



IEA Technology Collaboration Programme
on Energy Efficient End-Use Equipment

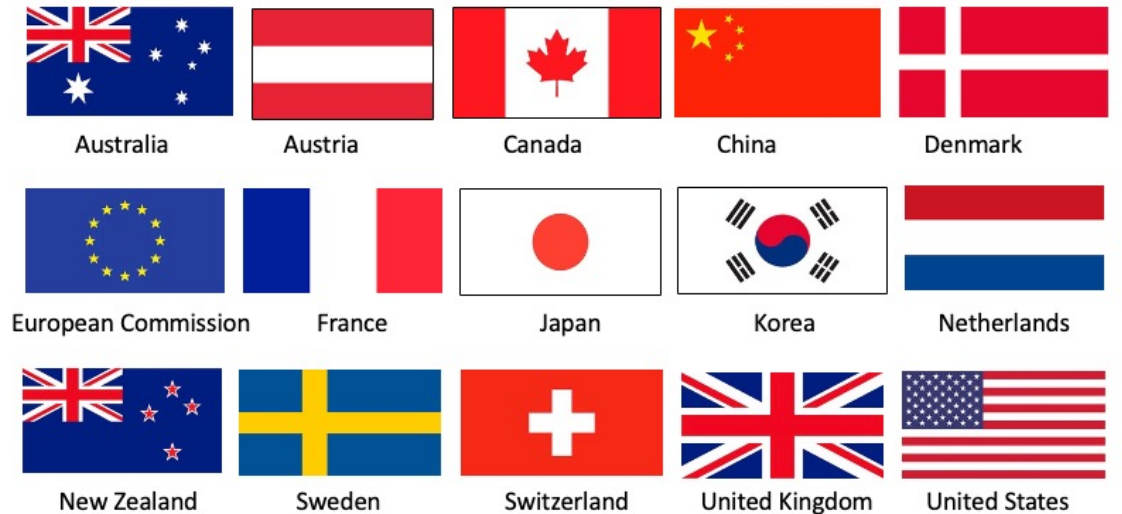
IEA Technology Collaboration Programme on Energy Efficient End-Use Equipment (4E TCP)

Hans-Paul Siderius, Vice-chair
19 September 2023

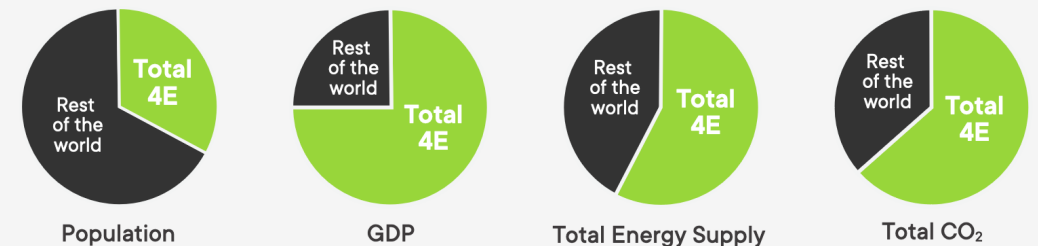
iea-4e.org

4E TCP at a glance

- 4E provides an international platform for governments to collaborate on *policy measures* to stimulate the uptake of energy efficient end-use technologies (*non-transport appliances and equipment*)
- 4E has *15 members* actively participating in 4E collaborative projects
- Most 4E members are represented by the government agency responsible for national product policy, including *standards and labelling* programmes



4E Membership indicators



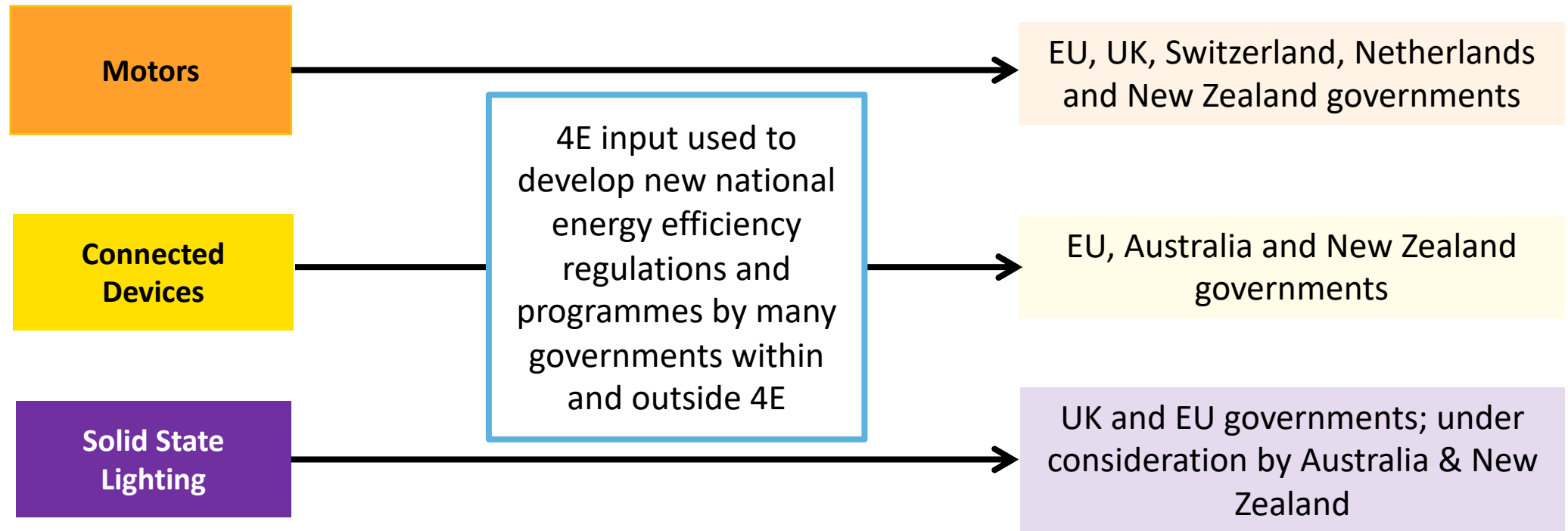
Outline

- The impact of 4E TCP 2019-2023
- End of Term Report
- Strategic Work Plan 2024-2029



Impacts: policy development highlights

During its fourth term 4E has provided a highly effective international platform for governments to collaborate on the development of policy measures, designed to stimulate the uptake of energy efficient end-use technologies.

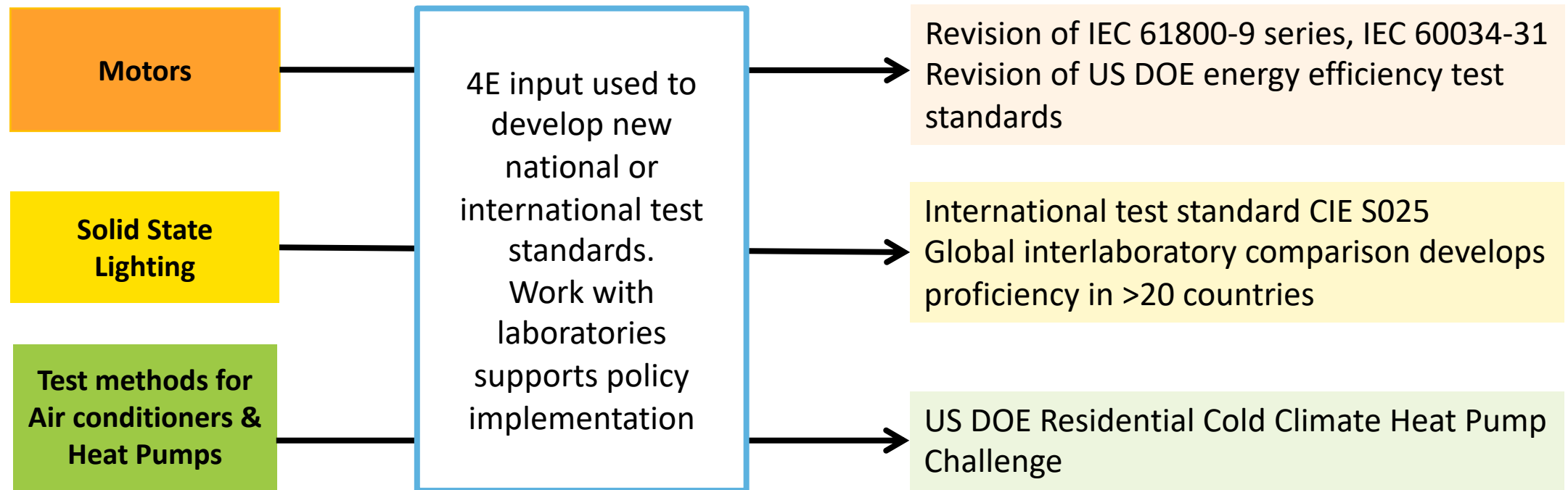


Impacts: standardisation & capacity building highlights

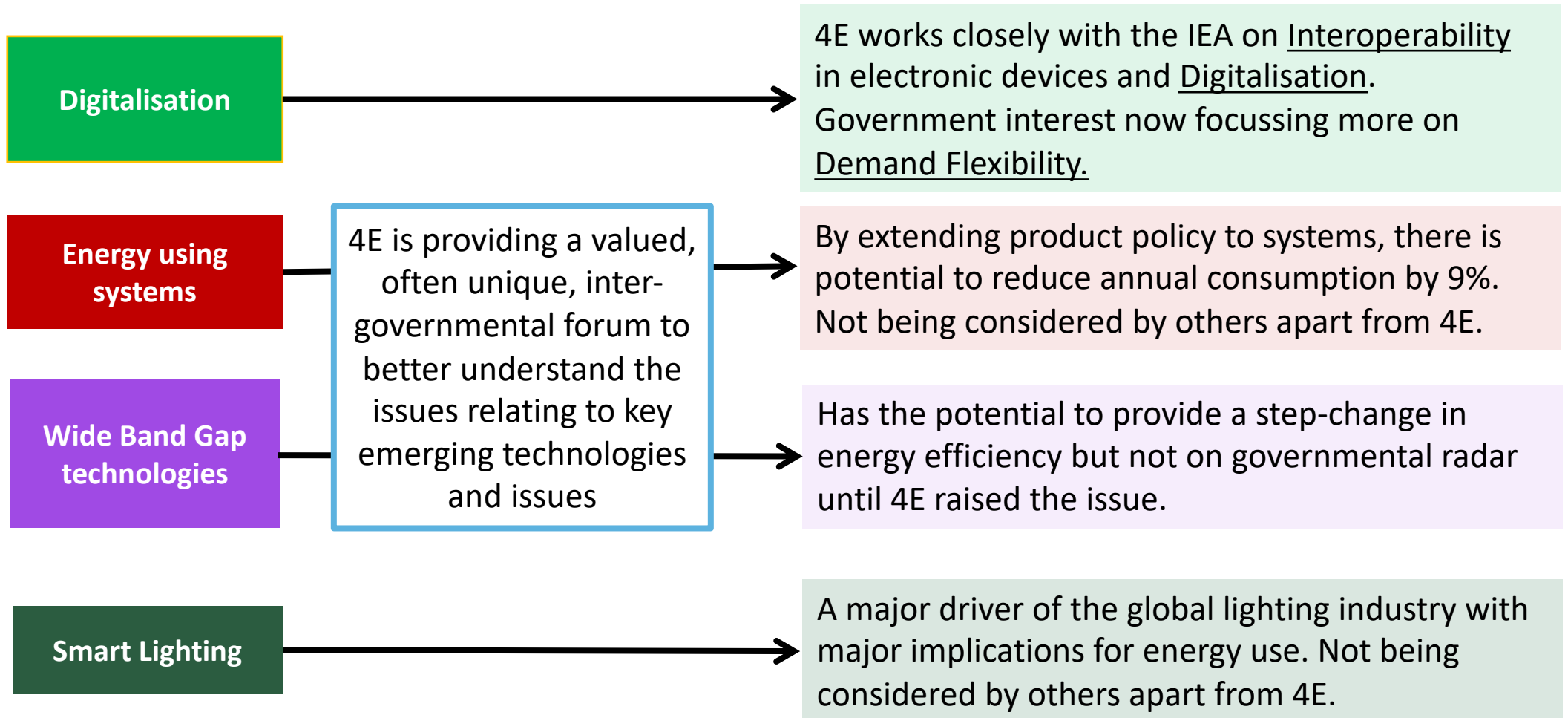
4E facilitates the development of methods for testing energy performance - the cornerstone of energy efficient policies.

Developing international test methods is a very efficient way for 4E to encourage international harmonisation.

4E also helps to develop networks of competent test labs around the world, to assist Members to expand their policy coverage and ensure compliance.



Impacts: emerging technologies and approaches



Strategic collaboration and partnerships



Energy Efficiency Market Reports (2019-22)
World Energy Outlook
Energy Technology Perspectives
Digitalisation and Energy
IEA's Digital Demand-Driven Electricity Networks (3DEN)
Initiative



4E provides expert input and technical support for a large number of international initiatives, including other TCPs

The Energy Efficiency Call to Action supported by The '*Achievements of Energy Efficiency Standards and Labelling Report 2022*'



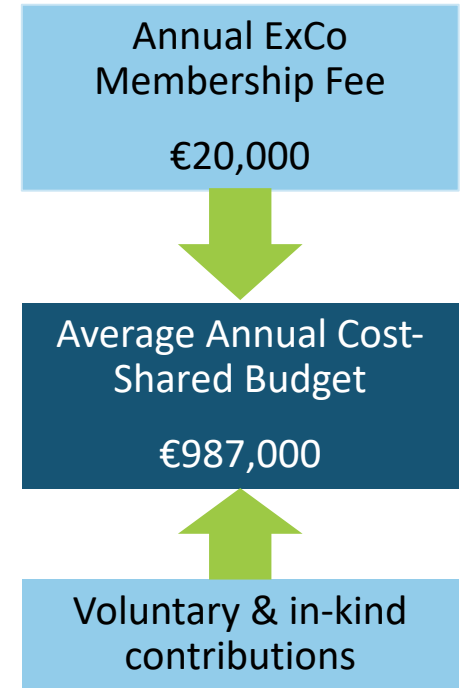
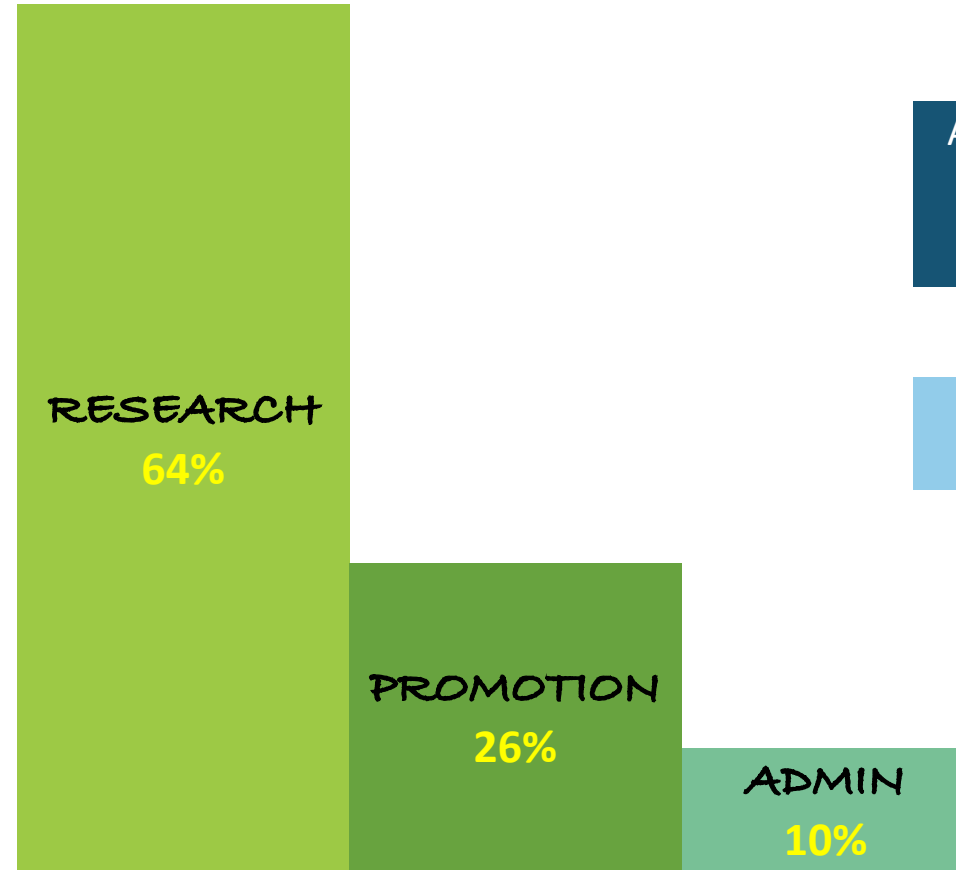
Presentations and reports for Digitalisation Working Group *Accelerating Energy Efficiency through Digitalisation*



Model Regulation Guidelines

4E Budget: 2019-2023

- The large majority of resources are targeted at research
- Most of our target market are policy makers
- There is considerable contact with industry and academia through standardization processes, & our platform advisory groups
- Membership fees have remained unchanged since 2016
- Administrative costs remain minimal



Vision

The energy sector is faced with unprecedented challenges as it tackles the requirement to decarbonise rapidly while still meeting demands for energy services.

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

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

The key influences on 4E's Strategic Planning

- The surge in renewable energy deployment has brought pressure on the management of power supply systems.
- 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 by 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.
- There are many important policy issues to be resolved regarding the role of digitalisation in facilitating the clean energy transition and identifying concrete pathways to Net Zero.
- Intergovernmental groups and NGOs promoting energy efficiency have proliferated. Governments are often confused about how these relate to each other, and to 4E.

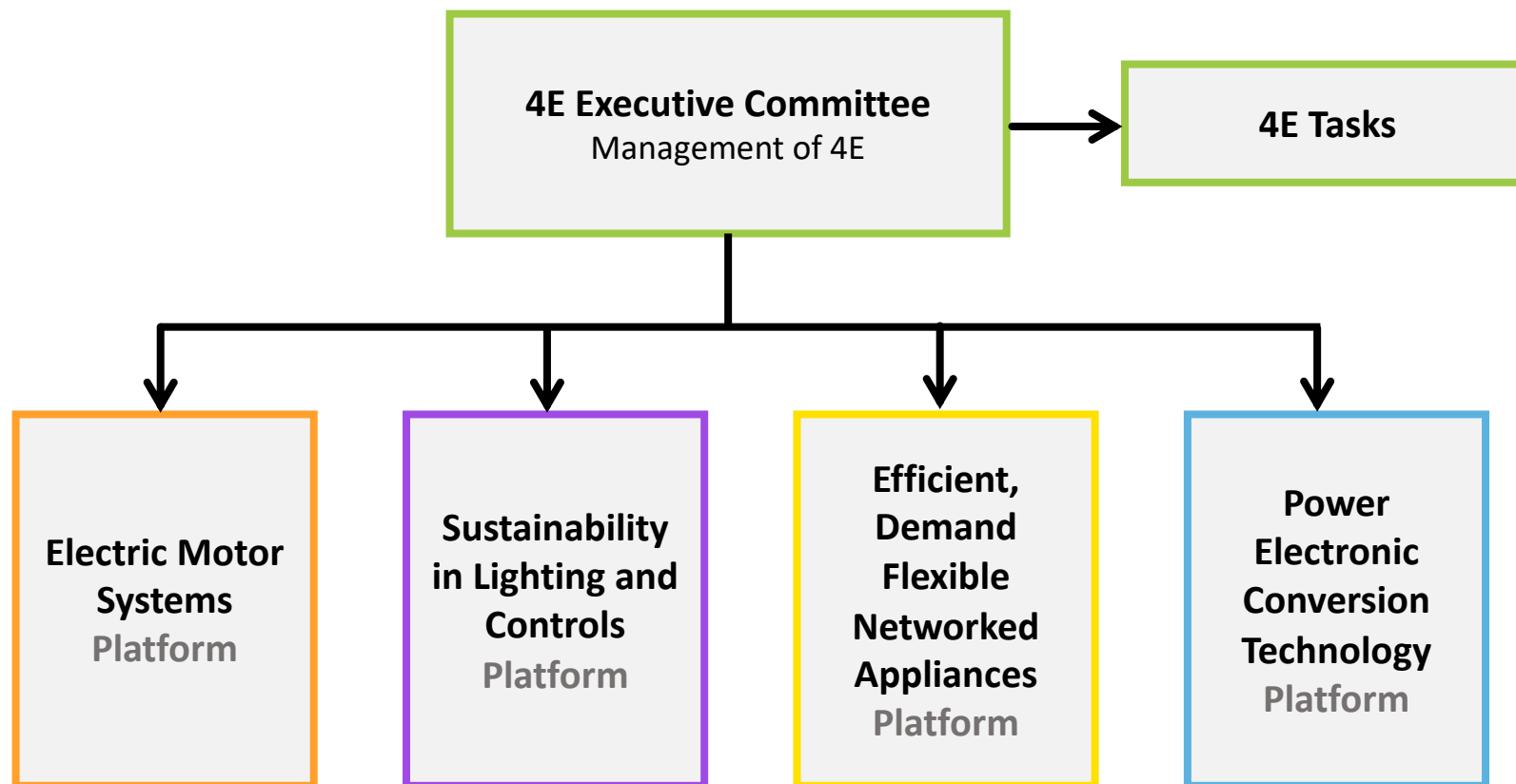




4E's Areas of Strategic Importance for 2024-2029

- Demand Flexibility (DF) for Appliances and Equipment
- Energy Using Systems
- Deployment of Emerging Technologies
- Cross-Cutting Topics

4E Structure: 2024-2029



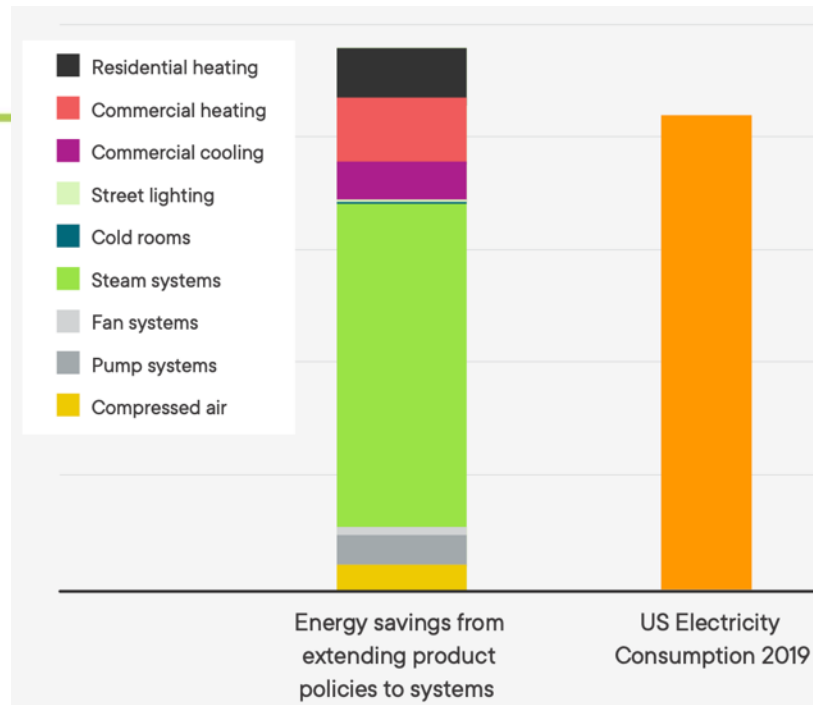
Demand Flexibility (DF) for Appliances and Equipment

- 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.
- The Electronic Devices and Networks Platform (EDNA) has already contributed to global knowledge through the IEA, G20 and Energy Efficiency Hub and is 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

4E's estimates annual global energy consumption could be cut 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 2019

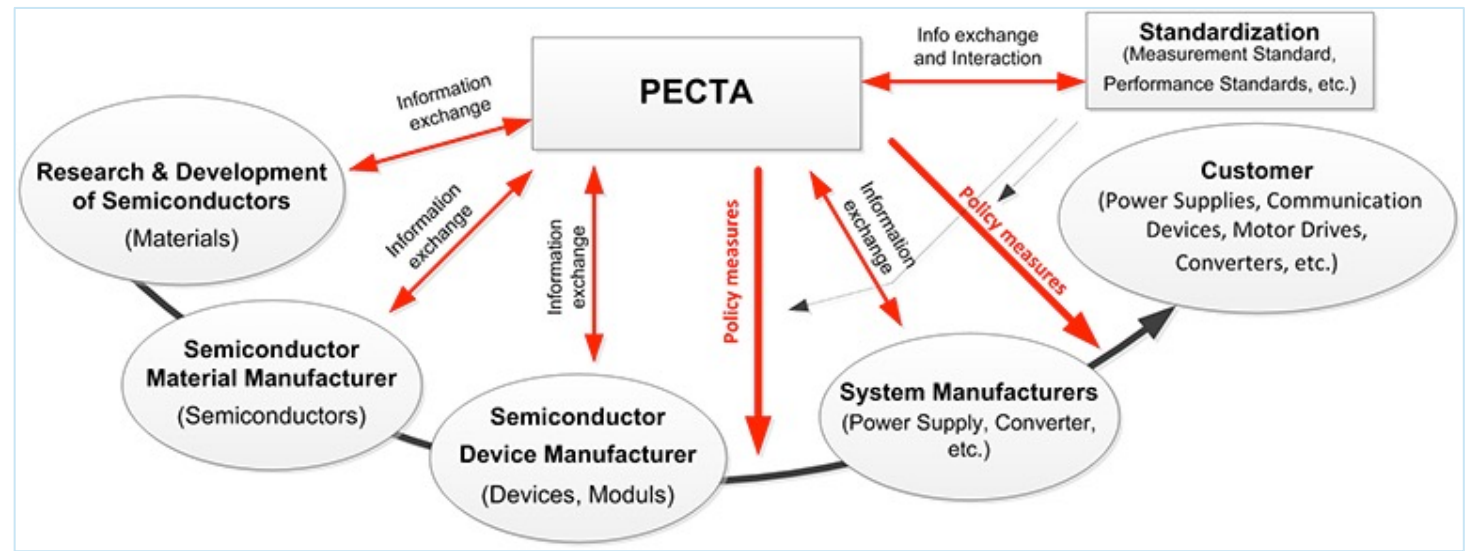


- 4E has been actively facilitating energy efficiency regulations for motor systems, particularly *fans, pumps and compressors*, through international standards.
- The energy efficiency of lighting systems will be expanded under the newly named *Smart Sustainability in Lighting and Controls (SSLIC) Platform*.
- Alongside continuing policy development work for motor systems, lighting and other important topics, 4E will tackle the *legal and administrative hurdles* that limit the ability of governments to extend product regulations to systems.

Deployment of Emerging Technologies

Wide Band Gap (WBG) power devices

- WBG technology represents a potential step-change in efficiency over convention power conversion technologies, however there is a lack of awareness and supportive policy measures.
- Prior to PECTA there was no independent co-ordination of technical and policy issues to bring together governments and the research to develop a coherent international approach.
- PECTA will lead standards to define efficiency, the losses and the reliability of the emerging WBG-semiconductor modules, devices and appliances, in an internationally accepted and technically appropriate way.



Deployment of Emerging Technologies

Smart Lighting

- An emerging technology with growing market share that has implications for energy consumption but which has received little scrutiny.
- 4E monitoring has already highlighted high energy consumption from early models leading to considerable innovation and improvements.
- 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

- 4E members have asked for support for policies approaches aimed at promoting heat pumps.
- 4E task on **test methods for air conditioners** was agreed by all as a gap where 4E could add value – 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.
- **However, we will not duplicate any of the valuable work already being done by the HPT TCP and others.**
- 4E likely to seek partnership arrangements with key players in the field.



Cross-Cutting Topics

Circular Economy

Issues such as product repairability, recyclability and lifetime are growing in importance.

For some products, increasing their lifespan can have a significant impact on the CO₂-emissions.

During the next phase, 4E intends to incorporate these aspects within its scrutiny.

Diversity, equity and inclusion

4E recognises the importance of diversity, equity and inclusion in our work.

The relationship of energy efficient product policy on affordability (how it affects low-income householders) is where 4E is able to make a significant contribution.

4E intends to expand 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 to raise issues of concern and share approaches to market surveillance and enforcement.

Summary of Strategic Work Plan 2024-2029

- Since 4E was established in 2008, the world in which it operates has seen many changes.
- 4E's new Strategic Plan reflects priorities of the [2022 Ministerial Communique](#) and the IEA [Medium-term Strategy for Energy Research and Technology](#) (2023-2027).
- During the new term, 4E will work with policy makers to encourage adoption of the technologies needed to reach Net Zero Emissions by 2050.
- To achieve this, 4E will build on its experience and established networks to bring a policy focus on the important areas of Demand Flexibility, Energy Using Systems and Emerging Technologies.
- To support successful policy implementation, 4E's activities will continue to span policy design, standardisation, capacity building and interactions with key stakeholders.
- We will enhance our successful interactions with the IEA Secretariat, Energy Efficiency Hub, SEAD, TCPs and other fora representing relevant areas of knowledge.



Additional Slides

4E TCP Website

www.iea-4e.org

- Website provides the *hub* for news and information
- Portal for all 4E TCP activities
- **700** 4E publications freely available
- Major upgrade in 2021
- Members-only site for sharing confidential information



4E TCP Communication Activities



4E TCP uses a wide range of channels to reach its target audience.

Making an impact

Key Findings EES&L Report

Appliance standards and labelling are highly effective policy programmes, already saving consumers billions of dollars and avoiding Giga tonnes of CO₂ emissions, each year.

The following information is based on global evidence from countries with energy efficiency standards and labelling (EES&L) programmes published by 4E and the International Energy Agency in "Achievements of Energy Efficiency Appliance and Equipment Standards and Labelling Programmes".



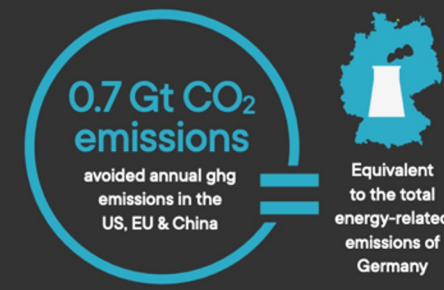
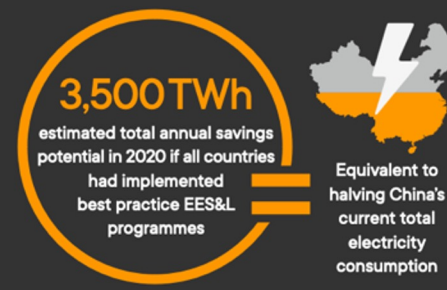
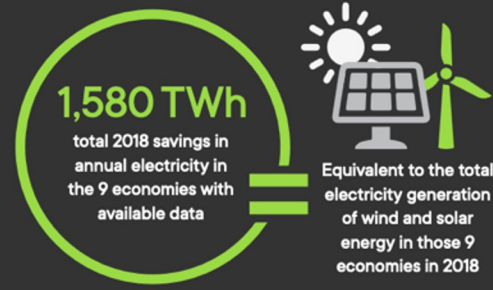
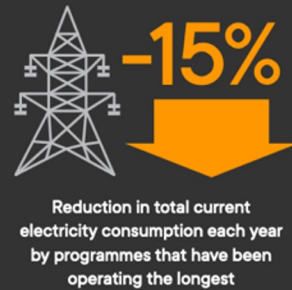
Rate of efficiency improvement in new major appliances, over and above the underlying rate of technology improvement



Reduction in stock energy consumption by individual appliances with longest running programmes



-2% to -3%
Drop in annual average purchase price of efficient appliances over medium to long term



“There is substantial evidence that with sustained support from governments, EES&L programmes could deliver even more by expanding the scope of programmes to cover more products and by increasing the levels of ambition in policy settings.



4E TCP Outputs: 2019-2023

