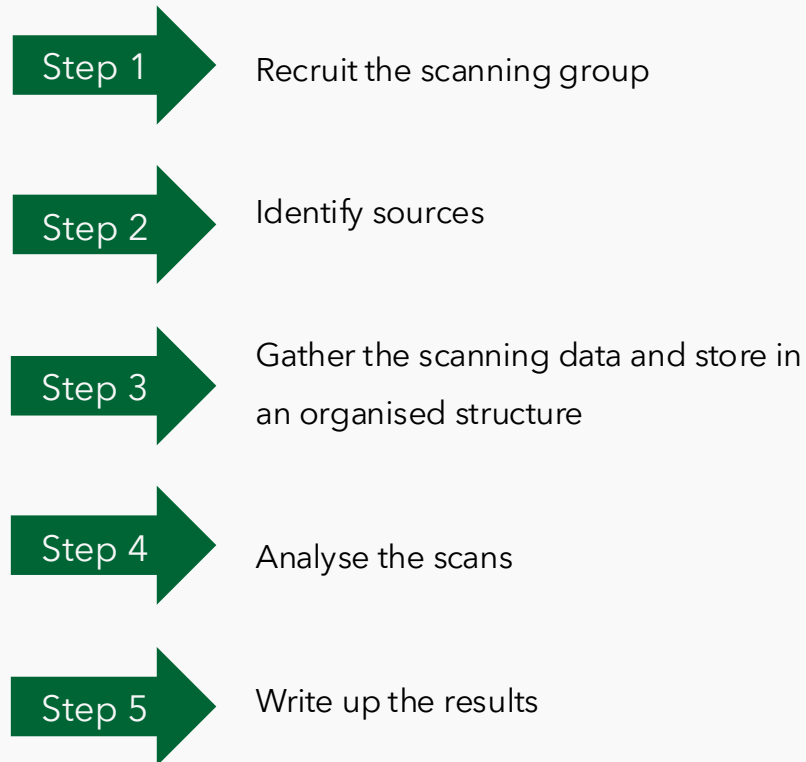
Overarching horizon scanning question:			
Topic of scan: <i>What issue/ threat/ opportunity/ signal of change have you identified?</i>		Date submitted:	Submitted by: <i>Name, organisation</i>
Potential scale of impact: Small Large ★ ★ ★ ★ ★	Certainty of outcome: Low High ★ ★ ★ ★ ★	Impact time horizon: e.g next 5 years/ 10+ years	PESTLE category Highlight: Political, Environmental, Social, Technological, Legislative, Economic
Description: <i>[Include:</i> <i>• What this scan is about</i> <i>• How it relates to the horizon scanning question</i> <i>• Why you think it is important</i> <i>• Key evidence</i> <i>• Links to other relevant material]</i>			
Source/s and further reading:			
Key words:			

*If you have feedback or an alternative template you'd like to share, please contact:
futures@go-science.gov.uk*

nuclear fusion

Sources	Nature Scientific American	Date	March 2022
Potential impact on [geography] ★ ★ ★ ★ ★	Urgency for LA ★ ★ ★ ★ ★	Impact horizon S M L	
If researchers can harness nuclear fusion — the process that powers the Sun — it promises to provide a near-limitless source of clean energy. A recent set of landmark results have moved us closer to that goal. Scientists at the Joint European Torus (JET) near Oxford, UK, announced in February 2022 that they had generated the highest sustained energy pulse ever created by fusing together atoms, more than doubling their own record from experiments performed in 1997. JET's tokamak fusion reactor produced 59 megajoules of energy over a fusion 'pulse' of 5 seconds — more than double the 21.7 megajoules released in 1997 over around 4 seconds. Researchers at US Department of Energy's Lawrence Livermore National Laboratory achieved a burning plasma reaction - a fusion reaction in which more energy was generated from the process than was required to initiate it - for the first time in January 2022. The experiment achieved a sustained reaction for the first time - if only for a fraction of a second. Fusion is attracting a lot of interest. The White House held a summit on fusion in March 2022; the Biden administration, and a growing cadre of risk-taking investors, see fusion as an important tool on the path to an economy with net-zero greenhouse gas emissions by 2050. DOE will now coordinate all of its fusion energy research to advance the technology for "possible" deployment by the end of the decade. Implications [Redacted]			
What are the long term implications for the renewables sector? If energy production becomes less important to [the area], what should replace it?			

A full Horizon Scanning exercise can be arranged in five steps:



Individuals or small teams tasked with horizon scanning should focus on steps 2, 3 and 5, omitting the workshop.

Step 1:

Recruit the scanning group

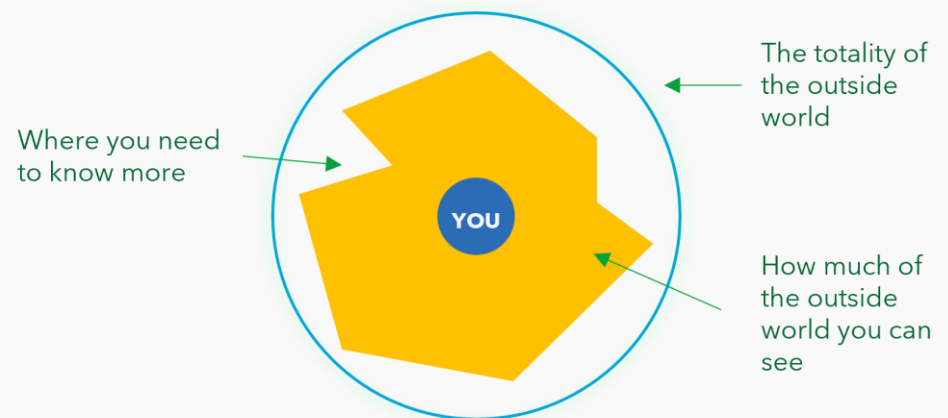
You can involve as many people as you want. Start with no more than 10 people - you can expand the network later if time allows. You should aim for a sufficient diversity of scanners to get different perspectives.

Step 2:

Identify sources

Ask the team to identify sources which are likely to be good places to look for signals of emerging change.

You are looking for information beyond the normal parameters of the organisation. One of the aims is to identify areas where you need to know more.





today

Programme:

11.50 Discussion and Horizon scanning case study

12.10 Exercise: **Driver mapping**

13.00 Close

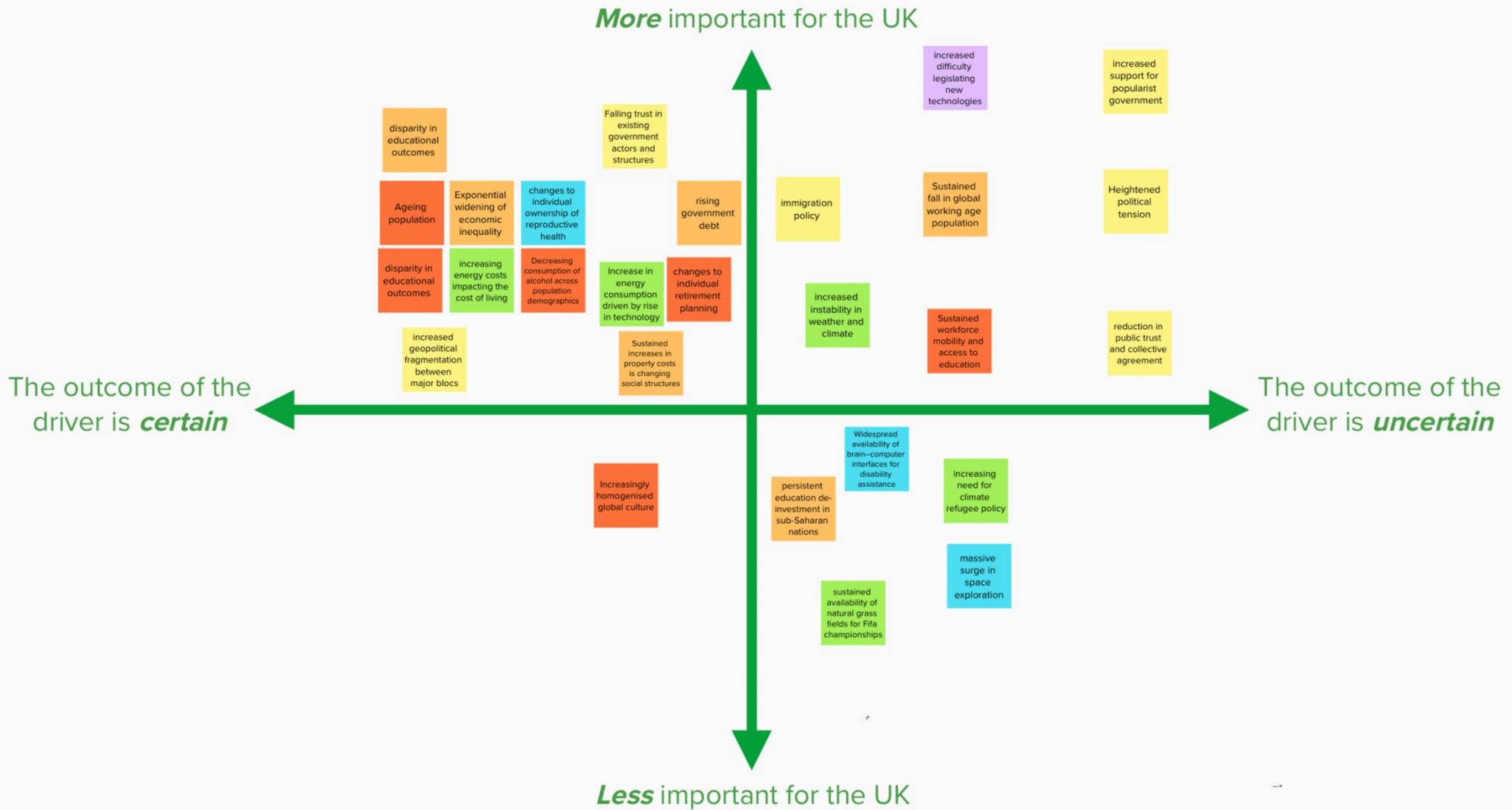
Driver mapping

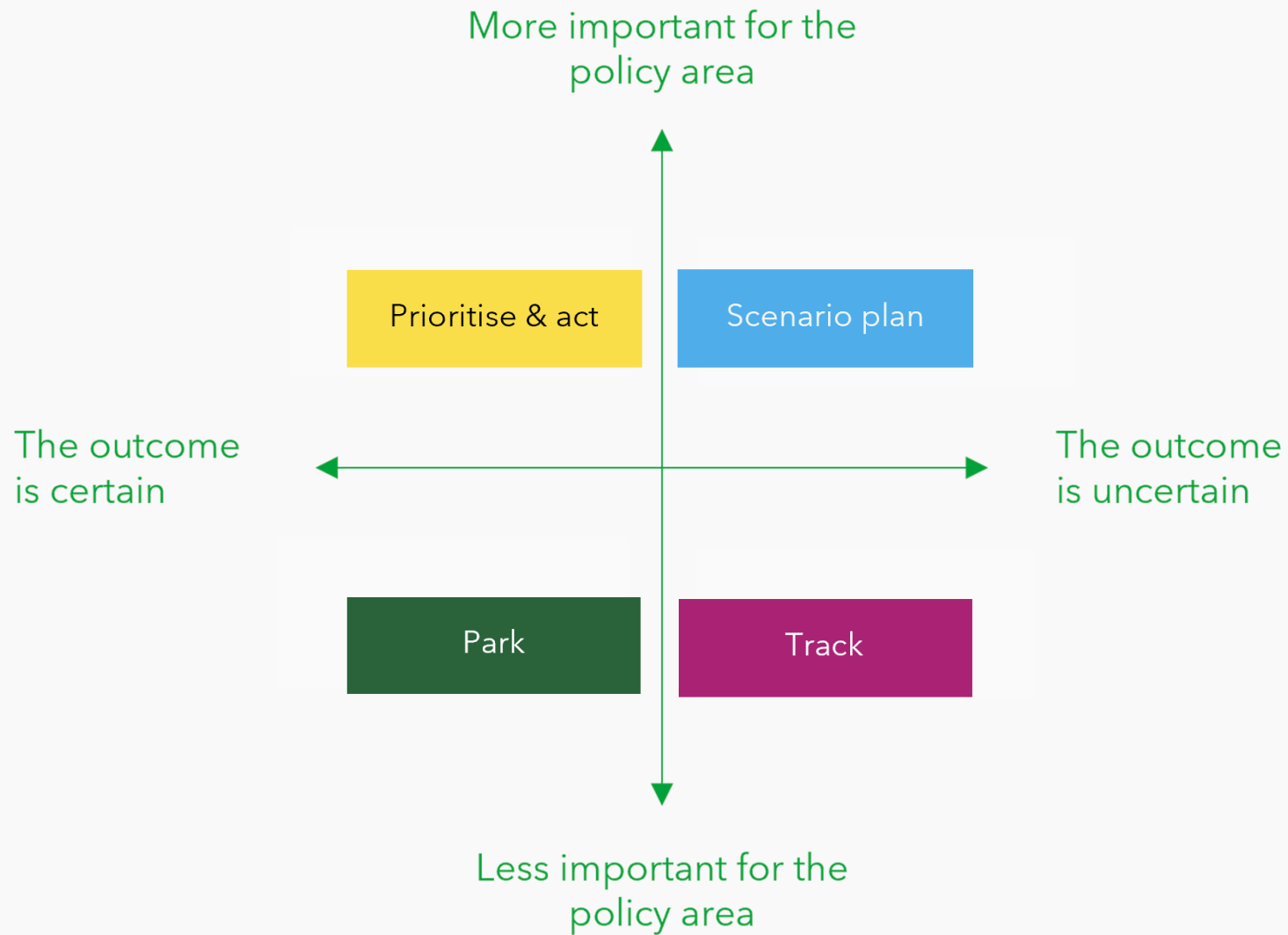
- Individually...
- Note down 4 drivers that will shape social and economic wellbeing globally in the future
- Start with your horizon scanning reading
- ...and then suggest other drivers based on what you think is important

Use short, descriptive phrases to make the drivers very clear. Include the nature of the change, such as “increasing”, “stable” (“Sustained economic growth in China” is clearer than “The Economy”, for instance).

What are the drivers that will shape social and economic wellbeing globally in the future?

Domain	1	2	3	4	5	6	7	8	9
POLITICAL	1	2	3	4	5	6	7	8	9
ECONOMIC	10	11	12	13	14	15	16	17	18
SOCIETAL	19	20	21	22	23	24	25	26	27
TECHNOLOGICAL	28	29	30	31	32	33	34	35	36
LEGISLATIVE	37	38	39	40	41	42	43	44	45
ENVIRONMENTAL	46	47	48	49	50	51	52	53	54
VALUES	55	56	57	58	59	60	61	62	63



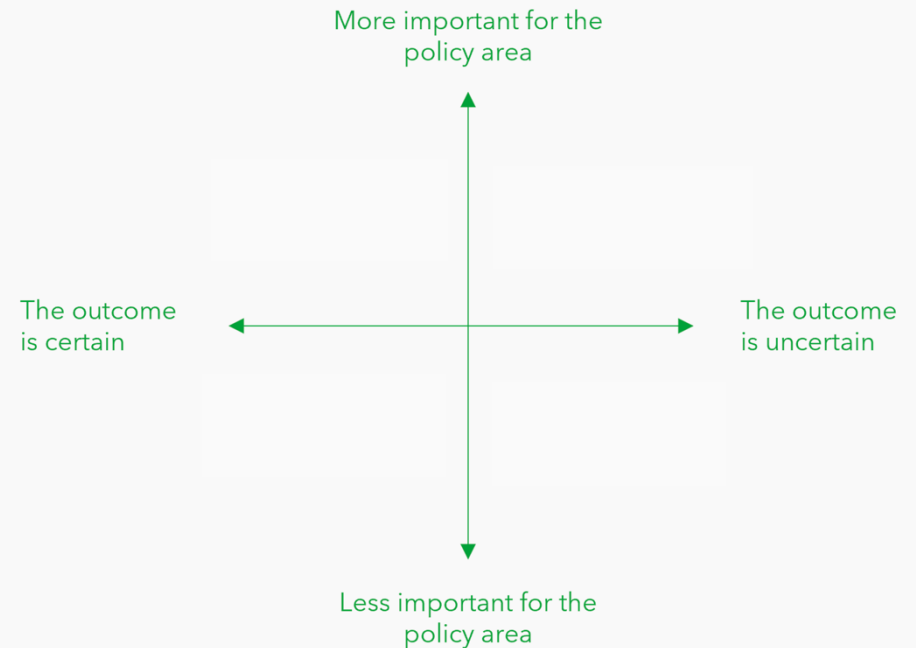
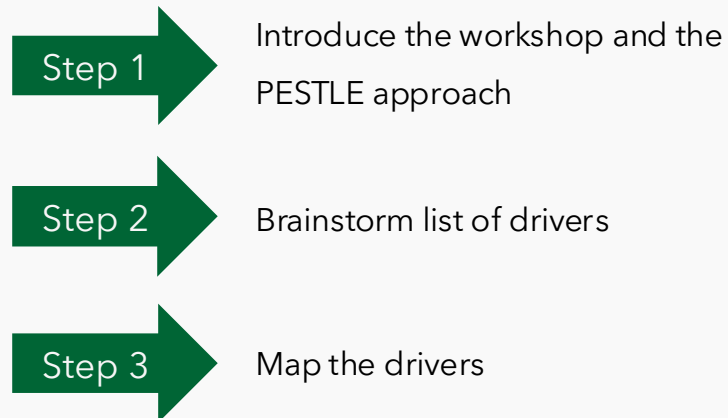


How to include more perspectives

- Expand your participant group to include people from outside your policy area
- Survey people from outside your area beforehand, adding their thoughts to your pre-researched list
- Run several sessions with different groups

The Approach

There are three steps:

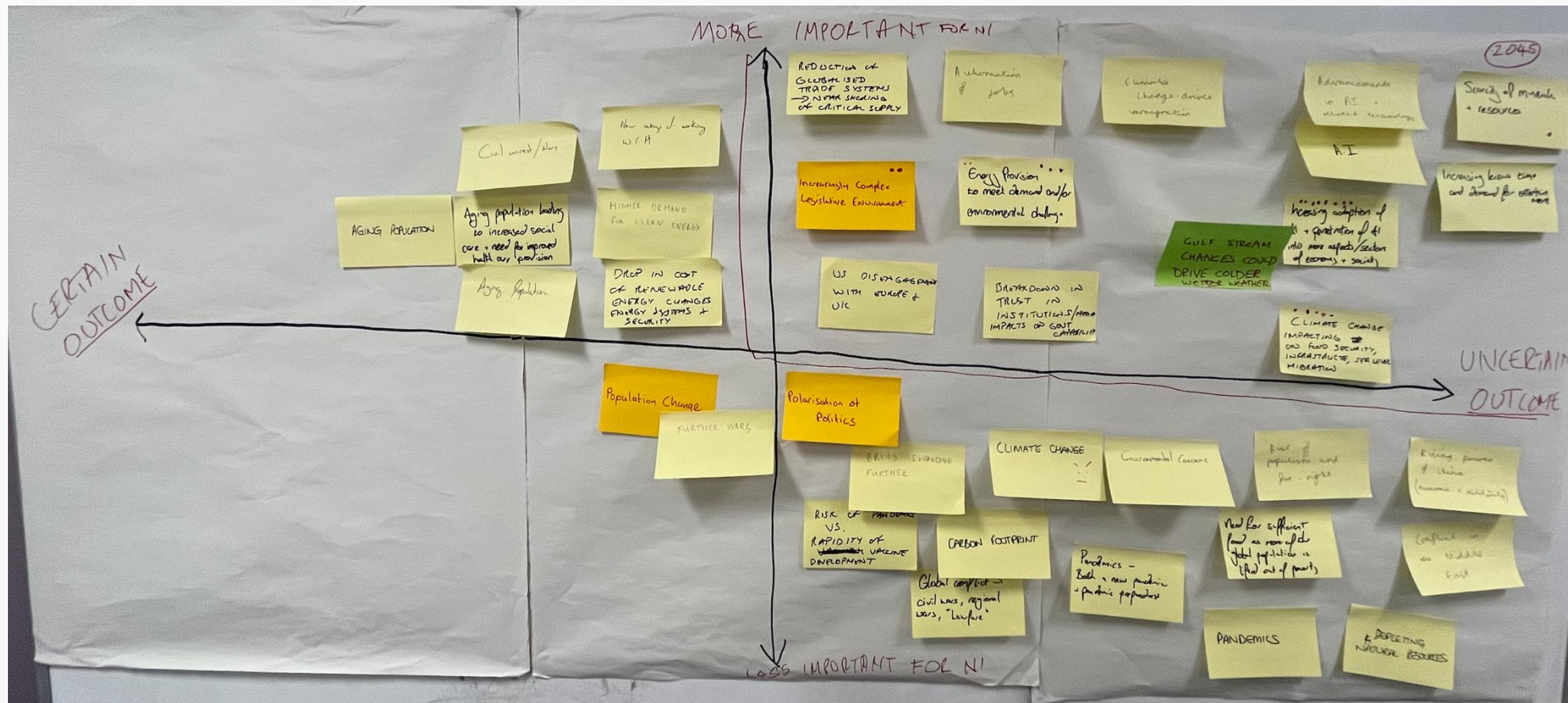




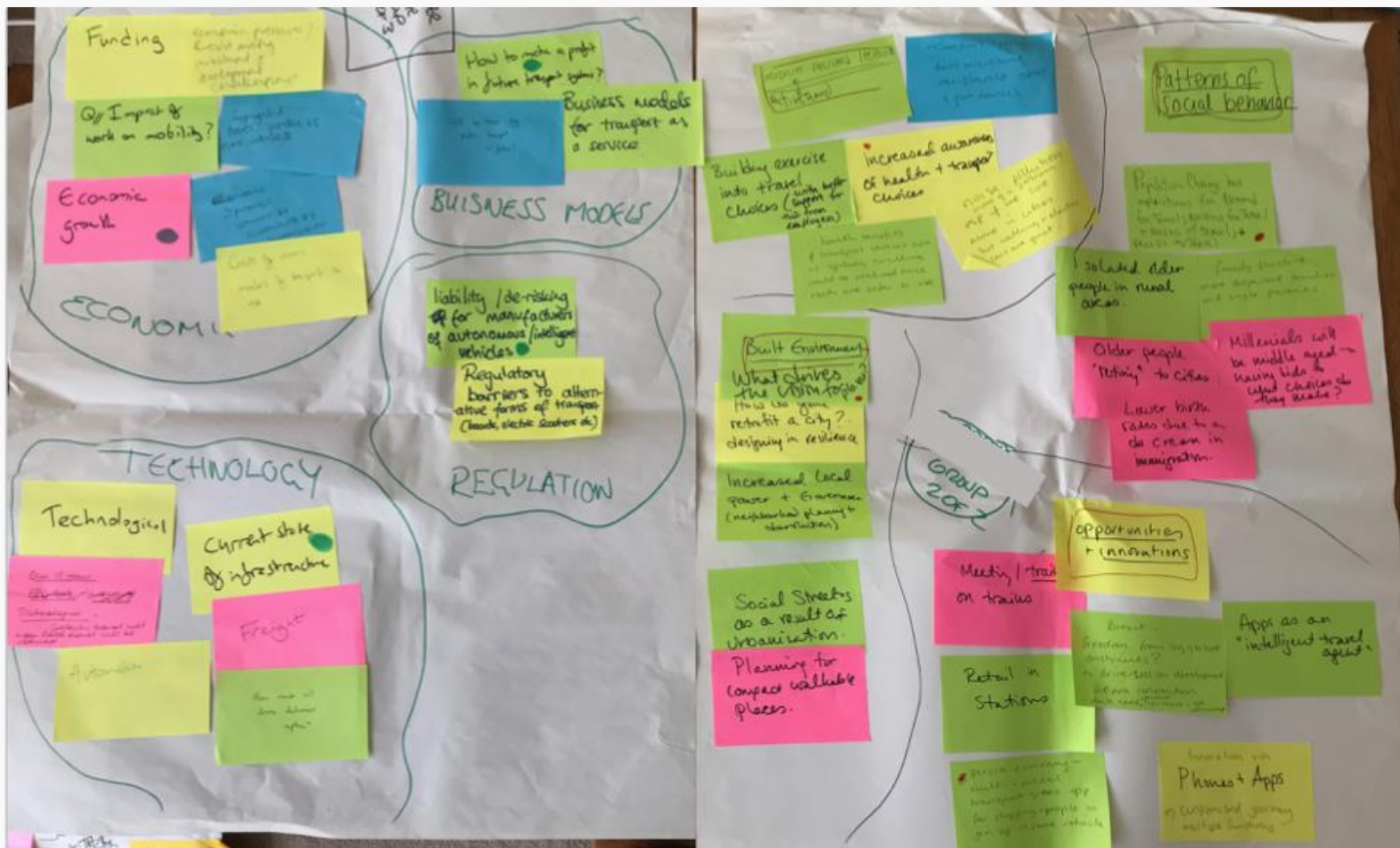
today

Programme:

- 10.00 Welcome and introduction. Recap Day 1
- ▶ 10.15 Discussion: Driver mapping case study
- 10.30 Presentation: Introduction to the scenarios
- 11.00 Exercise: [Scenarios and SWOT](#)
- 11.30 Break (self organised!)









today

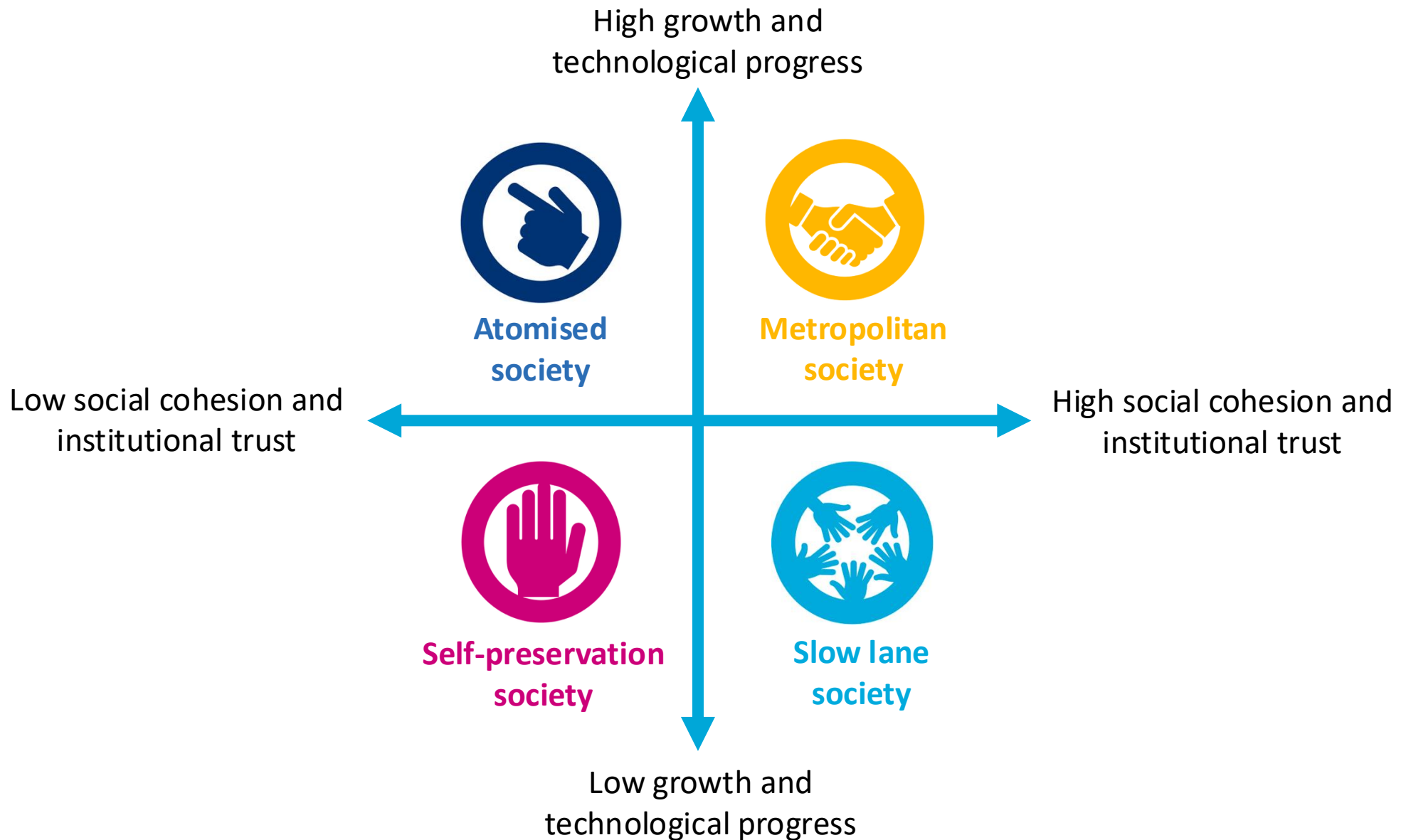
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Scenarios

Scenarios are compelling stories about a range of different possible futures. They describe future worlds so that people can understand what it feels like to live there and what this will mean for them. You can use scenarios to explore the implications of many different futures for you, your stakeholders and your project or policy.

GO-Science's *Net Zero Society* scenarios



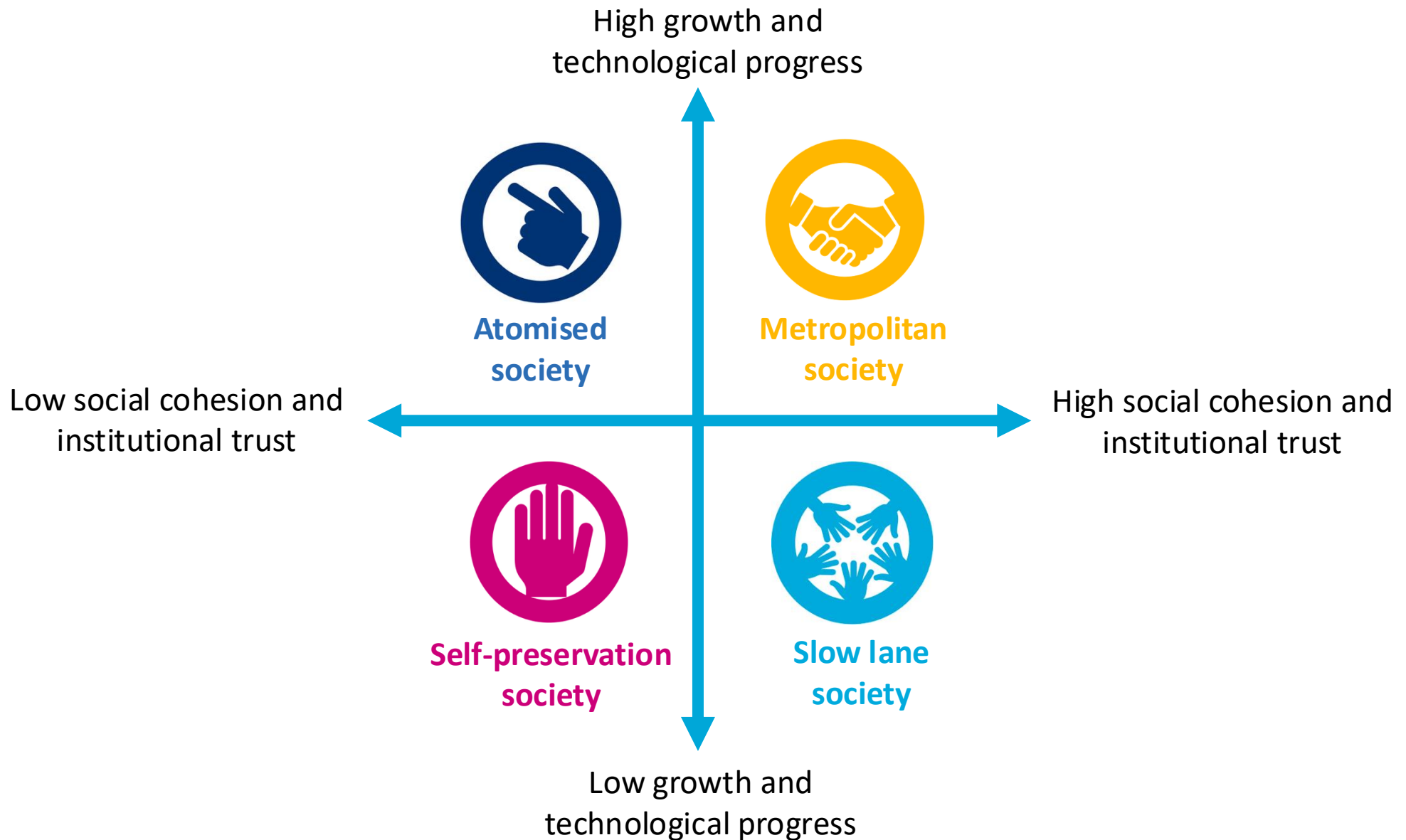
GO-Science's *Net Zero Society* scenarios



Atomised society

- The UK enjoys economic growth fuelled by technological innovation.
- Living conditions have improved, but at the expense of the environment. Lowering emissions is not a priority.
- Life is good for people on higher incomes - but those on lower incomes have been disproportionately affected by the impacts of climate change.
- New technology has driven improvements in public sector services (including the benefits systems, healthcare, and social care).
- Automation of work is widespread. Upskilling and retraining have failed to keep pace, meaning work is precarious for low skilled workers.
- A breakdown in international cooperation means states prioritise protection of their own societies and critical infrastructure over global commons.

GO-Science's *Net Zero Society* scenarios



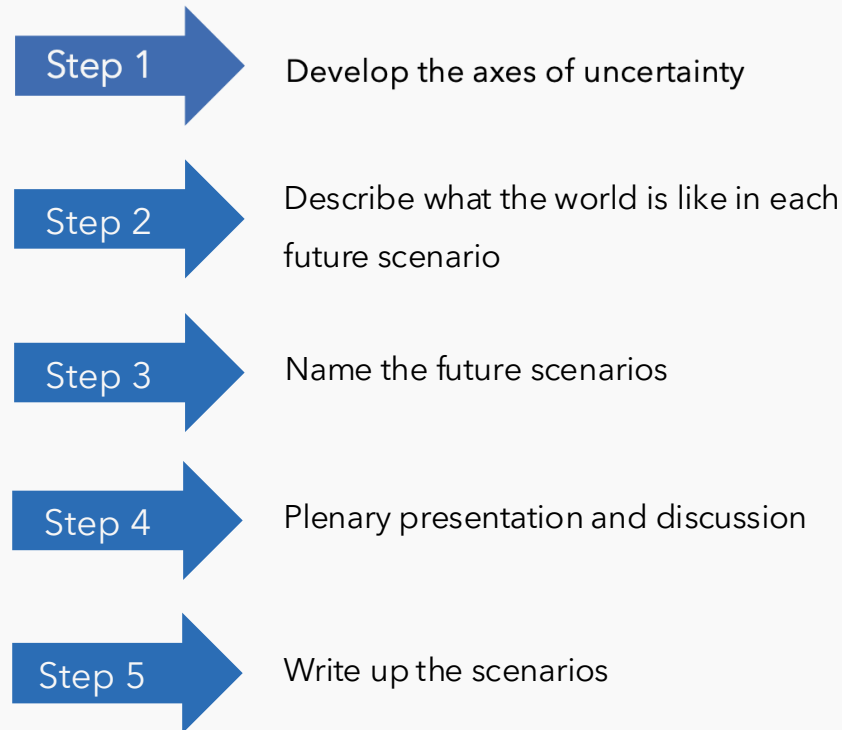
GO-Science's *Net Zero Society* scenarios



Metropolitan society

- GDP growth has been increasingly decoupled from emissions, energy demand and resource extraction.
- Significant upskilling programmes have supported transition to the green economy and have addressed the impacts of widespread adoption of automation technologies across industry.
- Centralised government decision making is supported by AI which makes decisions fairer and more impactful.
- Tensions exist between the growing, diverse urban population and rural populations - who resent the increased funding for infrastructure development in urban areas at the expense of similar investment in the countryside.
- States collaborate effectively to meet climate targets and to accommodate those displaced by climate impacts. A range of technologies are in place to mitigate the most severe impacts of climate change and minimise conflict around scarce resources.

There are five steps:



Step 1:

Develop the axes of uncertainty

- First you work with your long list of critical uncertainties, developed from the Driver Mapping tool. Use the prioritised critical uncertainties from the top right-hand quadrant of the driver map (try for a minimum of 10 critical uncertainties)
- You are aiming to create a continuum between two opposite uncertain outcomes – the way a driver may play out. These are not necessarily positive or negative – they are just the extremes of the uncertainty. Explore different ways to describe the outcomes and pick the best for your purpose. For instance, 'Productivity' could be described as:

High and steady
productivity
growth



Low and
fluctuating
productivity

HIGHER DEMAND FOR CLEAN ENERGY

UK
HAS ENOUGH
CLEAN ENERGY



UK IS
ENERGY
POOR

UK INVESTS
ENOUGH IN
RENEWABLES



UK DOESN'T
INVEST IN
RENEWABLES

CONSUMERS
ARE WILLING
TO PAY MORE

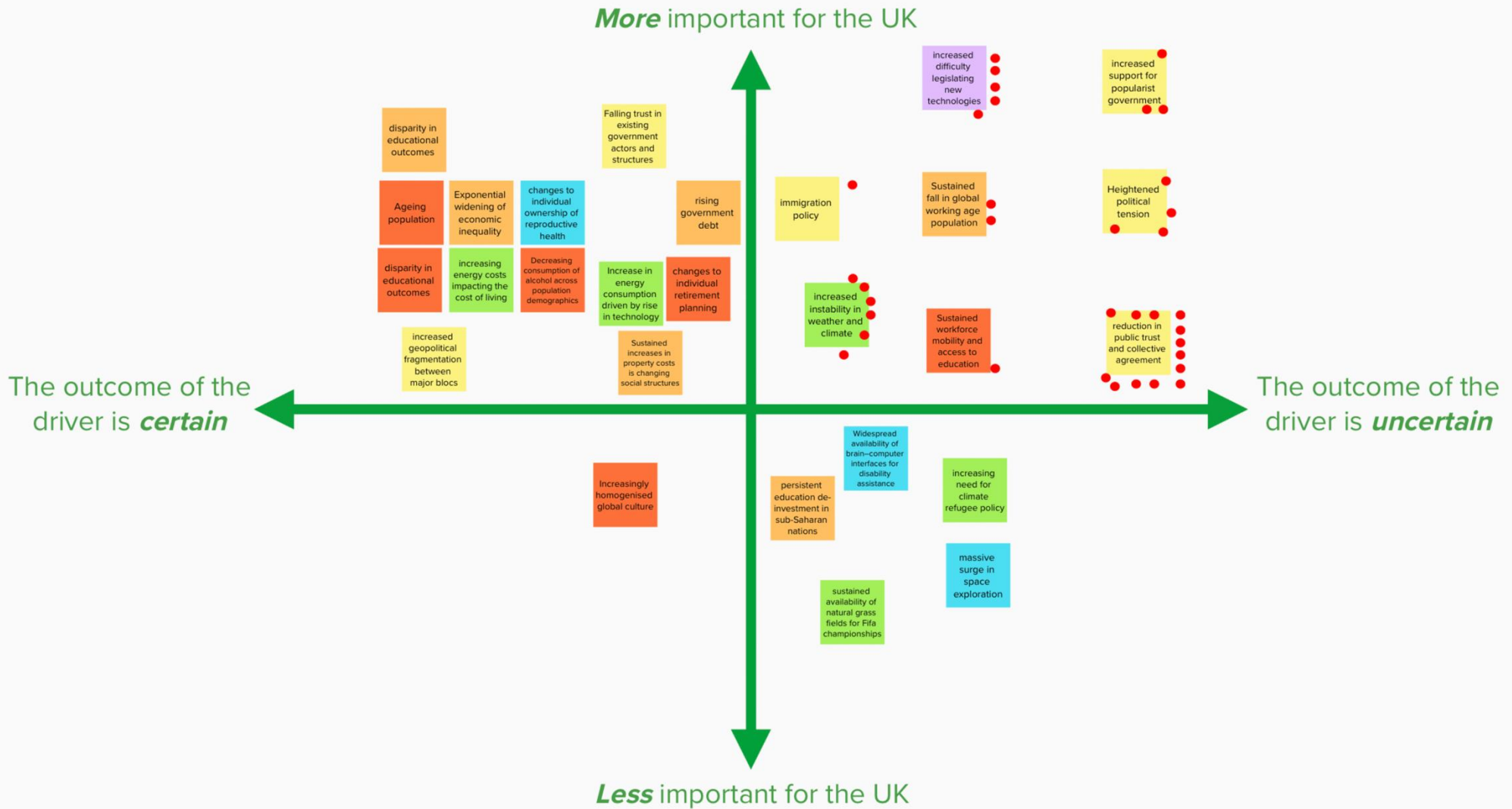


CONSUMERS
DEMAND
CHEAP
ENERGY

CLEAN
ENERGY
ALL OFFSHORE
WIND



PRODUCTION
IS LAND &
SEA BASED



important for the UK



The outcome of this driver is *uncertain*

Administration,
business and citizens
distrust each other and
operate in their own
interests

reduction in
public trust
and collective
agreement

Administration,
business and citizens
trust each other and
work together for
public good

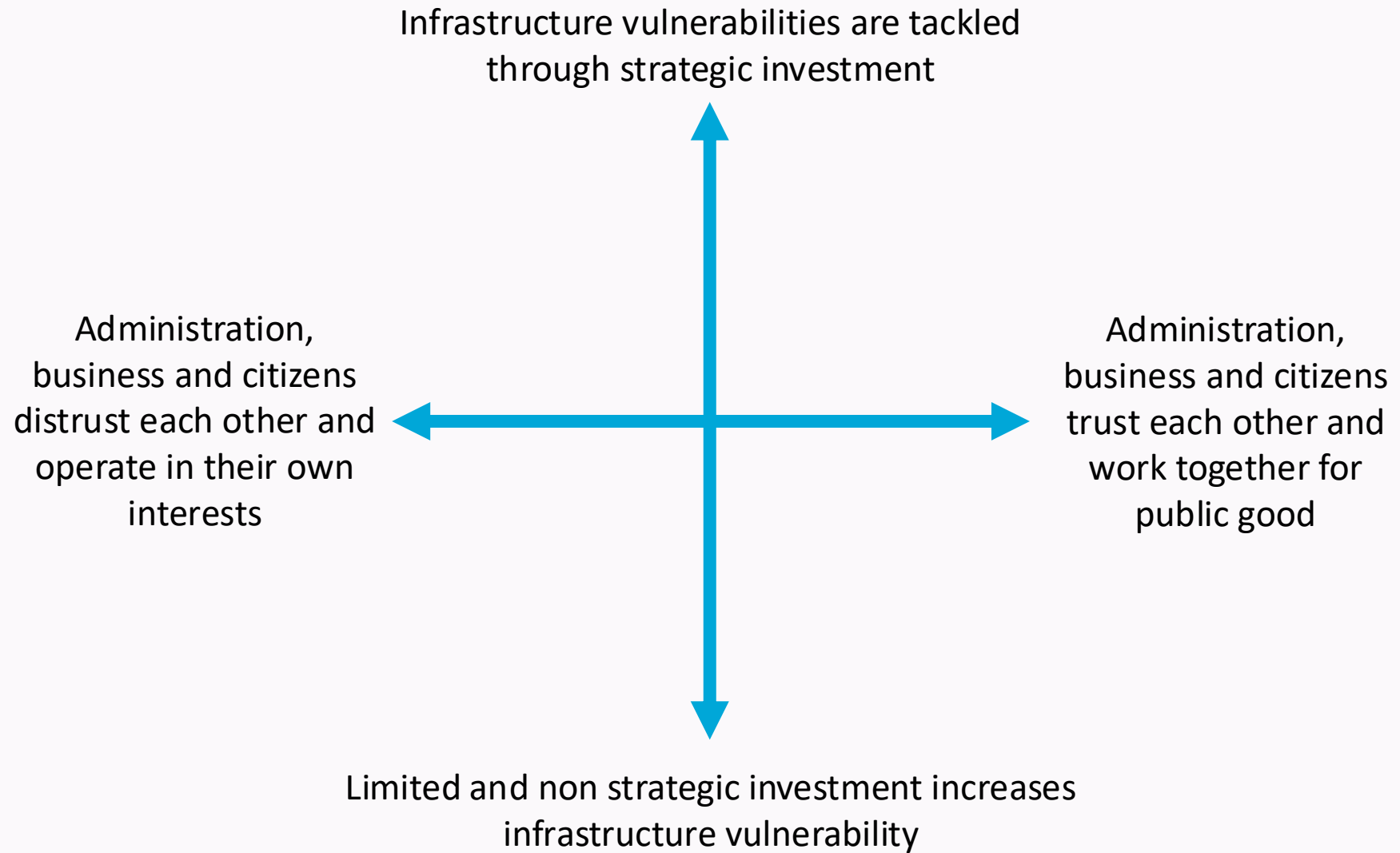


increased
instability in
weather and
climate

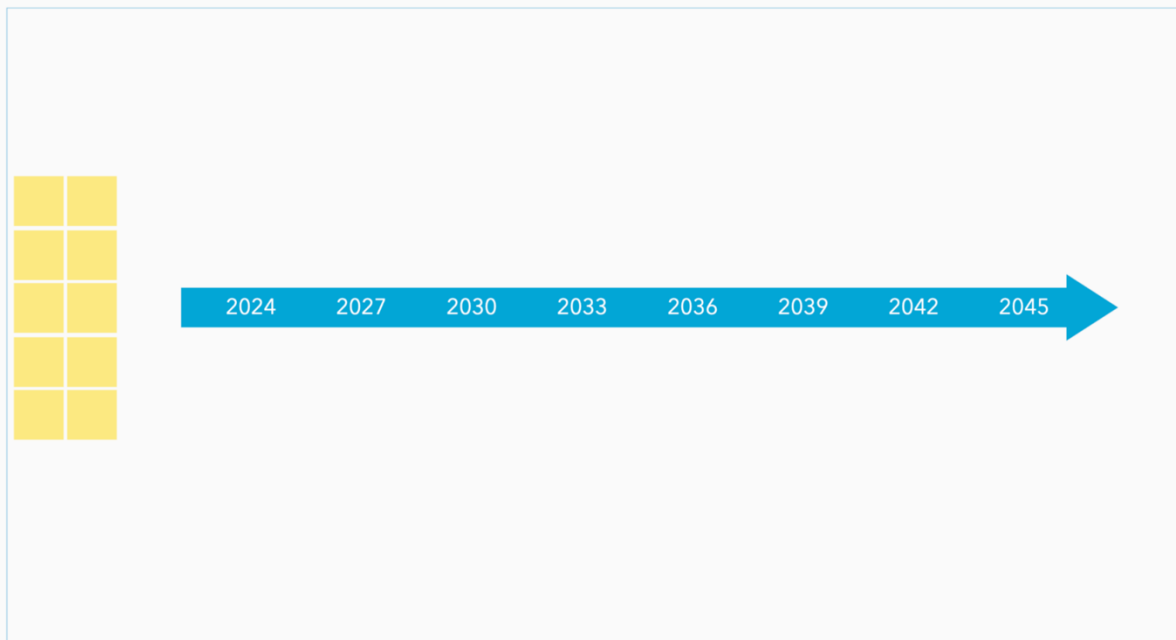
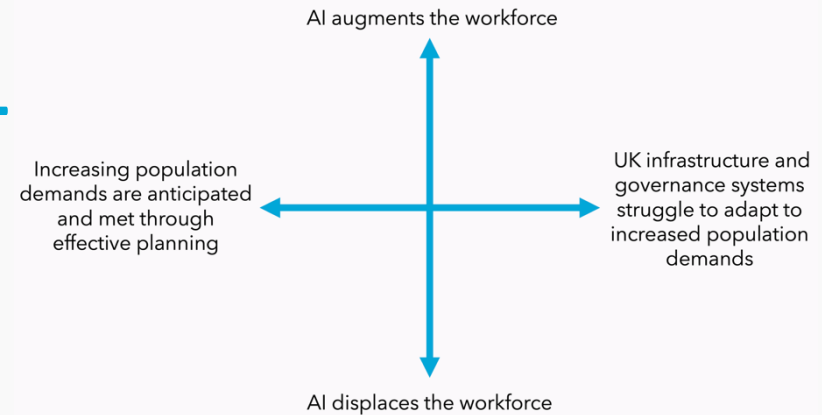
The diagram features a central light green rectangular box containing the text 'increased instability in weather and climate'. Below this box is a horizontal blue double-headed arrow. To the left of the arrow's tip is the text 'Infrastructure vulnerabilities are tackled through strategic investment'. To the right of the arrow's tip is the text 'Limited and non strategic investment increases infrastructure vulnerability'. The entire diagram is set against a white background with green decorative borders on the top, bottom, and right sides.

Infrastructure
vulnerabilities are tackled
through strategic
investment

Limited and non strategic
investment increases
infrastructure vulnerability

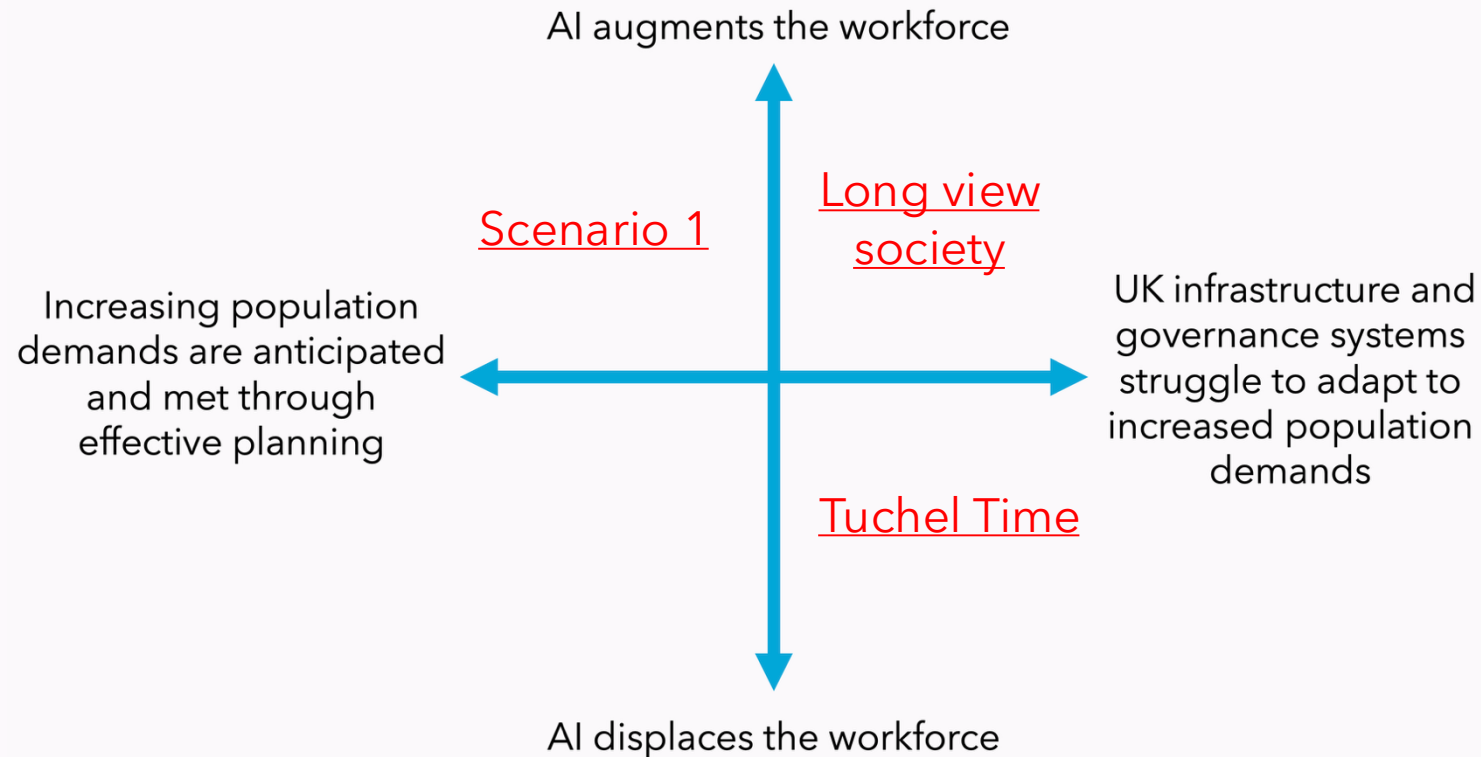


What has happened in the last 1 years to bring us here?



Name your
scenario

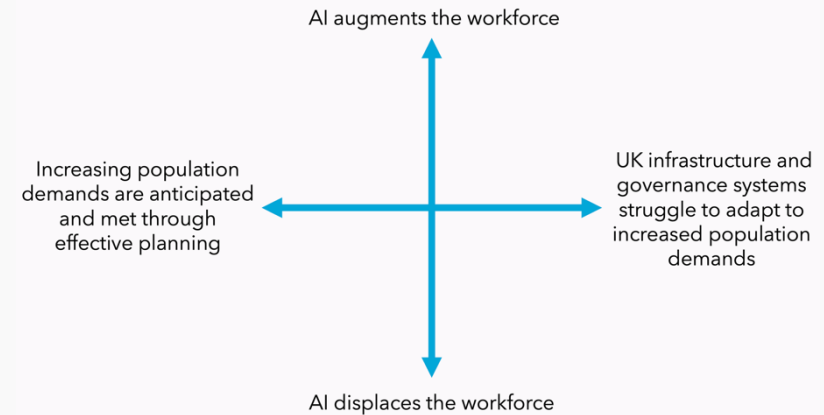
Mural Links



Importance/uncertainty map

Review:

- Easy? Difficult?
- Insightful?
- Was your scenario plausible? Explain why/why not?
- Would you like to live in your scenario? Is that what you expected before the conversation?
- Which scenario do you think is closest to where we are heading?



Step 5:

Write up the scenarios

After the workshop, you will need to write up the four scenarios so you can share them. This could be a short narrative or you may want to do further work to add more detail. In the Net Zero Society example above, the scenarios were used as a starting point for a set of quantitative models.

In order to bring your scenarios to life and help people engage with them, you could use some of the [Experiential Futures](#) methods such as storytelling, media headlines, or 'A Day in the Life'. In the [Net Zero Society Foresight](#) project, the scenarios were used as the basis for a public engagement exercise.

Next Steps

Scenarios are often used as part of a wider futures process. For example, they can be a basis for [Policy Stress-testing](#).

Depending on the object of the exercise, you may wish to consider one or both of the following: understanding stakeholder impacts and identifying main recommendations and issues.

Stakeholder impacts: what this means for you, your stakeholders and your policy area

Think about what each scenario means for your stakeholders. Some questions you may ask include:

Given the characteristics and conditions in each future...

- What does this mean for you, your stakeholders and your policy/strategy?
- Consider the characteristics in a SWOT format:
 - What are our strengths in policy or strategy for this future?
 - What are our weaknesses in policy or strategy for this future?
 - What are the opportunities that the policy or strategy needs to facilitate?
 - What are the threats that the policy or strategy needs to mitigate?

Identify the main recommendations and issues for developing the policy or strategy

This step creates the bridge between the future described in each scenario and the present policy/strategy challenge.

- Assume that you are in this future.
- Based upon this conversation, what three recommendations would you make to ensure that the policy/strategy meets its objectives?

You may wish to run the Policy Stress-testing tool at this stage.

You can use these recommendations as an input to a Roadmapping exercise.



Case Study

The GO-Science Net Zero Society project was commissioned as part of the government's net zero strategy in 2021. The project involved developing a set of plausible scenarios to stretch thinking about how society might change by 2050. Multiple workshops (including Driver Mapping and Axes of Uncertainty), fed into the creation for four scenarios, each with narratives and brought to life by rich picture illustrations. The scenarios produced are the cornerstone of the net zero society foresight report and have been designed to help policy makers stress-test policies.

**Resources for this tool can be found in the
Resource Bank
Case studies can be found in the
Case Study Bank**



today

Programme:

- 12.00 Discussion: Review key lessons
- ▶ 12.15 Discussion: Scenarios case study
- 12.30 Working with The Futures Toolkit
- 13.00 Close

Perfect Storm

High concentration of population

Changing Places



Spatial planning determines the nature of place

The nature of place emerges organically

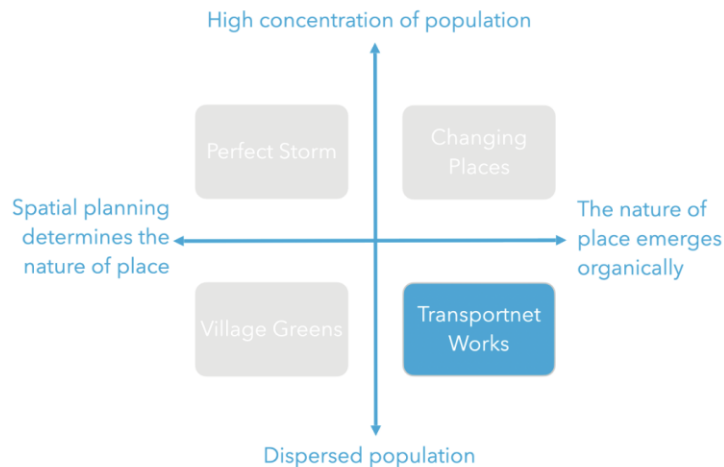


Village Greens

Dispersed population

Transportnet Works

The view from 2042



It is 23 May 2042 and today, the Minister for Infrastructure will visit Greenwich to announce the next wave of investment in Britain's intelligent highways programme. The Minister will tell the world that now that the UK's information ultrahighway reaches every corner of the land, it's time the intelligent highway did the same.

The core technologies in the intelligent highway - induction charging and self healing - have been hugely effective and with 30 percent of Britain's roads now converted the Minister will today announce which routes are to be included in stage 3. These will be the strategic roads that crisscross Britain's rural areas and that are of such importance for maintaining the flow of goods and services around the country. Britain's metropolitan roads will be included in stage 4. The Minister will no doubt gloss over the fact that there are no concrete plans to bring intelligence to some cities.

There were a few raised eyebrows when it became known that the announcement about roads would be made at the National Maritime Museum; but the Minister's choice of location is an acknowledgement both of the continuing strategic importance of Britain's maritime sector and of the role that shipping has played in developing the intelligence technology that is, paradoxically, set to transform road travel.

of the role that shipping has played in developing the intelligence technology that is, paradoxically, set to transform road travel.

Riding the waves of change

The world's leading automotive executives must surely have felt a twinge of jealousy back in 2018 when the first autonomous cargo ship launched²⁶. They must, as they tried to work out how to move beyond level 1 towards level 4 autonomy, have envied the so called Tesla of the Seas.

In retrospect, it's hardly surprising that shipping won the race. Autonomous shipping had some big hurdles to overcome, but the scale of the canvas offered more scope to experiment. The Tesla – the name stuck – worked an industrial route, sailing fertilizer 37 miles from production facility to port, deploying GPS, radar, cameras and sensors to navigate around other vessels and dock on her own. By 2020, she was fully autonomous, running the route successfully without any

2018
World's first
autonomous ship
is launched

²⁶ [Norway takes lead in race to build autonomous cargo ships](#) (2017) The Wall Street Journal

crew on board. She was also electrically powered and her annual operating costs were cut by 90%; and she replaced 40,000 (non emission free) truck drives a year through urban areas.

The Tesla wasn't a British invention, but Britain was on the case. Rolls-Royce were leading players in the smart ship revolution, looking at fundamental questions about technology, reliability, safety and commercial incentives.²⁷ Their deal with Google to develop intelligent awareness systems using Google's cloud based machine learning software to detect and track objects at sea was at the heart of the future developments.²⁸ Like The Tesla, Rolls-Royce began with local vessels; by 2025, they were operating in international waters.

Are we nearly there yet?

2021

Concern that
AVs have been
overhyped by
the market

Back on land, the journey to autonomy was encountering a few hiccups. A combination of factors such as user confidence, the trade off between safety, comfort and network performance and the sometimes confusing mix of vehicle capabilities on offer²⁹ was concerning consumers and regulators alike. The question of network performance was a particularly thorny one for an automotive industry that had no role in delivering it.

²⁷ [Autonomous ships: The next step](#) (2017) Rolls-Royce Ltd

²⁸ [Google AI to help drive Rolls-Royce autonomous ship development](#) (2017), The Engineer

²⁹ [Research on the impacts of connected and autonomous vehicles on traffic flows](#) (2016) Department for Transport

By 2022, achieving a reliable level 3 autonomous vehicle (AV)³⁰ – let alone level 4 or 5 – was being called into question amid continuing safety concerns about driver disengagement from the driving task.³¹ Leapfrogging to Level 5 was not perceived to be viable by regulators or by the growing numbers of consumers – particularly younger consumers – who were unwilling to move beyond level 1³².

Consumer wariness was not helped by high profile lawsuits over ownership of key technologies which reinforced concerns that some parts of the industry were putting market share before good practice³³.

Significant questions about the network needed answers too. Where would local government get the money to make roads more AV-friendly? Who would be responsible for the vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) low-latency wireless networks needed to manage the driverless traffic? Would AVs promote urban sprawl and threaten Britain's natural environment?³⁴

These were difficult questions for the industry and for the regulator. It was, for the time being at least, back to the drawing board. Government asked industry to join it in the AV Strategy Group

2023
Significant
questions over
the network
and the natural
environment

³⁰ [When does a car become truly autonomous? Levels of self-driving technology explained](#) (2017) Wired.co.uk

³¹ [Collision Between a Car Operating With Automated Vehicle Control Systems and a Tractor-Semitrailer Truck Near Williston, Florida](#) (2017) National Transportation Safety Board

³² [Consumer Interest in Automation: Preliminary Observations Exploring a Year's Change](#) (2017) MIT Age Lab

³³ [Waymo and Uber head for a self-driving car crash in court](#) (2017) Bloomberg Business Week

³⁴ [Driverless cars could see humankind sprawl ever further into the countryside](#) (2017) The Conversation

(AVSG) to explore the way forward.³⁵ One of the key issues they began to address was how to imagine, design and build the infrastructure needed for the future³⁶.

Goodbye to grime, crime and travel time

2025

Professional families begin to realign their values

It became apparent in the mid 2020s that a new trend was emerging amongst the professional classes. Realigning – the term coined to describe the phenomenon – was superficially akin to downsizing but driven by a more complex set of choices and values. Those who realigned were likely to be professional, middle class, middle age families with children in their early teens. They were generally, but not necessarily, home owners with double incomes who worked hard. Their children generally, but not necessarily, aspired to go to university and worked hard to get there. One thing they all had in common was being tired of the combination of pollution, crime and transport gridlock they faced most days. Parents might have been willing to put up with one or two of these, but all three seemed too much.

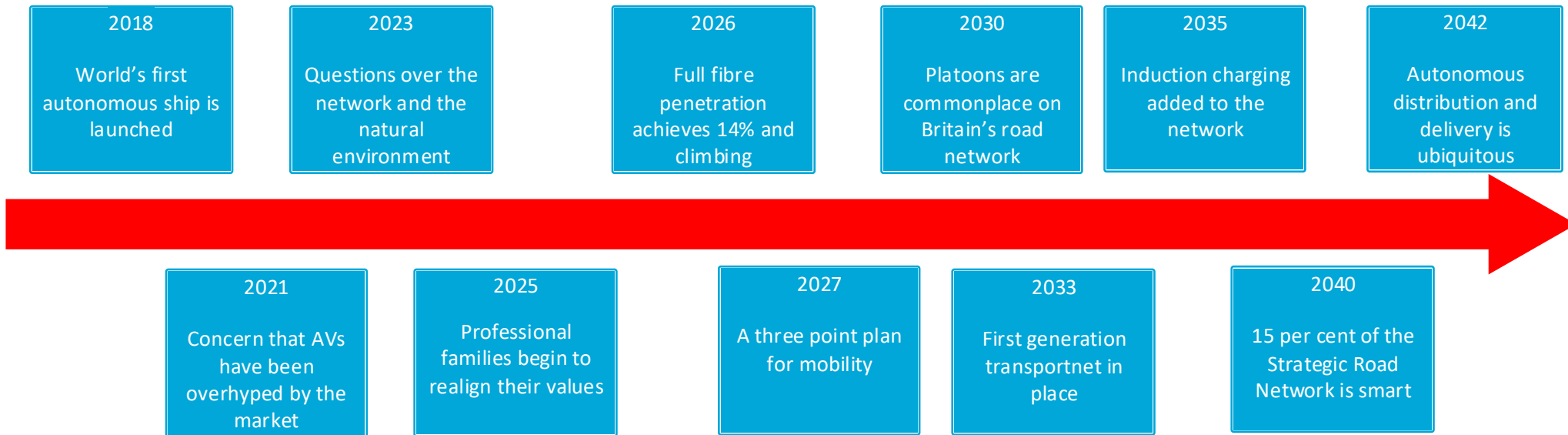
The threat of drugs and drug related crime to children's safety was, for example, a growing concern throughout the 2020s. Cannabis use had increased amongst intelligent urban teenagers for a number of years³⁷ and the earlier they started smoking it, the more it was likely to reduce their academic preformance³⁸. Bad enough, but the increased risk to middle class

³⁵ [Connected and Autonomous Vehicles: The future?](#) (2017) House of Lords Science and Technology Select Committee

³⁶ Written evidence from the Transport Systems Catapult House of Lords Science and Technology Select Committee (2017)

³⁷ [Clever teenagers twice as likely to smoke cannabis, study finds](#) (2017) The Independent

³⁸ [Marijuana use linked to poorer school performance, major new research reveals](#) (2017) The Independent





today

Programme:

12.00 Discussion: Review key lessons

▶ 12.15 Discussion: Scenarios case study

12.30 Working with The Futures Toolkit

13.00 Close



today

Programme:

- 12.00 Discussion: Review key lessons
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Government
Office for Science

How we can help you think about the future



The GO Science Emerging Technologies, Futures and Foresight team works to promote and embed strategic long-term thinking within government and across the Civil Service

Updated Jan 2024

Who are we? The Go-Science Futures Team



Emily Connolly
Deputy
Director



Tom Wells
Deputy
Director



Karen Folkes
Head of
Strategic Futures



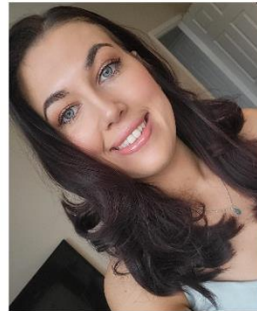
Ruth Marshall
Head of Futures
Capability



Christina Hadjiyianni
Head of Futures
Resources



Jonathan Nunn
Head of Futures
Advice



Melissa Jane Cruickshank
Delivery
Manager



Niki Tsoutsoura
Futures Project
Officer

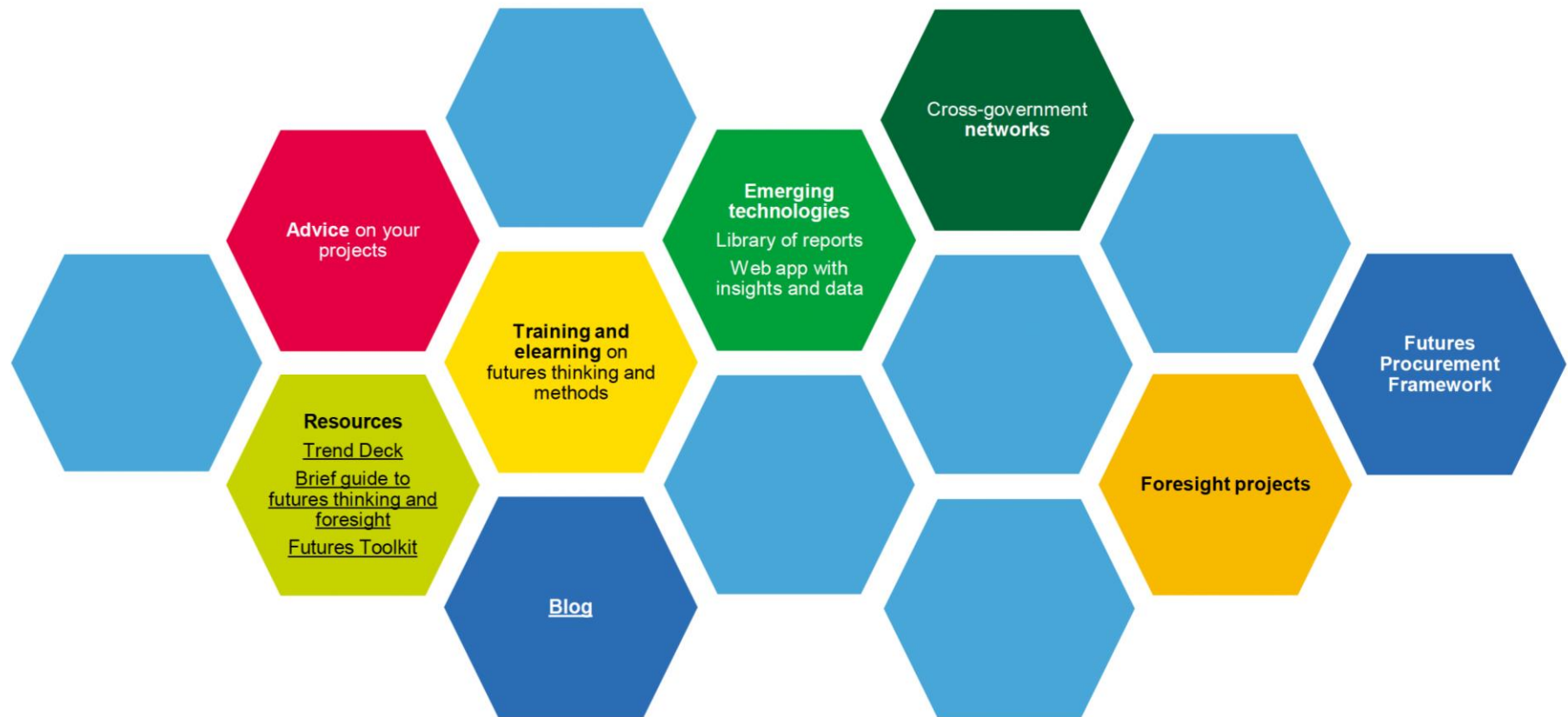


Shaan Rashid
Project Research Officer
- Intern



Terence Ma
Project Research Officer
- Intern

At a glance: our services





Government
Office for Science

Evaluation and Feedback

Futures tools

- Horizon scanning
- Scenario planning
- Stress testing/wind tunnelling
- Three horizons

Other strategic tools

- Systems thinking

Monitoring

Implementation, metrics and
baselines

Futures tools

- Horizon scanning
- Drivers of change
- Scenario planning

Other strategic tools

- Quantitative scenarios

Government Office for Science

The FUTURES x POLICY Cycle

([Click here for background](#))

**CLICK TO
SELECT A STAGE
OF THE POLICY
DEVELOPMENT
CYCLE TO LEARN
HOW FUTURES
CAN HELP**

Image adapted from the [ROAMEE
Policy Cycle](#) in The Green Book:
appraisal and evaluation in central
government (2020)

Rationale

Scoping around policy issues -
setting the strategic context
and motivations

Futures tools

- Horizon scanning
- 7 questions & issues paper
- Driver mapping
- Visioning
- Delphi

Other strategic tools

- Systems mapping
- Exploratory/participatory futures

Objectives

Defining objectives and
generating solutions options

Futures tools

- Horizon scanning
- Driver mapping
- Scenario planning
- SWOT analysis
- Roadmapping
- Backcasting

Other strategic tools

- Speculative design
- Systems mapping
- Exploratory/participatory futures

Appraisal

Designing, testing, and assuring policy

Futures tools

- Driver mapping
- Scenario planning
- Stress testing/wind tunnelling
- Three horizons

Other strategic tools

- Red teaming



Government
Office for Science

The Futures Toolkit

For further guidance and support, contact the
GO-Science Futures Team

futures@go-science.gov.uk

Produced in collaboration with



SAMI Consulting

robust decisions in uncertain times