Northern Gas Networks

Young Innovators Council

Young innovators council

Session 2: The Hydrogen House

April 2021

Young innovators council

Northern Gas Networks

Contents:

"I think the hydrogen house has lots of potential!"

Council Member

1. Overview

Background

Northern Gas Networks' Young Innovators Council (YIC) is the voice of young people at Northern Gas Networks. It will provide young people's perspectives and Northern Gas Networks will ensure these young people's thoughts and opinions are put at the heart of the business' decision making. Each session agenda will be co-created by S4TP, Northern Gas Networks and the Young Innovators Council, leading to meaningful and relevant engagement which will provide a real opportunity to influence decision-making.
The council is made up of 34 young people aged 14–18 who are based across the footprint of Northern Gas Networks.

Key principles of all sessions:

- Empower young people to use strategies and methods to acquire information and knowledge and to use that knowledge to make decisions.
- Empower young people by recognising their experience and expertise.
- Respect their leadership activities.
- Build mutually respectful relationships between adults and young people.
- Involve young people in cocreation at all stages of the process from defining the problem to gathering and analysing data for decision making.
- Include young people in the evaluation process.

All sessions follow a distinct format:

- Knowledge sense test prior to witnesses
- Key information and knowledge given by 'witnesses': the witnesses may be from Northern Gas Networks or other specialists in the field. Information about a subject may also be given prior to the session. This methodology ensures that the young people are prepared to ask questions of the witnesses and have a framework for understanding the content of the session.
- Break out to smaller groups to discuss, offer ideas and prioritise into:
    - NOW = quick wins, easy to implement
    - WOW = big impact, take a little time to implement
    - HOW = big impact, not possible now
- Decide who will feed back 1 or 2 ideas from each of the above categories
- Feedback to whole group

Session 2: The Hydrogen House

Total length: 120 minutes
People Involved: 2 S4TP facilitators, 2 S4TP tech support, 5 Northern Gas Networks facilitators, 1 Northern Gas Networks witness, 1 external witness
(plus observers, see Attendees)
Date and Time: 14th April 2021, 5pm
Panel attendance: 26
Panel apologies: 6

Objectives:

- **A.** What would make you want to visit the hydrogen house on an educational visit?
- **B.** What would you like to do / hear / see on a visit?
  - i. What information would you want to learn if you went to the hydrogen house? Could there be a difference for your specific age range and for younger children?
  - ii. What's the most engaging way to present this information in a visit?
- **C.** What would you need to see at the house to make you excited about a future career in STEM, e.g., would it be part of a general visit, or would it be a specific career focused school event?

Pre meeting:

Prior to the session the young people were asked to undertake a short task to focus their thoughts on educational trips and begin to imagine what an engaging trip might look like for their age group:

TASK:
"For this session, we would like each of you to have a think about any excellent educational visits you have had outside of school - to museums, learning centres, discovery zones, aquariums, farms, orienteering trips... the list is endless! We will ask each of you to contribute anything you can remember (funny stories always welcome!), and we will feedback about these memories at the very beginning of Session 2, to get our brains whirring! Have a think about:

a. Why was that trip engaging?
b. What did you particularly enjoy?
c. What activities or experiences made it memorable or successful for you?"

"I hope through this council we can help change the way this company and others approach sustainability for the better."

Council Member

2. Attendees

Young Innovators Council

Amanda
Amiee
Bernard
Brook
Charlotte
Declan
Drew
Ellie C
Finn
Imogen
Joshua
Josie
Kaitlin
Kate
Lewis
Lina
Lucas
Lydia
May
Maya
Samuel S
Sophie
Taylor
Tom
Travis
Yvana

Solutions for the Planet

Jen Baughan	CEO
Claire Fitton	Youth Insights Manager
Fran Isherwood	Youth Insights Administrator
Jamie Baughan	Tech Support

Northern Gas Networks

Jenny Wilkinson	Stakeholder Manager
Alex Brightman	Northern Gas Networks facilitator and witness
Lewis Burton	Northern Gas Networks facilitator
Ian Coates	Northern Gas Networks facilitator
Claire Spencer	Northern Gas Networks facilitator
Stella Matthews	Witness
Jane Herbert	Observer
Melanie Taylor	Observer

Others

Elaine Richmond	Witness, Communities and Events Manager at the National Science and Media Museum
Ivan Jepson	Observer
Brian Matthews	Observer

3. Session theme and materials

Theme: the hydrogen house

Materials:

Prior to the session YIC members were sent an information video animation 'Why are we looking to transport hydrogen through the gas network in the future?' https://www.youtube.com/watch?v=q6wx0n2tkMg

During the session the YIC heard a witness presentation from Elaine Richmond, Communities and Events Manager at the National Science and Media Museum, based around the 'Hook, Inform, Enable & Extend' framework of engagement.

The council also heard a presentation from Alex Brightman, Hydrogen Home Liaison Officer at Northern Gas Networks, on the logistics of the hydrogen house and a video of the building of the house. https://www.youtube.com/watch?v=-ghPjaL-xeY

Questions for Elaine, National Science and Media Museum:
What has been the most successful exhibit across the museums, and do you know why?
What happens if an exhibit is not as successful as anticipated, and how do you approach this situation?
What happens to equipment after an exhibit is changed?
How is an exhibit's success measured?
Does the idea for an exhibition or the audience you want to target come first when brain storming?

Table 1: YIC questions to Elaine Richmond; YIC Session 2

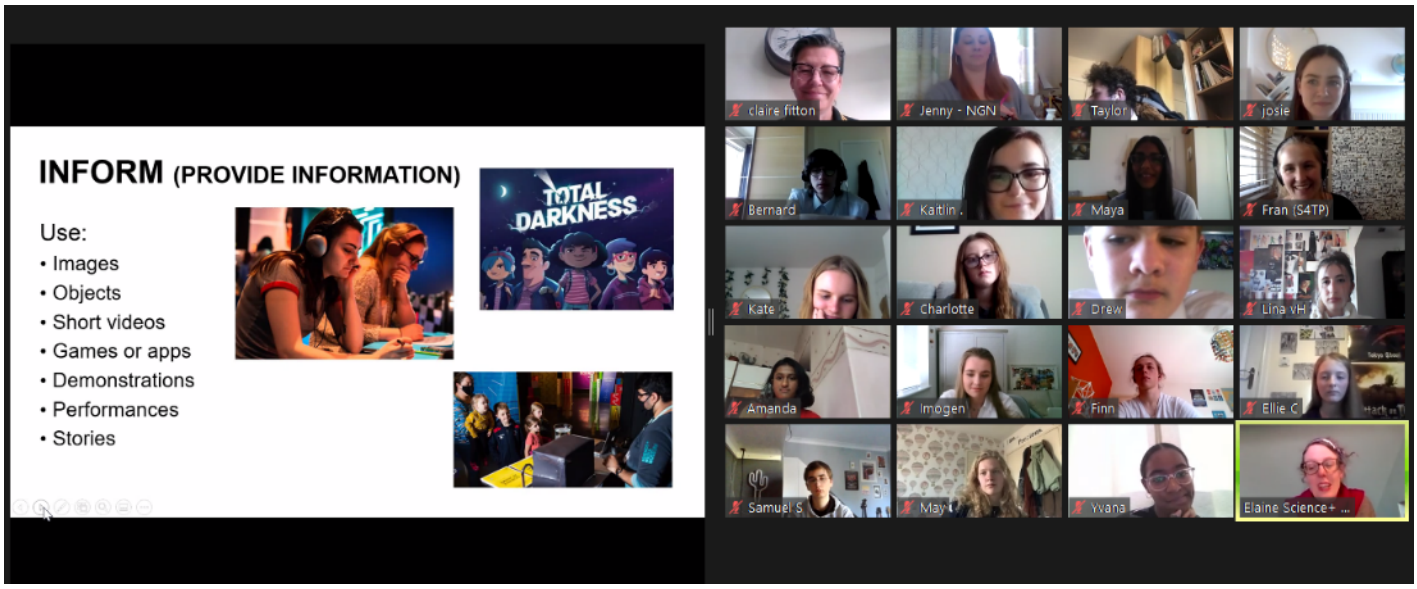

Figure 1: Elaine Richmond's witness presentation; YIC Session 2

4. Engagement methods:

S4TP use a variety of engagement mechanisms to inform and engage the council, which have been tailored to meet the needs of young people, allowing different and broad perspectives to be heard. The session involved written, online and offline opportunities for participants to express their views. This helps people with different accessibility needs to make an equal contribution. By using different techniques, it is believed that we can enable sustained engagement over the period of the council.

Feedback on actions from previous session – 'You said / We did'

S4TP's methods of engagement crucially hinge on businesses feeding back on the actions they have taken after hearing the voices of young people. Northern Gas Network's Young Innovators Council is NOT a consultative body, it is a forum for co-creation and actions. Therefore, each session starts with Northern Gas Networks feeding back on any actions that they have taken in response to the previous session.

Figure 2: Examples of 'You said / We did' feedback from Northern Gas Networks; YIC Session 2

Pre-engagement knowledge share

This information and expertise sharing from a witness enables young people to gain a level of understanding of the subject area in order to have a meaningful input to both breakout sessions and main sessions.

Slido word cloud
A Slido word cloud was used to gather feedback in real time. Council members were asked to write two words that describe an excellent educational visit. Each word differs in size based on the frequency it was used. This method set the scene for the session and visualized their responses, helping to warm up the YIC before they delved further into the subject.

Figure 3: Slido produced by the YIC research task; YIC Session 2

Polling using stamps inside the breakout rooms
One way to engage the council quickly and effectively about their preferences is using interactive polls. The council members were asked to 'stamp' their typed ideas and suggestions (which are displayed on an interactive whiteboard) with various icons, to highlight which suggestions could be done now or later, and which they felt were the most effective suggestions.

Small group work
Small group work was written into the session plan as a result of feedback from Session 1. It was indicated that many of the council members preferred the work undertaken in the breakout sessions. With such a large group, splitting into smaller groups facilitated deeper discussions on the topic. In Session 2 council members were put into groups of 4-5.

Large group feedback
S4TP felt it important that the young people themselves fed back to the larger group, rather than the facilitators. We are aware that though initially this may feel a little uncomfortable, in the longer term it will help to develop the YIC's ownership of ideas, decisions, and the council itself.

Co-creation
One of the most important parts of developing the Young Innovators Council is to build advocacy among the young people and, in turn, champion their views within Northern Gas Networks. Advocacy is built up over time and is the result of carrying out top quality meaningful engagement in partnership, to deliver results that work for everyone. Co-creation is a co-operative process in which, in this instance, young people with diverse experiences, skills and knowledge come together to address a common issue, and which enables them to be actively involved in shaping the things which impact their lives now and in the future.

Post-session feedback

In order to respond to the needs and the requests of the Young Innovators Council, post-session questionnaires are filled out (see Appendix 1). This ensures a holistic and innovative approach to responding to the young people's needs.

Agenda

Time	Activity	Lead	Room (main/breakout)	Timings (mins)	Outcome
5:00	Welcome & feedback from previous session	S4TP/Northern Gas Networks	M	7	
5:07	Introduction to session & objectives	S4TP	M	3	
5:10	Breakout session 1	S4TP & facilitators Discussion	BO	20	List of best experiences at events/activities/ visits What would make you want to visit the hydrogen house?
5:30	What makes a great science based event or activity? Q&A	Elaine Richmond, National Science & Media Museum	M	10	
5:40	The logistics of the hydrogen house	Alex, Northern Gas Networks	M	5	
5:45	Breakout session 2	Facilitators – Elaine to rotate	BO	35	What activities / events would you suggest? What format should these take?
6:20	Return to main room – 5 groups feedback to everyone	S4TP & facilitators	M	15	List of suggested actions for Northern Gas Networks
6:35	Q & A The science & future of hydrogen	Stella Matthews, Northern Gas Networks Specialist	M	30	Understanding of the hydrogen projects Northern Gas Networks is delivering.
7.05	Plenary/end			5	

Table 2: Agenda for YIC Session 2

5. Key Discussion Points:

Objectives A and B:

A. What would make you want to visit the hydrogen house on an educational visit?

Market it as a future home, not just a science experiment
Working toilet and facilities, milk in the fridge, cooking utensils on show, something on the TV; a house fully ready to live in, not a show home
Knowledge about the hydrogen house provided before a visit, awareness of the reasoning behind promoting hydrogen
An aesthetically pleasing house, e.g., modern design, variety of colours and patterns
Freedom to be able to roam around and explore
Learning about the science behind the hydrogen house and how it works practically
Aim to make visitors want to buy it; buy into hydrogen-powered homes
Emphasis on how carbon is negatively impacting the environment, and the comparative impact of this hydrogen house - hydrogen as an opportunity
Competitions, challenges, puzzles and activities for schools and groups
Able to relate a visit to the hydrogen house to an in school topic – this will help school visits understand what Northern Gas Networks is doing and why they are doing it
Should show visitors the need for change and involve them in the transfer to hydrogen; make them feel that if they accept hydrogen they are helping the world, even though it only feels like a small change to their individual lifestyle
Point out ways that hydrogen systems need to be refined and improved in future for the next generations

Table 3: YIC recommendations for Objective A; YIC Session 2

School Trips I've Been On:

- Bewerley Park Trip - Y6 - Orienteering style activities - Team building activities - Very active - Outside activities - Leap of Faith - Rock Climbing at Brimham Rocks, we walked there from the camp - We found a garlic flower plant on our walk to Brimham Rocks - Very very long walks - At one with nature
- Robin Hood's Bay - Y5 -
- Sealife Centre - Y2 - Animal Biology - Learning about the different animals and how/where they live
- Museum Trip (?)
- Yorkshire Wildlife Park Zoo - Y4 - Learning about animals, their habitats and characteristics
- Lightwater Valley - Y8
- Christ Church - Remembrance Day Service -
- Ice Skating - I learnt to ice skate (I wasn't that great) - I spent time with my friends - I met an amazing ice skater while I was there, he was an older man and he helped me learn
- Bowling Trip - Not the most educational trip - Fun trip - We played against the teachers to see who could win - Students won - Yay - WooHoo
- Mini Christmas Tour - HHS band - We went around the local primary schools and played Christmas music for them - Socialising - Spent time with the people at Springwater School - The people there have extra educational needs, they were super sweet and it was so special - They were curious about the instruments and wanted to know about us too - I have a lot of good memories from that day
- Eden Camp - War Information Centre - Amazing trip - Much easier to understand the war and how it felt, you could see how things would have appeared to others - Each cabin had a different scene set, anywhere from a bombed house, inside a submarine and even a Nazi head quarters! - I enjoyed it so much that I had a second trip with my family - It was still just as fun then - I remember that I was scared of the moving hand, it was underneath a pile of broken buildings, this is where a bomb appears to have gone off - All the sounds were very real, they were so loud you could feel them - Real models of tanks, aircrafts and even a bombshell - One of my favourite school trips

Figure 4: Example of YIC research task, to help make recommendations for Objective A; YIC Session 2

"It has allowed me to discuss current issues surrounding energy with people of a similar age who are all passionate about similar topics as myself."

Council Member

B. What would you like to do / hear / see on a visit?

Transparent wall with potentially transparent pipes, which distribute a hydrogen that has been artificially coloured so visitors can see if moving around the house; transparent radiators; plastic balls and pipes to show the movement of hydrogen
To be able to use the facilities that use the hydrogen, e.g., cooking on the stove, showering in the bathroom (in a wetsuit)!
The usable everyday items could demonstrate how much gas or hydrogen is used to power it
A gaming station that looks like it belongs to the people who live in the house, but that has the interactive learning games for visitors
Comparison guessing game between Carbon vs. hydrogen appliances
Share the physical journey of the hydrogen from source to house on the walls simplified
Puzzles, e.g., how much hydrogen would it take to heat up x cubic litres of water?
Northern Gas Networks hydrogen house version of monopoly
Hydrogen house escape room
Real life scenarios problem solving, e.g., 'Faketown'
Visitors bring their own food and cook it on the hydrogen cookers; school groups could bring school dinners
A tour around the house
Freebies are always welcome – to help visitors remember the trip
Scientific facts about hydrogen, such as advantages and environmental benefits, displayed in a colourful, attractive, and accessible way to ensure more people can be involved
Interactive games should involve all the senses
Simple graphs that make comparisons to things students of different age groups would understand, which relate to their curriculum
Images projecting what our planet would look like with continued carbon use compared to if we switch to hydrogen
Ask younger students to design their 'house of the future' – prize for best
For tactile learners: a physical puzzle or task around making something work that uses hydrogen
The mobile phone app could have an interactive map, games and activities built into it
Scavenger hunts: find and gather information throughout the house

Table 4: YIC recommendations for Objective B; YIC Session 2

Objective C:

C. What would you need to see at the house to make you excited about a future career in STEM, e.g., would it be part of a general visit, or would it be a specific career focused school event?

The group began by discussing how the hydrogen house could be used to promote STEM careers. The council felt that there should be a strong focus on future energy and future jobs rather than focusing on traditional jobs in this field. The question as to whether the careers focus should be part of a general visit depended on what activity was being undertaken. It was noted that all areas of the house must be fully wheelchair accessible. One council member noted - "It needs to relate to what I'm learning: what we're studying, subject specific, and demonstrate how my school subjects are helpful and relevant to our future – and how they can affect the future of the planet."

FOCUS	ACTIVITIES
The house should reflect how the subject of hydrogen and alternative energy relates to what I'm learning in school; be subject specific, demonstrate how my school subjects are helpful in affecting the future	• Giving tasks and challenges to schools to research and complete ahead of their visits, e.g., water electrolysis • Videos of the chemistry/ engineering/design/etc. behind the house
Future jobs orientated; green economy; platform the people behind the hydrogen science and the designing and building of the hydrogen house, to highlight the STEM careers involved	• Video/audio stories about the people behind the house; what subjects they did at school, etc. • Footage of the building of the appliances • Lecture style events for older age groups from industry professionals about the house and site as a whole • A 'day-in-the-life' scenarios for a variety of hydrogen-related jobs
The house should project how this idea could work at scale, and showcase new building developments / ideas / concepts	• Timelines, e.g., the history of the development of hydrogen use and this house • To feed into project management careers: a game created where you have to design a whole neighbourhood with hydrogen houses
Provide information about the real-life impact of hydrogen on us and our lives; why should it matter to me?	• A pre-challenge which compares the footprint or usage of your own home before visiting the house
Make it relevant to the university application process, e.g., what did some of the people involved in the hydrogen house study at university, how did they get to this job, etc.	• Different types of information available for different interests, e.g., partner with housing developers to present the technology and explain that career path • Q & A sessions with Northern Gas Networks employees, especially apprentices • Offer careers' fairs at the house

Table 5: YIC recommendations for Objective C; YIC Session 2

Short knowledge share presentation from Stella Mathews:
After the YIC had their smaller group discussions about the development of the hydrogen house, they heard from Stella Matthews, Hydrogen Development Manager at Northern Gas Networks, on the various hydrogen projects that the company is currently working on.

Questions for Stella Matthews Northern Gas Networks:	
How do we detect gas leaks and how quickly do these leaks get fixed?	
What is the current commonly used method of producing hydrogen?	
If it leaked and ignited how dangerous would it be? Is it more or less dangerous than natural gas igniting?	*Answered in the chat by Ian Coates: "natural gas doesn't have a specific smell and this is why we put the smell into the gas, so that people can smell if there is a leak in their home or their street. If you smell gas there is an emergency number to call 0800 111 999 and an engineer will be called to specifically locate the leak and undertake a repair"*
How are existing jobs in gas going to change in the future with the use of hydrogen?	
If hydrogen was to escape, would it be more or less toxic to its surroundings?	
How do you emulate those 100-year-old pipes to ensure they are secure for the network?	
Are there different materials that the pipes could be made of that would decrease the chances of the hydrogen leaking?	*Answered in the chat by Ian Coates: "we are currently replacing our metal pipes with new plastic pipes. These new plastic pipes are a lot more robust as they don't corrode like metal pipes. Hope that answers your question."*
Is it more expensive to fix hydrogen leaks than fossil fuel leaks?	
Do all of the appliances that run on gas need replacing to allow hydrogen to be used, or can they be modified to reduce the environmental impact?	
How accommodating are residents with the hydrogen blend and participating in trials, or will there be incentives to get people on board?	*Answered in the chat by Jane Herbert: "We are supplying the gas blend to a community of 668 homes. We have spoken to them about the project over the last year and they are generally excited to take part and reassured that it won't have an impact on them or their gas use. As a thank-you we will pay the hydrogen element of their gas bill during the 10-month demonstration."*
Will the switch to Hydrogen have a significant impact on global energy trade or even on geopolitics?	

Table 6: YIC questions to Stella Matthews; YIC Session 2

6. Key recommendations (priorities)

At the end of their second breakout session, each group was asked to prioritise their ideas into a list of actions, using the NOW/WOW/HOW framework.

What would you like to do / hear/ see on a visit?

- directly compare the original natural gas appliances with the hydrogen ones
    - create a guessing game to demonstrate these **NOW**
    - open boilers and cookers/false fronts on appliances/transparent pipes with coloured hydrogen so that visitors have visuals **WOW**
- harness the use of a mobile app before, during and after visits to the house - games/activities/maps/quizzes/learning **HOW?**
- scavenger hunts leading the learning around the house, to help understand the processes involved in hydrogen extraction, use and distribution **WOW**
- puzzles and real-life scenario uses of hydrogen **NOW**
- cooking demos for schools, where they bring and cook their own food and have a meal there **NOW**
- escape rooms with hydrogen related tasks to complete and solve **HOW?**
- comparative images of what the environment will look like with/without the switch from natural gas to frame/influence the decision making of visitors **WOW**
- attention to detail = utensils in the kitchen, milk in the fridge **NOW**
- wearing a wetsuit and going into the shower! **HOW?**

What would you need to see at the house to make you excited about a future career in STEM?

- a 'day in the life of' STEM jobs - both roles at Northern Gas Networks / the wider energy industry, but also more specifically to do with the hydrogen house **NOW**
- base the majority of the activities and information presented on future energy **WOW**
- emphasis on the environmental value of hydrogen and its possibilities in the future **NOW**
- prove that it is a viable house for the 'average' family = viable career path **NOW**

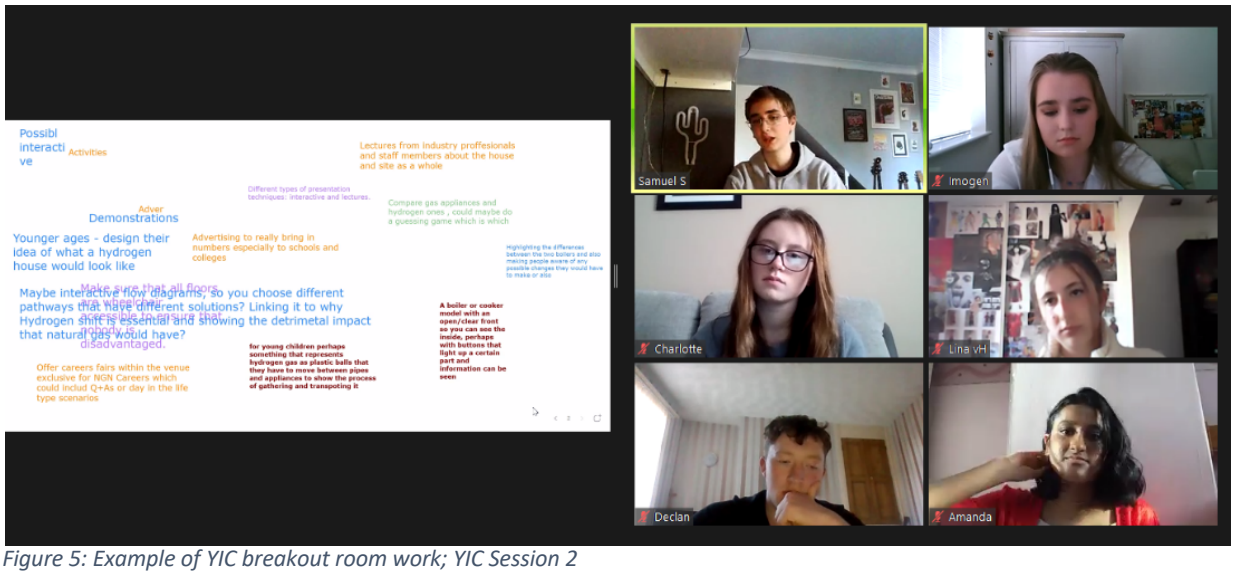

Figure 5: Example of YIC breakout room work; YIC Session 2

7. Agreed Actions for the Young Innovators Council

- To fill in post-session survey
- To forward any research task work undertaken to S4TP

8. Summary of modifications to be made after feedback.

The YIC members overwhelmingly felt that having more time in the breakout rooms and the groups being smaller was a success and led to more opportunities to share views and ideas. They felt that there was a good mix of information and opportunities to discuss. The council members also liked the fact that we had outside 'visitors' (witnesses) to give further information on a topic.

In the debrief session with facilitators it was noted that it took the breakout room groups a little time to 'warm up' (although this was not highlighted by the council members). It was suggested a very quick icebreaker could be done in the breakout rooms to help to relax the members.

The use of Slido worked well and S4TP would like to explore the possibilities of using this software in subsequent sessions.

9. Conclusion

The new format of the session worked well, and the YIC came up with a plethora of ideas of how the hydrogen house could be made engaging for their peers. Having a witness who was comfortable presenting to young people worked well and the council appreciated an external visitor attending the meeting. The post session feedback from the council members was very positive.

The YIC is still learning how to interact, work and collaborate with each other, however it may be worth investigating how they could undertake some pre-session work in small groups to further ensure that everyone plays an active role in contributing ideas, discussing options and shaping next steps.

Overall, it is felt that the key objectives set by Northern Gas Networks was met and the session was a success.

Appendix 1: Young Innovators Council Session 2 – Feedback

1. Session 2 was a little longer. Do you feel the session was long enough for the topics covered?

More Details

Too short	0
About the right length	21
Too long	1

2. Did you feel that you had the opportunity to contribute?

More Details

Strongly agree	20
Tend to agree	2
Neither agree nor disagree	0
Tend to disagree	0
Strongly disagree	0

3. Did you feel that your ideas were listened to?

More Details

Strongly agree	21
Tend to disagree	0
Neither agree nor disagree	1
Tend to disagree	0
Strongly disagree	0

4. What would you like to see more of in your council sessions?

What would you like to see more of in your council sessions?
More smaller breakout rooms, I think they worked really well on Wednesday. also, having more time in breakout rooms to share ideas.
I would like to see more problem solving tasks in the breakout rooms
Witnesses speaking about the issues/topics we are focusing on.
I would like to see more people/visitors coming in where possible, I understand if this can't be done. I think that was a really good idea to have Elaine in!
I enjoyed having multiple breakout rooms this time as I got to speak and see more people!
I really loved working in smaller breakout rooms! It made everything so much easier, and I felt as if there were more opportunities to share ideas as there was less people
I liked having the guests to talk about what the topic that we were covering in the session
I thought we had a good mix of information and speaking, so I felt there wasn't anything I wanted to see *more* of.
I quite enjoyed learning about the hydrogen house, so it would be nice to learn about more solutions similarly
The same sort of thing. It was really interesting to hear directly from employees about the projects and Hydrogen house specifically as well as wider events such as the Science Museum. Things I had never even considered for organising displays and exhibitions.
Separate group activities in the breakout rooms and listening to other people's thoughts on the different questions.
The different breakout rooms were great, I'd like to see more of them!
A small part of the session looking over the highlights of the report compiled from the last session!
I enjoyed the whole session and found the presentations very interesting.
More time to share ideas with the other groups and in breakout rooms
I thought the smaller group dynamic was okay but possibly too small.
I find what we do interesting and can't really think of anything else.
I enjoy the breakout rooms because everyone has the opportunity to share their ideas and opinions.
More sessions like the one we just had
Group challenges

5. We know it is a big group! If there is anything you'd like to add about the topics that you didn't have a chance to say in the sessions, please write it here:

- I was thinking you could maybe add a large hydrogen balloon above the house with an arrow pointing down to attract attention - not sure how realistic it is but just an idea
- I had a chance to say most of what I wanted
- Possibly what the change to hydrogen means on a global scale? What will the impact be on energy supply or will it remain largely unaffected?

Extracted April 2021 (sample size: 22)