

## **New ETC briefing: Energy productivity improvements make it possible to double GDP while reducing energy demand by a quarter**

London, 15 October 2025 – The Energy Transitions Commission (ETC) today launches *Energy Productivity: Increasing efficiency in an expanded, electrified energy system*, which highlights a major opportunity for the world to more than double global GDP by 2050, while reducing final energy demand by 24%.

As global prosperity grows, so will demand for energy services, such as mobility, heating, cooling and industrial production. But the ETC's report shows that energy productivity improvements can deliver greatly expanded energy services with less energy input and dramatically reduce reliance on fossil fuels.

- Energy productivity is the measure of economic output (GDP) generated per unit of energy.
- Electrification of road transport, building heating and cooking, together with more efficient appliances and smarter material use, makes possible greatly improved energy productivity.
- This makes it possible to deliver more energy services while cutting costs and reducing the need for land, water, and other natural resources.
- Governments, businesses and consumers must seize the chance to massively improve energy productivity by replacing inefficient fossil systems with far more efficient electric ones. Squandering this opportunity would increase the energy requirements and costs required to live comfortably, travel, and produce goods.

### **Growing prosperity with less energy input**

Energy-based services are central to rising prosperity. By 2050, kilometres travelled by car could rise 70%; air travel by 150%; cooled floor area could grow by 150%; heated floor area by 25%; and demand for aluminium, petrochemicals, cement, and steel will all expand. Artificial Intelligence (AI) could improve efficiency in some areas, but the rapid growth of AI and data centres could add massive and highly uncertain new energy demand over the next 25 years.

But there are huge opportunities to increase energy productivity over the next 25 years, meeting this demand for increased energy services while using 24% less final energy (the energy used by appliances/vehicles) and 36% less primary energy (the raw energy resource, such as coal, oil, and gas, or wind or sunlight) than today.

“There is a major opportunity to expand energy services and deliver prosperity while using less energy overall, through widespread electrification, appliance efficiency, and smarter material use. These solutions unlock energy productivity, i.e. greater economic value from each unit of energy. If governments act now to introduce supportive policy, global prosperity can double by mid-century while using less energy overall.” said **Adair Turner, Chair of the Energy Transitions Commission**.

### **Key opportunities for energy productivity improvement:**

- **Electrification over fossil fuels:**
  - Electric vehicles (EVs) are up to three times more efficient than petrol cars, which convert only 25% of the energy input into energy in the wheels, with the rest wasted as heat. And EV sales are on track to exceed 20 million in 2025 – one in every four new cars worldwide.

- Heat pumps deliver 3-4 times more heat per unit of energy than gas boilers, because they extract heat from the air. In 2024, global sales reached six million units, out-selling gas boilers in some key markets (e.g., by as much as 30% in the United States).
- Electric cooking is 4-5 times more efficient than traditional use of biomass and offers major health benefits.
- **Efficient appliances:** Replacing old technology with more efficient appliances that deliver the same benefits while using less energy (e.g., air conditioners, vehicles, lightbulbs, industrial motors) could cut global energy demand by around 10% by 2050. This would avoid the need for nearly 30,000 TWh of extra electricity generation (about the total global electricity consumed in 2024).
- **Smarter material use and recycling:** Material efficiency and recycling could cut energy needs by 44% in chemicals and plastics, 33% in cement, and 27% in steel, even as total demand for outputs grows. Potential gains are significant, for example, producing aluminium from recycled scrap uses about 90% less energy than new metal.

### **A one-time opportunity to double the pace of energy efficiency improvement**

At COP28 in 2023, countries committed to double the pace of energy productivity improvement from 2% per annum to 4% by 2030. The ETC details how countries can feasibly deliver that pledge, maintaining the higher rate for around 2 decades.

Beyond 2050, as electrification of the economy approaches the highest achievable levels, the pace of improvement may fall back to around 2%, and final energy demand will grow to support further growth of energy services and GDP. In addition, electricity demand may grow faster than our projections because of rapidly growing demand for AI and “rebound effects” (the tendency for energy demand to grow when prices fall).

This makes it essential to seize all available opportunities to improve energy productivity and avoid locking into fossil fuel systems and long-term costs.

"Electrification and efficiency are the twin engines driving a competitive future. The ETC's latest report on energy productivity offers quantifiable insights—showing that smarter electric technologies and championing efficiency across every sector can deliver more with less, doubling global prosperity while reducing final energy demand by a quarter. This is a powerful call to action: let's utilize the technologies available to us today to unlock our full energy potential." said **Jean-Pascal Tricoire, Chairman of Schneider Electric**.

### **Government, business and consumer action to seize the opportunity**

Governments must play an essential role in setting the policy frameworks, standards, and incentives that enable businesses and consumers to achieve productivity gains. This is a global priority, but actions will vary for governments, businesses and consumers by region:

- In all countries, electrifying road transport offers the biggest opportunity to cut fuel imports; vehicle energy efficiency standards are vital, together with scrappage schemes and trade-in programmes to increase the pace of stock turnover.
- In high-latitude regions (e.g., Europe, Canada, Northern China), priorities must include replacing gas boilers with electric heat pumps;

- In developing and tropical nations, fast-rising cooling demand requires efficient air conditioning and buildings designed to keep heat out, and replacing traditional biomass with cleaner cooking fuels or electricity can deliver major health and efficiency gains.

“Doubling the global rate of energy efficiency improvements is entirely achievable. The ETC’s report highlights the key actions: rapid electrification of transport and buildings, major efficiency gains in appliances and equipment, and greater material recycling. With strong government action, the COP28 energy efficiency target can be delivered, cutting emissions while enhancing energy security, affordability and competitiveness all at the same time.” said **Brian Motherway, Head of the Energy Efficiency and Inclusive Transitions Office at the International Energy Agency (IEA).**

The briefing launches ahead of COP30 in Brazil, where new country pledges will be assessed against the COP28 pledge to double the annual rate of energy efficiency improvements by 2030. This briefing shows how this target could be achieved for the next 20 years.

*Energy Productivity: Increasing efficiency in an expanded, electrified energy system* was developed in collaboration with ETC members from across industry, financial institutions, and civil society. The Energy Transitions Commission is a global coalition of leaders from across the energy landscape committed to achieving net-zero emissions by mid-century. This report constitutes a collective view of the ETC; however, it should not be taken as members agreeing with every finding or recommendation. ETC members have not been asked to formally endorse this report.

Download the insights briefing: <https://www.energy-transitions.org/publications/energy-productivity/> [Link will be live from 09:00 am, 15<sup>th</sup> October 2025].

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For further information, visit: <https://www.energy-transitions.org>

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