

ELECTRONICS ENGINEERING WITH PROFESSOR PETER GAMMON

TALKING POINTS

KNOWLEDGE

1. How many uses of silicon carbide can you list?
2. Where in your home would you find transistors?
3. What is the role of a transistor in an electrical circuit?

APPLICATION

4. What questions would you ask of Peter to better understand the process of producing a silicon carbide transistor?
5. Think of five questions that you have related to electricity or electronic devices. For each question, would you direct it to an electronics engineer or an electrical engineer?

ANALYSIS

6. What are the advantages of using silicon carbide rather than silicon in power electronics?
7. What are the motivations for improving the efficiency of electric cars?
8. What advantages do you think an apprenticeship would provide for someone wanting to become an electronics engineer?

EVALUATION

9. Electronics engineers are vital for converting our transport systems from fossil fuel power to electrical power. How would you assess the benefits and challenges of this transition?

CREATIVITY

10. Imagine a future when silicon carbide transistors have helped make our cars, trains, aeroplanes and even our satellites free from fossil fuels. How is the world different from today?

ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

Log on to the En-ROADS climate change solutions simulator at www.climateinteractive.org/tools/en-roads. This simulator was developed to show the impact of different policies on future climate change.

Play with the simulator to understand the importance of electrification and energy efficiency for reducing our greenhouse gas emissions. When you begin, you should see all the switches showing 'status quo' and a projected temperature rise of 3.6 °C by 2100.

Try:

- Increasing taxes on fossil fuels while subsidising renewables and nuclear energy. How will this change our predicted future emissions and the global temperature rise?
- Keeping your taxes on fossil fuels and subsidies for renewables, while reducing deforestation and methane emissions. Also try increasing carbon removal. Scientists have identified 1.5 °C as the critical threshold of warming to avoid exceeding. Is what you have done so far enough to keep warming below 1.5 °C?
- Keeping your policies so far, while also moving towards electrification and improved energy efficiency. Can you ensure that global temperatures do not increase by more than 1.5 °C?

Consider what this exercise shows about the importance of electronics engineering and electrical engineering in the 21st century.

MORE RESOURCES

- Learn more about the uses and potential of silicon carbide: www.pgcconsultancy.com/sic-information
- Learn more about electric vehicles: warwick.ac.uk/fac/sci/wmg/about/outreach/resources/electricvehicles
- Learn computer programming with a Raspberry Pi: www.raspberrypi.org/learn
- Engineering resources for schools from the University of Warwick: www.warwick.ac.uk/fac/sci/wmg/about/outreach/resources
- Engineering resources for schools from the IET: www.theiet.org/career/routes-to-engineering/stem-education