Clean Energy for the Urban Poor:

an Urgent Issue

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SUMMARY

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GNESD

GLOBAL NETWORK ON ENERGY FOR SUSTAINABLE DEVELOPMENT

GNESD

The Global Network on Energy for Sustainable Development (GNESD) is UNEP facilitated knowledge network of Centres of Excellence and Network Partners, renowned for their work on energy, development, and environment issues. The main objective of GNESD is to work for reaching the Millennium Development Goals (MDG) by:

- Strengthening the Members Centres' ability to acquire, assimilate, and apply existing knowledge and experiences.
- Working for a better understanding of the links between sustainable energy and other development and environment priorities, and technology and policy options, leading to better articulation of practical policies that can be adopted so as to promote and highlight the crucial role of energy for sustainable development.
- Working to provide research findings to the Governments to be considered in formulating their policies and programmes, and the private sector to attract investments in the energy sector, so that these favour energy sector growth for sustainable development, especially for the poor in the developing countries.
- Promoting a communication infrastructure that provides a means for Members to share experiences and draw on each other's strengths, expertise, and skills, and
- Strengthened South-South and North-South exchange of knowledge and collaboration on energy issues of common interest.

GNESD is one of several Type II partnerships in the field of Energy that were launched at the World Summit on Sustainable Development (WSSD) in Johannesburg, September, 2002.

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Ensuring universal access to modern energy services is imperative if the Millennium Development Goals are to be achieved. Seven centres from the Global Network on Energy for Sustainable Development (GNESD) in Africa, Asia and Latin America have analysed Urban and Peri-Urban Energy Access in a number of major cities around the world, as part of the network's ongoing investigations into the theme of Energy Access.

The analysis included:
• an initial assessment of how energy is used in the selected areas;
• assessment of existing energy policy reforms and of whether or not they have addressed the challenges facing urban poor;
• a focus on ongoing and planned energy policy reforms, assessing how likely they are to improve access to cleaner and more sustainable energy services for the poor;
• assessment of how policy processes could be improved to promote better access to cleaner energy services to address poverty alleviation and environmental concerns, and stimulate productive uses of energy;
• identification of viable and proven policy options that can assist in providing cleaner and more sustainable energy services to the poor in the rapidly growing urban and peri-urban areas;
• recommendations for relevant policy actions.

Findings

The key common findings of the study are grouped under the following headings:

• Lack of strategic planning and long term vision
• Inaccessibility of clean fuels due to nature of settlements
• Inability to afford clean fuels because of upfront connection costs
• Lack of formal monitoring mechanisms
• Mistargeted subsidies
• Lack of awareness regarding use of clean fuels

These themes and related policy options are presented in more detail in this Summary for Policy Makers. Full study reports are available on www.gnesd.org.

Energy access:
the background in 2008

Box 1: The Millennium Goals

(1)   Eradicate Extreme Hunger and Poverty.

(2)   Achieve Universal Primary Education.

(3)   Promote Gender Equality and Empower Women.

(4)   Reduce Child Mortality.

(5)   Improve Maternal Health.

(6)   Combat HIV/AIDS, Malaria and other Diseases.

(7)   Ensure Environmental Sustainability.

(8)   Develop a Global Partnership for Development.

In the developed world energy is almost universally available and accessible: light at the flick of a switch, heat for cooking or comfort at the turn of a knob. In many parts of the developing world the picture is very different. Current estimates put the number of people still relying on biomass for most of their energy needs at 2.4 billion, some 1.6 billion people are still without access to electricity and many have only limited or no access to cleaner and more modern fuels such as kerosene, liquefied petroleum gas (LPG) or natural gas.

In real terms that means millions of people—overridingly women—spending much of their time in the arduous business of collecting animal dung or firewood with which to cook or to heat their homes. Once they get their 'energy source' home the smoke produced from its combustion in traditional fires and stoves will expose them to pollutants that cause chronic respiratory diseases. Once again, this is overridingly amongst women, who do the cooking, as well as amongst young children who spend much of their time indoors with their mothers. Over one and a half million deaths per year in developing countries are associated with inhalation of smoke from solid fuels.

Efforts have been made to improve this situation and access to electricity and other modern forms of energy has been successfully extended to over a billion people in the past 25 years. But the glaring energy gap described above—both between North and South and between the wealthier and poorer people in many countries—persists and may even be widening. This is in spite of the fact that governments and international organisations everywhere recognise that the multiplier effect of access to modern energy services is vital in underpinning efforts to improve health, education, clean water and sanitation services.

The Millennium Development Goals
– providing a new impetus
The Millennium Development Goals represent the international community's commitment to halving poverty in the world's poorest countries by 2015. The eight Goals (see Box 1) address all of the dimensions of extreme poverty: income poverty, hunger, disease, exclusion and lack of infrastructure and shelter, while promoting gender equality, education, health and environmental sustainability.

Although they do not refer to energy as such, access to clean, efficient and sustainable energy services is recognised as being a prerequisite to the attainment of the Goals. Indeed, this link was defined explicitly in the Johannesburg Plan of

Implementation which emerged from the World Summit on Sustainable Development, calling on nations to:

'*Take joint action and improve efforts to work together at all levels to improve access to reliable and affordable energy services for sustainable development sufficient to facilitate the achievement of the MDGs.*'

Such a clear statement of the inherent link between energy and development sends out an equally clear message for policy making: that any planning of national development strategies must include energy and, if those strategies are to succeed, energy must be considered on a par with the Millennium Development Goals.

GNESD – identifying the causes of urban energy poverty
In previous studies on the theme of Energy Access, and in its more recent work summarised here, the GNESD suggests strongly that one of the major causes of the continuing and increasing energy poverty described above is the almost universal failure to address the needs of the poor as a specific issue within energy planning, or indeed to recognise the poor as being a category with specific energy needs. This argument becomes very clear if policy making is viewed as a simple chain: objective → policy → instrument → outcome. If the objective is missing the outcome cannot be successful.

In 2007–8, seven of the Network's Reporting Centres turned their attention to a key aspect of energy access development that has not so far been addressed: what are the implications of current urbanisation trends for the array of energy services demanded by an increasingly urban and peri-urban population? With the aim of contributing to meeting the MDGs through improved access to modern energy services, the Centres undertook an Urban and Peri-Urban Energy Access study in Africa, Asia, India and Latin America (see Box 2).

The study, which comprised a scoping phase and a thematic phase, provided an initial assessment of the energy situation in the field, asked whether or not energy policy reforms have addressed the challenges, assessed ongoing and planned policy reforms, identified viable and proven policy options and recommended further options.

By and large the Centres took the inhabitants of the slum quarters that have become such a feature of cities in developing countries as representative of the urban poor. Time and financial constraints meant that the surveys conducted were relatively limited in their scope, but there is reason to

Box 2: the Reporting Centres

Centre	Coverage
AFREPREN	Kenya
CENBIO, COOPETEC	Brazil
ERC	South Africa
FOUNDATION BARILOCHE	Argentina
AIT	Thailand
ENDA	Senegal
TERI	India

Full Centres reports are available at: http://www.gnesd.org

Box 3: Urban poverty today and tomorrow

Over the past half century the world's urban population increased from around 730 million in 1950 to over 3.15 billion in 2005. Around 1 billion, i.e. nearly one-third of the world's urban population are believed to be currently living in slum conditions. With virtually all population growth from now until 2030 taking place in urban areas that number is likely to double.

In **India** an alarming accompaniment to increasing population and urbanisation has been the deepening of urban poverty, growth of urban slums and the deterioration in basic service delivery. Slums in Delhi include informal settlements that are either squatter or illegal colonies where people live on undeveloped and unserviced lands without secure tenure or access to basic services.

In **Argentina** over 13 per cent of the population of Greater Buenos Aires live in slums. Here, as in other cities, there is a parallel growth of rich, well-serviced neighbourhoods and gated residential communities close to dense inner-city or peri-urban slums that lack even the most basic of services. There is parallel growth of slums, country clubs and closed wealthy neighbourhoods (often with private security services). As slums grow even inside the city, high income housing seems to bridge these neighbourhoods.

In **Kenya** urbanisation is occurring very rapidly. Over 40 per cent of the present population is urban and this looks set to rise to around 50 per cent by 2050. Around 34 per cent of the urban population lives below the poverty line and income distribution shows large disparity between the poor and non-poor.

In **South Africa** urbanisation is already ahead of the global trend: the 2001 census showed an urbanisation level of over 56 per cent, leading to major problems in terms of infrastructure, unemployment and poverty.

In **Thailand,** people migrate from the countryside to urban areas in search of better employment opportunities and higher income: 81 per cent of dwellers in the Bangkok region have migrated from other regions or slums. Most of the slums are currently in core areas of the city, but there are indications that this is changing with slums in core areas decreasing and new ones arising in urban fringe areas.

believe that they are representative of situations and patterns found elsewhere.

Key findings summarised
The poor urban households in the GNESD survey were found to be using multiple fuels, with their greatest fuel needs—for cooking, space heating, etc.—generally being met from a mix of sources extending from modern and relatively clean sources, such as LPG and kerosene to the traditional forms of biomass. Electricity, in spite of still being the focus of national energy policies in most of the countries, is generally used only for lighting and radio or TV.

All of the countries have overarching policies in place that, at least notionally, encourage penetration of modern energy sources, and all have introduced fragmented measures such as subsidies and lifeline tariffs. However, no country has yet developed a comprehensive approach to improving access with a specific focus on the poor. The survey findings are summarised in table form in Annex 1, showing households' fuel choices and some of the policies and initiatives already in place in the different countries. Further details can be obtained from the full reports.

Unlike rural areas, infrastructure is generally present within or close to the deprived urban areas, but stable access to modern energy remains inaccessible to the inhabitants because of administrative or institutional barriers, or because of failures in delivery mechanisms. Of course, improvements to—and extension of—infrastructure remain necessary in many places. However, the study findings indicate clearly that the solutions to providing better energy access in urban areas will lie as much in well designed policies that accompany clean and affordable energy supplies through to delivery, as they will in expanded infrastructure.

A second observation is that the energy mix—pattern of use of different fuels by the urban poor at different times—is an essential aspect of their energy profile and one which must be borne in mind when addressing the issue. Poor people's incomes, whether in rural or urban areas, are not only low, they are also generally irregular. This is reflected in the way they move up and down the 'energy ladder', purchasing cleaner and more efficient fuels whenever they can, but falling back on the less efficient ones when obliged by budgetary constraints. Significant use of fossil fuels and biomass therefore seems likely to persist for some time and these sources should be integrated into development strategies, with a focus on their sustainable management and cleaner and more efficient use. In this context, policy design should avoid over-emphasising a particular technology but should

be geared rather to supporting a range of technologies and service delivery models.

Why focus on the urban poor?

The simple answer to this question is because urban poverty is framing up to become one of the major challenges to governance and the design of public policies for the 21st century. The second half of the 20th century saw an unprecedented move of rural populations towards the urban centres of developing countries, as people left the land in search of more profitable activities. Some of the first migrants were able to secure employment and housing, but many were not. In most parts of the developing world, employment demand and the formal urban planning process did not keep pace with the influxes of migrants, forcing people into the informal sectors for both employment and housing. This process gave rise to the large 'informal settlements', more commonly referred to as slums, found in so many of the world's cities today.

For reasons that are beyond the scope of this energy-focused discussion, governments, at all levels from national to local, have not been at their most effective in addressing this thorny problem and areas of urban poverty—characterised by severe depravation, appalling conditions of hygiene and acute lack of basic services—are now an entrenched, multigenerational reality. Slums are also characterised by a lack of legal recognition and of land tenure rights, leaving residents in a shadow land of exclusion where they have had to develop their own coping strategies if they were to have any form of access to basic services.

This is the already worrying condition of today's cities, but the current problem of slum and squatter settlements may be only a glimpse of the future. Until at least 2030, by far the greatest proportion of growth in the world's population will take place in urban areas in the less developed regions, under the combined forces of still relatively high birth rates and continuing migration. Many of the new residents of these areas will be poor and will therefore have difficulty in gaining access to basic services. There are real fears that, without effective government action, the major cities of tomorrow's developing world will be places of unparalleled inequality with a pattern of abundant wealth alongside huge marginal areas of destitution becoming ever more commonplace (see Box 3 describing places covered in the GNESD studies).

Poverty in this type of setting is characterised not only by lack of income and opportunity but also by subjective perceptions and real incidences of social exclusion. When such

a yawning divide is associated with systems that seem to spawn and perpetuate poverty and a vicious circle of entrapment, there is, as one UN-HABITAT report put it, 'a formula for trouble'. As well as consigning residents to the treadmill of a hand-to-mouth existence and a struggle to obtain even the most basic amenities, unattended poverty in urban areas can generate high crime rates, social unrest or even conflict.

Governments have attempted to address these questions in a variety of ways that extend from tearing down slums and relocating populations (incidentally destroying the social fabric) to the now more currently accepted approach of upgrading slums. From the energy point of view, however, one thing seems to remain constant, neatly encapsulated by a conclusion from the GNESD's Argentine report: '*regarding policies aiming at mitigating energy poverty in urban areas [in Argentina], no general policy has ever been specified or defined on the subject.*' This is confirmed for other regions, for example India, where '*discussions with officials at the Ministry for Urban Development revealed that energy access for the poor is not yet on the Ministry's radar screen.*' The India study goes on to highlight a major finding, reflected in other reports: that there is a 'disconnect' between the authorities responsible for planning and delivering energy services and those addressing urban poverty alleviation. Unlike housing, water, sanitation and roads, energy tends not to be recognised as a basic service in urban areas. Although most countries have policies on access to modern energy for all of their citizens, few—if any—have included specific targets or provisions for providing clean energy access for the poor in national urban development policies or in city development plans[1].

With the urban poor already so numerous and set to increase massively, the future of developing country cities will depend on how well governments, at all levels, manage their growth, ensure effective governance and provide for delivery of services. If all of the citizens of tomorrow's cities are to be able to meet their basic human needs for nutrition, warmth and lighting—and if they are to attain their right to better health and education as defined in the MDGs—the policies introduced to achieve sustainable urban development must also address the question of energy poverty and must make its alleviation an integral part of their design.

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1) Kenya is the exception among the GNESD reporting centres: 'Kenya's National Energy Policy (approved 2006) provides overall policy guidance for the energy sector and contains explicit policy statements on energy access for the poor.'

For this to be achieved a new approach will be necessary. One in which poor people's actual situations and needs are central, so that better informed and better coordinated institutions and other stakeholders will be equipped to follow through any overarching policies to ensure that their implementation delivers energy services to those who are most in need. In other words, the resolution of the policy maker's 'radar' needs to be improved so that the urban poor appear clearly on the screen. Some steps and possible actions to help tighten the focus are described below, based on the GNESD Reporting Centres' findings.

Where are the urban poor?
The answer to this may seem obvious but, in fact, virtually all of the Centres involved stressed that there is no clear definition of the urban and peri-urban poor and that in many cases the areas in which they are living have, to date, been neither clearly identified nor mapped.

In South Africa, for instance, '*informal or 'illegal' settlements do not appear on city maps, including those intended to guide infrastructure network extensions. These homes are not officially counted as part of the urban poor population […]; they do not therefore qualify for most anti-poverty programmes*'. This lack of data on the urban poor is an obvious barrier to efficient policy design. How, for example, can grid building or extension be planned for areas that apparently have no official existence?

In other cases (e.g. Brazil) national statistics distinguish only between urban and rural populations. In such cases the urban poor are 'lost' in aggregated statistics that reflect the urban area as a whole but say nothing about the poor population specifically. The example from Senegal (in Box 4) of trying to establish just what constitutes a peri-urban area is a clear illustration of the difficulties in obtaining precise definitions. There is a clear need here to agree on some definitions and to make gathering of accurate data on the urban poor a priority, as it is an obvious prerequisite for identification of areas for policy intervention

Furthermore, even though slums and the urban poor may appear to constitute a relatively homogenous problem when viewed from afar, it must be borne in mind that they are, in fact, very heterogeneous in nature. Slums may differ widely in terms of their origins, of levels of income amongst their inhabitants and of the degree to which they have become consolidated or have a potential to do so. To produce a picture that will contribute most effectively to targeting

of policies to alleviate poverty, including energy poverty, governments and other participating stakeholders should develop indicators using data at the lowest practical level of aggregation. In this way they will be able to build up (energy) poverty profiles from national to local levels to ascertain who is poor, where they live and the precise nature of their access to services and of their needs.

Clean fuels are inaccessible because of the nature of the settlement

One of the major barriers identified as limiting penetration of clean fuels among the urban poor results directly from the status, or rather lack of status, of the settlements in which they live.

The case of South Africa, where informal settlements sometimes do not even appear on urban planners' maps, has already been cited, and the inevitable rider to this situation is seen in virtually all of the places studied: electrification programmes target formal settlements and these are connected to the grid and are eligible for subsidies, while poor populations living in neighbouring informal settlements are excluded. Similarly, in both Argentina and Brazil moving up the 'energy ladder' by greater use of natural gas is encouraged notionally, but the distribution grids rarely extend to the unidentified poor neighbourhoods

Even when grids are present in poor areas, the problem of access is compounded by the almost universal requirement for proof of a valid address to obtain a household connection. For people living in unauthorised settlements this is not possible, as the settlements have no legal existence (sometimes even after decades of presence). People are thus automatically excluded from energy access, even though they may have the income capacity to pay for services. Poor households are left either to fall back on traditional inefficient and unclean sources or, as is frequently the case for electricity, to resort to illegal connections, with all of the dangers and extra costs that these entail (discussed below).

Exclusion because of the nature of a settlement is a widespread and entrenched barrier, stemming as it does from the common view that informal settlements are by their very nature temporary and unacceptable. The reality, however, is that many informal settlements have been established for decades and look set to expand in the future. This is a problem which requires a pragmatic, 'real-world' approach such as the temporary registration scheme adopted in Thailand (presented in Box 5). Although there are one

Box 5: Thailand – 'Quasi ID' allowing grid connections

In Thailand cities have grown without much effective central planning, a form of growth which has allowed the establishment of slums. In Bangkok, for example, slums increased from 50 in number in 1968 to over 1 000 in 1985.

Many of the houses in these areas were not officially registered, preventing them from obtaining connection to the electricity grid and leading to very high levels of illegal connections. To address this problem and prevent slum dwellers from falling into this trap, the Thai government issued temporary house registration numbers, known as 'Quasi household IDs' allowing application to be made for legal connection.

This policy, combined with a high priority given to electrification by the government and reduced electricity tariffs for low-consuming households, was highly successful and has substantially reduced the numbers of illegal connections.

or two remaining issues regarding this policy — with some households not being aware of 'quasi ID' and still obtaining electricity illegally from their neighbours, and higher than standard charges for meters for this type of connection — extension of this type of approach to other regions could nonetheless do much to help combat the problem of illegal connections, as well as fostering a feeling of social inclusion of slum dwellers who are often bitterly aware of the stigma attached to their exclusion from basic services.

Affordability

Most of the GNESD studies observe that the high cost of connections is a major hindrance to the uptake of cleaner and more efficient fuels by the urban poor. In the areas surveyed, this is especially the case for electricity and LPG, where the upfront costs of new connections together with that of meters for electricity and connections and appliances for LPG are prohibitively high for most poor households. In the case of electricity, this was found to be another major factor behind the long-standing concern of illegal connections (see Box 6).

The problem of connection costs can be addressed by introducing 'user-friendly' payment schemes that allow the

costs to be spread over time by, for instance, charging for connection in instalments or promoting alternative arrangements such as pre-paid connections for electricity, where payments can be made in smaller amounts from time to time. The design and implementation of imaginative ways of alleviating the burden of these upfront connection costs for the poor will do much to make clean energy more accessible to them.

The question of the cost of appliances is one which is relevant across the full range of energy sources and has implications for both upfront and recurring costs. First, where upfront costs are concerned, people will not be encouraged to switch to cleaner fuels if they subsequently find themselves faced with an insurmountable cost of replacing their appliances. Regarding recurring costs, old and inefficient appliances result in wasteful, and therefore expensive, use of all types of fuels, as well as in increased health risk when traditional biomass is used indoors (or even outdoors when burned in narrow slums streets).

Significant improvement could therefore be gained by considering the introduction of subsidies for appliances and by increasing support for programmes to design and distribute more efficient appliances for use with biomass, such as improved cooking stoves. The Kenya report also indicates a possible economic advantage here, pointing out that subsidies for efficient kerosene stoves and lamps could expand the kerosene market, widen access among the poor and lead to local investment in kerosene stove and lamp manufacture.

Given that the technologies most readily available to the poor tend to be those which are least efficient, poorer consumers inevitably pay more for each unit of useful energy they obtain than the wealthy, making their energy bills a greater burden on their household budgets. This difficulty is compounded by their frequent need to drop down the energy ladder

and to obtain fuels in small quantities. While, at first sight, this may appear convenient for people with fluctuating incomes who need a substitute fuel when they cannot afford, for example, a LPG refill, it is often a false economy. The unit prices for these fuels in small quantities tend to be comparatively high: figures from Kenya, for example, show that people purchasing charcoal in this way actually end up paying more than they would for other fuels. The study from India reports similar findings, indicating that purchasing biomass on a daily basis without any upfront cost could

appear to be an attractive fuel option for very low-income households when, in fact, on a monthly basis the cost of using biomass is actually the most costly of all of the fuel options.

There are implications here for the important question of subsidies. All of the countries surveyed had introduced some form of subsidy on the recurring costs of energy, most often in the form of reduced electricity tariffs for low-volume consumers or subsidies on LPG cylinders or kerosene. However, these rarely actually target poorer users and, while they may have some success in encouraging overall penetration of fuels, they are mostly blanket subsidies that have tended to benefit the wealthier classes, while bringing very little benefit to the poor.

In Thailand, for example, a subsidy on LPG has contributed to an overall high level of access. However, the subsidy applies only to a standard size (15 kg) cylinder, leaving poorer households who cannot afford the initial outlay to purchase un-subsidised 4 kg cylinders at a much greater price. Policies and measures to reduce the price of LPG, especially of small cylinders, would greatly increase affordability for poor households. An example of such an approach, adopted by Senegal when faced with a similar problem of targeting, is given in Box 7.

Subsidies have a role to play in both encouraging transition to more efficient and cleaner fuels and in alleviating the burden of energy costs for the poorer members of society, who are using a higher proportion of their disposable income to obtain their energy than the wealthy. If they are to succeed in this, however, considerable care must be given to design in order to ensure that the subsidies are properly matched to the actual consumption patterns and real needs of the target populations they are intended to help. Care must be taken to ensure that subsidies do not end up blindly subsidising consumption or become permanent due to lack of existing strategies.

Lack of formal monitoring mechanisms
Once policies and measures are in place they must still be implemented effectively if the services they aim to provide are to be delivered. As the South African study put it: 'in the absence of effective local delivery, government is powerless to implement its policies and provide services.' This in turn suggests that the policy process must include some way of monitoring implementation and providing feedback to allow measures to be better designed in the future.

Box 6: Illegal connections

This phenomenon, already alluded to in the discussion on exclusion from connection because of the nature of a settlement, was identified as a very important issue by all of the studies. The extent of the phenomenon is indicated by the table below, showing either quantified incidences or a qualitative assessment from each of the GNESD Centre reports (words in italics indicate the local name applied to the phenomenon).

**Obtaining electricity illegally:
the extent of the phenomenon**

Country	Incidence and/or qualitative assessment
Argentina	*Colgados* meaning clandestine: 'a culture of illegal connections'
Brazil	'Widespread'
India	*Hooking*': a private company in Delhi identified 6 500 out of 8 700 of its consumers [ ] as having no legal access to power. In the slums visited by TERI, most of the households acquired electricity through hooking.'
Kenya	'In Kibera, the majority of the houses connected to electricity in the area either had illegal connections or were tapped from a single point.'
Senegal	'In poorer areas like Rail and Ben-Barack 50 to 70% of the electric connections are illegal.'
South Africa	*Extension cord*: 'In the unserviced area of Dontseyake, 20 (out of 46) of the sampled households had an electricity supply from neighbours. None of the sampled households had an illegal connection in the sense of obtaining electricity that was not paid for.'
Thailand	In Bangkok only 68% of the households were connected through the Municipal Electricity Authority (MEA) grid, the remaining 32% of households were connected through neighbours.'

Illegal connection does not necessarily imply simply stealing electricity from utility companies. In most cases, the urban poor are prepared to pay for their electricity and in fact do so, buying electricity from a neighbour who has a legal connection and often paying much more than they would via their own legal connection. For instance, in the communities surveyed in South Africa, the average cost of an 'extension cord connection' (i.e. via a wire from a neighbouring building) was found to be almost ten times that of a metered connection, and monthly electricity expenditure for these users was around 60 per cent higher than for metered users. In India, users often pay comparatively large sums to contractors to provide 'hooked' connections, comprising an upfront 'connection' charge followed by monthly payments. In the Kibera slum (Kenya) people pay landlords for electricity as part of their monthly rent.

The 'vendors' of illegal electricity usually make sufficient profit from the arrangement to more than cover the cost of the connection and their own electricity consumption (1). For the 'consumers', however, the 'service' is generally of very low quality, unreliable and frequently dangerous. For instance, slum dwellers interviewed in both Kenya and Senegal spoke of dangers of electrocution and fires, the latter being particularly serious in slums where housing materials are highly flammable, streets narrow and population density very high.

Poor people, rightly, view electricity as clean, convenient and safe when correctly supplied. It is also clear from the examples above that they are willing to pay highly for it. In fact, electricity represents a disproportionately large share of their energy expenditure for an unreliable service that provides them with only sufficient power for lighting and possibly some entertainment and news media.

Whether obtained because the nature of the neighbourhood excludes it from the grid or because consumers are unable to meet connection fees, illegal connections represent very significant losses for utility companies, seriously hindering the establishment of sound electricity sectors, and provide users with an expensive and, at best, mediocre and unsafe service.

Efforts made so far (in Argentina for example) have tended to be specifically designed to favour normalisation of utility company billing but have lacked the necessary continuity to achieve legal and regularised access in a permanent and inclusive manner. Schemes that do not include individual metering, such as common metering for an area, have been found to discourage electricity saving at the household level.

This is a situation which is clearly not sustainable and one which needs to be addressed. Ineligibility for connection and upfront cost of electricity connections have been identified as the major barrier pushing people towards illegal connection.

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(1) The Senegal report provides a different slant on this and introduces a different incentive for illegal connections: the importance of social ties in African societies is such that electricity can be obtained from neighbours free of any connection cost. The neighbour, generally a relative or close friend, will pay for the all of the electricity consumed. In peri-urban Dakar, 52 per cent of the illegally connected households pay a connection fee and 48 per cent do not.

However, the GNESD study found no state level agencies with responsibility for access to clean energy for the poor nor any universal service obligation on the part of the government to ensure a sustained supply of clean energy to them. Conversely, the study did identify failures in delivery mechanisms affecting poor urban consumers directly, in the absence of proper monitoring and control. Most notable were the cases of malpractice on the part of fuel dealers, incidences of which were reported, in particular, in Kenya and India. The best documented case from the studies is India's Public Distribution System, described in Box 8.

In Kenya, the practice of unscrupulous dealers selling half-filled LPG cylinders is reported to be rife in low income areas. This has greatly affected the credibility of LPG suppliers and thus slowed the fuel's dissemination. The brief description of the situation encountered in Delhi's slums (Box 8) encapsulates the ways in which barriers and distortions can arise even in a system designed to assist the poor, if their actual situation is not the focus of coordinated policies that are monitored right through to the point of delivery. In particular, a full audit trail needs to be established to avoid subsidised fuels 'evaporating' only to re-appear on a black market, where the same poor consumers for whom they were intended are obliged to buy them at exorbitant prices.

The poor are, by the nature of their situation, the most vulnerable section of the population to the sorts of misconduct described above, as well as to market movements and forc-

es. For instance, the structure of an LPG market with a proliferation of middlemen can increase the cost of the energy service by the time it gets to consumers (as is the case in Kenya). Moreover, when fuel prices are linked to fluctuating world oil prices this can make fuels unaffordable or create uncertainty about their use within the target group and retard their uptake. In the absence of monitoring and control mechanisms the poor bear the full brunt of such fluctuations. Alternatively, if mechanisms are in place, action can be taken more quickly to soften the blow and protect any fragile progress towards improved energy access which may be made. Senegal provides a good example of this. Having observed that charcoal producers were dictating prices in the market, the country's government introduced a formal system to establish quotas and licence charcoal production, thereby regulating prices to ensure continued affordability by the poor, who are the predominant charcoal users.

Lack of awareness of use of clean fuels

Users' attitudes can also prevent the uptake of modern forms of energy. Many of the people interviewed during the GNESD surveys expressed doubts and fears about the safety of sources such as LPG and electricity while seeming unaware of the severe health hazards and environmental impacts associated with biomass. There is a clear need here for outreach programmes to dispel certain myths about safety and also to ensure that information about regulations is accurate: in one case potential users of electricity were under the impression that they would not qualify for connection if they already had an LPG connection.

Schemes like that suggested by South Africa—integrated urban energy centres (one-stop shops) offering information and selling appliances and fuels to give households immediate access to information and energy sources—could form a sound basis for this kind of action.

Conclusion

Together with food, clothing and shelter, energy is a basic human need, but it is one that is manifestly not being met for a large part of world's population. After decades of attempted reform based on a 'model' borrowed from the developed world, and assumed to be unique and inevitable, developing countries are experiencing a widening energy gap between the wealthy and the poor. Nowhere is this felt more cruelly than in the growing slums and underprivileged urban areas where poor populations are deprived of access to basic services while living within sight of, and often alongside, the very infrastructure they cannot access.

In most cases, providing clean and modern energy services in urban areas is not basically a technical problem, even though there are pressing needs for more and better infrastructure in many places. Rather, a new approach is needed with a focus on removing the institutional and administrative barriers to people's access to a whole range of energy services, and this is clearly more a question of designing and implementing the right policies and instruments, than one of providing further technical solutions.

This Summary for Policymakers has attempted to give an overview of the energy poverty situation of the urban poor in so far as this can be discerned from a set of limited and discrete case studies. From these it has been possible to pinpoint some barriers to access at every stage of a process that extends from planning to delivery and to identify policy options or instruments emerging from the studies. These are summarised in Table 1 (below)

The issue of urban energy poverty is a pressing one. Over the next three decades almost 95 per cent of population growth is expected to occur in urban areas and without careful and proper management the energy gap between those with access to energy services and those without will both deepen and widen. If the cities of tomorrow are to thrive they will need to be able to call on the capacities of citizens who are free from the exactions of hunger and poverty, who have attained a reasonable level of education and who are in sound health. It is worth underscoring once again the pivotal role of energy for attainment of the Millennium Development Goals: if the problem of energy poverty is not addressed fully, reaching the Goals will be seriously compromised in many places.

Box 8: The PDS in Delhi – a delivery failure
Kerosene continues to be the baseline cooking fuel for a majority of urban poor in India. To ensure its availability and affordability to the poor it is supplied via a network of Fair Price Shops (FPS) under a mechanism called the Public Distribution System (PDS).
Distribution is facilitated through the use of 'ration cards' with specified items including kerosene being provided at subsidised rates to cardholders.
While this system is designed to help the poor, its investigation in Delhi reveals that it is dysfunctional in several ways:
- o Kerosene cannot be distributed under PDS to households that have an LPG connection, forcing them to pay full market or even black market prices if they wish to fall back on kerosene when LPG refills are unavailable or are temporarily unaffordable.
- o Proof of an address is required to obtain a ration card, but given the temporary and unrecognised status of many slums their residents generally do not qualify. This is a common barrier to access to subsidised kerosene, once again forcing poor people onto the black market.
- o Improper practices on the part of FPS dealers are leading to householders receiving less than their actual entitlement. The TERI study shows that as much as 26 per cent of the total kerosene allocated in India cannot be accounted for; another study has claimed that the amount of kerosene being diverted to the black market or adulterated and sold illegally as vehicle fuel is equal to almost 40 per cent of the subsidy meant for the target group.

Table 1: barriers to access to clean energy services in urban and peri-urban areas and policy options and instruments

Barriers to access	Policy options and/or instruments
Lack of strategic planning and long-term vision: - a lack of clear definition of poverty in urban and peri-urban areas is depriving people of basic rights; - current targets for improving quality of life do not include access to modern energy among basic services.	• Identify, map and measure informal settlements as a matter of priority. • Develop **comprehensive** energy policies and ensure that energy forms part of all actions to improve access to basic services. • Make energy an integral aspect when planning strategies to attain MDGs.
Clean fuels inaccessible because of nature of settlement: - lack of a valid address is a major barrier to access for those living in areas without legal status.	• Special forms of temporary status could be granted to households to allow them to accede to basic services while the whole complex area of land tenure is being addressed. Thailand's 'Quasi ID' scheme provides a successful example that could be reproduced.
Costs can be a barrier to access: - high cost of connections for electricity and LPG plus the cost of appliances is a major hindrance to access; - inability to pay electricity bills or purchase refill charges of LPG is a barrier.	• Design and introduce 'consumer-friendly' ways of spreading connection costs (instalments, etc.). • Consider extending subsidies to appliances. • Introduce well designed subsidised tariffs for electricity. For LPG, ensure that subsidies cover the sizes of cylinders best suited to the poor as well as the 'standard' sizes. • Make sure that subsidies reach the target group and avoid 'leakage' to wealthier groups. Senegal provides an example of specially sited LPG outlets designed specifically to serve poor areas with subsidised cylinders of appropriate sizes. Argentina has also introduced a Social Gas Cylinder scheme with a limited number of outlets.
Lack of formal monitoring mechanism: - lack of monitoring through to delivery of energy services can leave the way open for malpractice; - market structures and movements can adversely affect the poor who are vulnerable to such forces.	• Establish agencies with the appropriate responsibilities and powers. Ensure that there is a full audit trail on subsidised fuels to avoid their diversion to an informal market. • Consider actions to help regulate prices if these are forced up to levels which make energy services unaffordable to the poor.
Lack of awareness: - User attitudes can prevent uptake of modern energy. People interviewed have expressed doubts about safety aspects or have inaccurate information about availability.	• Initiate outreach activities to raise awareness. South Africa's proposed 'one-stop shop' information centres provide an example.

Annex 1:
Summary Table Of Findings

Annex 1: summary energy profiles for the selected study areas

Country and Study Focus	Energy Profile	Policies and Initiatives in Place
Argentina, Villa Fiorio and Budge slums, Buenos Aires	**LPG:** Used by 92% of households for cooking and other high-consumption uses, in the absence of connections to the natural gas grid. **Kerosene and biomass:** Small percentage of consumers without LPG still dependent on kerosene and biomass. **Charcoal:** Used to supplement LPG for space heating and cooking. **Electricity:** Used by virtually all households, mainly for lighting. Low quality and discontinuous service, many illegal connections or unpaid bills.	• 'Regularisation' of illegal connections and introduction of area metering to reduce non-technical losses. • Introduction of pre-paid electricity meters and development of a social tariff for electricity. • 'Social Gas Cylinder Plan' setting up of a limited number of sales points for subsidised LPG cylinders.
Brazil	**Firewood and charcoal, kerosene:** main fuels for cooking. Some use of **NG, LPG**. NG grid lacking in poor areas. LPG has good distribution network of 13 kg bottles, but low penetration due to cost of taxes paid to informal groups. **Electricity:** Used for lighting and communications. Widespread illegal connections.	• Major health study on effects of biomass (indoor pollution) on women and children. • Gas Allowance Social Programme (2002) to encourage LPG use. • Social tariffs for electricity. • New regulatory framework for Brazilian energy industry. • 'Light for Everyone' (electrification) programme. • 'Energy Development Account' to promote universal electricity access and use of innovative energy sources.
India, Delhi (slums)	**Kerosene:** Is the baseline fuel for urban poor. **LPG:** Is the primary fuel in those houses that have a legal connection. This is a more prominent fuel amongst those with higher monthly per capita expenditure. **Biomass:** Still much used because of its ease of use and availability in small quantities. **Electricity:** Used for lighting. Obtained either through metered or illegally 'hooked' connections.	• Kerosene is distributed through Fair Price Shops under the Public Distribution System to which access is via ration cards. • There is an across-the-board subsidy on LPG. • Lifeline tariff for electricity: consumption up to a certain level at very low tariff, increasing progressively with consumption. • Efforts to extend electrification.

Kenya, Kibera, Nairobi	**Kerosene:** Most used fuel for lighting and cooking (fast, efficient, cheap and good distribution network). **Charcoal:** Also used for cooking. In spite of its production being outlawed, charcoal is easily and continuously available and easy to obtain in small amounts. **LPG:** Is beginning to penetrate as now available in smaller size cylinders. Not popular at present due to high upfront costs, unreliable supply and safety perceptions. **Electricity:** Some use at household and SME level. Very low level of registered legal access.	• Kenya's National Energy Policy (approved 2006) provides overall policy guidance for the energy sector and contains explicit policy statements on energy access for the poor, to encourage penetration of petroleum-based fuels and re-legalise but regulate production of charcoal to make it sustainable. • Lifeline tariff for electricity giving domestic consumers using less than 50 kWh/month a subsidised price and removal of VAT for consumption of less than 50 kWh/month.
Senegal, Ben Barak, Daliford and Rail peri-urban areas of Dakar	**LPG:** Is the most common fuel for cooking. Available in range of cylinder sizes (27.5, 12, 9 and 6 kg). 27.5 kg and 6 kg are preferred sizes as they are the only ones connectable to cooking stoves. **Charcoal:** Easily available in small quantities. Used as backup for LPG in case of shortages or family budget constraints. Also preferred by some for traditional cooking. **Electricity:** Electrification levels vary but electricity is used for lighting. High levels of illegal connection.	• LPG subsidised and made available in different sized cylinders (including subsidy on small cylinders) successfully encouraged transition to the fuel. Progressive withdrawal of subsidy appears to be freezing demand increase amongst the poor. • Charcoal quota and licensing system for sustainable resource management.
South Africa, Khayelitsha, Imizamo Yethu, Cape Town	**Kerosene:** The most widely used fuel for cooking and heating in poor households because it is easily available, the distribution network is good, the fuel is easy to use and appliances are cheap. **LPG:** Use limited by current pricing and distribution network. It is also perceived as a dangerous fuel. **Electricity:** The main source of lighting, with high incidence of neighbour-to-neighbour connection via extension cords.	• A National Electrification Programme started in the 1990s to address the backlog of electrification by 2012. • Zero VAT on kerosene. • An Electricity Basic Services Support Tariff (2003): free allocation of 50 kWh to households using less than 150 kWh monthly. • Promotion of alternative fuels by Basic Alternative Energy Policy. • Urban Renewal Programme to improve interdepartmental coordination. • Production of 5 kg LPG cylinders in form of a 'value pack' with safety features and connectable to other appliances. • Cape Town is the first African city to develop a comprehensive Energy and Climate Change strategy.
Thailand, Khon Kaen (slum) and Bangkok	**LPG:** most commonly used fuel for cooking, followed by electricity and charcoal. Traditional biomass use negligible. **Electricity:** Very high electrification level but also high level of illegal connections (32%) in Bangkok. Used for lighting, heating entertainment, etc. Most households have electronic devices, 1/4 A/C units and over 1/2 washing machines.	• High priority given to electrification in government's development strategy. • Temporary registration of households to allow them to qualify for legal electricity connection. • Reduced electricity tariffs for monthly consumption less than 150 kWh over 3 months; standard tariff for consumption over 150 kWh.