1. The My2050 lesson

2.1. Starter Activity: Option (a) or (b) (10 minutes)

1. STARTER OPTION (a): Key-Term Match-Up

This is a short activity to introduce students to key words in the My2050 simulation. It is useful as an introduction to climate change.

Use the cut-out key word and definition cards in the annex.

- Divide the students into teams - team size isn't important, whatever suits your class best.
- Give each team a set of key words.
- Read out the definition of one of the terms.
- One player in each team then races to put their hand in the air holding the correct key word.
- The team with the player to put their hand up in the air fastest gets a point.
- The winning team is the team is the one with the most points after all of the definitions have been read out.

Variation: Give the students a set of key word cards and definition cards and get them to simply match up the key terms and definitions in teams, the team who does this the fastest is the winner. This option may be more suitable for Key Stage 3 students.

OR

You can play this as a class round robin (i.e. students can give their opinions verbally around the room, which means that everyone will get a chance to contribute). This option may be more suitable for Key Stage 4 students.

Differentiation: There are two sets of keywords in the annex – Key Stage 3 cards and Key Stage 4 cards (or lower ability and higher ability).

OR 1. STARTER OPTION (b): Climate Change Causes and Effects

Variation: Students requiring extra support can refer to *1a.Key-Term Match-up* in the annex to guide them. You can also ask students to suggest different locations in the UK and around the world where these causes and effects are taking place.

Differentiation: Students can be asked to rank the causes and effects according to their severity and explain their decisions. Students may also wish to explore the arguments of those who are sceptical about climate change.

This is a short activity to get students to explore the causes and effects of climate change and is more suited to a class that has already examined the issue of climate change.

- Students should create a table divided into two columns with the headings: 'possible causes of climate change' and 'possible effects of climate change', as shown in *1b. The cause and effect table.*
- Students should populate the table based on their prior knowledge of the causes and effects of climate change.
- The facts below may be useful for students.

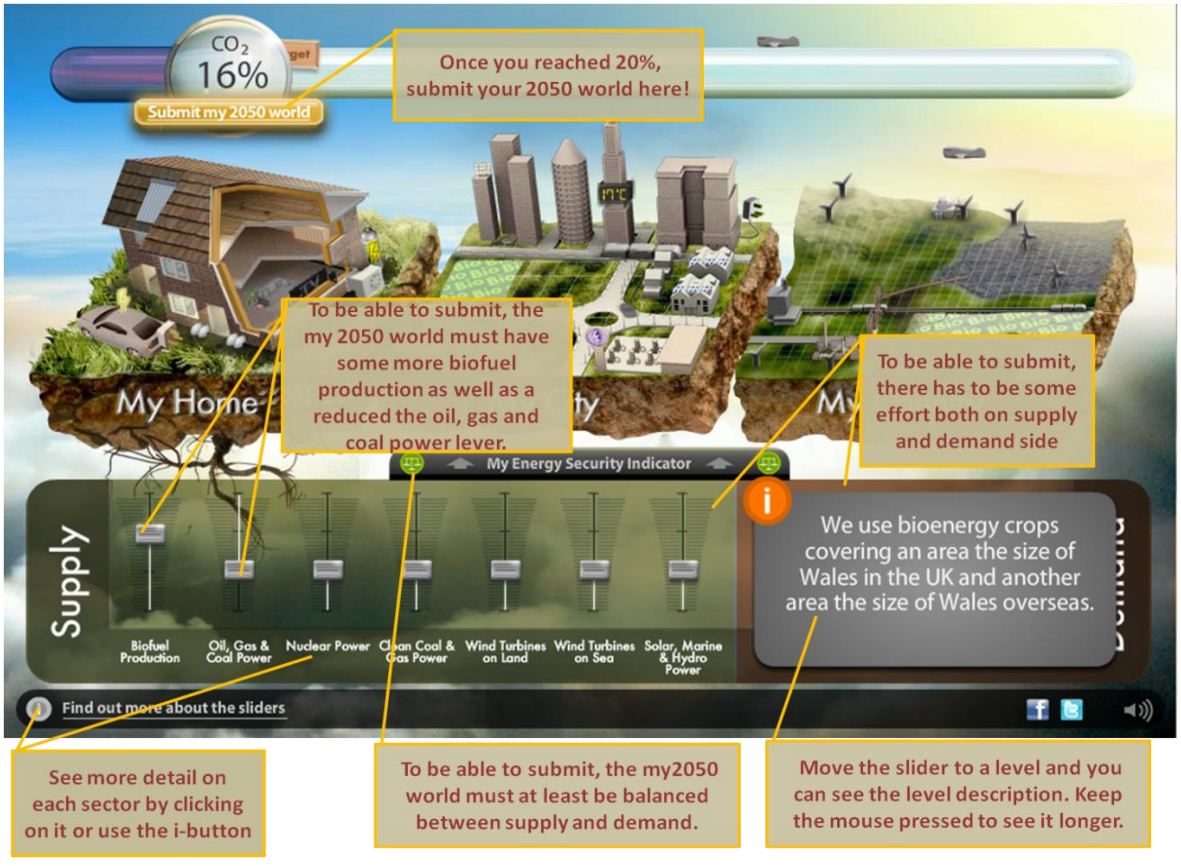
Climate change facts

- Rising temperatures – the average temperature of the Earth's surface has risen by about 0.8^{o}C since around 1900.
- Global average sea level continues to rise – likely to be 0.5m or more by the end of the century.
- Extreme weather – more frequent heat waves and heavy precipitation are very likely in the coming decades in many regions.
- Increased risk of extinction for 20 to 30% of species and loss of biodiversity.

The My2050 Simulation

Before running a session using the My2050 simulation, it is useful to understand how the simulation works. The My2050 Simulation contains 14 levers, separated into 7 **supply options** and 7 **demand options**. More information can be found about each option by clicking on the name of the lever. It works well to start from the left and move to the right when selecting levers.

In order to reach the target to reduce greenhouse gas emissions by 80% below 1990 levels, you must set the level of ambition you want for each of the 14 levers, from low effort through to high effort. This is shown as levels 1 – 4. As well as reaching the reduction in emissions target, you should aim to **balance the amount of energy you supply with the amount of energy that you demand** so that you achieve **energy security**. This can be explored by clicking on the 'My Energy Security Indicator' bar.



'Top Tips'

- The biofuel production lever must always be set higher than level 1
- The fossil fuels lever needs to be set low, but fossil fuels are still important in ensuring security of supply
- There needs to be effort made in both the supply and demand levers
- Some levers have less impact than others

Key messages

The My2050 Simulator is based on a more complex data set – the 2050 Calculator. You may wish to direct particularly keen students to this online tool: http://2050-calculator-tool.decc.gov.uk/

DECC is using this tool to help understand what needs to be done to ensure emissions targets can be reached while maintaining energy supply. The key messages from the 2050 Calculator and the My2050 simulation are that:

- Ambitious per capita demand is required. The greater the constraints on low energy carbon supply, the greater the reduction in demand will need to be.
- A substantial level of electrification of heating, transport and industry is needed.
- Electricity supply may need to double, and will need to be decarbonised.
- A growing level of variable renewable generation increases the challenge of balancing the grid.
- Sustainable bioenergy is a vital part of the grid in sectors where electrification is unlikely to be practical.
- There is an ongoing need for fossil fuels in our energy mix.
- Emissions from agriculture, waste, industrial processes and international travel make up a small proportion of emissions today, but will have a much greater significance by 2050.

Further information can be found at:
http://www.decc.gov.uk/en/content/cms/tackling/2050/calculator_exc/calculator_exc.aspx

Feedback

The Department of Energy and Climate Change (DECC) is keen to engage in an open and transparent debate around the choice and trade-offs the UK faces to reach the 2050 emissions reduction target. The My2050 world that you choose can be shared on Facebook and Twitter to compare and debate different options. The first 10,000 My2050 worlds that have been submitted online have been analysed by market research group Ipsos MORI and can be downloaded on the DECC website.

2.2. My2050 Simulation: Option (a) or (b)(25 minutes)

Explain to the students that the Department of Energy and Climate Change (DECC) has created a simulation to try and find out what they would do to help meet the UK's target to reduce its greenhouse emissions by 80% below 1990 levels by 2050 as set out in the Climate Change Act 2008.

Option (a) describes what to do if you are using an ICT suite; option (b) describes what to do if you are going to use the whiteboard in the classroom.

2. OPTION (a): Students have access to an ICT suite

1. Ask students to enter http://my2050.decc.gov.uk into the address bar. Students should wait for tool to load (a screenshot is shown on the front page of this toolkit).

2. Students should then click on the blue box (where it asks 'can you reduce our greenhouse emissions by 80% below 1990 levels and help avoid dangerous climate change?'). **Inform students, if they don't already know, that this is a legally-binding target that the UK Government has agreed to in order to tackle climate change**.

3. Read out the statement on the next screen: '**By 2050 we will need to change dramatically the way we produce and consume our energy'**. As students click on the next button, explain that the tool refers to UK generation of energy as supply and our consumption of energy as demand. Instruct students that you are going to give them 10 minutes to come up with the 'best' solution for the UK, by making changes at the level of home, city and country using the levers. Students will have to decide what they understand by 'best solution'.

4. **Variation**: you can extend this activity by getting students to focus on creating an ideal supply world and discuss why they made specific choices, before looking at creating an ideal world in terms of demand – this will add 10 minutes to the activity.

5. Remind students that they can find out more about the individual levers by using the information icon.

6. At the end of the challenge, ask students to stop and, in groups, discuss their solutions:

- What criteria did they use to achieve the ideal solution? (carbon emissions, impact on the economy, level of change required in society)
- Did they need any additional information to make better choices about what the UK should do to achieve this target?
- How many people considered the balance between supply and demand? Why is this important? (N.B. If the UK generates more energy than it needs, then this could be used as export to other countries, thereby helping with the reduction of carbon emissions elsewhere).

7. Once students are happy with their ‘new world’ ask them to submit their world by clicking on the 'submit my world' icon.

Figure 2: An example of a My2050 World

Image: http://my2050.decc.gov.uk/

8. Students should **read the details on the next page and only submit the world if they are happy that their changes are realistic**. Remind them that these are changes that would impact on their lifestyles as they become adults.

Figure 3: Ready to submit a My2050 World

Image: http://my2050.decc.gov.uk/

OR 2. OPTION (b): Access to computer with internet access and a projector/ whiteboard

1. Make sure that the website is already loaded when the class starts – http://my2050.decc.gov.uk/

2. As you click on the blue box (where it asks 'can you reduce our greenhouse gas emissions by 80% below 1990 levels and help avoid dangerous climate change?'), inform students, if they don't already know, that this is **a legally-binding target that the UK Government has agreed to** in order to tackle climate change

3. Read out the statement on the next screen: **'By 2050 we will need to change dramatically the way we produce and consume our energy'**. As you click on the next button, explain that the tool refers to our generation of energy as supply and our consumption of energy as demand.

4. Explain to the students what each lever on the game represents (clicking on the lever will give you more background information on it) and that you can set each lever to 1,2,3 or 4.

5. Read out a lever name and explain what each level (1, 2, 3 and 4) will mean in 2050. For example if the oil, gas and coal power lever is set to level 1, this means that in 2050 we will use 10% of the fossil fuels we use today, if the lever is set to level 2 we will use 50% of the fossil fuels used today and so on.

6. Ask the students to show which level they would put the lever on by lifting their arms to a certain height in front of them. If they think the lever should be on level 1 they should put their arms straight out in front of them, if they think level 2 they should lift their arms slightly higher, level 3 should be higher still and for level 4 the students should have their arms straight, above their heads.

7. Go through all the levers in this way and set the lever to the level the majority of the class vote for.

8. Once students have voted on each of the levers, see if your My2050 world reaches the 80% less emissions target. If it doesn't, ask the students how they would change the levers and then see if the class agree with their ideas.

9. If your world does reach the target ask students if they would be happy to live in the world they have created. Would they be willing to make the changes indicated? What do they think life would be like in their My2050 world?