

IEA 4E Technology Collaboration Programme

Strategic Work Plan 2024-2029



Strategic Direction

This document presents the mission, vision, rationale, and key elements of 4E's Strategic Plan for the period 2024-2029.

Mission

4E engages with member governments to accelerate their clean energy transition through improved and innovative energy efficiency and decarbonisation policies for products and systems.

4E is an international platform for collaboration that harnesses the expertise of governments, industry, experts and other organisations focussed on the development and deployment of energy efficient equipment and systems within all non-transport sectors.

Vision

4E's fifth term occurs as the energy sector is faced with unprecedented challenges as it tackles the requirement to decarbonise rapidly while still meeting demands for energy services. We believe that this transition cannot be achieved in time without a massive and rapid increase in end-use energy efficiency. 4E's vision is therefore to see:

Products and systems optimised to accelerate the transition to a safe, reliable, affordable, and sustainable energy future

Strategic Context

Since 4E was established in 2008, the world in which it operates has seen many changes. 4E's new Strategic Plan for the period 2024-2029 reflects priorities of the 2022 Ministerial Communique and the IEA Medium-term Strategy for Energy Research and Technology (2023-2027) and is influenced by the following key issues.

The key influences of the changing environment on 4E's Strategic Planning

- While governments are more aware than ever of the need to improve energy efficiency, there are many important existing and new policy issues to be resolved regarding the role of digitalisation in facilitating the clean energy transition and identifying concrete pathways to Net Zero.
- As the surge in renewable energy deployment has brought pressure on the management of the power supply systems, governments are focussed on mechanisms to guide decarbonization and the clean energy transition.
- In this context, the role of appliances and equipment is often seen mainly in terms of demand flexibility. The potential for efficient equipment to improve the pace and affordability in the transition to greater levels of renewable energy utilisation is not well understood within many governments.
- Digitalisation is changing wider social expectations of service, value and usability providing substantial challenges for technology designers and policy makers if the opportunities for overall benefits are to be realised.
- Intergovernmental groups and NGOs promoting energy efficiency have proliferated, although most are not focussed on appliances and equipment. Governments are often confused about how these relate to each other, and to 4E.

4E's Strategic Strengths

- The Membership of 4E, which we hope to add to in the new term, comprising of policy makers in countries with well-established energy efficiency programmes, represents a unique body of knowledge and experience on energy efficiency product policy development.
- 4E's reputation as a source of credible information established over many years.
- The network of experts within governments, industry and other international organisations accessible by 4E on a wide range of topics.
- 4E's experience in facilitating the effective sharing of knowledge and information amongst members and others.
- The ability to partner with the IEA and other organisations to disseminate information to a wide group of governments and policy makers.

4E's Areas of Strategic Importance for 2024-2029

Members of 4E have identified a number of key areas where international collaboration can greatly assist in meeting local policy objectives. 4E's role in facilitating greater understanding of the challenges and in co-ordinating international policy responses is considered vital as governments navigate their way through a clean energy transition.

▪ Demand Flexibility (DF) for Appliances and Equipment

In previous terms, research by the Electronic Devices and Networks Platform (EDNA) has increased the understanding of the energy implications of connected devices and networks, contributing to global knowledge through the IEA, G20 and Energy Efficiency Hub. As governments move to decarbonise their energy system, the ability of appliances and equipment to be used as a demand flexible (DF) resource is critical. Unlocking this potential will require governments and industry to agree on a unified, global approach that overcomes the proprietary issues that currently impede progress.

As one of the few established international fora active in the digitalisation space, EDNA's background places it in a unique position to take a leadership role during the next term by developing an agreed internationally applicable framework for governments and industry to ensure that products can access DF. To signal this change in focus, EDNA will change its name to the 'Efficient, Demand Flexible Networked Appliances Platform'.

Improving Data Centre efficiency is also vital to ensuring that the exponential increase in data flows does not translate into increased energy consumption, as highlighted by the IEA. As EDNA focusses on a few key issues during the next term, the work on Data Centres will continue and expand.

▪ Energy Using Systems

The opportunity to deliver large energy savings in systems is well known, but for the first time 4E's has quantified the potential to reduce annual global energy consumption by 9% (17,000 PJ, 4,780 TWh) by extending product policies to cover relevant systems. This is larger than the total annual use of electricity in the US in 2021.

4E has been actively facilitating energy efficiency regulations for motor systems, particularly fans, pumps and compressors, through the work of the Electric Motor Systems Platform (EMSA) on relevant international standards. The Energy efficiency of lighting systems have been covered in the Solid State Lighting (SSL) Platform and will be expanded in the new term under a new name: The Smart Sustainability in Lighting and Controls (SSLC) Platform.

Meanwhile, a detailed examination by 4E has revealed several legal and administrative hurdles that limit the ability of governments to extend product regulations to systems. As 4E members aim to raise their level of ambition, 4E will work to develop innovative remedial solutions during the next term, alongside continuing policy development work for motor systems, lighting and other important topics.

▪ Deployment of Emerging Technologies

Wide Band Gap (WBG) power devices have the potential to provide a paradigm shift in energy efficiency within a wide range of applications including renewable energy supplies, electric vehicles, data centres and mobile phones. 4E's Power Electronic Conversion Technology Platform (PECTA) provides a unique independent co-ordinating body to link governments and the research community with the aim of identifying policy approaches for this important emerging technology.

Smart Lighting is an emerging technology with growing market share that has potential implications for energy consumption, but which has received little scrutiny. 4E monitoring has already unearthed considerable innovation and improvements from early models that exhibited high energy consumption. The Smart Sustainability in Lighting and Controls (SSLC) Platform will expand this essential knowledge base as governments consider regulation and other means to drive improvements more widely throughout the industry.

Heat Pumps are identified by the IEA and others as a key transformative technology. While policies to promote the deployment of heat pumps for residential and commercial/industrial applications are of great interest to 4E members, we do not intend to duplicate any of the valuable work already being done by the HPT TCP and others. Our project to improve energy efficiency test methods for heat pumps for space conditioning was agreed by all as a gap where 4E could add value, and we believe that there may be further opportunities. In the next term we will investigate where 4E's policy focus can complement the more technical work of the HPT TCP and others.

▪ Cross-Cutting Topics

Circular Economy issues: Issues such as product repairability, recyclability and lifetime are growing in importance, particularly where energy consumption during the 'use phase' of the product is not the main environmental impact. As energy efficiency standards converge towards the theoretic maximum efficiency, aspects such as the lifetime of the appliance will contribute a greater share of the CO₂-emissions from products. During the next phase, 4E intends to incorporate these aspects within its coverage.

Affordability: 4E recognises the importance of diversity, equity and inclusion in our work and believes that the relationship of energy efficient product policy on affordability, particularly how it affects low-income householders, is both topical and where 4E is able to make a significant contribution. 4E intends to include this consideration as part of our examinations of technologies and programmes.

Monitoring, Verification and Enforcement (MV&E): Attention to MV&E ensures that expected energy efficiency gains from regulatory policies are realised in practice. 4E will continue its **forum for regulators** as a much valued mechanism for national regulators to raise issues of concern and share approaches to market surveillance and enforcement, meeting face-to-face alongside each ExCo.