Public views on the research priorities of the Environment Agency about onshore oil and gas

Sciencewise Sounding Board report

March 2016

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The report was approved by the Sciencewise Programme Board.

The report is entitled: 'Public views on the research priorities of the Environment Agency about onshore oil and gas'.

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Executive summary

The objective of this project for the Environment Agency was to enable input from members of the public into the future direction and priorities for its research related to the environmental regulation of the onshore oil and gas industry. Sciencewise engaged 17 members of the public from selected locations in England in an online dialogue with researchers from the Environment Agency about the environmental impact of onshore oil and gas extraction and the Agency's research priorities in this area.

Participants were provided with information about the development and regulation of the onshore oil and gas industry, including environmental risks. They were then asked about:

- any concerns that they may have around the environmental impact of onshore oil and gas
- what issues researchers at the Environment Agency should concentrate on to address public concerns, and
- what would build their confidence in the research carried out by the Environment Agency.

Given the small number of participants, results should not be interpreted as representative of the public at large. Rather, this type of public engagement is indicative of the range of public views, experiences and perspectives on the issues at hand.

Polling of participants both before, during and after the Sounding Board information and dialogue sessions showed that many, but not all, participants were ‘somewhat concerned’ or ‘very concerned’ both about the environmental impact of onshore oil and gas extraction in England, and about unconventional shale gas, widely known as fracking. More participants became ‘very concerned’ about shale gas as they learned more about the issues over the course of the sessions, while in a contrasting development the number of participants 'unconcerned' about conventional oil and gas extraction also increased.

Participants identified a wide range of environmental concerns associated with onshore oil and gas, including impacts on water, soil, air, and wildlife, as well as the risk of earthquakes, sink holes and subsidence. Many participants were preoccupied with local and immediate impacts from onshore oil and gas and fracking, ranging from contamination of the local water supply to the impact of industrial traffic on local roads. They also suggested that as a relatively small and densely populated country, the UK might not have the same prospects for the development of onshore oil and gas as some other countries. There were a number of key themes to this discussion including the importance of health and safety related issues, the importance of clean-up and restoration of sites after the closure of wells, and the need for better understanding and communication of environmental and health and safety risks.

Participants identified a number of research priorities for the Environment Agency around onshore oil and gas. When asked to imagine the development of an extraction site near their home, participants placed a high priority on health and safety related issues including potential risks to the water quality, issues around the use of chemicals, and gas leaks. They also placed a strong emphasis on understanding local environmental impacts, including on wildlife, and traffic and noise pollution. Participants made a number of specific suggestions for research, including the need to establish environmental baselines and metrics for safe operations, and the need to consider the density and cumulative impact of wells.

Participants also put forward a number of suggestions for things the Environment Agency could do to build their confidence in its research. They considered the Environment Agency to be an appropriate party to undertake and oversee research. They emphasised the importance of independent research, and were concerned about industry involvement introducing bias. They also pointed to the importance of transparency around research activities, and communication of findings in an easily accessible way. Finally, participants noted that deeper local engagement as part of research activities would build trust in results.

Background

About the Sounding Board

The Sounding Board is a Sciencewise tool for gaining rapid deliberative public input on challenging issues involving science and technology. Participants for the Sounding Board were recruited from the general public using stratified random sampling on the basis of demographic characteristics including age, gender, geographical location and social background. Policy makers circulated materials to the group in advance, and then engaged in an online facilitated discussion to gather an understanding of views on the topics in question.

Objective for the Environment Agency

The objective of the project for the Environment Agency was to enable input from members of the public into the future direction and priorities of its research related to the environmental regulation of the onshore oil and gas industry.

Environment Agency researchers wished to achieve this through a structured and non-confrontational dialogue that would help technical experts better understand lay concerns and drivers. In particular, they wished to explore the nature and extent of environmental concerns of participants about onshore oil and gas exploration and production in England, and participants' views about where the Environment Agency should focus its research efforts. The insights gained would feed in to:

- the Environment Agency internal research plan, updated annually in mid-year
- the Environment Agency externally published research priorities, updated annually
- informal detailed research questions used to inform the Natural Environment Research Council and other research organisations, and
- Environment Agency operational public engagement activities around potential oil and gas sites.

This project also aimed to better equip Environment Agency technical experts when they participate in external research governance, for example advising Research Council projects.

Design and structure

Sciencewise designed and ran a series of four online workshops involving 17 public participants. Participants were divided into two groups. Each of these groups convened online for two meetings. The first session for each was designed to present them with relevant information about the topic. The second session explored participants' views in greater depth, with a chance to share and discuss different perspectives. There was one week between the first session and the second session, giving participants time to engage with further information from the Environment Agency, do some research of their own, or talk about onshore oil and gas with friends and family.

Participant recruitment

Participants were recruited from areas in England near historic oil production sites, where further exploration for onshore oil and gas might occur in the near future: Merseyside (including Liverpool);

southern Nottinghamshire (including Nottingham); and southern Hampshire (including Winchester and Eastleigh).

Recruitment was carried out by a specialist agency that approached members of the public by telephone. The aim was to recruit 8-10 members of the public for each group. The recruitment brief required that participants were recruited from a variety of age ranges, and that the participants were broadly reflective of the wider population in terms of gender, ethnicity, and socio-economic status.[1] Furthermore, the brief specified that participants should not have an entrenched view on onshore oil and gas, positive or negative – or any existing relationship with the Environment Agency or the oil and gas industry. Questions were included in the recruitment questionnaire to determine this. A modest amount of money was paid to each participant as a token of appreciation for their participation.

Participants were contacted by Sciencewise before the start of the Sounding Board and given access instructions as well as some concise background information about the project. They were contacted by telephone shortly before the start of the sessions to ascertain that they had received the instructions and were ready to join the Sounding Board.

1. **Information session**

The purpose of the information session was to present participants with essential information which would assist them in making informed contributions to the dialogue session. The information session was a 60-minute interactive workshop, with presentations from Environment Agency researchers and several opportunities for participants to ask questions of the Environment Agency.

The information presented to participants was originally put together by the Environment Agency's Evidence Directorate, developed with input from the Sciencewise team and finalised with the help of detailed feedback from an independent expert: Michael Bradshaw, Professor of Global Energy at Warwick University, reviewed each of the slides designed for the information session and provided comments to help ensure the accuracy of the information and to prevent any bias.

During the information session, the Environment Agency experts presented general information about the Environment Agency and about onshore oil and gas, followed by detailed information about risks associated with fracking, the Environment Agency's approach to monitoring activity around wells, and the purpose and scope of the Agency's research programme.

There were several slots where participants were invited to ask questions about the information they had been provided with. A Sciencewise facilitator made sure that all participants had the opportunity to pose their questions and that they were satisfied with the clarifications provided by the Environment Agency experts.

The information session also included two polling questions for participants, asking them to express to what extent they were concerned about the environmental impacts of onshore oil and gas extraction in England. Responses were recorded and briefly displayed to participants immediately after they responded.

[1]Further detail on the demographic makeup of participants is included in the Annex of this report.

An audio recording was made of the entire information session. Additionally, the Sciencewise team made detailed notes of the question and answer sessions to inform the report.

Immediately after their participation in the information session, participants were sent a brochure and an information video from the Environment Agency, so that they could find out more about the regulation of onshore oil and gas in England. This was left to their own discretion – there was no requirement for participants to use this information.

2. **Dialogue session**

The purpose of this session was to engage participants in an informed dialogue about the Environment Agency's research on onshore oil and gas, providing the Agency with useful insights into public views, which could inform their research programme. The dialogue session was a 90-minute interactive workshop, structured around a small number of discussion questions (see the Annex of the report for detail).

Participants reconvened in the same groups as the previous week, when they attended the information session. Everyone who attended the information session also participated in the dialogue session. There were seven participants in the first dialogue group and 10 in the second dialogue group. One participant who missed the information session due to technical issues was separately briefed and was therefore able to participate in the dialogue session.

The dialogue session was attended by a five-strong team of Environment Agency researchers, each with their own area of expertise, so that they could feed in to any discussion as and when appropriate. The same team of experts attended both dialogue sessions, and two of the experts had also participated in the information sessions. The experts were encouraged to participate in 'listening mode' as much as possible, in order to allow the dialogue between participants to develop. The session was moderated by a Sciencewise facilitator.

Three discussion questions were at the centre of the dialogue session. The facilitator asked each participant in turn to share their view on the discussion topic and, once all participants had spoken, invited Environment Agency experts to reflect on the issues raised. In a few instances, the collaboration tool ('whiteboard') of the Adobe Connect software was used to gather initial responses to discussion questions; at other times the facilitator simply addressed participants one by one, asking them to speak. Each discussion lasted 15 to 20 minutes, with some five minutes added for the expert response.[2]

The two polling questions that participants had answered during the information session were revisited twice during the dialogue session: once at the very beginning of the session and once at the end, after discussions had taken place. This meant that at the end of the Sounding Board, participants' views on the environmental impacts of onshore oil and gas extraction and fracking had been recorded three times:

- Before receiving detailed information about the risks associated with onshore oil and gas extraction and fracking and how activities are regulated by the Environment Agency and others

[2] The Adobe Connect technology did not work perfectly in both sessions: in one instance the whiteboard function was problematic; in another instance Environment Agency experts could not be heard by participants. The issues were addressed as quickly as possible and alternative options were used to continue the session in accordance with the facilitation plan. Participants' evaluation survey results suggest almost all participants were satisfied with information provided and had sufficient opportunity to share their views. These technology issues are therefore unlikely to have significantly impacted the results of the dialogue.

- After the information session and a seven-day 'reflection period' in between the two sessions, but before engaging with the discussion questions, and
- After the dialogue session, having received detailed information and participated in informed discussions with other participants and Environment Agency experts.

As with the information session, an audio recording was made of the entire dialogue session. Additionally, the Sciencewise team made detailed notes to inform the report.

Interpretation of results

Given the small group size, the results of the Sounding Board should not be interpreted as representative of the views of the public at large. Rather the value of this form of deliberative engagement lies in opening up the policy process to input from a broad range of perspectives. This can assist policymakers to test whether they have correctly understood the range of relevant issues, and to identify additional benefits, or questions and concerns which may need to be addressed.

The views of all participants are summarised and represented in the report. Where a view was a common theme across the deliberative sessions, we refer to this view as being held by 'many' participants. When a view was echoed on a number of occasions, we refer to this as 'some' participants. We identify when a point was made by a single participant only.

Policymakers should be particularly careful regarding interpretation of these results in two instances:

- When issues are raised, or strong views held, by only a small minority of participants. This should *not* be seen as indicative that an issue is likely to be unimportant to the general public or ignored in wider public debate. It may be the case that views are held by a larger group of the public as a whole. It may also be the case that an issue with only minority support plays a prominent role in public debate, if it is championed by influential interest groups.
- When technical or complex areas are discussed, and participants may not yet have fully developed views. Members of the public form judgements on the basis of information provided, but are not technical experts. Their views may shift as other considerations are raised by expert scrutiny of issues over the course of public debate. Policymakers should therefore be careful not to interpret initial judgements as fixed.

Results of the Sounding Board

This section of the report presents the results of polling and discussion during the four online workshops, and further thoughts gathered through a follow-up survey. We summarise these results in the following sections, in line with the structure of the workshops:

Information sessions

- Initial polling of participants on their concerns about the environmental impact of onshore oil and gas extraction and fracking in England.
- Initial views of participants on onshore oil and gas.

Dialogue sessions

- Participants' concerns about the environmental impact of onshore oil and gas.
- Participants' views on the issues researchers at the Environment Agency should concentrate on to address public concerns.
- Participants' views on what would build their confidence in the research carried out by the Environment Agency.

Follow-up survey

- Further thoughts about the research priorities of the Environment Agency around onshore oil and gas.
- Further reflections on learning more about onshore oil and gas as part of this project, including whether views had changed.

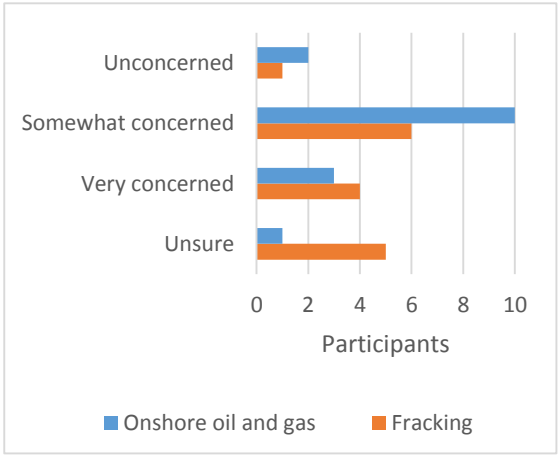
Polling questions on environmental impacts of onshore oil and gas

Participants were provided with introductory information about the role of the Environment Agency and the history and development of the onshore oil and gas industry in England. They were also introduced to conventional and unconventional sources of oil and gas, including the process of fracking.[3] They were then asked to answer the following two polling questions, one after the other:

- How would you describe your feelings about the environmental impact of onshore oil and gas extraction in England?
- How would you describe your feelings about the environmental impact of fracking in England?

Participants could not see how others answered the polling questions until all participants had answered

Chart 1: How would you describe your feelings about the environmental impact of onshore oil and gas extraction and about fracking in England?



[3] The presentation used to provide this information to participants is included in the Annex of this report.

both questions. The results of these polls are presented in Chart 1.[4]
Asked about the environmental impact of onshore oil and gas extraction in general, most participants indicated that they were 'somewhat concerned', with much smaller numbers of participants selecting 'unconcerned' or 'very concerned' and one participant stating they were 'unsure'. Asked the same question about fracking in particular, levels of concern expressed by participants were higher, as well as levels of uncertainty (with five participants selecting 'unsure').

Initial views of participants on onshore oil and gas

Following this initial polling, participants were provided with further information about onshore oil and gas. This information was provided in two sections, and covered:

- environmental risks of onshore oil and gas extraction, steps in developing wells, and how the industry is regulated, and
- the Environment Agency's research activity with regard to onshore oil and gas, including examples of recent work, identified gaps in the evidence base, how the Environment Agency uses research, and the approach taken to working with other research institutions.

Participants had the opportunity to ask questions after each section, and asked for further clarification of the following issues:

- the environmental impact of fracking, including soil contamination and the impact on local agriculture, the impact on groundwater, the risk of earthquakes and sinkholes, transportation and disposal of waste, and restoration of sites that are no longer in use
- the possibility of 'blow-outs' on onshore oil and gas sites, and the possibility of equipment failure resulting in environmental damage as part of the oil and gas exploitation process, including 'jacket' failure, and 'bunding' of waste storage facilities
- location of drilling sites, including how far it is possible to drill horizontally, and whether well heads could be located away from population centres
- whether the Environment Agency has sufficient regulatory resources around onshore oil and gas and will take an active approach to enforcement, and how the UK regulatory system compares with the system in the United States
- targets for the development of the industry, and whether further development is 'worth it' considering the current low contribution of onshore oil and gas to current supply

> "Bearing in mind where the sources of shale gas are likely to be, would it be possible to locate the well head some distance away from the population centre?" (Sounding Board participant)

> "Is it possible that these wells can blow-out in the way an oil well can?" (Sounding Board participant)

> "Considering how little we are getting out of onshore supplies at the moment, will it be worth getting this out of the ground?" (Sounding Board participant)

[4] One participant missed the initial information session and as a result did not vote in this first poll. These results should not be seen as representative of public views at large. Rather, they are a useful gauge of the initial perspectives of participants.

- existing use of fracking in the UK, and whether any fracking has been undertaken at Wytch Farm (production site in Dorset, the largest onshore oil field in western Europe)
- the possibility of reusing wells as a source of geothermal energy, and
- whether there was sufficient funding for research in this area.

Participants also took this opportunity to make the following points:

- Concern about the environmental impacts of onshore oil and gas and fracking
- Impatience about slow progress of the development of the UK onshore oil and gas industry, and the impact of this on oil and gas prices
- The fact that the issue had been a matter of public debate in their local area, including as part of the General Election, and the need for more information and public engagement around the issues, and
- Relevant differences between the UK and the USA for the development of an onshore oil and gas industry, both regarding the availability of land in a more densely populated UK and the depth of shale reserves.

> "Americans have reduced the price of oil and gas – when are we making a move in the UK?" (Sounding Board participant).

> "I live in the Wirral peninsula and this is a political hot potato…we all need a lot more information." (Sounding Board participant).

Participants' concerns about the environmental impact of onshore oil and gas

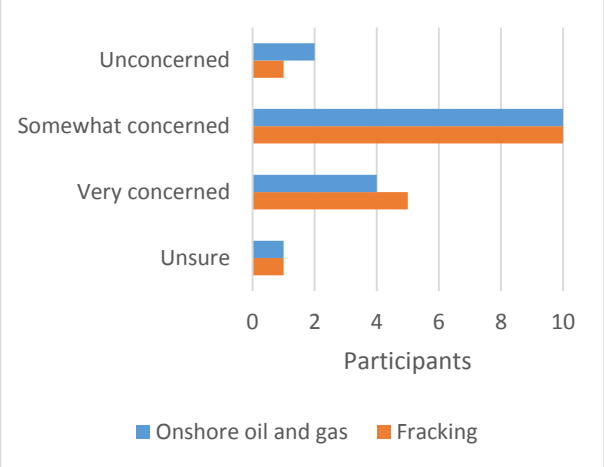
A dialogue session was held with participants one week after the initial information session. The first of three substantive discussion questions delved deeper into participants' concerns about the environmental impact of onshore oil and gas.

Participants were first asked to answer the same two polling questions they had answered as part of the information session one week earlier:

- How would you describe your feelings about the environmental impact of onshore oil and gas extraction in England?
- How would you describe your feelings about the environmental impact of fracking in England?

As in the previous session, participants answered the polling questions one by one, and did not see other participants' answers until all had answered both questions.

Chart 2: How would you describe your feelings about the environmental impact of onshore oil and gas extraction and about fracking in England?



The results are shown in Chart 2. Many participants felt 'somewhat concerned' or 'very concerned' about the enviornmental impact of onshore oil and gas and fracking in England. In the time since participants had responded to the same questions one week earlier, more participants had formed views about fracking. It

is worth restating that these results should not be seen as representative of public views at large, but only of the perspectives of participants involved in the project.

After completing the polling questions, participants were asked the following question: *If you have concerns about the environmental impact of onshore oil and gas, **what are they**? If you have no concerns, **why not**?*

Participants were invited to share their thoughts using the collaboration tool ('whiteboard') of Adobe Connect. This tools allows each participant to write on a virtual whiteboard that is visible to all participants. Participants' comments can then be grouped on the whiteboard and addressed in turn. Participants identified the following environmental concerns as part of the online whiteboard session, and the discussion that followed:

- **Water:** Many participants raised concerns about the potential impact on water resources. This included the impact on drinking water and farming, and the possibility of harmful leaks and spillage into the water table. Participants also identified the scarcity of water in some parts of the country as a concern and constraint, as well as water contamination from the use of chemicals in the fracking process.
- **Soil:** Some participants raised the possibility of soil contamination from leaks as an area of concern, including the potential impacts on food production.
- **Air:** Some participants expressed concern about the release of methane gas, both as a health and safety issue for nearby residents, and because of its impact on global warming.
- **Geology:** Some participants raised concerns about the potential for earthquakes and subsidence as a result of drilling activity.
- **Wildlife:** Some participants expressed concern that onshore oil and gas development might affect wildlife
- **Waste treatment:** One participant raised treatment of waste from onshore oil and gas extraction as a possible environmental risk.
- **Secondary containment:** One participant suggested the need for secondary containment to contain oil and gas leaks.
- **Clean-up:** One participant raised the need to ensure clean-up of sites post-production.

> "My concerns are water and soil contamination and the impacts this has on drinking water and farming, and the release of methane and the impact on global warming" (Sounding Board participant).

> "We already have lots of coal mines. We get lots of subsidence. Will this extend into the continental shelf? Will it add to subsidence?" (Sounding Board participant).

> "I want to know that the operations are done properly and that there is sufficient budget in place to allow clean-up when they are finished." (Sounding Board participant).

Participants also identified the following related issues:

- **Health and safety:** Many participants mentioned health and safety issues. Their comments focused on the possible impacts on nearby residents from water and air pollution, as well as on on-site health and safety issues, including the need to ensure operations are properly regulated.

> "Just how safe is it? There are already minor tremors in Blackpool. What are the EA's views on this?" (Sounding Board participant).

- **Risk and uncertainty:** Many participants identified a need to better understand the risks and impacts associated with fracking, including the idea that this was an 'unproven technology'.
- **Need for an onshore oil and gas industry:** Many participants questioned the need for a UK onshore oil and gas industry at all, including whether the environmental risks were 'worth it', suggesting demand could be met in other ways.
- **UK geography:** Some participants made reference to the size and population density of the UK to reinforce concerns about environmental impact.
- **Distance from residential areas:** Some participants raised concerns about the location of onshore oil and gas sites near residential areas, including the impact on local transport from site-related traffic.
- **Previous UK experience with fracking:** One participant said that fracking has been underway for 20 years in the UK without complaint. In their view, the issue had been inflated by the 'beard and sandal brigade' without credible research.

> "Fracking is an unproven technology…we need to minimise the risk." (Sounding Board participant).

> "Onshore oil and gas has a relatively low yield – only 2% of oil and 0.4% of gas [This information about current yields had been provided by Environment Agency researchers]. But there are risks to the soil and air, as well as around the treatment of waste. So for me the disadvantages outweigh the advantages. Is it really worth it?" (Sounding Board participant).

Participants' views on Environment Agency research priorities

After the initial discussion session participants were given a short presentation by Environment Agency experts, consisting of a selection of slides from the previous week's information session. The reminder slides covered onshore oil and gas resources, environmental risks, current research activities and knowledge gaps.

Participants were then asked to imagine a scenario in which an oil and gas company proposed to drill a well near their home. They were asked what issues researchers at the Environment Agency should concentrate on to address their concerns about such a development.

Participants identified the following areas of focus for researchers at the Environment Agency:

- **Health and safety:** Many participants raised the importance of reassurance around health and safety issues. In particular, they pointed to the use of chemicals as a cause for concern, identifying potential risks to the water supply and fire prevention as areas of research interest. One participant mentioned the practice of using LPG as an alternative to chemicals, which some other participants were sceptical about from a health and safety angle. Many participants also mentioned methane leaks as a health and safety issue and an area for research, and one participant pointed to the need for safety procedures for responding to leaks and links to emergency services.
- **Local environmental impacts:** Many participants stressed the importance of understanding the impact of an onshore oil and gas development on the local environment, and suggested research should focus on the local level.

> "What comes out of the ground could be radioactive and may have a wider effect" (Sounding Board participant).

> "Sometimes we are not told the full truth about chemicals, and we only find out 20 years later." (Sounding Board participant).

- **Traffic:** Despite having been informed about the respective roles of the Environment Agency and local authorities in the regulation process, many participants raised the issue of traffic impacts associated with onshore oil and gas sites, including CO2 emissions and noise pollution, as research areas of interest.
- **Water:** Many participants thought that research should address risks to water quality and supply, including pollution of aquifers as a result of leaks and spillage.
- **Environmental baselines:** Some participants argued that establishing environmental baselines should be a priority, covering ground movement, methane levels and background radiation. They also suggested establishing metrics that could be shared with the public, including safe distances from the water table for operations.
- **Property values:** Some participants pointed to the impact of onshore oil and gas development on local property values as an area of interest.
- **Density of wells:** One participant raised the issue of density of wells, and their cumulative impact on earth movement.
- **Old wells:** One participant raised the issue of monitoring old wells, to measure impact over time. Another participant stressed the importance of verifying remediation after operations are completed.
- **Transparency and communication:** A strong theme of discussion was the need to keep the public informed about (research into) the environmental impacts of onshore oil and gas, including (research about) impacts at a local level. These issues were explored in greater depth in the next part of the session.

> "There is a need to reassure the public on water quality and pollution of aquifers. Water quality is a big issue. I'm interested in the effect on the local environment, for people in the area." (Sounding Board participant).

> "I am concerned about the escape of methane, which can be potent. Will the gas be properly contained?" (Sounding Board participant).

> "How many oil wells can be drilled on a shale belt and what distance apart to minimise earth movement." (Sounding Board participant).

> "Having key metrics established, put them in the public domain. This would alleviate concerns." (Sounding Board participant).

Participants' views on confidence in research by the Environment Agency

The final substantive section of the discussion session focused on the question: *What would give you confidence in the research carried out by the Environment Agency?*

Participants identified the following issues:[5]

- **Evidence**: Many participants indicated that their confidence in the Environment Agency's research depended on the Agency's ability to provide evidence on the impact of onshore oil and gas operations on

> 'There's scaremongering in the press, but we need hard facts; that would give us more confidence in the programme'. (Sounding Board participant).

[5] These suggestions should be treated with some caution as there may be a difference between what people say would give them confidence in research, and how they actually act, possibly favouring evidence that supports their own views. The channels through which evidence is communicated are also likely to impact how it is perceived.

the environment. Some participants specified particular issues on which they thought the Environment Agency should report in detail, such as water supply, risks relating to chemicals, or cumulative impacts on local areas. A few participants mentioned the prospect of using evidence from the monitoring of active wells, either from abroad or to be compiled in the UK over time.

- **Robust research:** Some participants emphasised that they needed to know that the research carried out by the Environment Agency was robust, for instance by being reassured about the quality of the research team, the funding allocated to the research and the thoroughness of the research methods. One participant mentioned the need for the research to focus on the long term, ensuring continuity. A few participants said that they had a great degree of confidence in the robustness of the Environment Agency's research.
- **Independence:** Many participants expressed concern about industry involvement introducing bias into the research. They said they would be more confident if they knew that research was carried out by scientists who were not funded or appointed by parties who had a commercial interest in onshore oil and gas. Some specified that the involvement of universities bolstered their confidence in research findings. A few participants said they were worried about undue influence from senior management and politicians overturning independent research findings to further particular interests.
- **Transparency**: Many participants spoke about evidence and transparency in conjunction, emphasising that the Environment Agency should release all available information and that it should clarify how it conducted its research. A few participants stressed that no information about risks should be omitted; one participant said that evidence about successes in risk management should also be highlighted.
- **Timely publications and updates**: There were a few comments from participants about the timing of publications, arguing that the public should be given information well before decisions about onshore oil and gas activity are made. One participant added that regular updates would further help them feel confident about the research of the Environment Agency.
- **Accessible information:** Some participants indicated that they needed better access to information in order to be more confident in the Environment

> "Understanding what went into the risk assessment. Seeing the information and evidence…(would give me confidence). "(Sounding Board participant).

> "There should be a long term focus with the capacity for continuous improvement – not just a short term approach." (Sounding Board participant).

> "Would their concerns be with the public, or with the company who sponsors them? Would they have the public's best interest at heart?" (Sounding Board participant).

> "I'm more comfortable with the EA – which would be far more impartial than handing this over to the oil and gas industry." (Sounding Board participant).

> "I don't need confidence in the research. I need confidence that the research won't be overturned." (Sounding Board participant).

> "I wouldn't know where to look – would it be published somewhere?" (Sounding Board participant).

> "The research should be clear in its explanation. You shouldn't need a PhD in geology or chemistry to understand it." (Sounding Board participant).

Agency's research. Participants said they thought evidence should be presented clearly and concisely, in a manner that made the information more accessible for the public. Some also specified that the information should be easy to find and that the public should be made aware of research findings that are relevant to their local area. A few participants expressed concern that if research evidence would not be easily available, people would base their views on other sources – such as the press or publications from local groups – which might not be accurate.

- **Engaging the public:** Many participants said they would like the Environment Agency to work more closely with the public, both in setting their research agenda and in considering the evidence. Some thought that there should be public meetings in locations potentially affected by the onshore oil and gas industry, where the public could ask questions directly to the researchers who compiled the evidence.

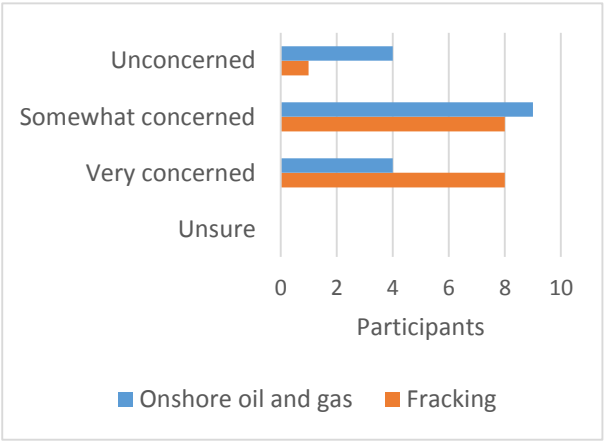
> "The general public needs to understand it, so that as time goes on the public is *with* you when you make a decision." (Sounding Board participant).

> "It would give me confidence to have researchers there to hear from their mouths about the impact on this area, not others speaking on their behalf." (Sounding Board participant).

Further thoughts about onshore oil and gas, including whether participants views had changed

Participants were polled a final time before the end of the session to measure whether their feelings around the environmental impact of onshore oil and gas and fracking had changed. The results of this final poll are presented in Chart 3. The results are broadly similar to earlier polls, although more participants had become 'very concerned' about the environmental impact of fracking, and 'unconcerned' about the environmental impact of onshore oil and gas, since the beginning of the dialogue session. This is shown in Charts 4 and 5, which compare the results of the three instances where participant responded to these polling questions.

Chart 3: How would you describe your feelings about the environmental impact of onshore oil and gas extraction and about fracking in England?



Participants were also given the opportunity to share further thoughts with the Environment Agency, including whether their views had changed and why, in a follow-up survey. A total of 14 out of the 17 participants completed this survey. Many participants who responded to the survey said that they felt more informed about the issues, including about the role of the Environment Agency. However, for many of these respondents, learning more about the issues as part of the sessions did not change their view; they said their level of concern about the issues had remained the same.

> "I was re-assured that the Environment Agency will be policing drilling and fracking operations which may take place now and in the future. I was not aware of the extent of the involvement of the Environment Agency." (Sounding Board participant).

Of the participants whose views had changed, some had become less concerned about the environmental impact of onshore oil and gas, largely because they were reassured by the involvement of the Environment Agency; others had become more concerned about the environmental and health and safety impacts of onshore oil and gas after learning more about these issues. One participant noted that while they had become more comfortable with the management of onshore oil and gas wells, their concerns about fracking in particular had increased, largely because of the possible impact on the surrounding area.

> "I became more concerned over the environmental and health & safety impacts" (Sounding Board participant).

Chart 4: How would you describe your feelings about the environmental impact of onshore oil and gas extraction in England?

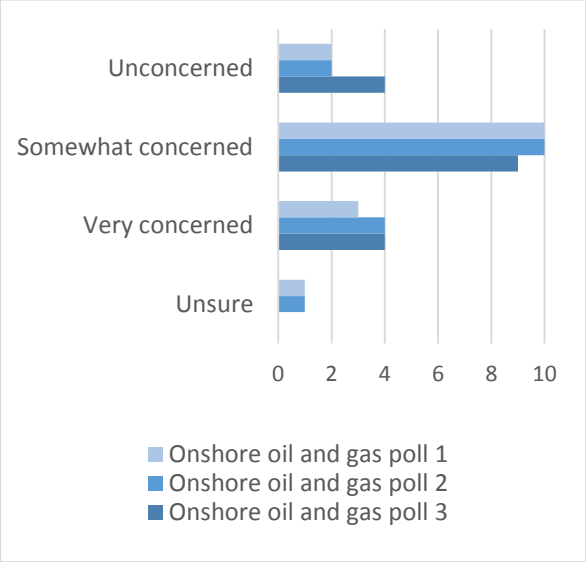
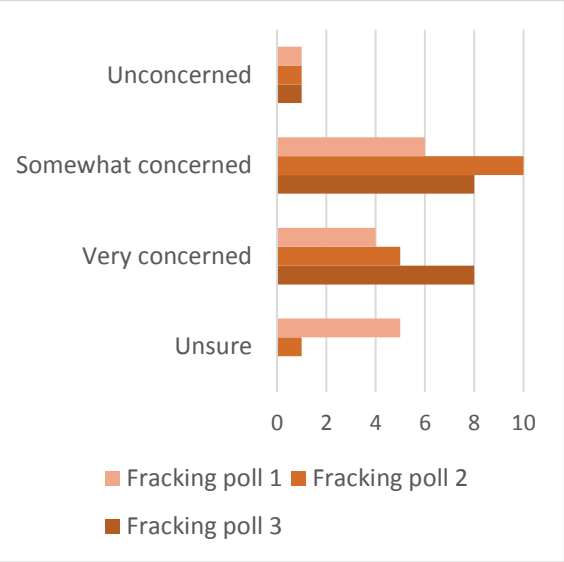


Chart 5: How would you describe your feelings about the environmental impact of fracking in England?



Further thoughts about the research priorities of the Environment Agency around onshore oil and gas

Participants were also given the opportunity to express any further thoughts about the Environment Agency's research priorities, both as part of discussion at the end of the sessions and in the follow-up survey. They largely took this opportunity to reinforce points made earlier in the process, including the following:

- **Communicating research**: Many participants called for more accessible information about the environmental impacts of onshore oil and gas, including communicating risk assessments in plain English. They noted this would alleviate concerns about safety in their area. They also noted that providing information to those directly affected was important.
- **Independent research**: Many participants reiterated calls for expert-led, neutral and independent research, and decision making based on evidence and not commercial imperatives.

> "I think their priorities are about right, however I do think the positive aspects of their work should be publicised more." (Sounding Board participant).

- **Health and safety:** Some participants emphasised a need for research into the impact of chemicals, and possible alternatives to.
- **Overall energy mix:** Some participant made points about the overall energy mix, calling into question the need for exploitation of onshore oil and gas. One participant noted that eventually onshore oil and gas will run out, and that there should be a focus on renewable energy and biofuels. Another suggested that oil and gas may only be required for use in manufacturing and medical industries. While they supported the idea of exploration wells, they doubted the need for a developed industry.
- **Energy independence**: One participant highlighted that fracking presents a national opportunity for energy independence, and expressed concern that it would never happen in UK.

> "For me it's still about health and safety, plus public awareness, and how much the public can play a part in ongoing projects." (Sounding Board participant).

> "I felt more comfortable with the subject and that it was being considered by scientists in a pragmatic neutral fashion." (Sounding Board participant).

Insights for the Environment Agency

Given the small number of participants, the results of the Sounding Board should not be interpreted as representative of the views of the public at large. Rather the value of this form of deliberative engagement lies in opening up government policy, planning and research processes to input from a broad range of perspectives. This can assist officials to test whether they have correctly understood the range of relevant issues, and to identify additional questions and concerns which may need to be addressed.

Participants' attitudes to the environmental impacts of onshore oil and gas in general were mostly stable throughout the process: each time the polling question was asked the majority of participants recorded their attitude as 'somewhat concerned', while smaller numbers opted for 'unconcerned' or 'very concerned'. By the end of the dialogue session, a few more participants declared themselves 'unconcerned' than in the previous polls; the number of participants saying they were 'very concerned' did not change.

Looking at the polling questions about fracking in particular, a few observations can be made. Firstly, the information and dialogue sessions have assisted participants who started off as 'unsure' in forming an opinion about the environmental impact of fracking. The final poll shows that all of the five participants whose response to the first poll was 'unsure' selected another option now – expressing their level of concern. Secondly, the number of participants describing their attitude as 'very concerned' about the environmental impact of fracking increased throughout the process, with a marked increase between the start and the end of the dialogue session. These findings suggest that the information and discussions helped participants in developing their opinion and that in some cases this meant that participants became more concerned about fracking. This is interesting as it might have been expected that levels of concern decrease as participants are presented with more information about how the risks associated with a new technology are managed.[6]

Over the course of the two sessions, participants showed a keen interest in the environmental impact of onshore oil and gas and the work of the Environment Agency. They actively engaged with the discussion questions and often built on issues raised by other participants. They identified a wide range of environmental concerns, including impacts on water, soil, air, and wildlife, as well as risk of earthquakes, sink holes and subsidence.

Many participants were preoccupied with local and immediate impacts from onshore oil and gas and fracking, ranging from contamination of the local water supply to the impact of industry traffic on local roads. They also suggested that as a relatively small and densely populated country, the UK might not have the same prospects for the development of onshore oil and gas as some other countries. There were a number of key themes to this discussion including the importance of health and safety related issues, the importance of clean-up and restoration of sites after the closure of wells, and the need for better understanding and communication of environmental and health and safety risks.

Participants identified a number of research priorities for the Environment Agency around onshore oil and gas. When asked to imagine the development of an extraction site near their home, participants placed a high priority on health and safety related issues including potential risks to

[6] A possible factor contributing to this was the emphasis on risk in information presented and discussion questions, with less time spent on environmental controls or potential benefits of onshore oil and gas – the latter not being within the remit of the Environment Agency.

water quality, issues around the use of chemicals, and gas leaks. They also placed a strong emphasis on understanding local environmental impacts, including on wildlife, and traffic and noise pollution. There were a number of specific suggestions for research including work to establish environmental baselines and metrics for safe operations, and research on the density and cumulative impact of wells.

Participants made a number of suggestions for things the Environment Agency could do to build their confidence in its research. They emphasised the importance of independent research, transparency about research activities, and of communicating findings in an easily accessible way. While participants were not prompted to give their opinion about the capability of the Environment Agency, several participants volunteered their views and these were generally positive. Participants made no negative remarks about the Agency at any point in the discussion, other than an observation about undue influence from politicians and higher management. The Environment Agency was seen as trustworthy and impartial and some participants were keen to find out if its research department was sufficiently funded. It is possible that the presence during both sessions of experts from the Environment Agency was a factor in participants' opinion-forming process.

Many participants expressed mostly negative views on the oil and gas industry, although a few participants emphasised the safe and successful exploitation of existing wells. For most participants the industry's profit motive made it untrustworthy in relation to protecting the environment and public health. Many participants were also very sceptical about any industry involvement with research and information provision. Some participants were similarly sceptical about involvement from others, such as the press, environmental groups, and politicians. None of these organisations were present during the information and dialogue sessions and their perspectives were not represented.

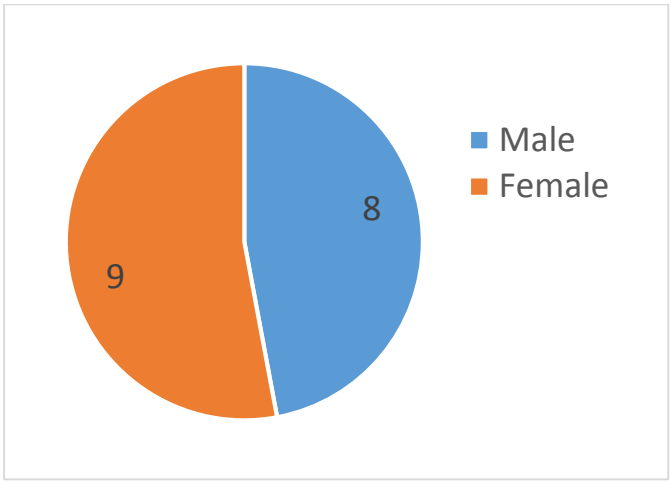
Many participants were keen for the Environment Agency to communicate with local residents about their environmental concerns and for the information provided to be as clear and concise as possible. While some participants acknowledged that some localised impacts are not within the Agency's remit, to them all the risks and impacts associated with the exploration and exploitation of new wells needed to be considered together. This suggests that the public would expect regulators and local authorities to develop a joint communication and public engagement approach.

A widely echoed message to the Agency was about doing more public engagement. Participants suggested that information about the Environment Agency's research should be easier to find and easier to understand for members of the public, and emphasised the value of ongoing interaction between the researchers and the public. As some participants put it: “you need to take the public with you”.

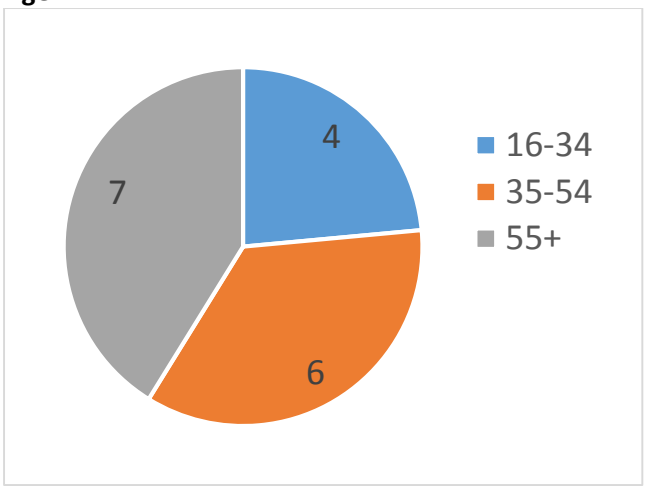
Annex: Who participated in the Sounding Board?

Sciencewise selected 17 participants for this project. Participants were recruited from the general public using stratified random sampling on the basis of demographic characteristics including age, gender, geographical location and social background. Participants were recruited from areas in England where exploration for onshore oil and gas might occur in the near future: Merseyside (including Liverpool); southern Nottinghamshire (including Nottingham); and southern Hampshire (including Winchester and Eastleigh). The charts below set out the basic demographic characteristics of recruits.

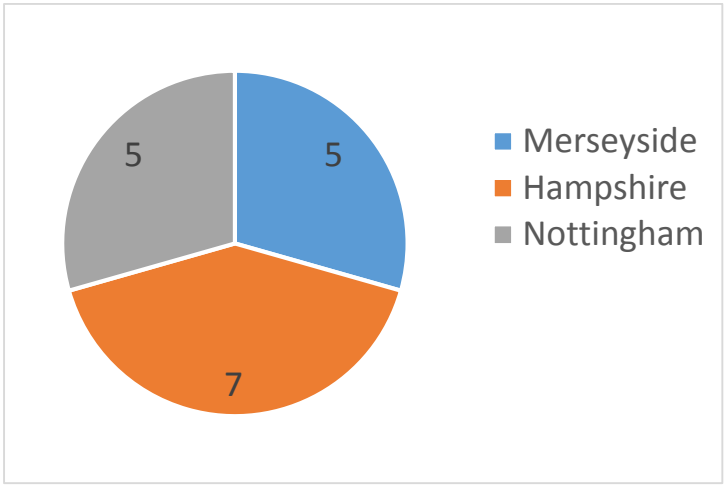
Gender



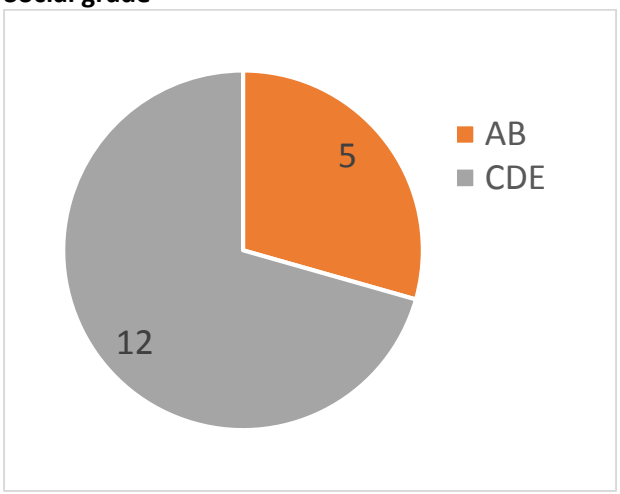
Age



Location



Social grade



Facilitation Plan

Information session

We will run two information sessions, one for each group of up to 10 participants. The focus is on a) getting everyone logged into the call and familiar with the tech and b) sharing information about onshore oil and gas. The sessions will also be attended by researchers for the Environment Agency that will present information to participants and answer questions.

Timing	Objective	Duration	Slides
7.15pm	**Log on / arrivals** **Participants are successfully logged on the call.**	15 mins	Slides provided by Sciencewise
7.30	Introduction by Sciencewise; participants familiarising themselves with technology	10 mins	Slides 1-5
7.40	Overall introduction of the Environment Agency and introductory information about onshore oil and gas	5 mins	Slides 6-10
7.45	Poll questions to participants	5 mins	Poll provided by Sciencewise – slides 11 and 12
7.50	Environmental risks of onshore oil and gas and how the industry is regulated	10 mins	Slides 13-20
8.00	Questions from participants on onshore oil and gas + regulation	10 mins	Slide 21
8.10	Introduction to the Environment Agency's research brief and activity	10 mins	Slides 22-28
8.20	Questions from participants	5 mins	Slide 29
8.25	Recap of information session and looking ahead to next week's dialogue session. Re-stating aim of the dialogue session. Thanking participants.	5 mins	Slide 30

Discussion session

The Sounding Board on onshore oil and gas takes participants through an information session, then through a dialogue session. The information sessions took place last week. This week, we will run two dialogue sessions with the same groups of participants. Participants have familiarised themselves with the basics of onshore oil and gas and the role of the Environment Agency.

The aims of the Sounding Board were outlined as follows:

- To explore and capture through dialogue the nature and extent of environmental concerns of participants about onshore oil and gas exploration and production in England.
- To help build the case for, and develop skills among those involved in the dialogue in using dialogue to influence research directions within the Environment Agency.
- To inform the direction and priorities of Environment Agency research on the onshore oil and gas industry, its approach to formulating regulation and its external communications

where this is relevant.

The research questions for the project are:

- What is the nature and extent of environmental concerns participants hold or may have heard expressed about onshore oil and gas exploration and production in England? (Initial Responses and Views; and Views & Responses after informed discussion to be captured, measured, with reflection time for those who have changed their views to explore the reasons for this)
- What do participants believe the broad role and activities of the EA to be? (After initial discussion this would involve some form of brief input from an EA policymakers about the role itself.)
- What areas might participants wish to see explored in the EA's research priorities in light of the discussions exploring questions (1) and (2)?
- How can the principles governing public engagement over onshore oil and gas established in the recent public dialogue undertaken on this issue best be reflected in how the EA reports on onshore oil and gas research findings and their implications?

The table below sets out how we propose to run the dialogue session. A few things to note about this:

- We will repeat the **polling questions** used in the information session twice – once at the beginning and once at the end of the dialogue session. This way we can monitor how participants' attitudes to onshore oil and gas develop over the course of the Sounding Board.
- There will be **three discussion questions**, addressing:
  - any concerns that they may have around the environmental impact of onshore oil and gas
  - what issues researchers at the Environment Agency should concentrate on to address public concerns, and
  - what would give them confidence in the research carried out by the Environment Agency.

We will use the **Whiteboard function** of Adobe Connect, which allows participants to write onto a virtual whiteboard, which all participants can see in real time. This should help us get a quick overview of the main points and structure the discussion around these.

Timing	Objective	Notes	Duration	Slides
7.15pm	**Log on / arrivals** **Participants are successfully logged on the call.**	**Everyone gets logged on.** **Facilitators and tech support are available to help with troubleshooting.** **Viewing panels in presentation mode.**	**15 mins**	**Welcome + instructions**
7.30pm	**Welcome and introductions** Everyone knows who is on the call and is	An icebreaker to get everyone introduced, and also taking the opportunity to practice using some of the technical features of the webinar (eg. raising hands, using chat etc). Led by facilitator.	10 mins	Ground rules Recap of process aims The plan for today Introductions

	comfortable talking to each other	"What was one nice thing which happened to you last week?"		
7.40pm	**Rerun polling questions from the first session, followed by discussion** Allow measurement of whether information provided has shifted views in any way. Understand participant concerns around environmental impact of onshore oil and gas development.	**Discussion led by the facilitator. Environment Agency staff in listening mode – only intervening to respond to questions directed at them.** Poll question 1 : How would you describe your feelings about the **environmental** impact of **onshore oil and gas extraction** in England? Poll question 2: How would you describe your feelings about the **environmental** impact of **fracking** in England? Discussion: Using Whiteboard facility of Adobe connect. *If you have concerns about the environmental impact of shale gas, what are they? If you have no concerns, why not? Please write your thoughts down on the Whiteboard.* After a few minutes, the facilitator asks participants to stop writing and addresses each thought in turn, asking the participant who made the comment to elaborate.	20 mins	Poll question 1 Poll question 2 Poll results compared for question 1 Poll results compared for question 2 Whiteboard + discussion question
8.00pm	**Quick recap of key information from last week's session** Participants to refresh their knowledge of onshore oil and gas and the Environment Agency's approach to regulating this industry	**Environment Agency experts revisit some of the slides shown in the previous week's presentation, to remind participants of the possible issues around onshore oil and gas and the Agency's efforts to protect the environment from detrimental impacts**	10 mins	Oil and gas resources underground Environmental risks How we regulate the industry Understanding the effects of onshore oil and gas Known unknowns
8.10pm	**Discussion about research priorities for the Environment Agency**	**Scenario, followed by discussion questions. Discussion led by the facilitator. Environment Agency staff in listening mode – only intervening to respond to questions directed at them.**	20 mins	Virtual table

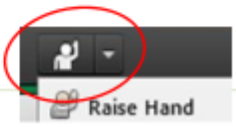
		*Imagine that an oil and gas company proposed to drill a well near your home…*What issues should researchers at the Environment Agency concentrate on to address the public's concerns? Participants are asked to take turns sharing their thoughts on the question going around a virtual table. Following this, participants are invited to comment on others' views, through raising their hand and awaiting their turn.		
8.30pm	**Discussion about how the Environment Agency approaches research**	*What would give you confidence in the research carried out by the Environment Agency?* Participants are asked to take turns sharing their thoughts on the question going around a virtual table. Following this, participants are invited to comment on others' views, through raising their hand and awaiting their turn.	20 mins	Virtual table
8.50pm	**Initial polling questions asked once more** Allow measurement of whether dialogue has shifted balance of views in any way. Opportunity to share any further thoughts	Poll: How would you describe your feelings about the **environmental** impact of **onshore oil and gas extraction** in England? Poll: How would you describe your feelings about the **environmental** impact of **fracking** in England? Participants are asked for any final thoughts about our discussions, or anything they want to say to the Environment Agency.	5 mins	Polling question1 Polling question 2
8.55pm	**Thank you and close** Participants feel valued for their contributions and understand what is happening next.	Facilitator thanks the participants and summarises what we've learnt from their contributions. Facilitator flags that they will be receiving evaluation forms - reminds them that they'll need to hand these back to trigger payment of the £40. Facilitator outlines next steps in the process.	5 mins	Slide outlining next steps

Information session presentation

Welcome to the Sounding Board

- You should be able to hear and talk on this call through your telephone, as well as seeing this presentation on your computer or tablet. The dial-in details for your phone are **0800 376 1896** followed by the code **6004 764 328**. We're doing the audio separately through the phones (rather than using computers or tablets for this) because the sound quality is better.
- Don't worry about enabling your webcam, as you don't need it for the call tonight.
- If you have any technical problems, please use the Q and A box at the bottom right of your screen and our team will help you.

Once you can both hear the audio through your telephone, and also see this presentation on your screen, please click on the 'raise hand' icon.



About the Sounding Board

We're running two separate sessions:

1) Introductory session:

Tonight's introduction is mostly an information giving session. The aim tonight is to get you up to speed on the key issues we'll be discussing next week.

2) Discussion session:

Next week we'll be working with you in a more interactive session. We would like to hear your thoughts and perspectives on the onshore oil and gas research programme of the Environment Agency.

Environment Agency

About this project

The **Environment Agency** are seeking public views about **onshore oil and gas** (including 'fracking').

They want to understand **what you think is important** and areas where you think **further research** is a priority.

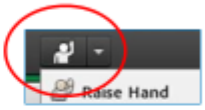
Your views will help the Environment Agency to better understand informed public opinion about onshore oil and gas, and help shape their **future research programme**.

Environment Agency

Ground Rules

- We'd be really grateful if you could:

1) Raise your hand to speak.
2) Try not to speak over other people.
3) Step forward / step back.
4) Use the Q and A box for any technical issues.
5) Keep confidential



- *The sessions will be recorded and we will ask you to complete an evaluation form about your experience.*

Environment Agency

Introduction to the context

- Presented by Ian Davey of the Environment Agency
- There will be 13 slides with information
- After 5 mins: a few poll questions
- Opportunity to ask questions in about 15 minutes
- If your question is about a particular slide, please remember the slide number!

Environment Agency

0

The Environment Agency

- An agency of the Department for Agriculture, Food and Rural Affairs (Defra)
- Range of responsibilities for protecting the environment in England

1

What the Environment Agency does

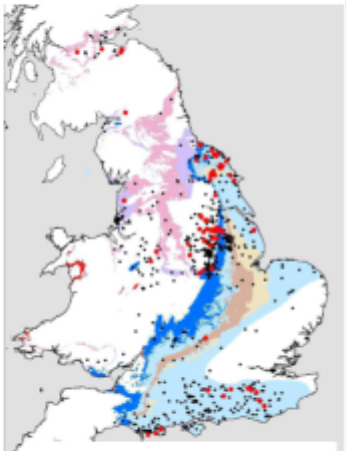
- Within England we are responsible for:
  - regulating major industry and waste management
  - treatment of contaminated land
  - water quality and water resources
  - Fisheries, conservation and ecology
  - inland river, estuary and harbour navigations
- We are also responsible for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea.

Environment Agency

2

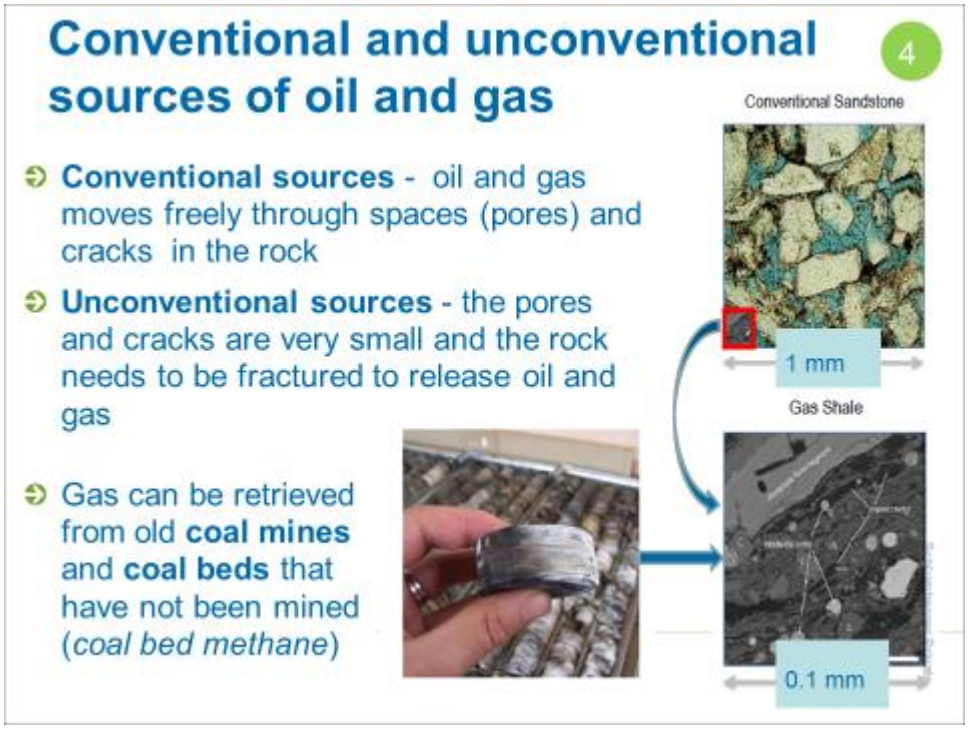
What is onshore oil and gas?

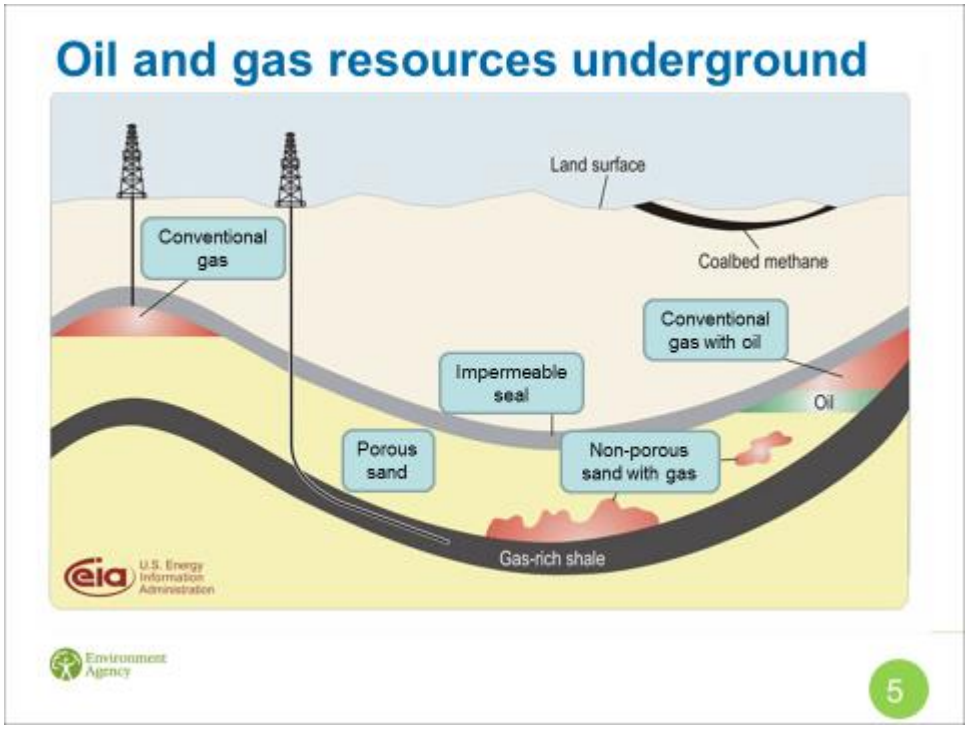
- Oil was discovered in Derbyshire in 1919
- Exploration onshore (i.e. on land) was important in the East Midlands during the second world war
- North Sea production has been important since the 1960s but we now import nearly half of our oil and gas
- More than 2000 wells have been drilled onshore in the UK
- Onshore production increased since the 1980s and provides around 2% of UK oil and 0.4% of UK gas production

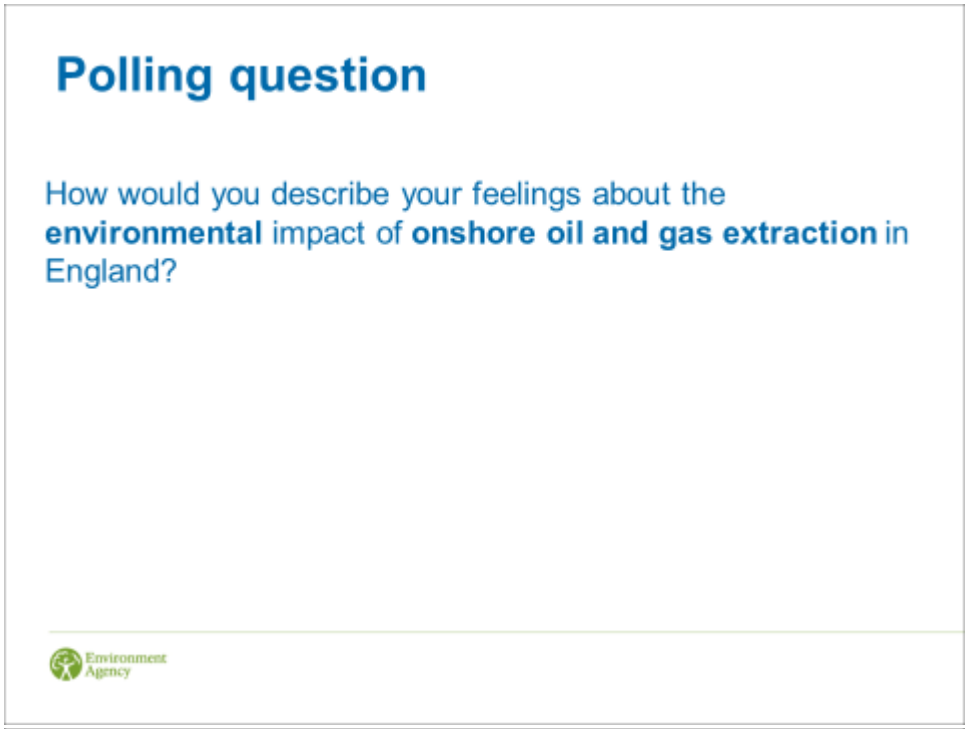


Existing and old oil and gas wells

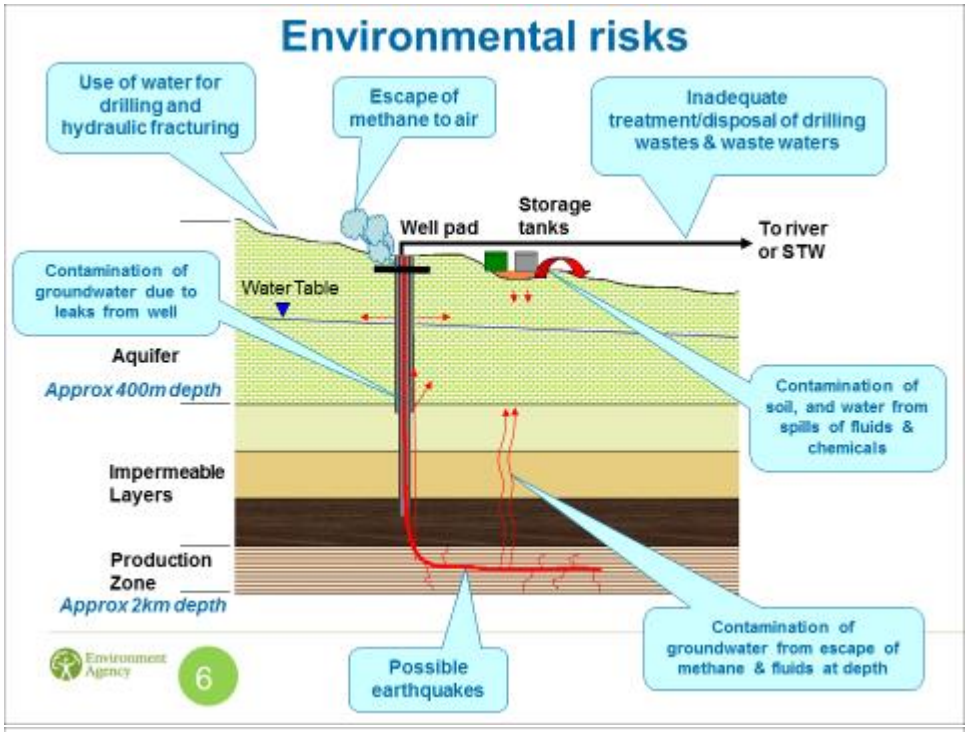
3


Conventional and unconventional sources of oil and gas
4
Conventional sources - oil and gas moves freely through spaces (pores) and cracks in the rock
Unconventional sources - the pores and cracks are very small and the rock needs to be fractured to release oil and gas
Gas can be retrieved from old coal mines and coal beds that have not been mined (coal bed methane)
Conventional Sandstone
1 mm
Gas Shale
0.1 mm


Oil and gas resources underground
Land surface
Conventional gas
Coalbed methane
Conventional gas with oil
Impermeable seal
Oil
Porous sand
Non-porous sand with gas
Gas-rich shale
U.S. Energy Information Administration
Environment Agency
5


Polling question
How would you describe your feelings about the environmental impact of onshore oil and gas extraction in England?
Environment Agency


Polling question
How would you describe your feelings about the environmental impact of fracking in England?
Environment Agency


Environmental risks
Use of water for drilling and hydraulic fracturing
Escape of methane to air
Inadequate treatment/disposal of drilling wastes & waste waters
Well pad
Storage tanks
To river or STW
Contamination of groundwater due to leaks from well
Water Table
Aquifer
Approx 400m depth
Impermeable Layers
Production Zone
Approx 2km depth
Contamination of soil, and water from spills of fluids & chemicals
Contamination of groundwater from escape of methane & fluids at depth
Possible earthquakes
Environment Agency
6


The steps in developing wells
Initial exploration - A few wells are drilled to investigate if oil and/or gas is present
Appraisal - More wells are drilled to assess how much oil and/or gas could be produced
Production - Many wells are needed to remove the oil and gas
Decommissioning - A managed process of closing down well-sites so that there is no longer a risk to the environment
Environment Agency
8

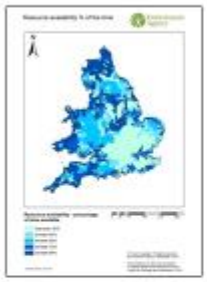
How we regulate the industry

- Issue **permits** for exploration and production, with conditions that protect the environment
- **Public consultation** on our proposed conditions before permits are issued
- Assess **monitoring** data and enforce compliance with permit conditions
- Permits, and the operator's responsibilities, cannot be handed back until the site is **safely decommissioned**

Environment Agency

9

Environmental controls – Water



- Licence needed for taking water from rivers and ground
- No drilling in protection zones around drinking water wells
- Use of chemicals strictly controlled and published
- Full assessment of risks

10

Environment Agency

Environmental controls – Waste

11

- Formal plan required on how all wastes are managed
- Use of the best available controls
- Sealed containers for all liquids – no open ponds
- No open flares allowed
- Wastes to be disposed of at licensed sites

Monitoring

- Reports required to show site condition at the beginning and end of operations
- Monitoring required before, during and after site is decommissioned until we are satisfied that there is no significant ongoing environmental risk
- Monitoring requirements set out in the permit or the Waste Management Plan

Environment Agency

12

Engaging with communities

- Local consultation on bespoke permits
- Extra consultation for sites of high public interest – including fracking sites
- Close working with local authorities and other regulators, including at public meetings
- Developed a short video and leaflet that explain our role

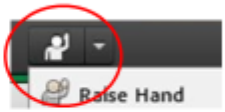
Environment Agency

13

Questions for clarification

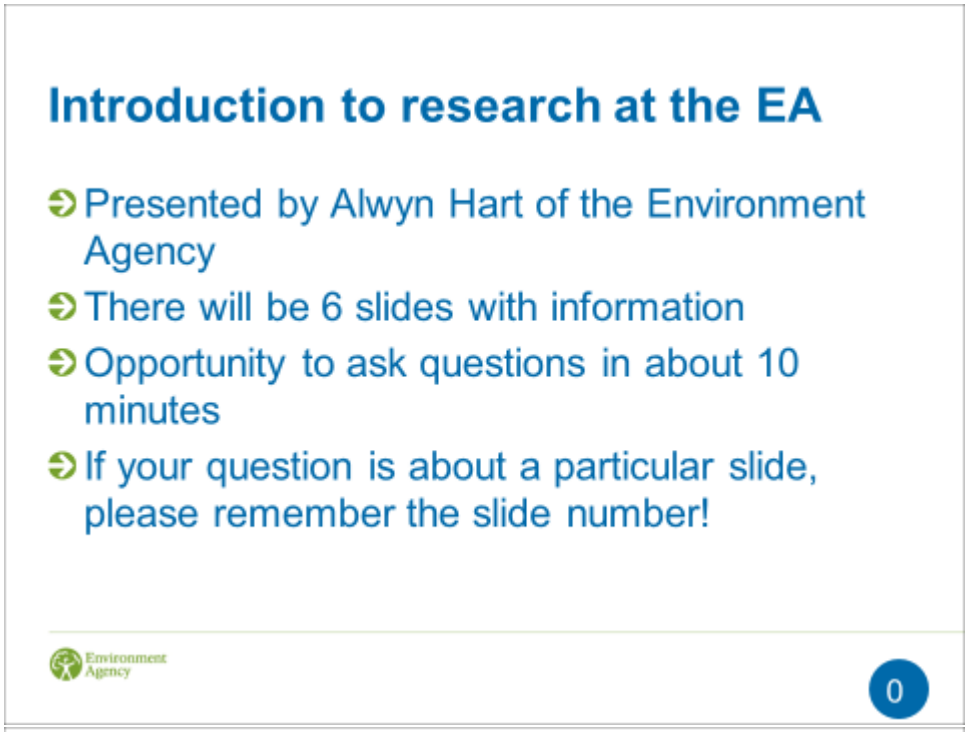
- Please raise your hand using this icon

- Anything you didn't understand?
- Anything that was unclear?
- Any extra information you need?



- If you can lower your hand by clicking on the icon again after you've spoken that would be much appreciated.

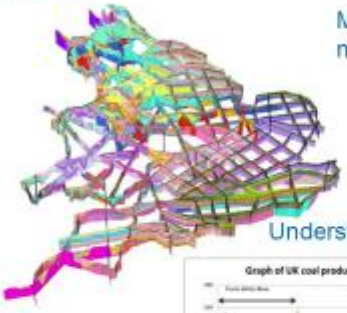
Environment Agency


Introduction to research at the EA
Presented by Alwyn Hart of the Environment Agency
There will be 6 slides with information
Opportunity to ask questions in about 10 minutes
If your question is about a particular slide, please remember the slide number!
Environment Agency
0

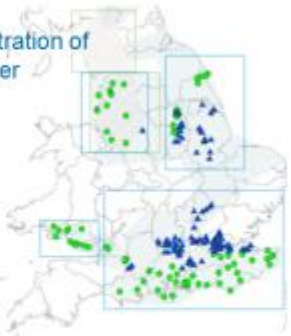

Research at the Environment Agency
The Environment Agency has an Evidence Group which consists of 50 scientists
They collect knowledge and information to help the Agency make evidence-based decisions
This is particularly important when dealing with risk
Some of the Evidence Group's current research informs the Agency's regulation of exploration for onshore oil and gas (7 full-time scientists)
Environment Agency
1

Looking at the existing situation

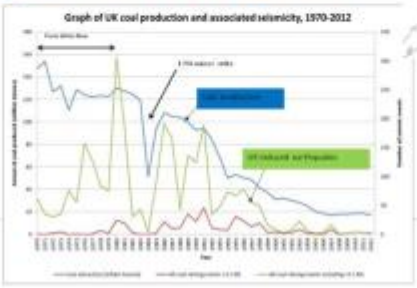
Mapping underground layers of water and shale rock



Measuring the concentration of methane in groundwater



Understanding seismicity



Environment Agency

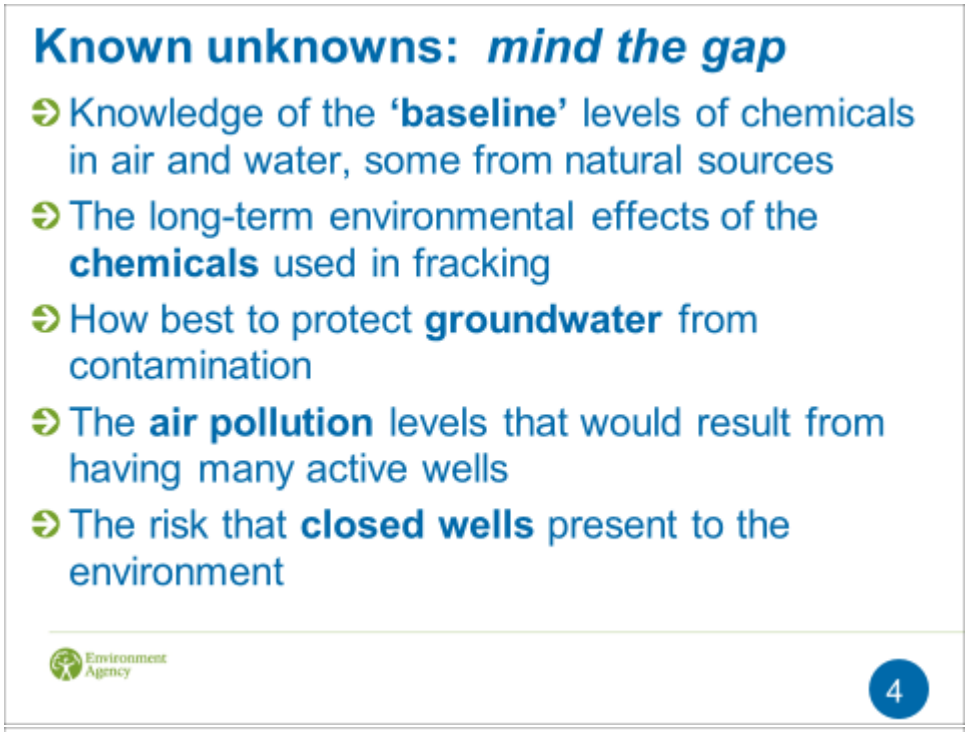
2

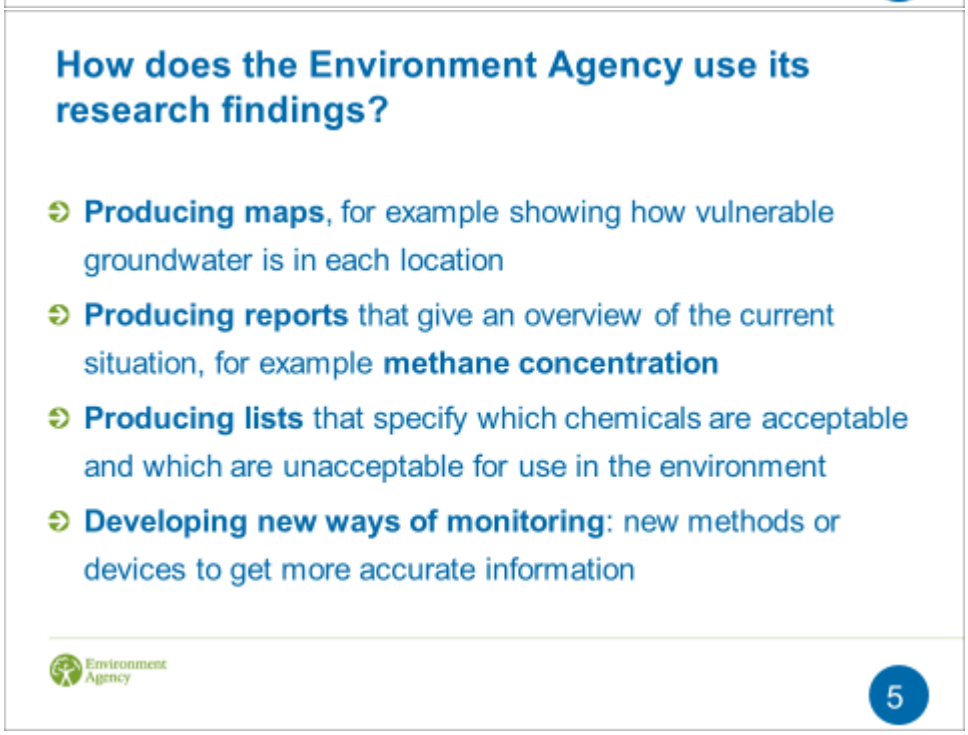
Understanding the effects of fracking

- We study the findings from **academic research** on onshore oil and gas
- For example, a recent paper provided evidence on how the risk of **groundwater contamination** relates to the **distance** between the drilling and deep groundwater layers (aquifers)
- Another area where we focus our research is on **chemicals** used for fracking
- We do this by working closely with other **expert bodies** and **industry**

Environment Agency

3


Known unknowns: mind the gap
Knowledge of the 'baseline' levels of chemicals in air and water, some from natural sources
The long-term environmental effects of the chemicals used in fracking
How best to protect groundwater from contamination
The air pollution levels that would result from having many active wells
The risk that closed wells present to the environment
Environment Agency
4


How does the Environment Agency use its research findings?
Producing maps, for example showing how vulnerable groundwater is in each location
Producing reports that give an overview of the current situation, for example methane concentration
Producing lists that specify which chemicals are acceptable and which are unacceptable for use in the environment
Developing new ways of monitoring: new methods or devices to get more accurate information
Environment Agency
5

What else is going on?

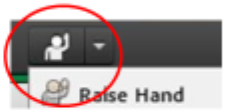
- The **British Geological Survey** are doing major research drilling projects, for example in the Vale of Pickering
- Universities around Europe are carrying out **EU-funded research**
- **International collaboration** through the EU Joint Research Centre Network
- Collaboration with academics and regulators in **North America** - to learn from their experiences but also appreciate where our regulations differ

Environment Agency

6

Questions for clarification

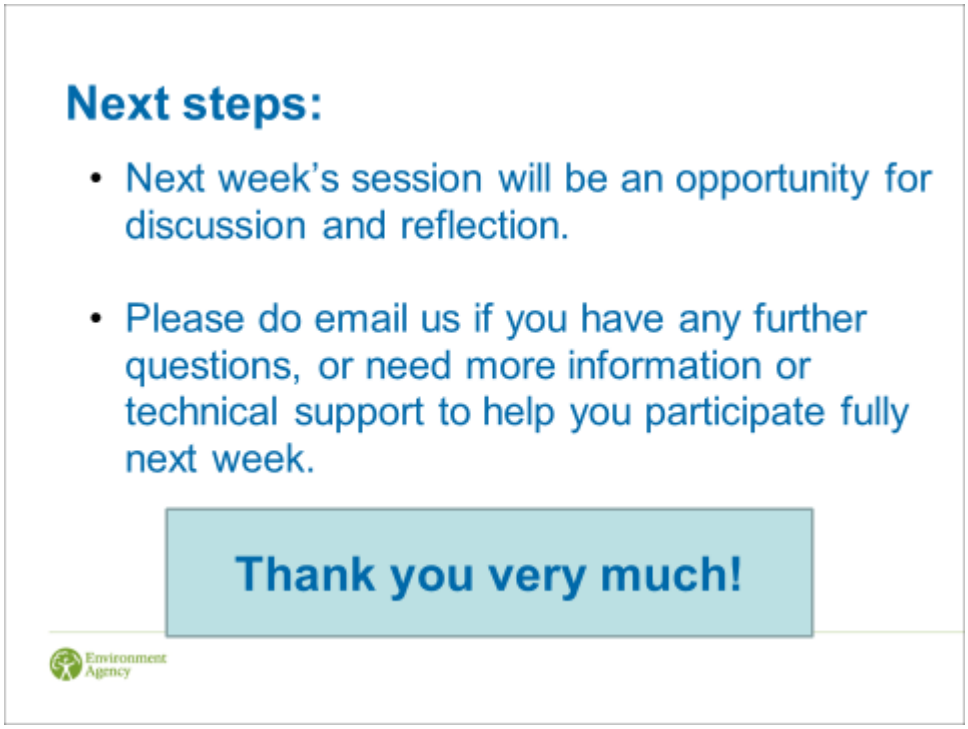
- Please raise your hand using this icon



- Anything you didn't understand?
- Anything that was unclear?
- Any extra information you need?

- If you can lower your hand by clicking on the icon again after you've spoken that would be much appreciated.

Environment Agency

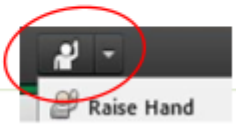

Next steps:
• Next week's session will be an opportunity for discussion and reflection.
• Please do email us if you have any further questions, or need more information or technical support to help you participate fully next week.
Thank you very much!
Environment Agency

Discussion session presentation

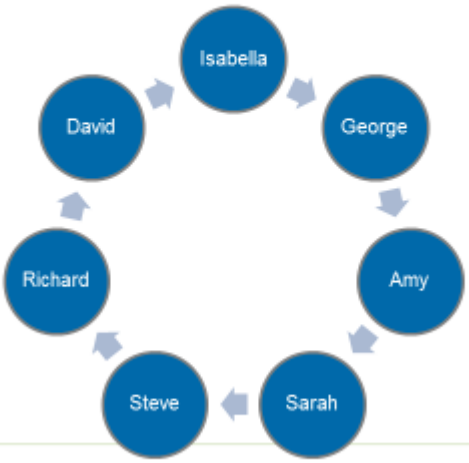
Welcome to the Sounding Board

- You should be able to hear and talk on this call through your telephone, as well as seeing this presentation on your computer or tablet. The dial-in details for your phone are **0800 376 1896** followed by the code **6004 764 328**. We're doing the audio separately through the phones (rather than using computers or tablets for this) because the sound quality is better.
- Don't worry about enabling your webcam, as you don't need it for the call tonight.
- If you have any technical problems, please use the Q and A box at the bottom right of your screen and our team will help you.

Once you can both hear the audio through your telephone, and also see this presentation on your screen, please click on the 'raise hand' icon.



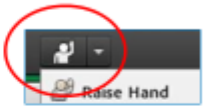
What was one nice thing that happened to you last week?



Environment Agency

Ground rules

- We'd be really grateful if you could:



1) Raise your hand to speak.
2) Try not to speak over other people.
3) Step forward / step back.
4) Use the Q and A box for any technical issues.
5) Keep confidential

- *The sessions will be recorded and we will ask you to complete an evaluation form about your experience.*

Environment Agency

About this project

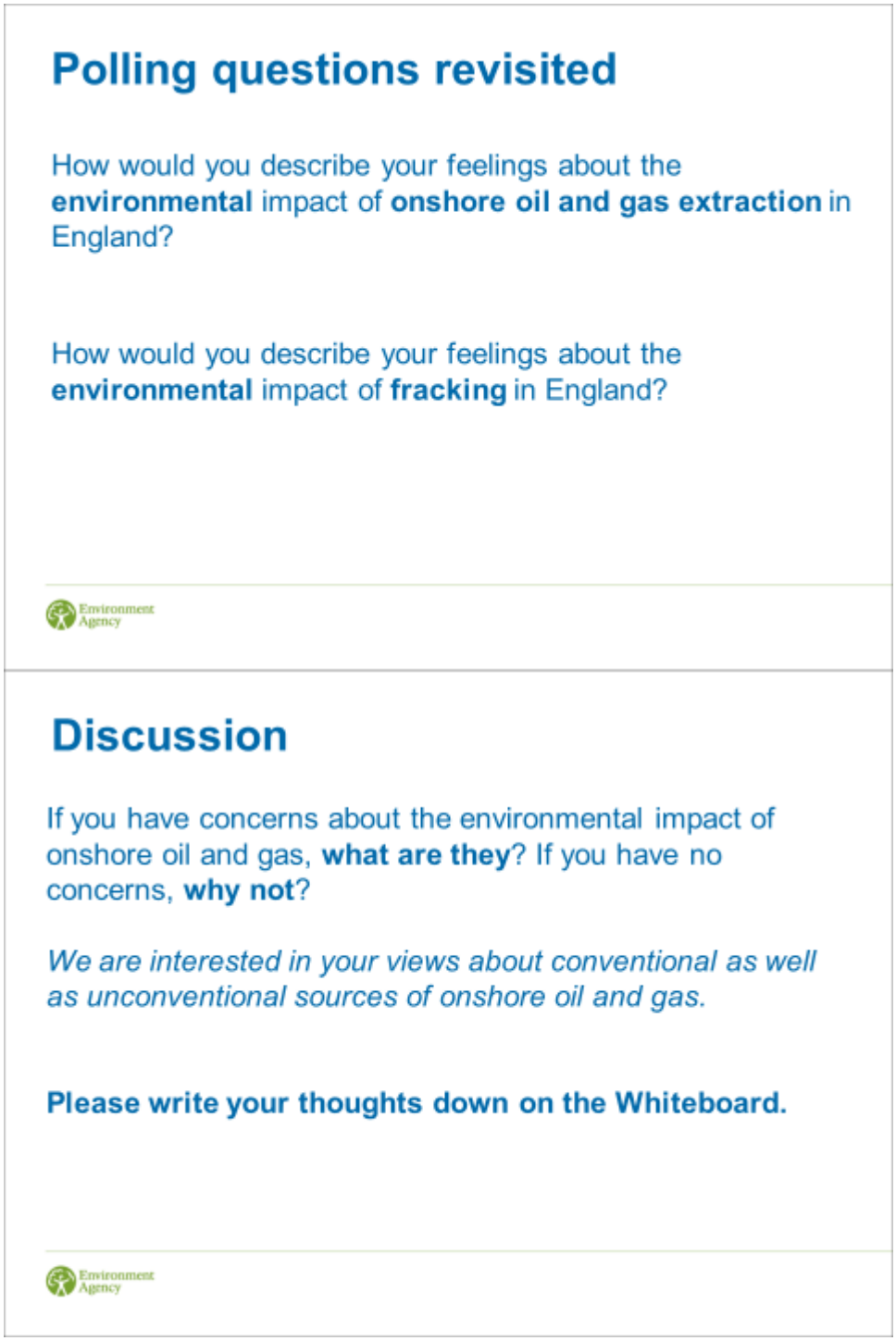
The **Environment Agency** are seeking public views about **onshore oil and gas.** They want to understand what you think is important and what you expect from their **research**.

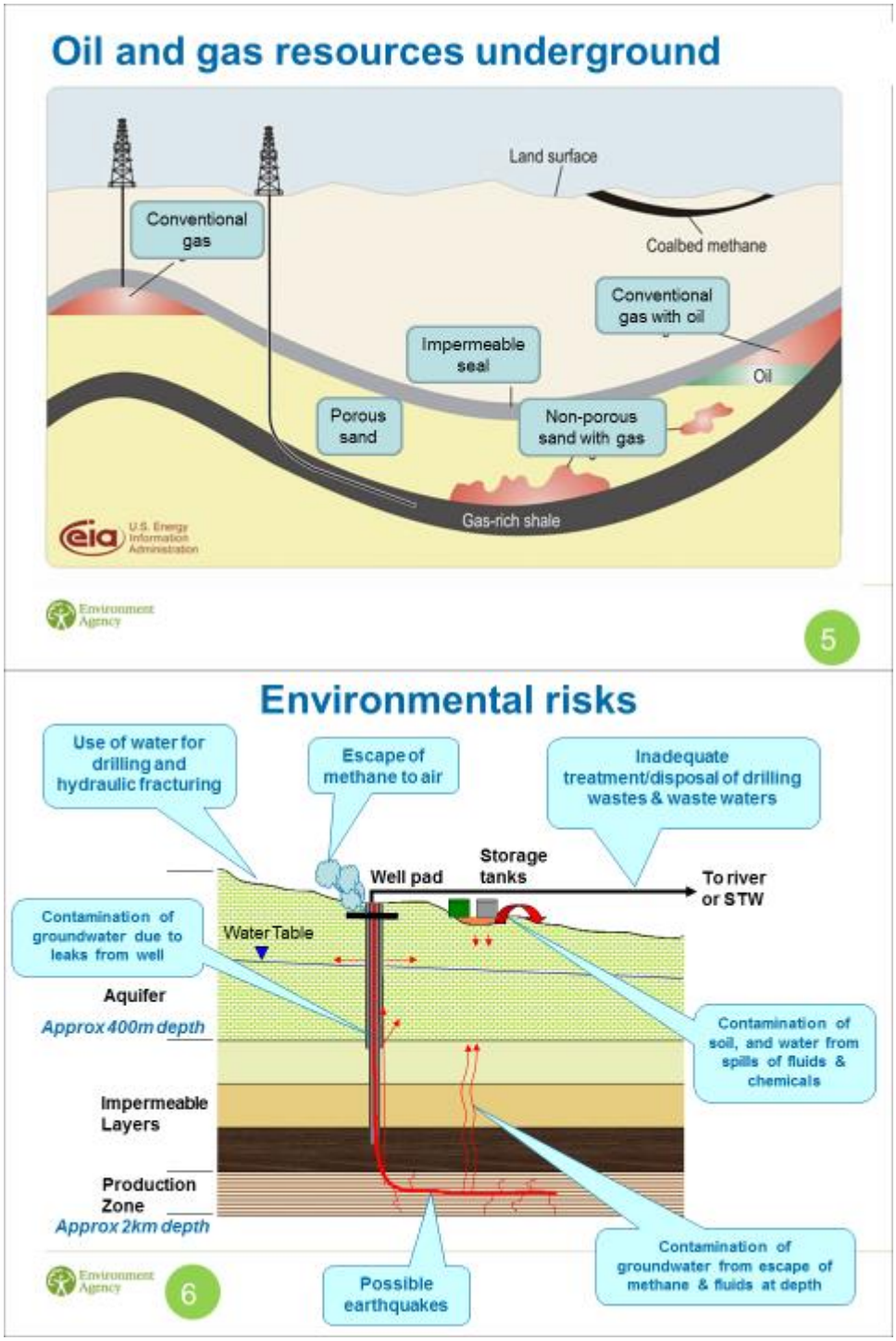
Two key points:

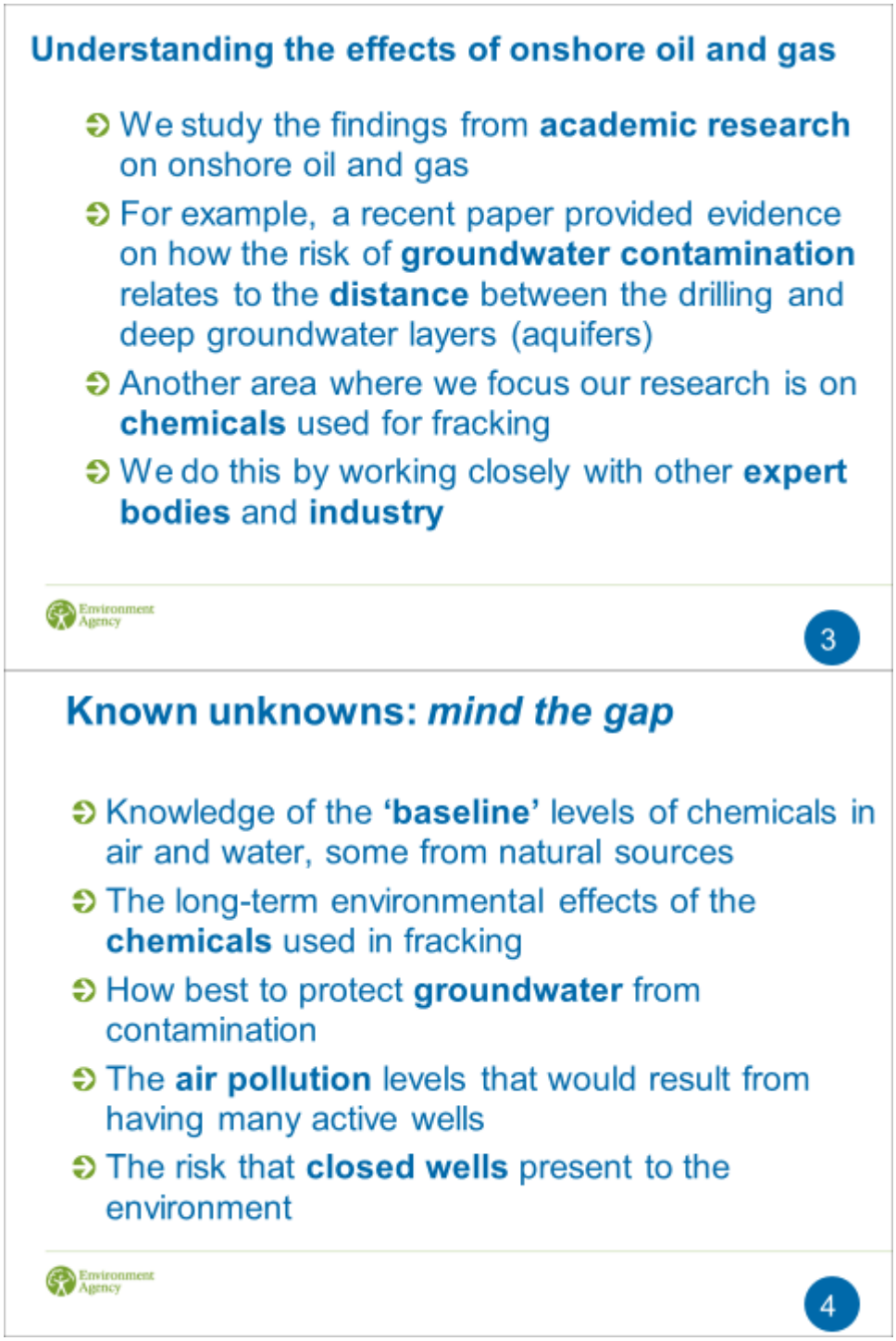
- We are looking for your thoughts on the Environment Agency's ***research*** activity
- We want to hear your views on ***conventional and unconventional*** sources of onshore oil and gas

Your views will help the Environment Agency shape their research programme.

Environment Agency


Polling questions revisited
How would you describe your feelings about the environmental impact of onshore oil and gas extraction in England?
How would you describe your feelings about the environmental impact of fracking in England?
Environment Agency
Discussion
If you have concerns about the environmental impact of onshore oil and gas, what are they? If you have no concerns, why not?
We are interested in your views about conventional as well as unconventional sources of onshore oil and gas.
Please write your thoughts down on the Whiteboard.
Environment Agency


Oil and gas resources underground
Land surface
Conventional gas
Coalbed methane
Conventional gas with oil
Impermeable seal
Oil
Porous sand
Non-porous sand with gas
Gas-rich shale
U.S. Energy Information Administration
Environment Agency
5
Environmental risks
Use of water for drilling and hydraulic fracturing
Escape of methane to air
Inadequate treatment/disposal of drilling wastes & waste waters
Storage tanks
Well pad
To river or STW
Contamination of groundwater due to leaks from well
Water Table
Aquifer
Approx 400m depth
Contamination of soil, and water from spills of fluids & chemicals
Impermeable Layers
Production Zone
Approx 2km depth
Contamination of groundwater from escape of methane & fluids at depth
Possible earthquakes
Environment Agency
6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Another area where we focus our research is on chemicals used for fracking
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Environment Agency
3
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How best to protect groundwater from contamination
The air pollution levels that would result from having many active wells
The risk that closed wells present to the environment
Environment Agency
4

Discussion

Imagine that an oil and gas company proposed to drill a well near your home…

- What issues should researchers at the Environment Agency concentrate on to address the public's concerns?

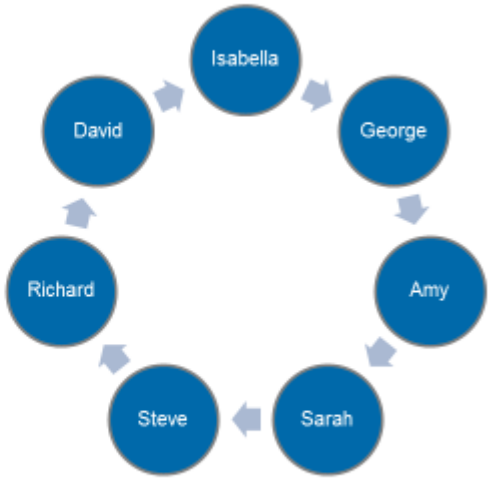
Please write your thoughts down on the Whiteboard.

Environment Agency

Discussion

Imagine that an oil and gas company proposed to drill a well near your home…

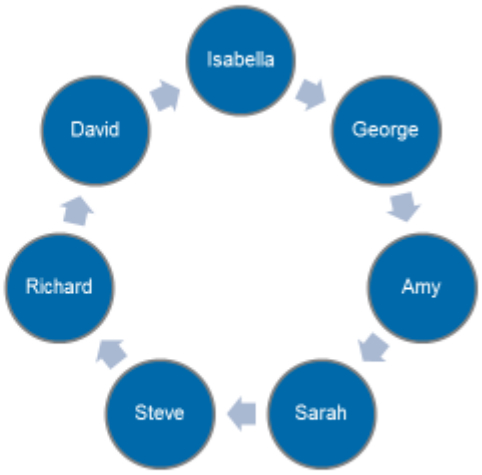
- What issues should researchers at the Environment Agency concentrate on to address the public's concerns?



Environment Agency

Discussion

- What would give you confidence in the research carried out by the Environment Agency?



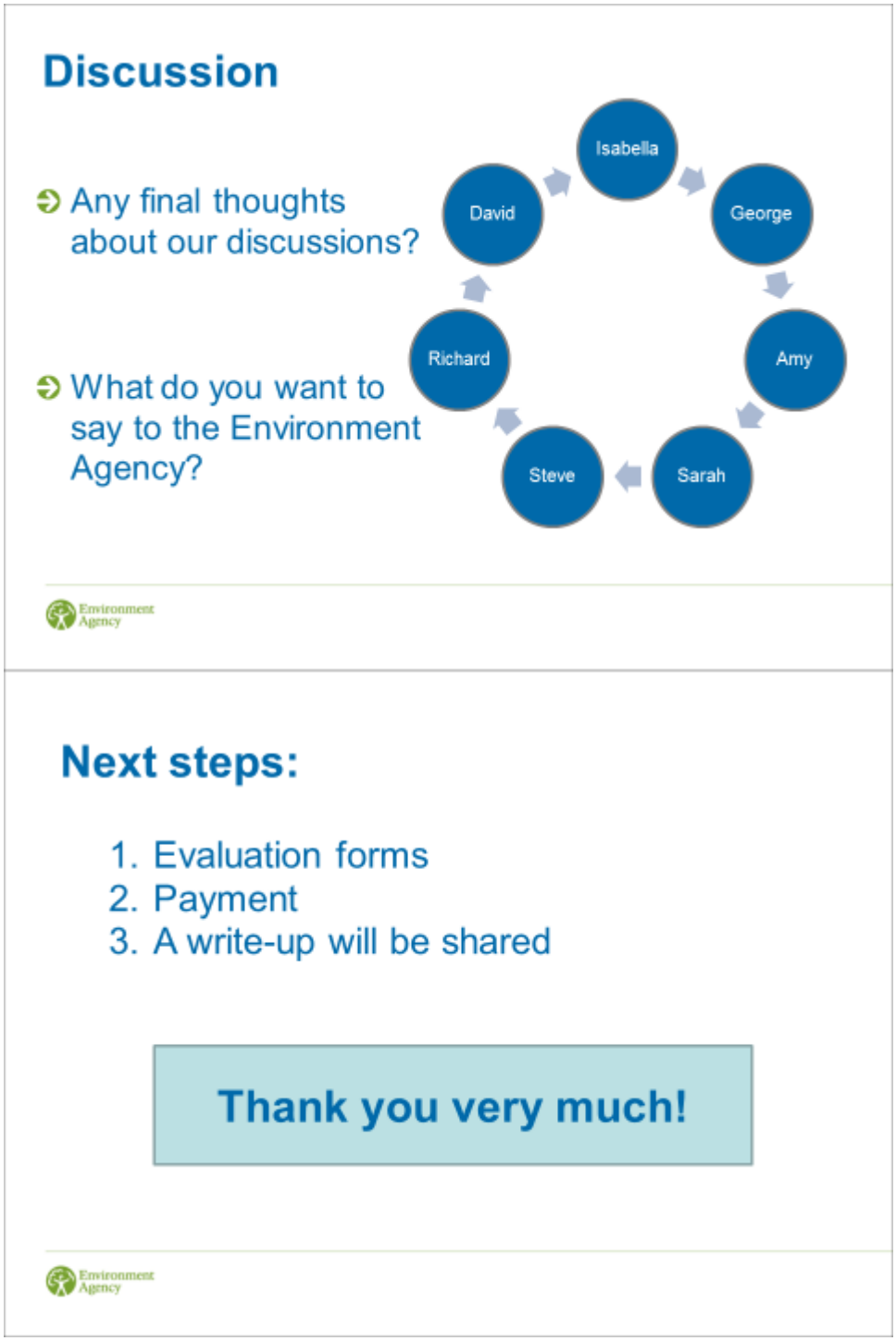
Environment Agency

Polling questions – once more

How would you describe your feelings about the **environmental** impact of **onshore oil and gas extraction** in England?

How would you describe your feelings about the **environmental** impact of **fracking** in England?

Environment Agency


Discussion
Any final thoughts about our discussions?
What do you want to say to the Environment Agency?
Isabella
George
Amy
Sarah
Steve
Richard
David
Environment Agency
Next steps:
1. Evaluation forms
2. Payment
3. A write-up will be shared
Thank you very much!
Environment Agency