

Energy Aware Devices



The 4E Electronic Devices and Networks Annex (EDNA) informs governments of the energy implications - both costs and benefits - resulting from the growing market for network-connected devices.

This briefing summarises the key findings of the report *Energy Aware Devices - Study of Policy Opportunities*, which outlines why and how network-connected devices can be cost-effectively harnessed to report their own, individual energy consumption. It highlights the costs and various benefits of “energy aware” devices and provides guidance to policy makers who wish to stimulate this device functionality. It covers all types of electrical and electronic devices and equipment, particularly those which are network-connected.

Observations for Policy Makers

- Until recently, the cost of identifying the energy being used by individual devices and appliances, in situ, has hindered energy saving opportunities. New technology, in the form of connected devices, now provides the potential for “energy aware” devices to estimate (or measure) their own energy consumption and communicate this to users.
- Energy *estimation* can be incorporated into devices for a small or *negligible* cost, e.g. within a device’s own firmware.
- Energy aware devices can:
 - **Facilitate efficient user behaviour** by providing actual energy use information.
 - **Improve monitoring, verification and evaluation**, by comparing actual energy use to estimates and by highlighting circumvention technologies.
 - **Inform better policy making and program evaluation** through collecting large quantities of device energy data.
- Governments can encourage the growth of energy aware devices through existing policy instruments, and should take steps to guide technology and develop appropriate performance and communications standards.
- Policies to encourage energy aware devices already exist in the US ENERGY STAR® and Korean and EU energy label programs. Voluntary industry agreements and MEPS could also be used to further stimulate the uptake of energy awareness amongst device manufacturers.
- Policy makers should be cognisant of privacy concerns by ensuring that any transmission of data remains under the control of the user.

More Information

The EDNA report and further information is available from <https://edna.iea-4e.org/tasks/ead> and by contacting the EDNA operating agent at info@edna.iea-4e.org

Key Findings

Implementing Energy Aware Devices is Extremely Cost Effective

Key operational information, which is already held by a device's microprocessor, can be used to estimate energy use, based on the relationship between operational status and power draw. As this calculation can be done by device firmware, no additional hardware is required, and as a result this functionality can be included at very low or negligible cost.



Energy Aware Devices Already Exist

Most modern vehicles communicate their fuel consumption to users. In this case, the vehicle's microprocessor calculates fuel consumption, from the control signal it sends to the fuel injectors.

Many computers and battery-powered devices also utilise similar energy estimation techniques to provide users with the ability to enhance operation and battery life.

Such software-based energy awareness has proliferated in vehicles and in IT equipment because the software costs are now close to zero. A similar approach would be feasible for a very wide variety of devices and equipment.

Policies for Energy Aware Devices Already Exist

The ENERGY STAR® program encourages energy awareness ("energy reporting") in its specifications for clothes dryers, clothes washers, dishwashers, lamps, luminaires, refrigerators, freezers, room air conditioners and pool pumps.

In South Korea, in order to be labelled with energy label 'grade 1', air conditioners and electric heat pump systems must have the ability to display power consumption using a smartphone.

The new EU energy label framework regulation allows for requirements on energy reporting in individual product regulations.

