

Energy, Economic Growth, and Poverty Reduction: The Linkages¹

by

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1. Introduction and Background

Poverty is an infringement on the fundamental human rights of society's most vulnerable that must be frontally tackled. Moreover, poverty is a multi-dimensional concept and the forms of deprivation that it takes — economic, human, political, socio-cultural and security — are interconnected. In addition, gender equity and environmental sustainability cut across all these dimensions of poverty (OECD, 2007).

This paper focuses on one aspect of poverty – economic poverty — and how to reduce it through pro-poor growth. As poverty is a set of interlinked forms of deprivation, it also addresses how progress on economic poverty may contribute to and be facilitated by progress on the other dimensions of poverty. In doing so, it also explores the now well-acknowledged linkages between energy, economic growth and poverty reduction.

More than 4 billion people the world over are classified as economically-poor. Over 3 billion of them — roughly half of the human race — whose daily incomes are less than two US dollars, face enormous challenges to meet their basic needs. And for the bottom one billion people whose daily incomes fall below one US dollar, basic survival, which is often taken for granted by the non-poor, is a constant struggle that must be revisited and confronted daily (OECD, 2007). The vast majority of these vulnerable people happen to be located in developing countries where the economic growth record has been anything but impressive, with the African continent harbouring a disproportionate share. Reducing economic poverty for this group of people is crucially vital and must engage the collective effort of the global community.

In spite of the seeming complexities of economic analysis, overwhelming evidence has clearly established that sustained economic growth is a prerequisite for long-term poverty reduction. For instance, large numbers of poor women and men have been able to escape economic poverty in countries such as China and India that have sustained high rates of growth.³ Yet the experience of many African countries in achieving economic growth and reducing poverty has been far from satisfactory.

In most developing countries, growth has been low and has not enabled the poor to lift themselves out of economic poverty. In particular, sub-Saharan Africa is in danger of not meeting the poverty reduction target of the Millennium Development Goals (MDGs). Even where, on the whole, growth and poverty reduction have been satisfactory, the evidence shows that all too often a significant proportion of poor people remained marginalised in the growth process and have not been able to escape poverty, an indication that growth has not been necessarily pro-poor — i.e. pro-poor growth is not automatic or inevitable; it requires conscious effort.

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³ This assessment is only valid at the aggregate level. The evidence also shows that the distributional aspects of growth cannot be taken for granted. For example, in the case China many of the poor in the western part of the country did not benefit from the growth process.

The explicit link between access to energy services, poverty reduction and sustainable development is now well-established (DFID, 2002; World Bank, 2001; WSSD, 2002). Energy is central to practically all aspects of sustainable development — including access to water, agricultural and industrial productivity, health care, educational attainment, job creation and climate change impact on sustainable livelihoods. Its linkages with other sectors are thus crucial for the type of economic growth that is central to sustained poverty reduction. Energy plays a critical role in underpinning efforts to achieve the MDGs and improving the lives of poor people across the world. As mentioned earlier, over one billion people in the developing world live on less than one US dollar per day. “Affordable”, accessible and reliable energy supply is critical for halving this number by the year 2015, *à la* MDG-1.1, as well as for economic growth.

2. What Constitutes Pro-poor Growth?

Importance of pro-poor growth

Pro-poor growth focuses attention on the extent to which poor people are able to *participate in, contribute to and benefit from* growth, as measured by changes in the incomes of the households in which they reside and the assets they and their children acquire to earn higher incomes in the future (OECD, 2007). Pro-poor growth aims at combining growth and social policies to achieve poverty reduction (Klassen, 2005). Though economic growth is the basis for increasing national income, it does not necessarily result in better distributional outcomes⁴ or poverty reduction. Consequently, policies that merely concentrate on growth may only be partially looking at the development problem. Promoting pro-poor growth is also critical in achieving a sustainable path out of poverty and meeting the Millennium Development Goals (MDGs), especially the target of halving the proportion of people living on less than one dollar a day (MDG-1.1).

Defining pro-poor growth

When can growth be described as pro-poor? Essentially, there are two shades of opinions on this issue (OECD, 2007). For one school of thought growth is pro-poor when the incomes of the poor resulting from the growth process are increasing *relative* to the incomes of the non-poor — i.e. whether any tendencies to income inequality can be halted or better still reversed. The merit of this perspective is that it focuses attention on whether the poor are benefiting more or less proportionately from growth and whether inequality — a key determinant of the extent to which growth reduces poverty — is increasing or falling. The second school of thought gives centre stage to the *absolute* rate at which the incomes of the poor are increasing. For example, are the incomes of the poor rising fast enough to reduce the number of people living below the international poverty line in accordance with MDG-1.1? Thankfully, the relative and absolute concepts of pro-poor growth are both relevant, and complement each other in the analysis of growth processes from a pro-poor perspective (Klassen, 2005).

3. Sustaining the growth process for poverty reduction

As already alluded to, the evidence clearly demonstrates that economic growth is an essential requirement and indeed, in many cases, the main contributing factor in reducing income poverty. Evidence across countries and time periods shows that long-term reduction in income poverty results first and foremost from growth. A study of the experiences of 14 developing countries during the 1990s found that income poverty fell only when there was economic growth and, in general, the higher the growth rate the greater was the reduction in income poverty (AFD *et al.*, 2005). This, however, may be context specific because, as argued by Stiglitz, although a fast rising tide is necessary to lift all boats, some of them could be smashed against the banks, getting destroyed in the process.

⁴ The case of China illustrates this phenomenon.

Sustained growth is essential for reducing economic poverty over the long-term. Every country encounters short episodes of growth, which may either be rapid or modest. These growth experiences are, however, not sufficient to provide the opportunities needed by poor people to escape the economic poverty trap. The key to reducing economic poverty lies in ensuring that a moderate rate of growth is sustained over the long-term — a growth process where the “tortoise beats the hare”. This is what the countries of Asia such as China and India have accomplished recently and this has resulted in a substantial reduction in income poverty.

Growth may start for a variety of reasons: discovery of natural resources, higher commodity prices, and a better investment climate for the private sector, to name a few. In India, a mere move by government signalling a more positive attitude toward business was sufficient to trigger growth (Rodrik *et al.*, 2004). However, once kick-started, sustaining growth requires a deepening of the incentive to invest and increasing the use and productivity of capital and labour across the entire economic spectrum, through appropriate policies and institutions.

The growth performance in Africa in recent years has improved markedly with most countries now recording 4-5% growth. These growth rates, however, fall short of the estimated 6%-8% annual growth required to achieve MDG-1.⁵ The challenge now is to ensure that growth accelerates and, more importantly, is sustained at levels required to achieve MDG-1 by formulating appropriate, context-specific policies and establishing the “relevant” institutions and organs to effectively implement these policies.⁶ Sustaining the growth process would require policies and institutions to, at the very minimum, boost the stability and predictability of doing business so that the risk-to-reward ratio for businesses and individuals improves, thus encouraging entrepreneurship and investment.

Factors that contribute to sustainable growth include: – macroeconomic stability; institutions that provide clear rules that are enforced predictably; good governance that will reduce the incidence of corruption and rent seeking; and a favourable investment climate which includes secure property rights, well-functioning markets that allow the productive assets of land, labour and capital to flow to areas where the returns are highest, and increase access to these resources, including for the poor.

Social and/or political conflicts, the absence of a well-functioning state, and policy volatility, caused by frequent political change, seriously undermine economic performance in many war-torn African nations. Restoring peace and the legitimacy of the state are, therefore, essential pre-conditions for pro-poor growth in fragile states.

What macroeconomic stability?

Macroeconomic stability is, without doubt, a necessary pre-requisite for pro-poor growth, although not sufficient. Whilst macroeconomic stability is essential for pro-poor growth — by helping to sustain growth and ensuring that the incomes of the poor are not eroded by inflation or damaged by economic crises — it needs to be achieved through a flexible approach to policy formulation and implementation. Rigid adherence to targets that do not take account of the phase in the economic cycle (booms and recessions) or the potentially high returns to social investment may undermine growth unnecessarily (World Bank, 2005a). Moreover, setting of macroeconomic targets must consciously account for their impact on the poor. Thus, if public expenditure needs to be cut back to reduce fiscal deficits in pursuit of macroeconomic stability objectives, the burden should not be borne by the poor. Governments have

⁵ As a long-term issue, this assumes that the population dynamics, both in terms of growth and spatial distribution do not negate the beneficial effects of growth.

⁶ Defining “relevant” may be problematic since institutions are inherently culture-based.

often found it politically convenient to appease powerful vested interests by maintaining spending on services and investments that matter to them whilst cutting back expenditures that matter for the poor because they lack a strong political voice. More generally, a fiscal stance that would ensure macroeconomic stability without compromising on pro-poor growth should contain some combination of the following elements (Ashong, 2001):

- a. prioritising government spending in favour of pro-poor programmes including social sector spending;
- b. improving efficient use of public funds to ensure higher outcomes per unit of revenue;
- c. internal restructuring, reallocation, and close monitoring of expenditures to reap growth-enhancing efficiency gains;
- d. increasing transparency and accountability in the mobilisation and use of resources in all public sector institutions including at the local government level;
- e. designing effective mechanisms to ensure timely filing of tax returns as a means of reducing the lags between revenue inflow and payments for committed expenditures, and also to cut down the accumulation of payment arrears that often disadvantages the micro, small and medium-scale enterprises;
- f. improving tax collection in the private formal sector while also developing strategies to expand the tax base to cover the informal sector of the economy;
- g. exploring alternative sources of revenue generation to complement resources harnessed from traditional sources;
- h. reviewing and streamlining the procurement procedures and contract award systems of all ministries, departments and agencies of government (including local governments) to make them more transparent and cost-effective;
- i. strengthening operational and technical capacity of Finance Ministries and Treasury Departments, revenue collecting agencies for timely and effective monitoring of government receipts and payments in order to send out early warning signs; and
- j. reviewing and accelerating the restructuring of the public sector with the objective of making the public sector more compact and efficient in its delivery of government services. This should also tackle the high cost imposed on the private sector due to unnecessary administrative bottlenecks and perceived corrupt practices in the provision and delivery of public sector services.

Need for complementary policies and flanking investments

Policies associated with faster growth are not panaceas and may need complementary policies and flanking investments to bring about sustained, pro-poor growth outcomes. Harnessing the international economic linkages of trade and investment can assist to sustain rapid growth. However, this is more likely to contribute to sustained pro-poor growth if the international trading system is fair and development-oriented, and trade policy is accompanied by appropriate measures and policies instruments to build domestic capacity and competitiveness, enable productive assets to be redeployed in more gainful ventures, reduce the cost and risk of trading and doing business, and help the poor to adjust to or better cope with the new situation.

An effective regulatory framework with sound governance that ensures environmental sustainability is vital for sustaining growth, not least because a high proportion of developing countries are dependent on natural resources and because a high proportion of agriculture in Africa takes place on fragile lands with

depleted soil nutrients. Policies that promote environmental sustainability underpin pro-poor growth by ensuring that natural resources are not exploited unsustainably. Exploitation of natural resources is frequently accompanied by a “resource curse” or “Dutch Disease” (Sachs *et al.*, 1995). It also raises serious questions of governance associated with sovereign rents.

Over reliance on exports of natural resources may undermine pro-poor growth in several ways: the exchange rate appreciates which damages *tradable* sectors of the economy, such as agriculture; and inequality increases as does the risk of corruption and conflict. It is no coincidence that many of the “resource cursed” countries also happen to be fragile states. The case of Botswana stands out for emulation in this regard: with policies to effectively husband and manage foreign exchange earnings, prudent public expenditure policies that target the poor, and investments to promote broad-based growth, the discovery of natural resources has been the basis of pro-poor growth rather than the curse it has proved for many countries. Thus Botswana shows that “resource curse” can be avoided with prudent policies and management.

Avoiding one-size-fits-all approaches: context matters

Developing effective strategies to reduce poverty requires an understanding of who constitute the poor and how they earn their livelihoods. The poor, like any other socio-economic grouping, are far from being homogenous. Consequently, the incidence and impact of poverty among them vary with gender, membership of social groups, localities where they live, and whether they live in urban, peri-urban or rural households. Moreover, poor people employ a diversity of strategies in pursuit of their livelihoods. For example, though some two-thirds of the world’s poor live in rural areas, there are a wide range of “rural worlds” that offer different opportunities to earn livelihoods from agriculture and non-farm occupations. Strategies to increase pro-poor growth must take account of these seemingly divergent opportunities to earn incomes. The country context is also crucial for developing effective strategies. The world’s poor live in many different settings — in large, middle-income countries where many have been marginalised by the growth process; in low-income countries where growth has historically been low and sluggish; and one-third of the world’s poor live in “fragile and conflict states” where the state does not function effectively.

Given the diversity in terms of types of economy, resource availability, levels of development and variations in policies and institutions, it is not possible to arrive at a formula of policies and institutions that can be applied universally (World Bank, 2005a) — and, in fact, it would be naïve to assume otherwise. Context is, indeed, crucial. That notwithstanding, the fundamentals for sustaining growth remain the same across countries: what is required is a sound, objective analysis of each country’s concrete growth-inequality-poverty experience; and the policy and institutional framework to identify the critical binding constraints and bottlenecks that need to be removed to pave the way for rapid and sustainable pro-poor growth.

4. Importance of pace and pattern of pro-poor growth

Economic growth is more likely to be rapid, robust, longer sustained and more effective in reducing economic poverty when imbued with pro-poor characteristics and exhibits such tendencies. A recent study by the OECD forum on poverty, the Network on Poverty Reduction (POVNET, March 2007), has concluded that both the pace and pattern of growth — in terms of its sustainability, composition and equity — are important and, therefore, need to be tackled jointly for effective reduction in economic poverty and how these change over time.

Moreover, the effect growth has on poverty varies tremendously: available evidence shows that a 1% increase in *per capita* incomes may reduce income poverty by as much as 4% or by less than 1%, depending on the country and time period, implying that the *poverty elasticity of growth* is not given or constant. In part, this is due to initial conditions, particularly levels of inequality in incomes and assets (Ravallion, 2004; Dohman *et al.*, 2007).

In addition, the effect growth has on reducing income poverty will depend upon the extent to which the pattern of growth enhances the ability of poor people to participate in, contribute to and benefit from growth — i.e. some of the determinants of the *poverty elasticity of growth*. If the pattern of growth is broad-based and inclusive with respect to the sectors from which the poor derive their livelihoods, the areas where they live, creates jobs that they are more likely to fill, and increases access to productive assets and markets for goods and services they produce, then it is likely that their incomes will rise more rapidly and they will be able to acquire the assets they need to continue to increase incomes in the future. If, on the other hand, the poor are stuck in regions and sectors that are marginalised from the growth process, then very rapid rates of *per capita* growth will do little to reduce poverty. The case of China again illustrates this point adequately: in spite of double digit rates of growth nationally since 2000, income poverty has not declined because, among other factors, the poor live in rural areas of marginalised regions in the western China.

Avoiding marginalisation of the poor

Policies are needed to ensure that the poor are not marginalised from the growth process. Addressing lagging regions in which the poor are concentrated is not easy because faster developing regions tend to capture economies of scale and concentration. Nevertheless, context-specific solutions that include improved institutions and governance, a better investment climate with increased access to credit and services to increase productivity, improving transport links with markets, and investing in the region's infrastructure may help kick-start faster growth. Greater investment in health, education, infrastructure and agriculture targeted at the poor, skills improvement and upgrading combined with enhancement of labour mobility to other regions, may pay dividends in ensuring that the poor benefit from growth (World Bank, 2005b).

Agriculture's critical and special role

Where the poor are concentrated in the agricultural sector — as is the case in many sub-Saharan African countries — policies that improve the performance of the sector play an important role in ensuring pro-poor growth, and even more so in ensuring a pro-poor pattern of growth. In such situations agricultural productivity features prominently in improving existing livelihoods, meeting consumption needs and providing the basis for new livelihoods. For example, the green revolution in Asia was very instrumental in lifting millions out of poverty because the Asian economy at that time was more predominantly agricultural. Where growth was initiated by increased agricultural productivity, growth has been pro-poor, as experienced in most countries of the Far East. Rising agricultural productivity contributed not only to growth and the incomes of the poor directly, it also helped with the transformation of the economy, enabling manufacturing and services to expand. Consequently, when agriculture lags behind other sectors in performance, overall growth tends to be less pro-poor (AFD *et al.*, 2005).

Agriculture in Africa has not been able to contribute to pro-poor growth as effectively as in Asia. Since 1990, *per capita* food availability has fallen by 3% in Africa whereas it has increased by 30% in Asia. African agriculture is confronted with unique challenges. Among others things, these include:

- a. wide range of crops and livestock combinations across diverse ecological zones that increases the demands on research and extension services — a situation that fossilizes rather than transforms the sectors;

- b. lack of a suitable investment climate and domestic savings for investment;
- c. poor quality and weak institutions;
- d. vulnerability in the absence of social protection that may undermine risk taking;
- e. low access to markets exacerbated by weak road and railway networks; and
- f. new and more demanding technical barriers to trade in accessing OECD and other markets.

Overcoming these challenges would require a combination of concerted investment in improving access to markets and productivity enhancing technology, improving policies and institutional quality, and a more favourable investment climate in agriculture that addresses the needs of both commercial and small farmers. Success in the direction that translates into growth of agricultural productivity should contribute to faster growth of the incomes of the poor, particularly if combined with the growth of productivity in non-farm activities to ensure that rural incomes rise rapidly (Datt *et al.*, 1998). In this regard governments and development partners need to re-examine and increase their commitment to the development of agriculture through more effective ways of providing support.

Addressing informality in production

The world over, the proportion of the non-agricultural workforce earning its living informally is increasing as employment in the formal sector has not kept pace with its growth. If productivity in informal occupations exceeds that in agriculture, and generates adequate incomes for the poor, as experienced in Vietnam (Bernabé, 2005), growing informality may not necessarily detract from a pro-poor pattern of growth. In Africa, however, productivity and incomes from informal activities are low with the majority of the self-employed engaged in “survival businesses” unable to escape poverty. Addressing informality requires a combination of removing barriers to formalisation, increasing the positive incentives of becoming formal by reducing rent seeking practices of corrupt officials, improving access to markets and finance, and ensuring higher rates of investment and job creation in the formal sector.

Addressing inequality

Inequality matters in shaping both the pace of growth as well its pattern and its effectiveness in reducing income poverty. Growth, inequality of incomes and poverty are interlinked and are sometimes described as three sides of a triangle. Inequalities in opportunities and the ownership and distribution of assets hinder the ability of poor people to participate in and contribute to growth, and the sharing of its fruits. High and rising levels of income inequality lower the poverty reduction impact of a given rate of growth. In particular, they, more often than not, cause political and social instability and thus hamper growth.

Gender represents an important dimension of inequality: women face special barriers in relation to physical and financial assets, and access and participation in the growth process, with serious consequences for the ability of growth to be pro-poor.

The growth experience, however, indicates that rising inequality does not have to be an inevitable consequence of the growth process, as long as there is a mix of complementary and reinforcing policies that addresses growth and distributional objectives, strengthens empowerment, and deals with gender and other biases, including ethnicity, race, caste, disability, religion, nationality, and political affiliation.

Addressing risk and vulnerability

Risk and vulnerability limit poor people's participation in the growth process. Due to their vulnerable status, the poor usually are very cautious and tend to be risk averse. They, therefore, shy away from higher risk opportunities with potentially higher payoffs. Moreover, escaping poverty is not a one-way passage and many of the poor are often predisposed to fall back into it, in part due to the absence of appropriate social safety nets and/or insurance markets that they can engage with. Shocks arising from natural disasters or man-made crises erode both the stock and value of the very assets that the poor need to boost incomes to escape poverty. Such situations can result in large numbers of people falling back into the poverty trap. This is exacerbated by the gradual disappearance of historical traditional coping strategies — extended family system, community-based mutual support systems, kinship and an unexploited, unpolluted environment have all been eroded with the rise of materialism and individualism.

Economic, political and social stability can help to avoid man-made shocks of internal origin and thus contribute to growth and more effective reduction of economic poverty. In the case of natural disasters (exogenous shocks), risk and vulnerability can be contained through prevention, mitigation, social protection and coping strategies. Such cost-effective, pro-poor growth-oriented investments can improve both the pattern and pace of growth with positive payoffs in terms of protecting the income base of the poor. Moreover, externally-induced shocks from globalisation pose new dangers that often weaken the capacity of the state to address the needs of the poor.

5. Energy and Sustainable Development

Every country's economy can be described as an integrated energy-system that consists of streams of energy-producing and energy-using activities. Energy is central to the economy because it drives all economic activities. This characterisation of energy directs our attention to its sources in nature, to activities that convert and re-convert this energy, and finally to activities that use the energy to produce goods and services and household consumption.

Traditionally, energy is treated as an intermediate input in the production process. This treatment of energy's role understates its importance and contribution to development. All economic activities and processes require some form of energy. This effectively makes energy a critical primary factor of production. Given the state of technological advancement in the economy, capital and labor perform supporting roles in converting, directing and amplifying energy to produce goods and services needed for growth and poverty reduction.

Energy thus plays a critical role in social and economic transformation. Lack of access to energy places severe constraints on national development resulting in sub-optimal outcomes where poor people are often the greatest losers. Energy services are essential ingredients of all three pillars of sustainable development — economic, social and environmental. And economies that have replaced human and animal labor with more convenient and efficient sources of energy and technology are also the ones that have grown the fastest. No country in modern times has succeeded in reducing poverty substantially without adequately increasing the provision and use of energy to make material progress. Indeed, by not ensuring a minimum access to energy services for a broad segment of the population, economic development of countries beyond the level of subsistence has proven to be a real challenge.

Emphasis on productive uses of energy services is important in helping people out of poverty. At the national level, energy propels economic development by serving as the launch pad for industrial growth and, via transport and communications, providing access to international markets and trade. Reliable,

efficient and competitively priced energy supplies also attract foreign direct investment — a very important factor in boosting economic growth in recent times.

At the local level, energy facilitates economic development by improving productivity and enabling local income generation through improved agricultural development (irrigation, crop processing, storage and transport to market) and through non-farm employment, including micro-enterprise development. As an indicator of local recognition of the importance of energy for businesses, Ugandan manufacturers, who were asked to rank the constraints on their firms' activities, identified power breakdown and voltage fluctuations as their top two problems. Recent developments in Ghana's energy sector buttress this point.

Demand for energy is a derived-demand, emanating from the demand for other goods and services. In the process energy services are consumed to produce other goods and services. Thus, the introduction of electricity in a rapidly developing agricultural region will help to raise the productivity of local agro-industrial and commercial activities by supplying motive power, refrigeration, lighting, and process heating. However, simply introducing cheap, easily available modern energy does not necessarily guarantee socio-economic progress. Other factors, particularly on the demand side, matter as well. For example, when development efforts fall short of expectations because of poor pricing and marketing policies, improving electricity supplies will have little effect on local welfare. It is, therefore, crucial that when policymakers assess the prospects for policies targeted at improving energy supplies, they also consider sources of energy demand such as local health and education programs, macroeconomic and pricing policies, and complementary infrastructure such as roads, water supplies, and sanitation.

Energy also has strong and important links to the environment. Many energy sources are drawn directly from the environment, requiring sound management for these sources to be sustainable. Furthermore, energy use affects the environment. Emissions from fossil fuels, for example, reach beyond the local and national levels to affect the global environment and contribute to climate change. The poorest people often live in the most ecologically sensitive and vulnerable physical locations. These areas may be the most affected by the predictable effects of climate change such as increased frequency of extreme events — such as floods, drought, rising sea levels, and melting ice caps. The risks facing poor people are often increased by the unsustainable use of biomass resources by themselves or others — although more often by the latter group who exploit these resources for commercial purposes.

The World Commission on Dams underscores the fact that while hydropower from large dams has made significant contributions to economic development, in some cases this feat has been achieved at unacceptably high prices with respect to its impact on environmental and social outcomes. Such imbalances, the Commission recommends, can be addressed by learning from the past and negotiating outcomes where the interests of the most powerful stakeholders are balanced with the needs of less powerful stakeholders, and are both more equitable and transparent.⁷ Use of indigenous renewable resources combined with efficient supply and use of fossil fuels with cleaner technologies, can help reduce the environmental effects of energy use and help developing countries grow their economies while also replacing existing, inefficient polluting fossil fuel technologies that pollute the environment. Much as this may seem enticing, the issue of affordability particularly in respect of the poor cannot be taken for granted. As a complementary measure, careful management of energy resources is important to promote economic growth, protect ecosystems and provide sustainable natural resources.

⁷ 'Dams and Development: A New Framework for Decision-making', The Report of the World Commission on Dams, November 2000, Earthscan, London.

6. Energy and Poverty Reduction

Energy's links with the rest of the economy are critical for the type of economic growth that is vital to sustained poverty reduction. These energy/poverty reduction links are strong and complex, and operate through four broad channels: socio-economic development; macroeconomic stability; governance; and the environment (World Bank, 2001).

Link through socio-economic development

Energy's socio-economic development ties to poverty reduction involve productivity, income growth, education and health, gender, and the social impact of energy extraction. All these links between energy and social and economic development are reflected in the strong correlation between energy consumption and a composite index of human development indicators — the United Nation's Human Development Index (HDI).⁸ The HDI reflects achievements in the most basic human capabilities: — leading a long life (life expectancy); being knowledgeable (educational achievement); and enjoying a decent standard of living (income, measured in purchasing power parity terms).

- **Productivity**

Millions of poor people across developing countries currently consume, on a per capita basis, just 5 percent of the modern energy services consumed by people in high income countries. Such inadequacy in energy services has condemned the poor to walk or use animal power instead of travelling by motorized transport. It also means that they must live in poorly lighted and badly heated or cooled homes, and labour without the benefit of powered machines, while also cooking with polluting fuels such as wood and animal dung.

Because the poor are often condemned to subsistence existence, any cash payments for modern energy services could be regarded by them as “luxury”. And yet expanding access to modern energy services can alleviate drudgery in the lives of the poor who need energy for basic services such as cooking, lighting, heating, refrigeration, communication, and information. Besides, the poor also need energy to power productivity-boosting equipment that improves their income-earning capabilities. In particular, enhanced access to energy services is important for improving agricultural productivity, not just in terms of volume of crops grown, but also in post-harvest value-added activities such as drying, processing, conservation and timely transportation to markets, all of which require energy.

- **Income Growth**

Energy consumption shows a strong correlation with national income, so that countries with higher income are also those with higher energy consumption. Economic growth creates employment and raises incomes. However, most economic activity would not be possible without energy as a critical input, and these include the small and medium-scale enterprises (SMEs) that constitute the primary source of new jobs for the poor. Consequently, the type of economic growth that creates jobs and raises incomes depends on greater and more efficient use of energy.

- **Health and education**

Modern energy services enhance the delivery of key social services. In particular:

- a) electricity makes it possible to refrigerate vaccines, operate medical equipment, and provide lighting after sunset in health clinics;
- b) in homes, electricity helps to improve children's educational attainment, even where its use is limited to a single light bulb;

⁸ UNDP Human Development Report, 2004

- c) energy for pumping and treating raw water makes it possible to provide clean water in communities; and
- d) for poor people everywhere, access to modern energy services frees time for productive ventures, education, and leisure—time that would otherwise be spent collecting traditional fuels or in much less productive manual labor.

- **Gender Dimension**

Health access, education attainment, and productive activities of women and children are very sensitive to the availability of modern energy services. Modern cooking fuels free women and children from the burden of collecting and carrying large loads of firewood over long distances and from exposure to harmful fumes from primitive cooking stoves. Improved lighting makes it possible for adults and children to relax and have entertainment after the end of their daytime activities; it also provides a better learning atmosphere for children beyond the hours of sunset. Moreover, electricity enables both women and men in poor households to engage in activities that generate income—by providing lighting that extends the workday and powering machines that increase output beyond subsistence levels.

The lack of modern fuels and electricity also reinforces gender inequalities. Many of the poorest households are headed by women — due mainly to the loss of a male bread winner. Women and girls in such situations are disproportionately burdened by lack of access to modern fuels and electricity since they are responsible for fuel gathering, cooking and food preparation. In addition to the time spent gathering fuels, most traditional staple foods involve a large amount of threshing, de-husking or grinding, which is mostly done through female labour in the poorest households and regions due to lack of access to mechanical power. Many girls are withdrawn from school to attend to such domestic chores with lifelong harm to their literacy and economic opportunities. Energy services such as heat for cooking and power for food processing are, therefore, particularly important for women and girls.

- **Social impacts of energy extraction**

Energy's social and economic links extend to energy extraction. Oil, gas, and coal mining operations, “when properly managed”, should help reduce poverty in the host communities: by creating jobs and raising incomes; transferring skills and building local capacity; transferring a share of fiscal revenues to the local level; and increasing investment in social infrastructure.

Unfortunately, countless examples do exist of extractive operations that have negatively affected communities through: loss of traditional livelihoods; exposure to communicable diseases; involuntary resettlements or in-migration; civil wars and strife; deterioration of governance; human rights abuse; and social unrest resulting from competition for jobs or rents. Remedies for these adverse social impacts would require “sound” policies, adequate legislation, institutional capacity building, consultation with stakeholders, and investor sensitivity to the issues.

Link through macroeconomic stability

Government borrowing and contingent liabilities or guarantees to support investments in energy infrastructure have often been a source of macroeconomic and fiscal instability in developing countries. The shocks associated with such instability usually affect the poor the most, in part because government programs (including social, investment and infrastructure programmes) that benefit them tend to be cut back at times of fiscal stress.

Even with support from government, public resources are usually inadequate to finance the investments to meet the poor's energy needs. Reforms that transfer responsibility for financing energy investments to the private sector directly benefit the poor by reducing the strain on public finances. But the transitional costs of adjustment to private financing can be high and can bear heavily on the poor, especially when large subsidies for energy consumption are reduced or removed to achieve full-cost recovery tariffs. In these cases a phasing out strategy or "safety nets" may be needed to soften the impact on the poor — an example of a public good case for energy subsidies..

Energy is especially important for macroeconomic and fiscal stability in oil exporting developing countries such as Algeria, Angola, Chad, Equatorial Guinea, and Nigeria. In these countries the energy sector accounts for a large share of gross domestic product (GDP), government revenues, and export earnings. Fluctuating world oil prices can put their macroeconomic and fiscal balances at risk—and thus the budgets for social programs that help the poor. Although diversifying the economy is the ultimate solution, domestic energy suppliers and consumers could help by giving up their large public subsidies.

Link through governance

The corruption and patronage often associated with public monopoly provision of energy services raise the cost of these services. Again, poor people usually bear the greatest burden—because the additional cost takes a larger share of their income and because they are the most vulnerable to exploitation by corrupt officials. So the poor benefit from reforms that break up these monopolies, introduce competition where feasible, create transparent and independent regulation, and make management accountable to private investors rather than to politicians.

Special governance issues arise in oil producing developing countries. The revenues from petroleum can be enormous relative to revenues from other sources and in absolute terms, offering great potential for economic development. But more often than not, petroleum rents in developing economies become a curse rather than a windfall. Oil exporters typically fall behind other developing countries in achieving development targets, including economic growth and poverty reduction. They are also more likely to experience political instability and civil conflict. Weak governance appears to be closely linked to these outcomes. While weak governance may often predate the discovery of petroleum, there is strong evidence that petroleum revenues themselves erode governance and undermine development where institutions are inadequate.

Link through the environment

Indoor and urban air pollution from traditional energy sources and inefficient engines damage the health of millions in developing countries, with enormous cost to families and to the economy. At the end of the 1990s it was estimated that exposure to soot and smoke caused 4 million premature deaths and 40 million new cases of chronic bronchitis every year. Indoor air pollution causes more deaths and illnesses than tuberculosis, AIDS, or malaria. Air quality in 85 percent of the developing world's large cities—where the population is growing fastest—is a public health hazard.

Also well-documented are the risks of environmental damage from oil and gas extraction and coal mining. These risks include removal of soil and forest canopies; pollution of soil, water, and the atmosphere; damage to fragile ecosystems; diminished biodiversity; and climate change as a result of gas flaring or methane seepage from coal mines. Past damage to the environment from extractive operations has been enormous, much of it leading to direct harm to the poor. As extractive operations have moved to more remote, environmentally sensitive areas, environmental concerns have become even more critical.

The key to addressing the environmental issues that arise in energy extraction lies in policies, procedures, and frameworks to ensure that the available technologies are properly applied. The remedies require clear guidelines for operations; adequate laws, regulations, and contracts; environmental impact assessments; continuous monitoring; stakeholder consultation; capacity building in environmental institutions and affected communities; and corporate sensitivity to the issues. Thanks to the attention to these concerns from stakeholders, technologies that minimize or eliminate adverse impacts have been developed and widely implemented.

7. Energy and the Millennium Development Goals⁹

Energy is particularly important for achieving the Millennium Development Goals (MDGs). Currently, the available energy services are not sufficient to meet the needs of the poor. Some 2.4 billion people worldwide depend on traditional biomass for cooking and 1.6 billion people do not have access to electricity. “This situation entrenches poverty, constrains the delivery of social services, limits opportunities for women, and erodes environmental sustainability at the local, national and global levels. Much greater access to energy services is essential to address this situation and to support the achievement of the MDGs”. The links between energy services and the MDGs are summarised as follows:¹⁰

- *Eradicate Extreme Poverty and Hunger (MDG-1)*: Energy inputs such as electricity and fuels are essential to generate jobs, industrial activities, transportation, commerce, micro-enterprises and agriculture outputs. Most staple foods must be processed, conserved and cooked, requiring heat from various fuels.
- *Achieve Universal Primary Education (MDG-2)*: To attract teachers to rural areas electricity is needed for homes and schools. After dusk study requires illumination. Many children, especially girls, do not attend primary schools in order to carry wood and water to meet family subsistence needs.
- *Promote Gender Equality and Empower Women (MDG-3)*: Lack of access to modern fuels and electricity contributes to gender inequality. Women are responsible for most household cooking and water boiling activities. This takes time away from other productive activities as well as from educational and social participation. Access to modern fuels eases women’s domestic burden and allows them to pursue educational, economic and other opportunities.
- *Reduce Child Mortality (MGD-4)*: Diseases caused by not boiling water, and respiratory illness caused by the effects of indoor air pollution from traditional fuels and stoves, directly contribute to infant and child disease and mortality.
- *Improve Maternal Health (MDG-5)*: Women are disproportionately affected by indoor air pollution and water- and food-borne illnesses. Lack of electricity in health clinics, illumination for nighttime deliveries, and the daily drudgery and physical burden of fuel collection and transport all contribute to poor maternal health conditions, especially in rural areas.

⁹ This section is drawn freely from “The Energy Challenge for Achieving the Millennium Development Goals”, UN-Energy, United Nations, 2005.

¹⁰ Original source from UNDP; reproduced in UN-Energy (2005).

- *Combat HIV/AIDS, Malaria and other Diseases (MDG-6)*: Electricity for communication such as radio and television can spread important public health information to combat deadly diseases. Health care facilities, doctors and nurses, all require electricity and the services that it provides (illumination, refrigeration, sterilization, etc) to deliver effective health services.
- *Ensure Environmental Sustainability (MDG-7)*: Energy production, distribution and consumption has many adverse effects on the local, regional and global environment including indoor, local and regional air pollution, local particulates, land degradation, acidification of land and water, and climate change. Cleaner energy systems are needed to address all of these effects and to contribute to environmental sustainability.
- *Developing a Global Partnership for Development (MDG-8)*: The World Summit for Sustainable Development called for partnerships between public entities, development agencies, civil society and the private sector to support sustainable development, including the delivery of affordable, reliable and environmentally sustainable energy services.

8. Conclusion

The explicit link between access to energy services, poverty reduction and sustainable development is now well-established. Energy is central to practically all aspects of sustainable development. Over the centuries energy has spearheaded economic transformation and has underpinned human development: it lights our schools; cooks our food; heats our homes in winter and cools them in summer; keeps our hospitals functioning; powers our industries; and transports goods, services and humans near and far. So pervasive is energy in our lives that we generally take it for granted and fail to notice its significance. Energy is, indeed, vital to modern living.

Energy is also vital if we are to achieve the Millennium Development Goals of halving poverty rates and improving health. It is needed to increase productivity and create jobs. And it is needed to safely store medicines, light homes and to reduce the world's greatest child killer, acute respiratory infection — an infection caused to a great extent by cooking on solid fuel in poorly ventilated homes.

In spite of these well-established links between energy access, economic growth and poverty reduction, energy has surprisingly been the missing element in plans to transform Africa and tackle its people's chronic poverty.

Africa has a great deal of under-exploited energy resources, both renewable and non-renewable. That notwithstanding, the paradox of Africa is that although it desperately needs energy for economic growth and poverty reduction it is a net exporter of commercial energy. Despite this potential Africa has the world's lowest per capita consumption of energy. Africa produces 7% of the world's commercial energy, but only consumes 3% of commercial energy. In part this is because energy demand is derived demand; and most of the demand for Africa's energy is from outside its boundaries.

While Africa undoubtedly needs modern energy to stimulate economic growth, the majority of the population will be bypassed without a significant effort to reach them.

The vast majority of people in sub-Saharan Africa live in rural areas and many of these people do not live in villages but in scattered homesteads and hamlets. Getting power to them will prove exorbitantly expensive through conventional grid extension schemes. Often conventional grid and fuel distribution networks, especially those driven by commercial considerations, do not reach the majority of rural areas.

Moreover, efforts at finding appropriate solutions to the energy problems in rural areas, where the majority of the poor live, are hampered by inadequate attention at the national policy level to rural development generally, and energy in particular.

For poor people the priority energy requirements are for cooking, heating and lighting. But they also need energy to improve their incomes through small-scale industries and food processing. Energy is also needed to improve the public services they rely on, such as refrigeration for health clinics and the pumping of water both for irrigation and domestic use.

Meeting these needs in African countries will depend on four key factors: affordability, accessibility, availability, and sustainability.

- a) The first of these, affordability, involves bringing the cost of energy within the reach of more people.
- b) Accessibility means increasing capacity to address poverty in the region; the identification and mobilisation of resources to provide modern energy services; meeting huge imbalances between supply and demand; and shifting energy consumption from biomass to more reliable and efficient sources of energy.
- c) Availability requires that Africa's energy resources are made more available to African populations and for Africa's development.
- d) And, sustainability would require Africa to reduce its dependency on unsustainable biomass.

The critical role of energy and the costs of energy services must be explicitly factored into overall national economic and social development strategies, including poverty reduction strategies and MDG advocacy, as well as donor-supported programmes in order to reach development goals. In short, energy planning must be linked to goals and priorities in other sectors with the ultimate objective of catalyzing and sustaining pro-poor growth. In the final analysis reforms to the energy sector should protect the poor, especially the 1.1 billion people who live on less than \$1 per day, and take gender inequalities into account in recognizing that the majority of the poor are women.

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