

Energy Economics: A Place for Energy Poverty in the Agenda?

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The global energy system faces three major strategic challenges in the coming decades: the growing risk of disruptions to energy supply; the threat of environmental damage caused by energy production and use; and persistent energy poverty. The first two challenges have attracted a lot of attention from the energy-economics community, much less so the need to address the problem of energy under-development. On current trends, the number of people in poor countries relying primarily on traditional biomass for their energy needs will continue to rise, while the number lacking access to electricity will barely fall. To change this course, decisive policy action is needed urgently as part of the broader process of human development. Meeting basic human needs, such as food and shelter, must be at the heart of any strategy to alleviate poverty. Modern energy services help enable those needs to be met. In practice, concrete improvements in human welfare can be realised quickly at modest short-term cost. Strong political will and commitment on the part of the governments of the world's poorest countries will be crucial. Rich industrialised countries have an important role to play in this process too. In addition to moral issues involved, we have obvious long-term economic, political and energy-security interests in helping developing countries along the path to energy development. The cost of providing assistance to poor countries may turn out to be far less than that of dealing with the instability and insecurity that poverty creates.

It was an exceptional honour for me to accept the IAEE's Outstanding Contribution to the Profession Award in 2005 and to be included on the list of esteemed economists who have received this award in the past.

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I believe that over the next quarter of a century our global energy system faces three major strategic challenges: the growing risk of disruptions to energy supply; the threat of environmental damage caused by energy production and use; and persistent energy poverty. I am also of the view that the only way that the goals of energy security, environmental protection and expanding access to energy to the world's poor can be reconciled is through strong and coordinated government action and public support.

Soaring energy prices and the geopolitical turmoil of recent years have reminded us of the essential role affordable energy plays in economic growth and human development as well as of the vulnerability of the global energy system to supply disruptions. Safeguarding energy supplies is once again at the top of the international policy agenda. The threat to the world's energy security is real and growing. Analysis we have carried out at the International Energy Agency (IEA) shows that, in the absence of new government action, the consumption of oil and gas will continue to rise inexorably through to 2030, pushing up the need for imports and accentuating the consuming countries' vulnerability to severe supply disruptions and resulting price shocks. Much of the additional imports will have to come from the Middle East, along vulnerable maritime routes. In addition, the concentration of oil and gas production in a small group of countries with large reserves – notably Middle East producers and Russia – will increase their market dominance and their ability to control the level of prices in the longer term.

The growing insensitivity of oil demand to price will also accentuate the potential impact on international oil prices – and, therefore, gas and electricity prices – of a disruption to oil supplies. The share of transport demand, which is price-inelastic relative to other energy services, in global oil consumption is set to rise, making overall oil demand less and less responsive to movements in international crude oil prices. The corollary of this is that prices would fluctuate more than in the past in response to future short-term shifts in demand and supply. The cushioning effect on demand of subsidies to oil consumers, which remain big in many countries, contributes to the insensitivity of global oil demand to changes in international prices.

Current trends in energy supply also carry the threat of severe and irreversible environmental damage – including changes in global climate. If unchecked, energy-related emissions of carbon dioxide will rise broadly in line with fossil-fuel use through to 2030, i.e. by more than half. The bulk of the increase will come from developing countries, overtaking the OECD as the biggest emitters soon after 2010. The use of low- or zero-carbon renewable energy sources is set to expand rapidly, but emissions will be driven higher by the inexorable growth in consumption of fossil energy, especially coal. The latest work by scientists on the potential consequences of rising concentrations of greenhouse gases in the atmosphere and by economists on the costs of inaction should leave us in no doubt that the energy path we are currently on is far from being sustainable (IPCC, 2007).

Up to now, the energy-economics community has devoted considerable time and effort to analysing the challenges of energy security and environmental

sustainability that are emerging from the way in which we produce and use energy. We have provided the public, policy makers and industry with timely and high-quality advice on how to address these concerns. I am proud of the contribution the IEA has made in these areas. The most recent *World Energy Outlook* presented the results of an in-depth assessment of how far the policies that governments around the world are currently considering could take us in curbing the growth in demand for fossil fuels, imports and carbon-dioxide emissions, as well as of the associated economic costs (IEA, 2006). Those policies – aimed principally at diversifying energy use towards less carbon-intensive fuels and at improving the efficiency of energy use – would, if fully implemented, significantly reduce the rate of increase in demand and emissions. Importantly, the economic cost of these policies would be more than outweighed by the economic benefits that would come from using and producing energy more efficiently.

Unfortunately, the energy-economics community has given far less attention to the challenge of energy poverty amongst the world's poorest people. Over the past five years, less than 20% of the articles that have appeared in the major international energy journals have focused on developing countries, and only a tiny fraction of these have addressed energy-poverty issues. I would like to take this opportunity to appeal to all energy economists around the world to give more attention to this pressing issue.

The stark facts should give us all pause for thought. Today, 1.6 billion people in developing countries do not have access to electricity in their homes. Most of the electricity-deprived are in sub-Saharan Africa and south Asia. For these people, the day finishes much earlier than in richer countries for lack of proper lighting. They struggle to read by candle light. They lack refrigeration for keeping food and medicines fresh. Those appliances that they do have are powered by batteries, which eat up a large share of their incomes.

Another hallmark of energy poverty is the use of traditional biomass in unsustainable, unsafe and inefficient ways. Currently, 2.5 billion people – 40% of the world's population – rely on traditional biomass such as wood, agricultural residues and dung to meet virtually all their cooking energy needs. In many countries, these resources account for over 90% of all household energy consumption. These people live mainly in rural areas of Asia and Africa. The use of biomass is not in itself a cause for concern. But, in practice, it has a number of harmful consequences for health, the environment and economic and social development. People, most often women and children, can spend many hours gathering such fuels. This reduces the time they can devote to more productive activities, such as farming and education. Wood gathering can also lead to deforestation, resulting in local scarcity of fuelwood and severe damage to the ecosystem. In addition, reliance on traditional biomass has a direct impact on human health. The World Health Organization estimates that each year, 1.3 million people – again, mostly women and children – in developing countries die as a result of fumes from indoor biomass stoves (WHO, 2006).¹ Only malnutrition, HIV/AIDS and lack of clean

1. Some 200 000 more people die each year from the fumes from coal stoves and heaters.

water and sanitation are greater health threats.

Despite the prospect of continuing economic expansion and technological progress in the developing world, on current trends, 1.4 billion people will still lack electricity in 2030. That is barely 200 million less than today. Although 2 billion people will gain access to electricity during this period, this will be offset by rising world population. Most of the net fall in the number of electricity-deprived will occur in Asia; in Africa, their number will increase significantly. Furthermore, the number of people relying on traditional biomass for cooking and heating is also set to expand. In the absence of new policies, it will rise to 2.7 billion in 2030 – equal to one-third of the world's population.

These trends imply that the first of the United Nations' Millennium Development Goals – to eradicate extreme poverty – is very unlikely to be met. One of the targets used to measure progress in achieving that goal is halving the proportion of people living on less than \$1 per day (UNMP, 2005). Given the strong links between income on the one hand and access to electricity and modern forms of energy on the other, meeting this target would imply a sharper increase in electrification rates and use of modern fuels than we at the IEA are currently projecting. Put another way, past experience shows that a rapid transition to modern energy would normally be expected to accompany the substantial growth in prosperity that achievement of the poverty-reduction goal calls for.

These prospects are unacceptable – morally, economically and politically. That is why decisive policy action is needed urgently to accelerate energy development in poor countries as part of the broader process of human development. We can not simply sit back and wait for the world's poorest regions to become sufficiently rich to afford modern energy services. Concrete improvements in human welfare can be realised quickly at modest short-term cost. The trends I have just described are not inevitable. They can – and must – be altered.

In my view, meeting basic human needs, such as food and shelter, must be at the heart of any strategy to alleviate poverty. Energy services help enable those needs to be met. Indeed, access to energy is a prerequisite to human development. It contributes to social development by improving health and education and to economic development by enhancing the productivity of labour and capital. Like improved health, use of energy is both a contributor to, as well as a consequence of, higher incomes (Bloom and Canning, 2000). By the same token, the extensive use of traditional biomass and the limited availability of electricity and modern fuels for cooking and heating are causes, as well as manifestations, of poverty.

During the early stages of economic development, the absolute amount of energy used by each person and the share of modern forms of energy – especially electricity – in the overall energy mix are key contributors to *human* development. In practice, making available relatively small quantities of modern energy services can bring about significant improvements in human welfare – and at relatively modest cost. For example, providing LPG cylinders and stoves to all the people who currently still use traditional biomass for cooking by 2030 would

boost world oil demand by a mere 1% and cost at most \$18 billion a year. That is less than the profits several major energy companies made in 2006. The value of the improvements to social welfare, including saving 1.3 million lives each year, is surely much higher.

Identifying the size of the challenge is one thing. Overcoming it is another. Strong political will and commitment on the part of the governments of the world's poorest countries will obviously be crucial to breaking the vicious circle of energy poverty and human under-development. This will need to involve important investment in energy infrastructure, much of it funded by the private sector in view of the constraints on public finances. In many cases, mobilising that investment will hinge on progress in applying and respecting the basic principles of good governance in the energy sector and in the wider economy. Laws and regulations that impede energy trade and investment have to be reformed. And public policies aimed at improving both the quantity and quality of energy services will need to be backed by broader policies to promote investment, economic growth and productive employment, including rural development programmes, training and education and support for micro-credit. Often, this will call for far-reaching legal, institutional and regulatory reforms.

Policy reforms and development priorities will always need to be tailored to each country's situation. In the poorest countries, relying solely on private capital to build energy infrastructure from scratch, in the early stages of development, is unlikely to succeed, because of the risks involved. Public-private partnerships may be one way forward for these countries.

Rich industrialised countries have an important role to play in this process. In addition to moral issues involved, we have obvious long-term economic, political and energy-security interests in helping developing countries along the path to energy development. For as long as poverty, hunger and disease persist, the poorest regions will remain vulnerable to humanitarian disasters, to social injustice and to political instability. Lack of resources is not an excuse. The cost of providing assistance to poor countries may turn out to be far less than that of dealing with the instability and insecurity that poverty creates.

Energy economists have to play their part in this endeavour. We must deepen our understanding of the causes of energy poverty and study the policies and instruments that can best facilitate the transition of hundreds of millions of poor citizens of the world to modern energy services. We must identify which policies work and why, and at what cost. And we must communicate our findings and messages effectively to policymakers and other stakeholders to make change happen.

We economists have a tremendous amount of theoretical and practical knowledge and understanding of the energy sector. However, this is not enough. As the ancient Chinese philosopher Confucius said "he who merely knows right principles is not equal to him who loves them". At the moment, when it comes to the economics of energy poverty, there is a poverty of energy economics. To tackle the challenge successfully we need to feel the pain of the poor and harness the power of energy to help make poverty history.

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