Several top-down policy initiatives are currently under development. For example, a Climate Technology Centre and network is being established under the UNFCCC. Alongside this, donors such as the UK Department for International Development have piloted innovation centres in developing countries. These offer the potential to remain entirely top-down or to evolve in more contextually sensitive ways that seek to understand and respond to local needs and circumstances. At present, neither outcome is inevitable.

"Our approach is to...provide analysis that can help craft the development of more equitable and sustainable energy pathways into the future"

Our approach in the STEPS Centre Energy and Climate Change Domain is to understand how energy pathways in developing countries, particularly those that could benefit the poor and marginalised, have evolved historically so as to provide analysis that can help craft the development of more equitable and sustainable energy pathways into the future.

More reading

Energy Pathways in Low-Carbon Development: From Technology Transfer to Socio-Technical Transformation, STEPS Working Paper 46, by Rob Byrne, Adrian Smith, Jim Watson and David Ockwell (2011). ISBN 978-1-78118-000-6

"Dynamic Sustainabilities: Technology, Environment, Social Justice" by Melissa Leach, Ian Scoones and Andy Stirling, 2010, Earthscan Books. ISBN 9781849710930

Other books, working papers and briefings in this series are available at www.steps-centre.org

Credits

This briefing was written by Rob Byrne and edited by Julia Day.

About the STEPS Centre

The STEPS Centre (Social, Technological and Environmental Pathways to Sustainability) is an interdisciplinary global research and policy engagement hub uniting development studies with science and technology studies. We aim to develop a new approach to understanding, action and communication on sustainability and development in an era of unprecedented dynamic change. The STEPS Centre is based at the Institute of Development Studies and SPRU Science and Technology Policy Research at the University of Sussex with a network of partners in Asia, Africa and Latin America and is funded by the Economic and Social Research Council. Find out more: www.steps-centre.org

Contact us

STEPS Centre, Institute of Development Studies, University of Sussex, Brighton
BN1 9RE, UK
+44 (0)1273 915673
Email: steps-centre@ids.ac.uk
Web: www.steps-centre.org
Twitter: @stepscentre

Institute of Development Studies

University of Sussex
SPRU – Science & Technology Policy Research

STEPS centre

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Energy Pathways in Low-Carbon Development

From STEPS Working Paper 46: Energy Pathways in Low-Carbon Development: From Technology Transfer to Socio-Technical Transformation

STEPS briefing 46

Energy and development go hand-in-hand: lighting, cooking, mobility, heating, cooling and communications are all essential to development processes. Moreover, the manner in which energy services are realised has both positive and negative consequences for our health, environment, wealth and social relations.

At a time when increasing access to modern energy services is seen as a key international development priority - as we attempt to achieve the Millennium Development Goals (MDGs) in the context of a changing climate - the STEPS Centre believes a much broader and ambitious approach to energy and development is needed.

"By 2030 the number of people without access to electricity will fall by only a fraction"

Uneven access to modern energy services

The record of increasing access to modern energy services is highly uneven across the world, and current trends suggest that the poor will continue to rely on traditional biomass - such as wood and waste over

Solar-powered lighting, Sri Lanka_World Bank Photo Collection

the coming decades. By 2030 the number of people without access to electricity will fall by only a fraction – from 1.4 billion to 1.2 billion, according to figures from the Organisation for Economic Cooperation and Development (OECD) and International Energy Agency (IEA). Those relying on traditional biomass might even increase from the current 2.7 billion to 2.8 billion. A reliance on energy from biomass is widely recognised to have negative impacts on health, education and quality of life, further deepening and entrenching poverty.

An urgent policy issue

These long-standing issues form an important part of the on-going international discussions over climate governance under the UN Framework Convention on Climate Change (UNFCCC) but hold a particularly strong salience at present due to the urgency of meeting the MDGs and addressing climate change.

For international policy, this urgency is evident in the coincidence of 2012 as the UN's International Year of Sustainable Energy for All and the Rio+20 Summit - the UN Conference on Environment and Development. Indeed, it was during the first Earth Summit in 1992 that the UNFCCC was officially born. Since then, two major policy instruments have been created that include, amongst other things, increasing energy access while addressing climate change – the Global Environment Facility (GEF) and the Clean Development Mechanism (CDM). Both instruments seek to make use of markets to diffuse low carbon technologies but the CDM, in particular, has mobilised billions of dollars of finance to install such technologies in developing countries.

Missed development goals

However, the distribution of CDM projects mirrors the earlier uneven record of increasing energy access. The poorest countries in the world continue to miss out on these investments while some developing countries (e.g. China, Brazil and India) attract most of the finance and low carbon technology. Even where the CDM has been successful in mobilising project finance it is questionable how much "development" has actually been achieved, either in narrow technological terms or in broader human terms. Its success appears to be confined to the deployment of some types of low carbon hardware, accompanied by a marginal increase in local jobs. As such, the CDM is unlikely to contribute to development in many countries, much less to achieving some kind of sustainability.

A broader concept of technology

We believe this gloomy situation arises from an enduring conception of technology as consisting simply of hardware. This narrow conception leads to the view that hardware can be transferred from one place to another where it can be put to use with only minimal training and support. From this perspective, the main problem in diffusing technologies is their cost, and the main solution is favourable finance.

However, if we recognise that technology includes softer characteristics, such as knowledge, then we can begin to see that policy instruments like the CDM are inadequate. Relevant knowledge, skills and capabilities are needed to adopt, adapt and develop technologies, as well as to make use of them. All of these are likely to be dispersed throughout any nation's economy and beyond, giving rise to the notion that technologies are situated in systems. Without attention to how technologies fit into current systems or how current systems can be developed to absorb technologies, we lower the chances of successful deployment of hardware and neglect their developmental opportunities.

"Relevant knowledge, skills and capabilities are needed to adopt, adapt and develop technologies, as well as to make use of them"

But, more than this, technologies are embedded in people's routines, or afford possibilities for new routines. Often technologies and routines co-evolve, helping to express, reproduce or even create cultural practices. And, of course, the control of technologies can lead to economic and political power, especially evident in large infrastructural technologies such as grid-based electrical services.

Understanding technology in this broader sense – situated and co-constituted with knowledge, skills and capabilities – enables us to explore the complexities of interacting social, environmental and technological systems, and to recognise that no single direction of development is inevitable. Rather, multiple viable pathways of development are always possible.

Energy pathways for the poor

This insight raises the further possibility that pathways of development more favourable to the poor and marginalised could be fostered in ways that are self-determined and self-directed. This does not preclude the use of top-down policy initiatives; rather, such initiatives can be part of more inclusive policy-making that realises multiple viable pathways of development depend on multiple knowledges, skills and capabilities in continually evolving processes.

charcoal vendor, Zambia_CIFOR