BBC TEACH

Climate change: Ade on the frontline
Hydrogen house in Gothenburg, Sweden

In partnership with Geographical Association

Video summary	Before watching	While watching
Ade Adepitan visits a house in Gothenburg which is powered by converting sunlight into hydrogen. He meets Hans-Olof Nilsson, who runs a renewable energy company with his colleague Martina Wettin. Hans-Olof built the house to showcase what his company can do. By converting excess summer sun into hydrogen, Hans-Olof can store enough power to get through winter. Download/print a transcript of the video.	Use a map to locate Sweden. Ask students what they know about Sweden. You might want to recap the issue of climate change, the need to mitigate the effects at a global scale by reducing our carbon emissions, and list some of the ways that this might be done. As well as using less energy in our everyday lives, we also need to think about how we can replace fossil fuels with sustainable energy sources such as solar, wind, tidal and geothermal (for example). It could be useful to discuss and clarify examples of renewable and non-renewable energy. After an initial discussion about this, you could ask students what a house of the future might look like in terms of energy sources and identify some key features. It could be worth considering the relevance of location at this point and asking students how landscape, terrain and local climate might influence the sustainable energy choices. **Introduce key terms such as:** **Sustainable**: the idea of using resources responsibly today so that future generations can also use them **Renewable energy**: energy from a source that won't run out, for example; wind, solar, hydroelectric and tidal energy. **Hydrogen**: a highly flammable gas.	You may wish to stop at relevant points during this short film to pose questions and check understanding, or wait until the end. Useful questions might include: • Why doesn't Sweden get much sun in the winter months? • How is the surplus energy from summer sun stored? • How is energy generated in the winter months? • What are the ingredients of this energy source? (Sun and water) • What else can this hydrogen energy technology be used for? • What do students think about this technology? You might have a discussion about zero carbon emissions, its versatility in providing energy for houses, cars, buses, etc. The beauty of being able to store energy from sunny days to dark days and how the elements of sun and water are freely available. You may also want to discuss the cost of the system technology, the space needed for the storage of hydrogen, and whether this would be realistic in a built-up city environment?

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After watching

You could ask students to return to their original ideas about a house for the future and identify a chosen list of features, including renewable energy sources, and a rationale about why they were chosen. The house should have a specific location, this could be the locality in which students live or it could be a locality in another country, and a given context such as urban or rural. Students could then explain how their house is particularly suited to its location.

You could discuss with students how carbon emissions can be reduced even if using a system that relies on fossil fuels, and recap why reducing energy use matters. Students might set up an energy review of their school and investigate savings inside and on the campus following a mapped audit of energy use.
Students could be asked to prepare a presentation making a case for the adoption of the sun and water fuelled technology seen in the film clip, or another type of sustainable energy for their school. They will need to argue their case as to why their renewable-energy approach was chosen and how it is more effective than other options.

Students could consider the importance of locational aspects. For example, if advocating solar panels, which direction do the roofs face; if wind turbines, what is the average wind speed on site and where is the best location? How close are neighbours to the school? How much outside space does the school have? Students could consider all these aspects in making their recommendations.

In 2020, Europe announced a new hydrogen strategy to help the continent achieve carbon neutrality. Students could research more about this and give a short presentation about what it means.

This short film is suitable for teaching KS3 and KS4 students. It can be used alongside the other Ade Adepitan films about climate change or watched on its own. All the films build on students' understanding of climate change issues and enable them to make global connections.

This film supports the KS3 geography curriculum by building understanding about energy, land use and resources, and how they are managed sustainably.

At KS4 this supports work on sustainable energy and cities, thinking about energy, resources and waste management.

This clip could be used to support the delivery of geography to KS3 and KS4 students. Specifically, this topic appears in OCR, Edexcel, AQA, WJEC KS4/GCSE in England and Wales, CCEA GCSE in Northern Ireland and SQA National 4/5 in Scotland.

Where next?	Links
Research BedZED, which is in Hackbridge, London. It is an environmentally friendly housing development. How are the homes heated and powered there? What measures have been taken to make the homes more sustainable? Would it be possible to do this on a larger scale?	Generating electricity: https://www.bbc.co.uk/bitesize/guides/z3qd7p3/revision/2 Renewable energy: https://www.bbc.co.uk/bitesize/articles/zgkvdnb Managing the impacts of climate change: https://www.bbc.co.uk/bitesize/guides/zx234j6/revision/4