Royal Academy of Engineering | Awardee Excellence Community

What does the electricity grid of 2050 need to look like?

The UK government has set a target to decarbonise the electricity grid by 2035: if the Labour Party gain power, they propose shortening this to 2030. But how we are going to achieve a reliable, resilient, affordable and decarbonised system by that time remains hotly disputed, particularly as we anticipate more frequent and severe weather events.

In good news, renewable energy sources such as wind and solar are increasingly cheap. But their inflexibility and unpredictability continue to pose a challenge. They cannot be ramped up to meet demand, nor can excess energy be effectively stored.

Decarbonising the grid is an epic task: transformations are required across all aspects of generation, transmission, distribution and consumption. All areas of society will be touched by the move away from fossil fuels.

As such, the challenge requires the expertise of engineers across all disciplines: from mechanical engineers manufacturing wind turbines; to electrical engineers developing grid reinforcements; to chemical engineers devising novel storage solutions and technologies such as electrolysers; and software engineers using AI to optimise distribution.

Crucially, complex problems will not be solved in siloes. We need joined-up, big picture thinking; we need to share knowledge and work together. The Academy is uniquely positioned to facilitate interdisciplinary and international collaboration.

This discussion is an opportunity to share knowledge and perspectives on what the electricity grid of the future needs to look like and how we can get there. Discussions on this topic are thorny and crowded, but engineering perspectives are a key piece of the puzzle. Participants are encouraged to: share case studies and innovative solutions; discuss what sorts of skills and expertise needs to be mobilised to address this problem; and ideate on possible solutions. What does your ideal grid of the future look like? What can you see policymakers missing when they discuss this problem?

The outcomes of these discussions could lead to concrete steps taken by The Academy: from informing programme activities; to funding research, education or innovation; to promoting recognition of engineering and engineers; or developing policy recommendations and partnerships.