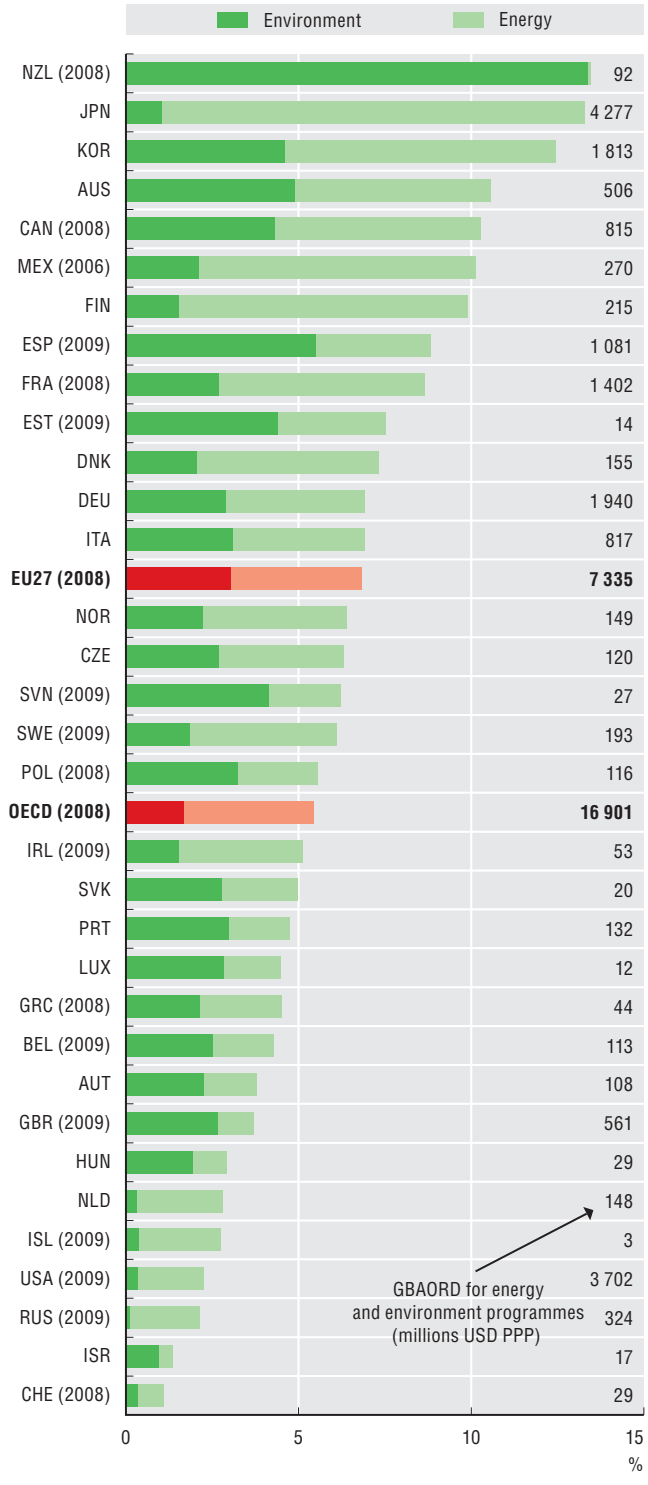
3. Environmental technologies

Government R&D budgets for energy and the environment, 2010

As a percentage of the total government R&D budget



Source: OECD, Research and Development Database, May 2011.

StatLink http://dx.doi.org/10.1787/888932486792

Finding cleaner, affordable and reliable energy sources and promoting sustainable growth have become major preoccupations of countries around the world. To this end, governments support research, foster innovation and the use of new technologies in production, and encourage the creation of markets for and consumers' uptake of "green" technologies.

Data on government budget appropriations or outlays for R&D (GBAORD) can be used to measure publicly funded research priorities to achieve policy objectives such as energy and environment. New Zealand for example allocates nearly 14% of its direct public funding of R&D to these two fields, most of which is environment-related. Japan follows very closely but mainly funds energy R&D. Across the OECD, countries emphasise energy (3.7% of total GBAORD) over environment (1.7%).

At the other end of the spectrum, the United States, the Russian Federation, Switzerland and Israel provide the least relative support with 2% or less of their budgets to these areas. However, in absolute terms, the United States is the second largest funder at USD 3.7 billion, just behind Japan with USD 4.2 billion.

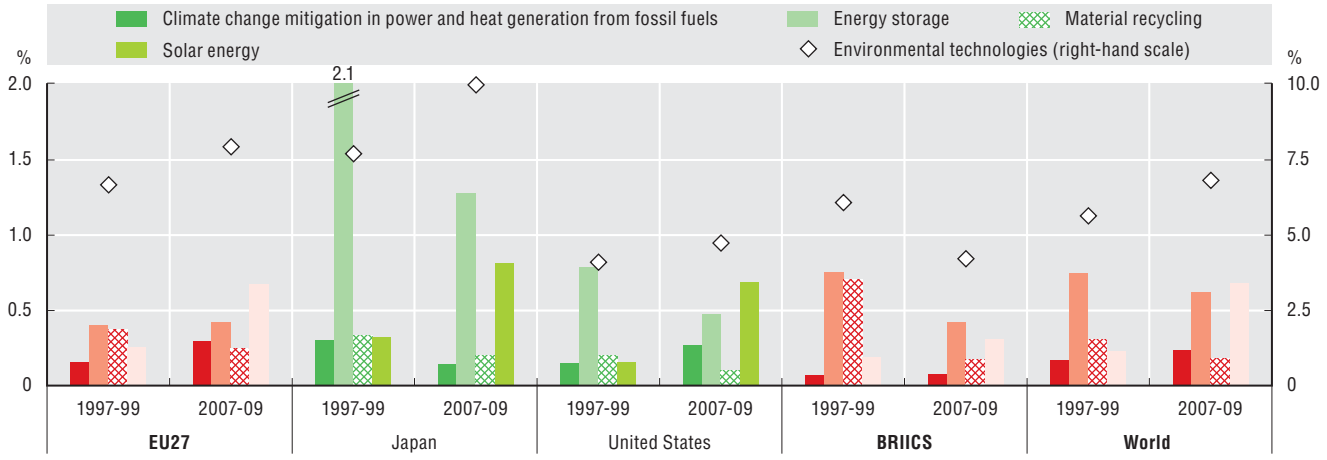
From a relatively small base, innovations in technologies related to climate change mitigation and solar energy are an increasing share of patent portfolios. In 2007-09, the share of Patent Cooperation Treaty (PCT) patents in solar energy was three times their share in 1997-99. However, patent applications in energy storage or material recycling technologies are increasing at a slower pace than total patents. In terms of geographic distribution, inventive activity in energy generation from renewable and non-fossil sources remains centred in European countries: in the late 2000s, the EU27 represented 37% of all PCT filings in this field, followed by the United States and Japan. China's share in such patents now ranks eighth worldwide.

Definitions

Government budget appropriations or outlays for R&D (GBAORD) measures the funds committed by the federal/central government for R&D. It can be broken down by various socio-economic objectives, defined on the basis of the primary purpose of the funder, including control and care for the environment as well as energy. *Environmental technologies* cover seven thematic areas including energy generation; climate change mitigation; emissions abatement and fuel efficiency; energy efficiency in buildings and lighting (see *www.oecd.org/dataoecd/4/14/47917636.pdf*). *Clean energy technologies* are a subset of environmental technologies, consisting notably of renewable energy generation, biofuels, carbon capture and storage. Patents for energy generation from renewable and non-fossil sources cover solar, wind, geothermal energy, energy from sea, hydro-energy, biofuels and fuels from waste.

Patents in selected environmental technologies, 1997-99 and 2007-09

As a percentage of total PCT patent applications

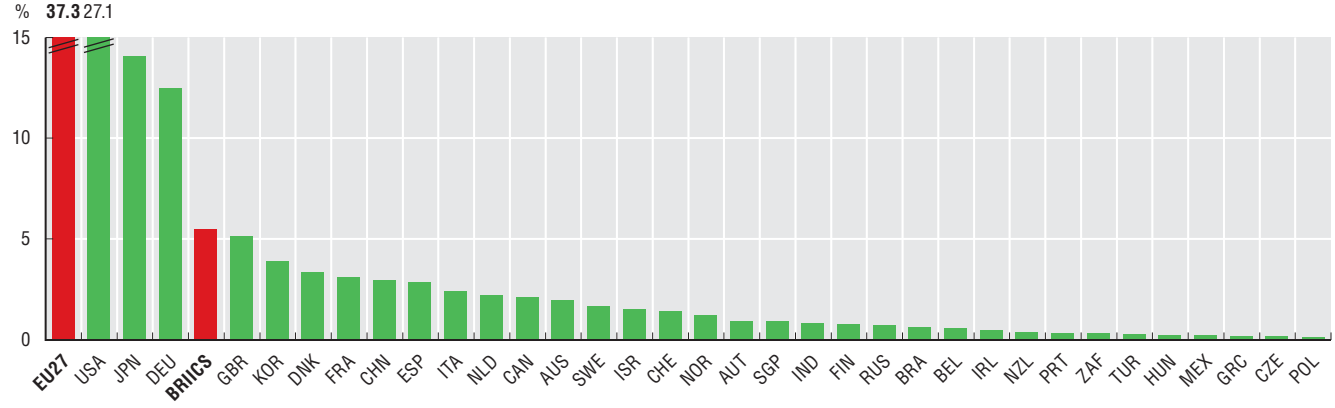


Source: OECD, Patent Database, May 2011. See chapter notes.

StatLink http://dx.doi.org/10.1787/888932486811

Countries' share of patents for energy generation from renewable and non-fossil sources, 2007-09

Patent applications filed under the PCT



Source: OECD, Patent Database, May 2011. See chapter notes.

StatLink http://dx.doi.org/10.1787/888932486830

Measurability

R&D budgets for control and care for the environment include research on the control of pollution and on developing monitoring facilities to measure, eliminate and prevent pollution. *Energy R&D budgets* include research on the production, storage, transport, distribution and rational use of all forms of energy, but exclude research on prospecting and on vehicle and engine propulsion, an important area for energy efficiency. In addition to R&D (which includes basic research, applied research and experimental development), the International Energy Agency collects and publishes data on government energy R&D which includes funding for demonstration projects. These expenditures are typically referred to as RD&D.

The European Patent Office (EPO), with the help of experts, including from the Intergovernmental Panel on Climate Change (IPCC), introduced a new classification scheme for technical attributes of technologies that can be broadly called clean energy technologies. The OECD Environment Directorate has developed search strategies based on patent classification systems to separate environmental technologies into seven categories, including clean energy technologies.