

The Climate Change Commission of the International League Against Epilepsy (ILAE) has undertaken an educational initiative to promote sustainable clinical and basic research practices in epilepsy among ILAE membership, and beyond. One of the main objectives is to foster a positive and proactive approach to sustainable research, highlighting the high impact that researchers and clinicians can have in their individual roles. Together with FutureNeuro (the Research Ireland Centre for Neurological Conditions), the Commission has sponsored the *Sustainability Training* video modules led by Green Lab Associates. The four videos are available on the “[Resources](#)” page of the Climate Change Commission website and on [YouTube](#) via the official ILAE channel. Below is a brief explanation of the sequential content of each video.

Sustainability Training: [part 1 video link](#) (12 min)

This video highlights the need for sustainable practices to mitigate the significant carbon emissions generated by clinical and laboratory research, especially from materials and equipment used. The video describes the rapid global growth of research and the challenges posed by resource scarcity, urging consideration of greener approaches.

- *Lab plastics and energy use*: The use of single-use plastics in research labs and the rising energy costs for universities are addressed. It is estimated that universities could now spend up to £40-45 million a year on energy, of which around half is allocated to research laboratories.
- *Growth and environmental impact of R&D*: Research has grown much faster than the global economy. Between 2007 and 2013, spending on R&D grew by 30%, outpacing global economy growth of 20%. Scientific production has an annual growth rate of around 8-9%. In 2022, around \$2.5 trillion was spent on R&D, contributing approximately 390 megatons of CO₂ emissions, equivalent to the global aviation sector. R&D ranks as the 17th largest emitter globally by some metrics. The scarcity of resources critical to operating research equipment is discussed, along with a comparison of funding between climate change and AI research.
- *Energy use and CO₂ emissions*: Labs use up to 100 times more energy than other academic spaces. Universities and research institutions are setting net-zero targets. Emissions associated with lab equipment are outlined. Purchased material, such as single-use plastics, solvents, and chemicals, contribute the most to carbon emissions in research labs. A comparison of universities' emissions shows that most emissions come from materials purchased rather than energy consumed.

Sustainability Training: [part 2 video link](#) (19 min)

This video focuses on sustainable research practices, emphasizing carbon emissions management and environmentally friendly purchasing decisions. Key considerations include evaluating the sustainability credentials of supplier, material, and equipment, as well as the importance of independent testing to avoid misleading greenwashing claims. Practical waste management strategies and examples of companies successfully incorporating sustainability are discussed. Collaboration with waste suppliers, facilities management, and lab services is critical to find effective solutions.

- *Top-down approach to sustainable purchasing*: Identifying sustainable products is challenging due to the lack of detailed environmental impact information in product specifications. Although price is often a priority, considering long-term sustainability can offer better value. Shared research platforms or core facilities are suggested as a strategy to reduce individual purchases. Company and product credentials are important factors when selecting suppliers. The use of sustainable lab consumables guides, as well as using third-party testing to verify product claims, is encouraged to make environmentally sustainable purchases.
- *Waste management* is a major concern in lab settings. According to the WHO, only 15% of healthcare waste is hazardous; therefore, labs may be over-classifying hazardous waste unnecessarily. Recycling capacities are site-specific and dependent on the waste supplier. It is recommended to work with facilities management to determine which lab materials can be recycled. Tips for successful recycling and examples of reduction and reuse are provided.

Sustainability Training: [part 3 video link](#) (16 min)

This video focuses on reducing single-use plastics, emphasizing the importance of reusing materials as well as managing cold storage to minimize environmental impact in research settings. Key areas of discussion include the embodied carbon in research materials, methods to reuse plastics, and strategies to optimize cold storage practices for energy savings.

- *Reducing single-use plastics*: The session begins with an overview of the impact of single-use plastics on carbon emissions, as well as the environmental and financial benefits of reuse in research and clinical environments. Reuse generally reduces carbon emissions due to the high impact of manufacturing single-use plastics. Practical tips are provided, such as consolidating orders to reduce packaging and opting for reusable items (e.g., tip boxes and gloves), to minimize the use of polystyrene in favor of more

sustainable materials. Emerging alternatives like biobased polymers, which have a lower carbon footprint, are discussed.

- *Practical tips for cold storage management:* Cold storage involves significant energy consumption. Best practices for optimizing sample handling and monitoring storage duration to prevent overcrowding are discussed. Tips for freezer maintenance and safety are offered, along with recommendations on establishing appropriate storage temperatures at the outset of research projects: e.g., setting ultra-low temperature freezers to -70°C instead of -80°C to save 25-30% in energy costs; samples may often be safely stored at -20°C or $+4^{\circ}\text{C}$ without compromising sample integrity.

Sustainable Research Training: [part 4 video link \(18 min\)](#)

After a short overview of the previous topics, the final video discusses the broader aspects of sustainability with a focus on digital impact, sustainable office practices, travels, and the critical importance of research quality and reproducibility. Actionable steps are suggested to minimize environmental impact within these areas.

- *Digital impact of data management:* Emphasis is placed on the high carbon impact of data storage, particularly in computing research and AI. The environmental cost of storing unnecessary data is exemplified by research related to fMRI studies.
- *Tips for minimizing digital impact* include using equipment until the end of its life, reduce monitor brightness, setting devices to low-power modes, and clearing old data from cloud storage. Running computational tasks during off-peak hours, when the electricity grid is less carbon-intensive, is advised as a way to reduce emissions from data processing.
- *Sustainable office practices:* Simple tips are shared, such as turning off lights and monitors when not in use, composting, avoiding single-use items to reduce waste (e.g., coffee capsules and cutlery).
- *Travel impact:* Air travel, particularly long-distance flights, has a significant carbon footprint. Alternatives, like taking the train or attending remote meetings, are discussed showing little correlation between academic success and frequent flying.
- *Importance of reproducible and sustainable research:* Reproducible research minimizes the need for redundant experiments, thereby saving resources. Open-access publications and maximizing data sharing would improve the impact of research outputs and help reproducible research, reducing unnecessary experiments.
- *Role of funding agencies in promoting sustainability:* Research funders are increasingly interested in environmental impact, with organizations like the Wellcome Trust and Cancer Research UK developing sustainability policies. Researchers are encouraged to emphasize their commitment to sustainability of their work in funding applications.