

Youth Engineering for Environmental Sustainability Summit

11-13 October 2021

Self-guided worksheet for
students participating in YEESS

Full programme of events can be found at
<https://yeess.imanengineer.org.uk/>



Say YEES to climate action!

Each year, the climate crisis becomes ever more urgent. Scientists say that we have until 2030 to keep global heating under 1.5C.

The West of England has created a Climate Action Plan to reach net-zero carbon emissions by 2030. Working together with regional councils like Bristol, South Gloucestershire, and Bath & NE Somerset, the aim is to become carbon neutral and climate-resilient by 2030.

The goals are set, but the routes to get there are still in question. That's where The Youth Engineering for Environmental Sustainability Summit comes in.

So how might we reach net zero by 2030?

This is your chance to find out the facts and question the experts. Watch our postcards from the future videos, and then discuss your ideas with other young people over the three day summit.

Question our leading regional politicians each day during the live broadcasts.

We're asking you to think like an engineer during this summit – it's all about finding solutions to the problems our society faces. We want you to be curious, work collaboratively, and imagine our future together.

Get ready!

Get up to speed ahead of the Summit with some background viewing on our website:

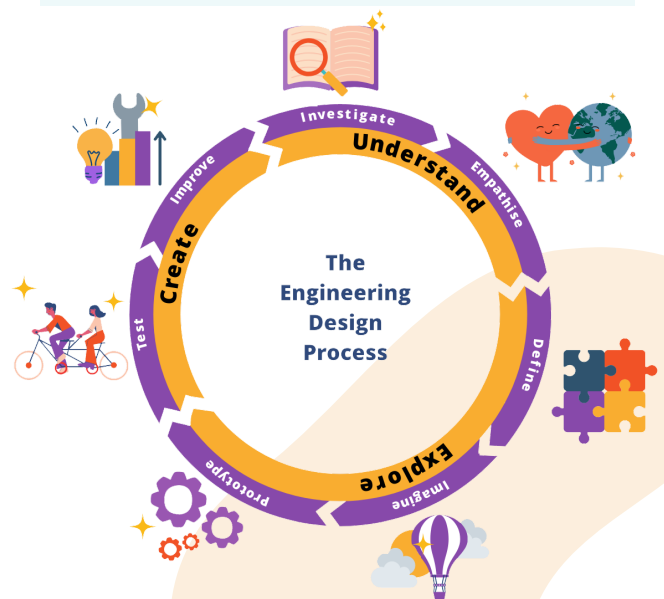
<https://yeess.imanengineer.org.uk/student-resources/>

Find out why scientists are saying this is Code Red for Humanity. How will thinking like an engineer help? And where is the money for all these changes going to come from?

You can also read more with our additional resources linked to the summit.

Go!

Follow this guide to work your way through the videos and chat discussions. Each day we tackle a different problem which needs to be solved to reach Net Zero in the West of England.



Transport



Investigate

Why do we need to slim down traffic?

Watch the video from Dr Steve Melia from the University of the West of England, Bristol:

<https://yeess.imanengineer.org.uk/monday/monday-intro/>



Transport is our biggest emitting sector and unlike the rest of the economy we have made no progress on reducing those emissions. Road traffic has increased by 30% since the 1990s, and is still growing as we drive ever more miles per year. In order to reduce carbon emissions, we have to reduce the amount of traffic on our roads.



Empathise with road users

You may need to do more research to answer these questions. You can answer them with bullet point notes, or in discussion with your class.

Why do your friends or family drive cars which run on petrol/diesel (even if they know about climate change)?

Why do you think people are driving more than ever before?

Is this the same in every country in Europe?

Why do your friends or family not walk or cycle to their local shops or services?

What would make taking public transport a better option for you?



Empathise

Transport



Define

We have defined our problem as 'how might we take 40% of traffic off our roads by 2030?'



Imagine

So which solution do you want to see prioritised over the next decade?

Electric cars



People will still need cars to get about – but we aim to make them greener. As well as going electric, our team at Bristol Robotics Laboratory is also researching driverless cars which can pick up passengers when they need it. We may see car ownership fall as people share cars in their community.



Professor Tony Pipe, Bristol Robotics Laboratory, UWE Bristol

15 minute cities



As cities get bigger, we can't depend on everyone travelling into the city centre and jamming up our roads. That's why we need to bring services out to where people live! 15 minute cities is an idea that everyone can reach their shop, school, or doctors with only a fifteen minute walk or cycle. In my team at Atkins, we're working on projects which will help make it easier for people to travel to their local centres on foot or by bike.



Lucy Corfield, Atkins

Integrated public transport



Not everyone can afford or drive a car, and our cities should be organised to support those people. That's why Moving Bristol Forward aims to connect up the dots with an integrated public transport network. Electric trams will connect up our suburbs, and green buses will take you where you need to go.



Emilia Melville, Moving Bristol Forward

Transport

Share your ideas!

Discuss your ideas with other young people in the I'm an Engineer chat. You can answer these questions with bullet point answers, or in discussion with your class.

Which scenario do you prefer? Why?

How much do you think each idea would cost? Who makes money? Who loses money? Could everyone use it?

Why hasn't this idea happened already? Or did it already used to exist?

What barriers currently stand in the way? How could you overcome them?

How could the Mayor of Bristol make your travel around the city easier?

Question the Mayor!

Send your ideas and solutions to Mayor Marvin Rees from Bristol City Council. There is a live Q&A session at 2:30pm on Monday 11th October:

<https://yeess.imanengineer.org.uk/monday>

The Bristol One City Plan was published in 2019 and includes all the goals which this summit was based on.

<https://www.bristol.gov.uk/documents/20182/33379/Mayor%27s+Climate+Emergency+Action+Plan+2019+FINAL>



Energy

Why can't we keep using gas boilers?

Watch the video from Associate Professor Ruzanna Chitchyna, Cabot Institute and Department of Computer Science, University of Bristol:

<https://yeess.imanengineer.org.uk/tuesday/tuesday-intro/>



Investigate

“Today in the UK, 9 out of 10 homes are heated via a gas boiler - they use a fossil fuel gas. Home heating accounts for 14% of our carbon emissions. But the rules are already changing: in Bristol all new homes will have a fossil fuel-free alternative heating by 2025. The next step will be updating old housing, by retro-fitting and replacing our existing home heating with climate friendly alternatives. We need skilled professionals in heating, retrofit, building, energy supply, ICT, management and more to tackle this whole-scale lifestyle change.”



Empathise

Empathise with residents

You may need to do more research to answer these questions. You can answer them with bullet point notes, or in discussion with your class.

Why do your friends or family have gas boilers in their homes (even if they know about climate change)?

Is this the same in every country in Europe?

Why do you think house builders aren't putting in climate friendly technologies right now?

What sort of housing would you like to see across our region in future?

Energy



We have defined our problem as 'how might we heat our homes without fossil fuels by 2030?'



So which solution do you want to see prioritised over the next decade?

Invest in renewable energy

“

The UK is a world-leader for wind power, which now accounts for 24% of our electricity energy mix. We have so many solutions at our fingertips for low-carbon energy, including nuclear power. We think that designing and rolling-out renewable energy sources is a huge opportunity for the UK economy, and our potential to lead the world in climate action and mitigation.

”

Darren McClure and Anna Muir, Atkins



Insulated homes

“

Energy demand has fallen over the years, with households consuming 12% less energy than they did in the 1970s. But to reach Net Zero, it has to fall even more. We need to tackle the energy efficiency of our housing stock's fabric – reducing our emissions and making our homes warmer and more comfortable to live in. Our engineers have an opportunity to work on housing ideas to help revolutionise the retrofit industry.

”

Ian Preston, Centre for Sustainable Energy



Invest in skills

“

The energy transition presents a jobs bonanza, and that is only a good thing for young people! As well as exciting technologies being installed in new housing, we also need to retrofit nearly 28 million homes across the UK. Whether it is heat pumps, insulation, engineering design, or electricity generation – that's a lot of skilled workers we need over the next decade. As you enter the workforce, get ready to contribute to our Net Zero transition!”

”

Denis Fernando, Friends of the Earth



Energy

Share your ideas!

Discuss your ideas with other young people in the I'm an Engineer chat. You can answer these questions with bullet point answers, or in discussion with your class.

Which scenario do you prefer? Why?

How much do you think each idea would cost? Who makes money? Who loses money?

Could everyone make these changes?

What barriers currently stand in the way? How could you overcome them?

How could Council Leaders make this energy transition easier for residents in the West of England?

Question the Council Leaders!

Send your ideas and solutions to Councillor Toby Savage from South Gloucestershire Council and Councillor Sarah Warren from Bath & NE Somerset Council. There is a live Q&A at 2:30pm on Tuesday 12th October: <https://yeess.imanengineer.org.uk/tuesday>.

You can read the Climate Emergency plan for South Gloucestershire here: <https://beta.southglos.gov.uk/climate-emergency-in-south-gloucestershire/> And the Climate Emergency plan for Bath and North East Somerset is here: <https://beta.bathnes.gov.uk/responding-climate-emergency>.



Test



Improve

Waste



Investigate

What does rubbish have to do with the climate?

Watch the video from Professor Lorraine Whitmarsh, Centre for Climate Change and Social Transformations, University of Bath:

<https://yeess.imanengineer.org.uk/wednesday/wednesday-intro/>

“Not only are mountains of waste bad for the environment and wildlife, but they're also linked to increased carbon emissions. How? Well the more stuff we make, transport, and then throw away, the more emissions are wasted in the process. In fact, two thirds of the UK's emissions come from the physical stuff we buy. We need to fundamentally rethink our throwaway culture.”



Empathise with residents

You may need to do more research to answer these questions. You can answer them with bullet point notes, or in discussion with your class.

Why do your friends or family throw away so much household rubbish (even if they know about climate change)?

Is this the same in every country in Europe?

Why do you buy disposable plastics and food containers?

Why do you give/throw away useable goods or clothes and then buy new ones?

How could our councils make it easier to reuse or recycle waste?



Empathise

Waste



Define

We have defined our problem as 'how might we reduce/reuse 65% of our waste by 2030?'



Imagine

So which solution do you want to see prioritised over the next decade?

Reduce and Refuse

“We can't swap or substitute our way out of this mess. Fundamentally, we have to stop buying throwaway stuff. I've seen the impact our society has on the natural world, and it's pretty dire. There's bottles, wet wipes and single-use food packaging littered all the way around the British Isles! That's why City to Sea is calling on us to REDUCE and REFUSE – just don't buy that straw, coffee cup, or bottle – choose reusable instead!”



Jasmine Tribe, City to Sea

Repair and Reuse

“Repairing our own belongings is an act of rebellion, of refusing to participate in our throwaway society. We need to fall in love with our stuff again – hanging on to clothes that bit longer, artfully patching up objects, or steampunk salvaging from landfill. These are all lost skills which are being rediscovered by our community of repairers.”



Professor Teresa Dillon, UWE Bristol

Design for Recycle

“While reduce and reuse are important parts of the waste triangle, we can't get away from the fact that most of us consume an awful lot on a daily basis. That's where recycle comes in. It's my job to re-design packaging and waste systems, so the materials can go back into a circular economy.”



Olivia Meyonette, Resource Futures

Waste

Share your ideas!

Discuss your ideas with other young people in the I'm an Engineer chat. You can answer these questions with bullet point answers, or in discussion with your class.

Which scenario do you prefer? Why?

How much do you think each idea would cost? Who makes money? Who loses money?

Could everyone make these changes?

What barriers currently stand in the way? How could you overcome them?

How could the West of England Mayor help households to reduce waste?

Question the Council Leaders!

Send your ideas and solutions to Mayor Dan Norris from the West of England Combined Authority. There is a live Q&A at 2:30pm on Wednesday 13th October:

<https://yeess.imanengineer.org.uk/wednesday>

You can read the WECA Climate Emergency plan here

<https://www.westofengland-ca.gov.uk/helping-to-tackle-the-climate-emergency/>



What next?

If the summit has inspired you to take action, then try these further resources. We have provided guides for teachers, as well as ideas for students in your schools and communities:

<https://yeess.imanengineer.org.uk/student-resources/>

Digital Engineering

All the materials from the YEES Summit were produced by UWE Bristol's Science Communication Unit, on behalf of the initiative for Digital Engineering Technology and Innovation (DETI) in the West of England, in partnership with I'm an Engineer Get Me Out of Here.

You can find all the resources on our website:

<https://www.digitaltrailblazers.net/resources>

About DETI Inspire

DETI Inspire champions science for children in the West of England with a particular focus on breaking stereotypes and challenging perceptions about STEM careers in order to appeal to under-represented groups in engineering.

Our vision is for every young person in the West of England to have access to inclusive, engaging and inspiring engineering experiences with real-life relatable role models.

We make it our mission to support and inspire the next generation of digital engineers.

I'm an Engineer

I'm an Engineer is a student-led, online STEM engagement and enrichment project. Since 2012 it has connected 25,000 students with 370 engineers.

Evaluation shows the online format is highly effective at reaching and engaging young people, especially those under-served by other STEM interventions.

