



**Monitoring the Effectiveness and Impacts of Policies to
Accelerate Energy Access to the Poor and Women**

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Abstract

The paper develops a framework for monitoring the effectiveness of energy policies with regard to the poor, rural and urban, and women. This framework is based on the axes of Availability, Access, End-use and Impacts. Suitable indicators have been identified for each level of monitoring. With regard to data collection it is suggested that the large amount of consumption data already available be used, before designing additional data collection. Data collection, however, should be followed by data analysis; and patterns that emerge should then be analysed. Finally, the concluding section suggests a minimal set of three indicators that could be used to monitor the effectiveness of energy policies.

Acknowledgements

After completing the first draft of this note, we read M&EED (2006). We have borrowed some monitoring indicators from that document. These are indicated where appropriate. Our thanks to Elizabeth Cecelski and Wendy Annecke, who also is a member of the group of authors of the M&EED guide, for bringing this and related material to our notice. Thanks also to all members of the ENERGIA team, the various discussants and others who commented on the paper, including the participants at the High Level Regional Policy Meeting on Networking Towards Gender and Poverty Sensitive Energy Policies, 3-4 November 2008, United Nations Conference Centre, Bangkok. The usual disclaimers apply.

Introduction

Monitoring is not an end in itself, but is meant to support government, service providers and civil society organisations by enabling an evaluation of policies and their effectiveness in achieving pro-poor and gender-sensitive policy objectives, in this case that of accelerating energy access to the poor and women. Monitoring thus should be based on an analysis of the connections between energy access, poverty and gender relations. Access, however, is not the same as availability. LPG, for instance, may be available; but may not be accessed by large numbers of poor households, either because the costs are too high, or because women are not able to utilise time saved in income-earning activities that make up for the cost of LPG. Availability works through income and gender factors to determine the types of fuel that are consumed, or access to energy, and the uses to which they are put. Consequently the income and gender factors combine with availability to influence fuel access and end use. The resulting patterns of fuel access and end use then come next into the monitoring framework.

The end uses of different types of energy have their effects or impacts on the wellbeing of the households and individuals within them. These impacts on wellbeing and capabilities of households and individuals are, finally, the objectives of development policy. Thus, monitoring changes in energy-related aspects of wellbeing - and capability - enters into the framework of monitoring the impacts of energy policies.

Seeing the poor and women as agents of their own change, requires that we pay attention to not just wellbeing narrowly defined as the consumption of various goods and services, but also at the capabilities of these agents. Thus, a process of change both in gendered roles and norms, and in the visibility of women as significant actors in the end use and management of energy resources, are part of the desired impacts of energy policies.

At the same time, in considering the impacts of energy services it is necessary to take into account a number of non-energy factors. How, for instance, does the possibility of setting up energy businesses work? This is an opportunity created, but whether the poor or women are able to utilise this opportunity depends on their capabilities, for instance, their ownership of capital and thus their rights to control and use their own income. Some such crucial factors from the non-energy domain have been included wherever it was felt that they are important to the outcomes being monitored.

Energy policies act in one or more of three domains – availability, access, and end-use of energy services. These, in turn, have or do not have an impact on the wellbeing of energy users. The monitoring framework we propose is divided into four levels – availability, access, end use and impacts on wellbeing and capability.

The first three terms viz. availability, access and end uses are specific to energy analysis. The more commonly used terms in monitoring frameworks are activities, inputs and outputs, as in M&EED (2006). But there is a correspondence between these sets of terms: availability/activities; access/inputs; and end uses/outputs. Impacts are common to both the framework here and to M&EED (2006).

Availability of Energy Services

We divide energy into three broad types – commercial and non-commercial energy and motive power. Motive power often does not enter into discussions on energy policy, but it clearly plays an important role in the level of production and productivity. For instance, if, as is usually the case in upland cultivation, the only motive power for cultivation is that of human labour, that obviously limits both the inputs into production and the scale of production. The introduction of non-human motive power, could have an effect on the extent and scale of production.

Commercial energy for household – (electricity, LPG, kerosene)

Non-commercial energy for household – (fuel wood, biogas)

Motive power (engines)

Table 1: Monitoring Availability

Type of Energy	Indicators for Monitoring Availability
1. Commercial energy - 1.1 Electricity - 1.2 LPG - 1.3 Kerosene	1.1.1 Villages/areas electrified, with number of KW/hours 1.2.1 Distance from LPG outlet 1.3.1 Distance from kerosene outlet
2. Non-commercial energy	2.1.1 Distance from forest/woodlot 2.1.2 Number of biogas plants installed
3. Motive power	3.1.1 Distance to all-weather road by location

The indicators chosen for monitoring availability of commercial energy are somewhat self-explanatory. The other two, however, do require some explanation. With regard to non-commercial energy, quintessentially fuel wood, the customary availability indicator would be distance from the source of fuel wood, either forest or woodlot.

The other non-obvious indicator is that of distance to all-weather road. In the absence of an all-weather road, the volume of goods (including energy inputs such as diesel, LPG, etc.) that can be transported is limited by human, or animal power. In many remote locations -such as hill/mountain areas (in the Asian uplands) and coastal islands (the chars of Bangladesh)- most imports and exports are carried by means of human (metabolic) energy. The establishment of an all-weather road is known to have an immediate impact on availability of energy. Motive power can be of various types – engines to serve as power tiller, for de-husking rice, to be used for transport (on road or water), and so on. Our hypothesis is that distance from an all-weather road is the crucial factor in the overall use of motive power. Villages that are closer to all-weather roads are more likely to utilise all kinds of motive power than villages that are further away from all-weather roads. Of course, there would be the further differentiation by income class and gender, which are taken into account in the next section on access; but at this point we are considering availability.

Energy policies are often aimed at improving availability. Settlements can be connected to the grid or roads improved. These are clear interventions aimed at increasing

availability. Such policies can go as far as reducing the usual norms for setting up connections to the grid or of recovering costs in the process. For instance, remote rural locations, such as settlements in desert, hill/mountain or coastal islands, where distances per connection would be more than in the densely populated plains, would require definite policy changes or subsidies to enable them to be connected.

Access to Energy Services

There is a big difference between availability of energy and access to it. This is where critical income and gender factors come into play. There may be electricity in the locality (village or urban slum) but the poor may not be able to access it. Similarly, there may be commercial fuels available for cooking, but women with a low opportunity cost of their own labour, may not access commercial fuel, but instead continue to utilise their labour time in collecting non-commercial fuel. Finally, there may be an all-weather road to the settlement, but the poor may not be able to afford the price of the motor and fuel that has now become available.

Policies to improve the access of the poor and women to energy services often work at this level, by, say, subsidising the cost of the energy to the poor and women. One of the important indicators here (5.1.1) is that of the proportion of non-commercial and commercial energy consumed by a household differentiated by income, social group and location. As mentioned earlier, it is expected that this will vary with the extent to which women have income-earning opportunities (Indicator 5.1.2) and will thus be an indicator of whether economic changes, favourable to improving women’s position, are taking place.

There are differences in women’s access to energy in different regions of Asia (South Asia, Southeast Asia, and East Asia). But there are three factors that run across these variations: control over or limits to women’s mobility; domestic and social violence; and women’s limited access to management and ownership rights over productive resources, including energy. These, in varying degrees across the regions, are factors that affect women’s access to energy.

Table 2: Monitoring Access

Type of Energy	Indicators for Monitoring Access
4. Commercial energy - 4.1Electricity - 4.2LPG - 4.3Kerosene	4.1.1 Number and proportion of households with electricity by KWh by income, social group, location and FHH (Female-headed households) 4.2.1 Number and proportion of households with LPG by income, social group, location, and FHH 4.3.1 Kerosene consumed by income, social group, location and FHH
5.Non-commercial energy	5.1.1 Proportion of types of energy (non-commercial and commercial) used by income class, social group, location and FHH

	5.1.2 Women's income earning opportunities
6.Motive power	6.1.1 Equipment owned/ operated by income class, social group, location and FHH

Income class is an accepted category for understanding the extent to which policies have an impact on the poor and on poverty. Why have we also included social group and location here? For one, in a number of South Asian countries social groups (defined on caste, religion, or ethnic basis) may be subject to forms of exclusion from certain social services, including energy services. Again, location (desert, hill and mountain or coastal islands) too tends to be a factor in disadvantaging certain groups from accessing electricity or other forms of commercial energy services. Among the excluded, women are the most excluded. It would be useful to know to what such forms of social, including locational exclusion, are being affected by policies that aim at improving the access of the poor and women to energy services.

We have also included female-headed households (FHH) as a separate category. With increasing numbers of households being headed by women and the increasing feminisation of agriculture these FHHs could be vulnerable to exclusion from various services. In Bangladesh, for instance, such single earning adult households are often the poorest.

End Uses of Energy Services

The type of energy accessed does not determine, or does not fully determine, the use of that energy. Electricity, for instance, has a number of uses. It could be used for lighting to help children read better and study longer, or for women to work longer at weaving, or for entertainment, etc. The end use of energy accessed by a household is very much a matter of decision-making structures within a household, with gender relations and age playing key roles. Knowing the end uses of energy within a household may tell us a lot about women's position within the household and changes being promoted by energy policies.

We have divided end uses of energy into the following categories:

Household - cooking, lighting, heating, entertainment, communication

Household production - agricultural processing, appliances and equipment

Small businesses - agricultural production, agricultural processing, weaving, etc.

Transport

Energy businesses (e.g. LPG distribution, generators, inverters)

Electricity for community services – (health, clean water)

The use of transport has specific gender characteristics. Women are often 'groped' or otherwise sexually abused in public transport, thus affecting the manner and extent to which women use public transport.

Energy businesses are the kind of off-grid generation and distribution of power that one often finds in remote locations. They might be used for lighting shops in markets, for household lighting, or even as a service for charging cell phones. The number and importance of such energy businesses are clearly increasing, showing the importance that people attach to electricity in one form or the other.

Community services, such as local health centres, roads, markets and meeting centres, can be considerably upgraded with electricity. Public lighting too is a form of community service.

Table 3: Monitoring End Uses

Type of End Use	Indicator
7. Household <ul style="list-style-type: none"> - 4.1 Cooking - 4.2 Lighting - 4.3 Heating - 4.4 Entertainment - 4.5 Communication 	7.1.1 Cooking methods/appliances used 7.2.1 Lighting appliances 7.3.1 Heating method – space/body 7.4.1 TV/radio – hours of use and type of programmes 7.5.1 Cell phones owned by income class and location
8. Household production	8.1.1 Use of mechanised equipment in agricultural production 8.1.2 Use of mechanised equipment in agro-processing 8.1.3 Gender distribution of use of mechanised equipment and appliances
9. Micro- and small business	9.1.1 Mechanised equipment used 9.1.2 Electrical lighting 9.1.3 Non-agricultural enterprises developed ¹ 9.1.4 Gender distribution (ownership and management) of equipment and lighting used
10. Transport	10.1.1 Access to mechanised transport 10.1.2 Gender distribution in use of transport 10.1.3 Women specific security measures
11. Energy businesses	11.1.1 Types of energy businesses 11.1.2 Ownership by gender
12. Electricity for community services	12.1.1 Distance from electrified health service by location 12.1.2 Distance from community/local government meeting place–by location 12.1.3 Distance from Internet centre ² 12.1.4 Distance from markets by location 12.1.5 Water supply system 12.1.6 Public/street lighting

¹ M&EED (2006)

² Modified from M&EED (2006).

Impacts of Energy Use

Increased use of energy of modern energy (electricity, LPG, engines) is known to have many beneficial impacts on human wellbeing. When judging the impacts of energy policies it is on these aspects of human wellbeing that one must study their impact.

Table 4: Monitoring Impact

	Impact Area	Indicators- by Income, Gender, Social Group and Location
13.	Health status	13.1.1 Respiratory 13.1.2 Eye 13.1.3 Back
14.	Education	14.1.1 Educational attainment by gender, income, social group and location
15.	Agricultural production and processing	15.1.1 No. of crops 15.1.2 Value of output 15.1.3 Time spent in processing 15.1.4 Management roles 15.1.5 Knowledge of new technologies
16.	Household work	16.1.1 Time spent 16.1.2 Sharing by women and men 16.1.3 Leisure/Entertainment 16.1.4 Phone use
17.	Small businesses	17.1.1 Productivity / income per hour 17.1.2 Hours worked (business timings)
18.	Household decision making	18.1.1 Decisions on income – major and minor purchases 18.1.2 Decision on appliances 18.1.3 Energy-related assets
19.	Transport	19.1.1 Reduction in transport costs 19.1.2 Volume of goods transported 19.1.3 Price differences
20.	Modern energy businesses	20.1.1 Income 20.1.2 Control rights to use and invest savings
21.	Law and order	21.1.1 Violence (whether in home or outside) 21.1.2 Women in markets, as buyers and as sellers
22.	Community facilities	22.1.1 Frequency of use of health facilities 22.1.2 Participation in community management 22.1.3 Frequency of Internet use

The shift from traditional biomass to modern fuels in cooking is expected to reduce the incidence of acute respiratory and eye infections and even of back injuries (resulting from collection and transport of fuel wood). These benefits would be to women and children, since women by and large are the cooks for the family, while looking after small children at the same time.

The second set of impacts is on education. Good and affordable lighting, along with better transport, would benefit education.

Engines could be used for drawing water for irrigation, or for transporting goods, etc. All of these would increase agricultural production, improve post-harvest processing and increase realised value.

Modern energy could reduce time spent in cooking and other domestic tasks, including washing clothes. Besides such reduction in time spent on domestic tasks, is there also an increase in sharing of these domestic tasks? And is there also an increase in women's involvement in income-generating activities?

Small businesses, typically run by the poor, could be located in the homestead or even in the market, as with a small shop. Lighting in the market would increase business hours and presumably, business income. Lighting could also increase the hours spent by women in weaving, and other income-earning and household work. Is there an increase either in productivity (per hour) or in hours worked?

Is there a change in women's roles in energy-related decision making, or in the use of additional income from energy-intensive production? In the purchase and use of energy appliances, e.g. the relative importance of lighting in the kitchen vs. lighting elsewhere? In the ownership, use and maintenance of new assets, such as engines or pump sets?

Motorised transport should lead to a fall in the cost of transporting goods, reduce price differences between production-centre and market, and thus also stimulate local production. To what extent are all of these effects occurring?

Modern energy businesses, as mentioned above, would be expected to increase. How many of them are owned and operated by women?

An improvement in street lighting and communications should improve law and order. Is there less violence against women in public? Do women go to the market or to community meeting places more often?

Types of Data Collection

Most countries conduct a census once every 10 years, but a census covers very few variables – e.g. household electricity connections, nearest all-weather road, health centre, education status. Further, the data cannot be classified by income or consumption groups, but they can be analysed by location, social group and gender.

Many Asian countries conduct large-scale national sample surveys (e.g. NSSO in India, BBS in Bangladesh, and HES in Thailand). These include more variables than a census – e.g. types of energy and quantities consumed, transport services consumed, energy use in home business, health status, etc. These may be collected once every 5 years. The data

can be classified and analysed by consumption/income groups, social groups, gender and location.

User data can be collected by service providers, e.g. electricity companies in Brazil that carry out in-depth investigations on their household consumers to obtain data on housing types, income levels, consumption patterns, applications specific to men, women and children, and economic activities like home-based enterprises (e-discussion, Day 6, Summary, ENERGIA and ESCAP).³

Projects usually conduct very detailed surveys of the project population with baseline and project impact data, along with case studies, often at the beginning and at the end of the project. These data can be classified and analysed by consumption/income groups, social groups, gender and location.

Similar data can be collected by PRA methods, including those conducted by trained high school children in rural areas (suggestion in e-discussion). This could be either on an irregular or periodic basis. We give an example of an innovative method of collecting data on the services provided by public authorities – energy, water, transport, housing, telephone, banks and hospitals. The Citizen Report Cards (CRC) involved a survey of randomly sampled households in Bangalore to assess their satisfaction with these public service providers. The first CRC in 1994 found many problems with dissatisfaction with public sector inefficiencies. These findings were disseminated through the media. The second CRC in 1999 found an improvement in the satisfaction level but not in the number of households paying bribes (Keith Mackay, 2007, p. 14). Civil Society Organisations (CSOs), the above example shows, can play a role in public monitoring.

Overall, for monitoring performance, besides public monitoring or audits, there is an important role for independent authorities. Organisations such as the census bureaus and sample survey organisations, including private sector organisations⁴, can be the basic data collectors. For those particular points with regard to energy that are not covered in existing surveys, questions can easily be added to the existing questionnaires, or special surveys could be conducted by these organisations as required.

Along with such data collection, there can also be a poverty or gender calculation of budgets, whether for governments or for service providers. This will give a broad figure, which can show the extent of the budget targeted to the poor or women. This has to be then followed up by an analysis of the use and effectiveness of the budget along the lines of availability, access, end use and impacts, as outlined here.

³ See: <http://energysolutionsforum.energia.org/summaries.html>

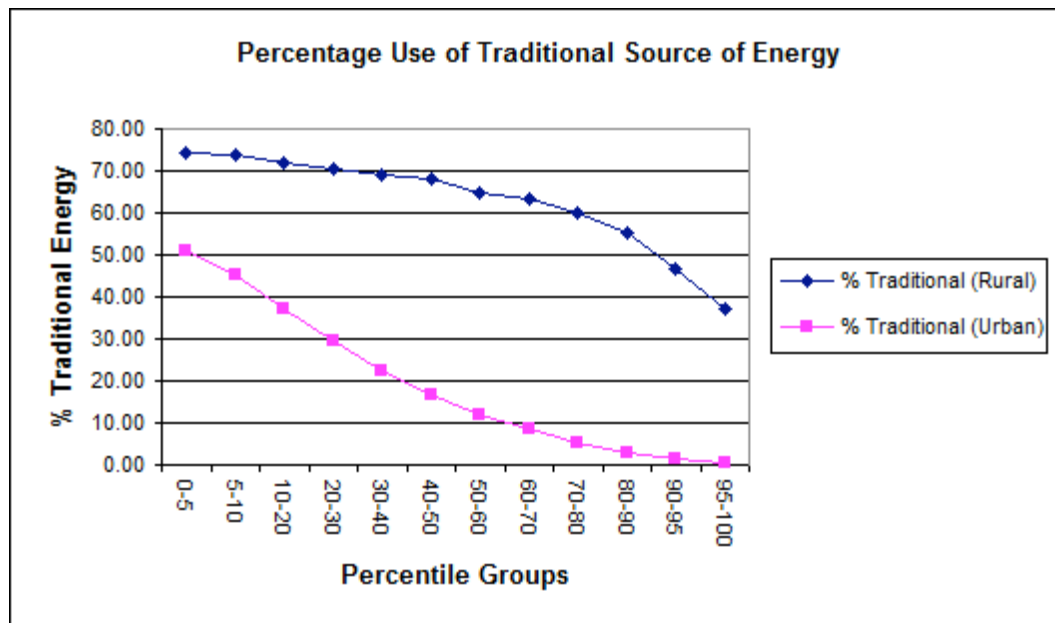
⁴ In the case of India there is not only the government's National Sample Survey Organization (NSSO), which does the basis consumer surveys, but also independent research organisations, such as the Institute for Population Studies, which conducts the five-yearly National Family Health Surveys (NFHS), the National Council of Applied Economic Research (NCAER), and so on.

The monitoring indicators we have put above are also quite numerous. In any actual survey just a few would be chosen, the choice depending on the type of intervention or policy and their expected impacts on the poor and women in the specific context.

A caveat about collecting and using data: it is easy to collect data, difficult to collate and tabulate data, and even more difficult to analyse data. There is a lot of data collected from the field that lies untabulated and even more unanalysed. For instance, there is substantial data in the Indian NSS about energy consumption patterns. But there is little analysis of this data. Below, we give an example of the analysis that could be done utilising Indian NSS data.

Figure 1 shows that there is a clear urban and rural difference in the use of traditional energy by consumption classes – there is a much sharper fall in the proportion of traditional energy as consumption goes up in urban areas, while there is much less of a fall in rural areas. It is important to then analyse why there is such an urban-rural difference in the pattern of traditional energy use and whether this is changing over time, and between rural locations too.

Figure 1: Urban and Rural Use of Traditional Energy by Consumption Groups (1999-2000)



Note:

1. Traditional sources: firewood and chips, dung cake
2. Non-traditional sources: Electricity, kerosene (PDS), kerosene (other sources), matches (box), LPG, other fuel.

Source: Calculated from NSS Unit Level Data by Institute for Human Development, New Delhi in Govind Kelkar and Dev Nathan, 2005.

We have given this example to emphasise the point that there is an under-analysis of existing data, whether on energy use, or impacts on health, but such data analysis can only point to the existence of a problem. Data can tell us that certain groups (women, the poor, indigenous peoples, low castes, minorities, etc.) are being excluded from various energy services. It cannot tell us why this exclusion occurs, or how to deal with it. That requires further analysis of the qualitative type. We agree that, "... quantitative analysis would not be very effective in describing the local politics in the village that led to the formation of the [village] committee or the details pertaining to the deliberations within it. How were certain groups included and others excluded? How did some individuals come to dominate the process? These and other process issues can be crucial to understanding impact, as opposed to simply measuring it" (Rao and Woolcock, 2005: 287).

Policy Suggestions

The paper has analysed the process of monitoring the effectiveness of energy policies through the domains of availability, access, end-use and, finally, impacts on human development.

Quite a large number of suggestions are embedded in the text above. Here we only draw attention to those that can be of immediate policy relevance.

1. Energy providers should begin by using the substantial data regularly collected through censuses, and large-scale consumer and health surveys.
2. Admittedly, additional data are required, and these could be collected through adding questions in these regular censuses and sample surveys, or there could even be special energy surveys conducted periodically by the sample survey organisations.
3. As a minimal set of data to monitor the effectiveness and impact of energy policies on the poor and women, we would suggest:
 - a. Proportion of modern energy use in households in urban and rural areas by income/consumption classes.
 - b. Number of KWh of electricity in urban and rural areas, by income/consumption classes.
 - c. Modern energy businesses owned and managed by women.
4. Most important is to use the data to identify patterns, the reasons for which can then be analysed, through qualitative methods, in order to identify what works and to rank different kinds of interventions to improve the access of women and the poor to energy.

Monitoring exercises, such as social audits by whatever name they are called, can be important in enabling the poor and women to see what they are getting as against what they are supposed to get. In South Africa, a minimal access to electrical energy is considered the right of a citizen. In most developing countries, however, access to electricity or cooking gas is not considered a right. Nevertheless, there is considerable

scope for the poor and women to mobilise to demand minimal access to energy services that are the marks of citizenship. To be excluded from access to electricity and/or cooking gas is a key form of social exclusion. Monitoring by the poor and women can be of help in raising their voice in ending such social exclusion.

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