

# CONCEPTS AND ISSUES IN GENDER AND ENERGY

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# CONCEPTS AND ISSUES IN GENDER AND ENERGY

## Part I: The Concepts

### 1 INTRODUCTION

This paper was commissioned by ENERGIA in response to a request by network members for a clearer understanding of gender concepts and how these manifest themselves in the energy sector. The paper also identifies some key issues of how energy plays a role in transforming women's lives. The paper is divided into two sections: the first section defines gender concepts and places them in the context of the energy sector, while the second section describes issues of gender and energy.

### 2 WHAT IS GENDER?

*Gender* is a concept which refers to a system of socially defined roles, privileges, attributes and relationships between men and women which are learned and not biologically determined. *Gender roles* shape our identity, determining how we are perceived, how we are expected to think and act as women and men. It is possible to identify some gender roles for which the rationale is biologically based, they are perceived as natural. The practical aspects of child rearing (for example, washing and feeding children) is one role expected of women in most societies primarily because women bear children, although both women and men take part in the socialisation of children imparting society's norms and values and ways of behaving. However, more often, gender roles are determined and prescribed by strongly held cultural and religious traditions. Gender roles are not universal, they vary in degree from society to society, which reinforces the point that gender roles are not determined by nature but by the social environment in which a person is raised. Because gender roles are socially constructed, they are subject to change in response to changes in social-economic circumstances, natural and man made disasters such as droughts and war, technological development, education and so on. In other words, gender roles are generally dynamic, they change with time. It is not only different communities that define gender roles differently but also different people in the same community can see gender roles in different ways. For example, in low income households, it is usually the wife who does the cooking, while in wealthy households, the task may be allocated to someone else, either another female relative or a paid servant. This example shows that gender roles are also influenced by other economic and social factors such as income, caste, and ethnicity.

The term *gender norms* is linked to gender roles and is generally used to mean 'socially accepted gender roles', in other words society's ideas of acceptable behaviour for women and men. Along with these roles come certain rights and obligations for women and men based on cooperation and support. Within a household men and women are able to negotiate to some extent what their rights, benefits and obligations are as regards carrying out certain duties or tasks. These negotiations can also be about conflict over and

competition for resources. However, these negotiations do not usually take place between equals. In most societies, men have more power than women to make decisions about and exercise control over their own lives and resources. This balance of power between men and women defines the relationship between the genders. The effects of differences in power operate at all levels in society: household, community, organisational, national and international. *Gender relations*, like gender roles, are socially determined and are influenced by the same factors. An analysis based on gender relations differs from one based on gender roles because it gives more focus to power relations and the connections between men and women's lives. The use of gender roles as an analytical concept can be restrictive since it is descriptive and fails to recognise the way gender is constructed and enforced in society.

**Case 1: Gender roles in rural Tanzania.**

*A Gender relations study was carried out in Korogwe Village in Tanzania by the Tanzania Gender Networking Programme, with the purpose of raising gender awareness. Female respondents considered cooking as "the most remarkable non-traditional role that could be performed by men", followed by fetching water and lastly fetching firewood. Male respondents on the other hand viewed men fetching firewood as the most remarkable change in gender roles, followed by men drawing water (TGNP, 1996).*

The negotiations between men and women that take place in the household result in an informal arrangement, but if this were a legal matter, it might be called a 'contract'. Therefore the term *gender contracts* is used to describe how the relationship in households between men and women is shaped and enforced, and the term can also be applied in a wider context of the society in which they live. This 'contract' is an invisible agreement which determines how men and women should behave and the sort of sanctions society "imposes" on those who break the gender contract. The gender contract is not a contract negotiated between equals but one in which one of the partners (usually the man) holds and can exercise more power than the other (usually the woman). In a development context the concept has been used to analyse men and women's ownership, access and control over property. The modern legal system usually gives men and women equal rights of ownership and inheritance. However, traditional systems often grant other types of rights, for example, women might not be able to inherit property. These two systems are often found operating in parallel in a community and this can lead to tensions and conflict, as women try to assert their right under the "modern" system.

For an energy planner, it is important to understand prescribed gender roles and relations in their context since these affect people's access to and control over resources, and their participation in decision-making. Sometimes, a project can require participants to act in ways that are contrary to their gender roles. This can result in resistance by intended beneficiaries to get involved as can be seen from the fuelwood project in Kenya (Case 2).

**Case 2: Women constrained by gender roles.**

*In the Kakamega area of Kenya a shortage in fuelwood meant that the women had to walk long distances to collect firewood. This situation inspired a project to encourage the*

*women in the village to plant trees. The men in the village already planted trees in the surroundings, but these trees were meant to be sold as timber.*

*Project planners visited the area and offered the women seedling of fast growing trees for firewood to plant on their fields. However, the women refused. They could not plant trees, because women are not allowed to plant trees while their husbands are alive. Their husbands own the land and it would be disrespectful to plant trees on their land. Planting trees is a man's task (Bradley, 1991).*

The case from Kenya demonstrates that it is difficult both for men and for women to go against the gender roles in their community. Even though, in this case, it would relieve the women's tasks, the women didn't accept planting trees because they found it not appropriate within their community.

As was pointed out above, gender roles, contracts and relations are not static but change over time; moreover they can actively be encouraged to change, and many groups are working to change them at local, national and international levels. Others do not wish these things to change, because they see them as part of the culture and tradition of the society in which they live. It is sometimes thought that traditional, rural societies are difficult to change in this regard, but that modern, urban society is more open to changes in gender roles and relations. However, education and contact with foreign cultures does not always imply more openness and tolerance to changing gender roles, as is illustrated by a case study from India. In case study 3 acceptance or rejection of non-traditional gender roles clearly has less to do with education and exposure (forest department officials are educated and relatively exposed to external cultures), but more to do with intrinsic dynamics within the local community.

### **Case study 3: Resistance to changing gender roles.**

*The Ministry of Environment and Forests noted that forests in India had suffered serious depletion and initiated a programme whereby village communities and NGO's would participate in regeneration, management and protection of degraded forests. The programme- Joint Forest Management (JFM), had special features for providing people with access to, and control over forest resources; and attempting to involve women substantively in resource management. Community Organisations called VSS were formed, in which every household was represented by one man and one woman. A VSS had to have at least 30% representation by women.*

*In reality, it turned out that in the regions where JFM was operating, most women were unaware of the programme; most VSS committees had less than 30% women; participation in the labour force was equal between the men and the women, but women were paid less than men even for the same work.*

*Following a study to explain the discrepancies, it was found that an overwhelming majority of the 'grassroots' male members of VSS had no objection to equal participation by women, equal wages for equal work, and even to accepting suggestions made by women. The men however expressed some concern about sending women away for training, because they were concerned about the women's safety and because they felt that women needed to be around to take care of young children. Surprisingly, when asked similar questions, men among Forest Department officials, NGO staff and wealthier men*



*in the village were of the general view that forest management was men's work. (Suryakumari, 2001).*

An example from Ghana on the other hand, demonstrates a successful change in gender contracts.

**Case study 4: Successfully changing gender roles.**

*A study was carried out by Dorm-Adzobu and Ampadu-Agyei on an agro-forestry project in Ghana's Volta region. The project has helped to transform an infertile region into productive farmlands through various sustainable agro-forestry practices. The farms are communally owned. Some of the proceeds from the farms are ploughed back into community activities while the rest is divided equally among members, including men and women.*

*Women also work with men on the community farms. The gender division of labour has not changed. But many women have their own farms. Every villager has a stake in the sustainability of the land. The era when it was men's exclusive responsibility to initiate or spearhead development has passed. In the project area, the natural resources, be they rivers, soils or trees, are managed by all.*

*While it is admitted that women have some traditional family roles, 'unjustifiable built-in gender roles' which relegate women to the background or the kitchen are strongly rejected. (Sigot et al, 1995)*

## 2.1 Complexity of the Gender Construct and its relevance to development

Not all see gender as a core issue deserving of distinction among the many issues that affect human fairness and efficiency in development. Gender inequality has to be seen as a part of broader issues of social, cultural and economic inequalities. Furthermore, gender cannot be addressed without reference to the other inequalities. Gender is not just a binary condition, but is graduated by affluence and poverty; age; marital status; caste systems and other cultures and traditions. Not all women are poor, and not all poor are women. Not all women are disadvantaged.

It is important to recognise that different groups of women may have very different needs in a given society. In communities where there is a strong division (for example based on class, caste or ethnicity), the needs and the capacity to meet those needs of the poor women will be quite different from those of the rich. One cannot assume that all women have the same problems. Nor should one assume that gender is the only basis for disadvantage. However, by taking gender into account, unexpected insights and solutions can emerge that would be missed by using standard planning approaches. The next section looks at the implications of not using a gender approach in energy planning.

## 3 WHY USE GENDER IN ENERGY?

Energy is a prime ingredient in all productive, subsistence and leisure activity. The quantity and quality of available energy determines the efficiency and effectiveness of activities, as well as the quality of life of the users. As such, both male and female

members of society are equal stakeholders in benefiting from energy use. However, all too often women and men do not benefit equally from access to energy. The same *energy service* may indeed impact on men and women differently, with different social or economic outcomes. It is not only the gender division of labour which creates different energy needs, but there are also different perceptions of the benefits of energy and the capacities to access those benefits based on gender. For example, men may choose to locate a light outside the house for security reasons (such as protecting livestock from theft) while women may choose to locate the light in the kitchen. An evaluation of the distribution of the benefits of a micro-hydro scheme in rural Sri Lanka found that in connected households, men and women had equal (but different) benefits from the energy services provided by electricity (mainly TV and lighting) (Dhanapala (1995) quoted in Barnett (2000)). However, it was the unconnected households where there was unequal distribution of benefits. These households benefited by access to TV (by visiting neighbours with sets) and the possibility of hiring lights for special occasions. It was the men who had greater access to TV because they had greater freedom of movement, particularly at night.

Why has energy planning not addressed women and men's needs equally? Until recently, the energy sector in development plans referred to large-scale, capital-intensive technology projects designed to provide energy for growth in the formal sectors of the economy of cash crops and mechanised production, which are primarily a man's domain<sup>1</sup>. Almost totally excluded from this definition are small-scale, management-intensive activities done primarily by women using their own muscle power or local natural resources, for both family subsistence and small-scale income activities, usually in the informal sector. Thus household energy-consuming activities like food processing, water procurement, transportation of water and fuel, and so on are generally not considered in energy planning. The said activities are almost exclusively within women's gender roles in many societies. It happens that participation of women in energy use is overwhelmingly at the small-scale, traditional level, hence their relative exclusion. Poor men are also subject to exclusion because they cannot afford entry into the larger-scale energy-use sector.

The traditional approach to energy in development policy and planning has assumed *gender neutrality*. It has assumed that a good energy policy, programme or project will benefit both male and female equally in meeting practical needs. It has assumed that any differences in the needs and capacities of men and women do not affect the extent to which they benefit from and contribute to energy development and use. What we find in reality is that energy planning is *gender-blind*, that it fails to recognise that needs of men and women are different. The consequences of gender-blind policies are that they tend to exclude women and do not change gender relations.

Traditional planning approaches view communities in terms of 'households' rather than men, women and children, or any other social-cultural distinctions within households. Thus in evaluating impacts, a programme is assumed to have been successful when

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<sup>1</sup> The electronic goods sector in South and South East Asia is a notable exception where women predominate as employees.

households have benefited eg by acquiring modern mechanised tools for agriculture cash crop production has increased and overall household income has increased. Closer, gender disaggregated scrutiny however may reveal that whereas the household produces more food, and men have reduced drudgery and increased performance in their farm work, the situation for women has not necessarily improved and may have deteriorated.

**Case 5: Lack of gender analysis in project planning – increasing women's burden.**

*Mechanisation of ploughing, organised through credit programmes open to men, has led to increased cash returns for affected households. The increased cash is invariably controlled by male heads of the households. At the same time it has brought longer working hours for the women, who are responsible for the non-mechanised tasks such as weeding and harvesting, now on the larger areas cultivated by the machines. Women are not able to obtain credit for machinery to carry out their own tasks both because they do not have collateral and because the agricultural product is the property of the men. Critics argue that projects resulting in 'unexpected' disadvantages such as increased workload for women are the result of failure to carry out adequate gender analysis during project preparation (Cecelski, 2000).*

Assumed gender neutrality in energy policies has led to the virtual exclusion of women's needs, as well as their potential contributions in energy. In attempts to redress this issue, in more recent decades, attention is increasingly being paid to women in national energy policies. In most cases such attention has been confined to household energy, as women are usually the chief cooks and main procurers of household fuel. In developing countries, the main fuel for cooking is biomass in its traditional form, including cow-dung, firewood and charcoal. Thus where attention has been paid to women in national energy policies, the focus has tended to be confined to traditional biomass energy concerns. But women have other needs and capacities in energy. The productive activities in which women engage also use energy, usually human and often biomass energy.

It must be noted, however, that increased attention to women's needs is not being matched with increased investment in meeting these needs. For example, funding for stoves programmes has declined, partly due to donor fatigue amidst many failed stove projects. Furthermore, gender as a development issue is still much misunderstood amongst senior politicians and bureaucrats charged with development and implementation of energy policy, both at the international and national levels.

In the conventional energy paradigm, women have not necessarily been excluded intentionally or their energy-related activities overlooked; they have simply been defined out of the energy sector. Since the mid 1990s, there has been a growing advocacy lobby for more *gender-aware* energy policies, programmes and projects. Such policies would recognise that women as well as men are participants in development, however, the nature of their participation is determined by their gender relations. Gender-aware policies and projects recognise that women have different interests, needs and priorities which may sometimes conflict with those of men. For example, a solar water-pumping project would ensure that there was tapped water for drinking (women's practical need) and for irrigation (men's practical need).

Gender-aware policies and projects can be achieved by taking a “gender approach” to energy planning. A 'gender approach to energy' does not imply targeting projects and programmes to women, (although such programmes could also be included). What is meant by a 'gender approach' is that all energy programmes and projects, of whatever kind - from local fuelwood programmes up to the construction of hydroelectric power stations - should be analysed for the impact they are likely to have on men and women. The motivation for using a gender approach is generally that women have, in the past, not been recognised as a separate group in most sectors of energy planning, that is planning has been gender blind.

#### 4 UNDERSTANDING GENDER NEEDS AND INTERESTS: THE USE OF GENDER ANALYSIS

Gender experts use a number of different ways to analyse gender roles and relationships. *Gender analysis* asks questions, in relation to men and women, about who is doing what, who owns what, who makes decisions about what and how, who gains and loses by a planned intervention. Gender analysis examines what is happening within the household and makes linkages with the different levels of the wider society.

Gender analysis is not about looking at women alone, nor is it about complaining that women suffer more than men, but rather gender is about reaching a better understanding of how communities work from the perspective of relationships between men and women. Gender interests are not always obvious, neither are potential impacts of energy interventions. Sometimes inappropriate interventions are made because they are made on the basis of assumptions. For example, the emphasis in energy planning for the benefit of women has long concentrated around cooking, with firewood collection being seen as the central problem to be tackled. However, our increased understanding of gender and energy issues (see Section 5.2) has shown that equating women’s needs solely with cooking is a very narrow interpretation and misses many aspects related to energy needs and the benefits that can be derived from access to energy services. Issues related to cooking are also more complex than initially realised. Men can get involved in fuelwood collection and do make decisions about stove purchases. Women are also involved in more activities than cooking.

Gender analysis is carried out using *gender analytic tools*. Gender analytic tools are systematic frameworks for diagnosing the existing gender situation in a given community, or for assessing what the impact of an intervention such as an energy project is likely to be, on men and on women. A *framework* is a system of ideas or conceptual structures that help understand the social world. It is important to recognise that a framework is based on certain assumptions about the nature of the social world, how it works, and how people behave. The framework also reflects how a problem is defined, the kinds of questions to be asked in any analysis, and the type of solutions likely to be proposed to solve the problem. Hence, there can exist more than one framework to analyse a particular problem because people make different assumptions about a particular situation. Frameworks compete with each other and often one framework is

used more at a particular point in time.

Gender analytical tools are intended first to draw attention to gender inequalities in a given community, and second to be an early warning system identifying gender problems that may arise if an energy initiative is started within the community. Carrying out a gender analysis of a planned energy intervention will be useful in order to understand the following:

**Needs:** to identify different needs of men and women that will help them to achieve more sustainable livelihood strategies;

**Constraints to participation:** to highlight the different responsibilities of men and women that might constrain their participation in an energy project;

**Ability to participate:** to understand different stakeholders' capacity to participate in any given intervention, e.g. given differential levels of education or autonomy.

**Different benefits from participation:** to determine the different ways in which men and women do, or do not benefit from particular energy interventions (adapted from Pasteur, 2002).

Gender tools are used during various stages of project or programme planning (problem definition, needs assessment, design of intervention, evaluation), although some could be applied in other contexts also, for example in evaluating policy. Their purpose is to ensure that differences between the genders are not inadvertently overlooked, and that any project choices that are made, are made with full recognition of what the differential effects are likely to be on men and on women (Skutsch, 2004). Gender tools are simple ways of gathering and arranging data so that gender differences are made clear to the outside observer, with a view to increasing the rationality of project decision making, though they can also have an effect within the community itself, by raising gender differences as a matter for discussion. The idea is that they should be used during the normal process of planning, so that gender is 'mainstreamed', that is to say, taken as one of the basic underlying factors that are taken into account in every planning exercise.

There are many gender tools which are commonly used by development planners, for example the Harvard matrix and the Gender Assessment Matrix. These can be found widely in literature on gender and development and are usually taught in gender courses. However, Skutsch (2004) considers that these tools are not very helpful for energy planning. She cites two reasons. First, standard gender tools give no direct guidance on how to determine achieving desired developments to address gender issues. Secondly, they do not ask some very simple questions: What forms of energy do women use, for what activities? What forms of energy do men use, for what activities? What kinds of energy would increase women's welfare, increase their productivity, and help empower them? And how do I need to design my project to ensure that women have some say over the outcomes? Skutsch has therefore developed a set of gender tools specifically for use in the energy sector<sup>2</sup>.

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<sup>2</sup> These tools are being developed with support from ENERGIA and when the tools are finalized it will be possible to download them from the ENERGIA website. [www.energia.org](http://www.energia.org)

In this section, two of the most commonly encountered gender analytical frameworks are described: the *triple role* and *practical versus strategic needs/interests*. Indications are given of the types of gender and energy issues that can be addressed within the frameworks.

#### 4.1 Triple Role

One of the first attempts at gender analysis was based on the gender division of labour and divides tasks for men and women into three main social-economic areas: reproductive, productive and community. This framework is known as the *triple role*.

##### *Reproductive*

This refers to all tasks undertaken to reproduce the labour force and includes child bearing and rearing, feeding the family, caring for the sick, teaching acceptable behaviour and so on. Here energy interventions would be to reduce drudgery, save time and generally improve standards of living.

##### *Productive*

This covers work done for payment in cash or in kind. It includes the production of goods and services for subsistence or market purposes. Energy interventions in the area of productivity activities would include increasing efficiency, reducing drudgery and transporting goods and people.

##### *Community tasks*

Community tasks are those done not for individual family gain but for the wellbeing of the community or society: charitable work, self-help communal construction of village facilities, sitting on village committees, involvement in religious activities, visiting friends who need help and so on. For women their community tasks are often seen as an extension of their reproductive roles. Electricity can play an important role in improving communication systems (computer, telephone) and providing lighting for both buildings and streets, thus allowing meetings in the evenings. Transport will help people move around more easily.

Of course these categories are not entirely watertight: there are fuzzy lines between them. For example, someone who runs in an election for a political position - is that community work or productive?

Women are involved in tasks in all the three main areas, which means that they are often expected to do a full day's work raising crops or working outside the home, plus housework and child-raising, plus community obligations. Men are mainly involved in productive and community tasks.

#### 4.2 Practical versus Strategic Gender Needs/Interests

Another analytical approach considers that gender roles have different assigned tasks which have different needs, including energy, to be met. These needs are divided into practical and strategic. They are always context specific, which means they depend on local circumstances and are influenced also by variables like age and civil status.

The words “needs” and “interests” are used somewhat interchangeably. However, there has been some debate amongst gender specialists as to whether or not they have different implications. If women are recognised to actively define their own demands, then some consider the use of the term “needs” in planning to give the wrong inference. The implication is that women are passive recipients of assistance, whereas the term “interests” is considered by some to be more active and hence more representative of the way women behave<sup>3</sup>.

*Practical needs:*

Interventions to meet practical needs aim to make women’s and men’s lives easier and more pleasant, but which do not challenge the accustomed tasks and roles of women and men in the household or in society, or their gender relations. That is to say, they do not upset the traditional balance of power and authority between men and women. They are needs primarily related to activities that keep the household running and the families daily survival ensured, which can also include improving household income. In this framework, practical needs are an amalgamation of practical and productive needs in the triple role framework. This is not surprising given that many of women’s income generating activities are carried out in the household and are actually based on practical household tasks, such as cooking and sewing, and are carried out in parallel with their household responsibilities.

Examples of energy services to meet practical needs are household lights (which can also extend working hours for income generation), improved cooking stoves for household use, improved supply of fuelwood for household use etc.

*Strategic interests:*

Strategic interests are those which relate to women changing their position in society and which help them gain more equality with men, and transform gender relations. Men also have strategic interests, for example, they wish to avoid conscription into a militia or they may resist women’s attempts to transform gender relations.

Women’s strategic needs are generally to do with addressing issues related to laws and gender contracts which tend to be biased against women. For example, in many societies certain groups of women (widows, divorcees, and abandoned wives) suffer economic deprivation as a result of their civil status, based on traditional or modern legal codes: their property can be removed from them by male relatives. In this context, a strategic need is to improve the status of women, for example, through laws which give women and men equal rights, and enforcement of these laws, which establishes their rights to land and other property. Other strategic needs for women may include laws on inheritance so that daughters have equal rights with sons, for example, and prohibiting violence against women. In most countries there are such laws but they are not always enforced. Some see these institutional approaches to addressing women’s strategic needs as too long term and look for other solutions which will bring changes in women’s societal status more quickly. For example, women earning an income through an

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<sup>3</sup> Kabeer (1994) quoted in March, Smyth and Mukhopadhyay (1999)

enterprise (such as a battery charging business) have been found to increase their status, accompanied by greater influence in decision making and control over resources, within their family and community.

Examples of energy services which meet women's strategic needs are street lights which enable women to participate the village council, radio and T.V. increasing women's knowledge and improving their self-esteem and confidence.

*Blurred boundaries between roles, interests and needs:*

It is important to realize that the boundaries between these needs are not fixed. What is a practical need in one case may well be a strategic issue in another. For example, in a society where women regularly run small businesses, such as in many West African societies, provision of electricity to replace kerosene in the women's shops could be seen as a productive need – one that improves the functioning of the enterprise. In another society, the provision of such electricity might for the first time open up the possibility of a small enterprise, in which case it could be seen as a strategic issue.

Case study 6 describes a project in rural Mali which addresses not only the practical and productive needs of women, but also their strategic interests. Their daily tasks, which used to take a lot of human energy, have been relieved (i.e. their practical needs have been met). Additionally, they are able to produce new, better and more products to gain income (thus meeting their productive needs). Finally, the creation of a decentralized energy enterprise owned and managed by women generates strong dynamics for structural transformation, in a setting where land and agricultural assets are traditionally owned by men and tasks are performed by women as unpaid obligations to men. The enterprises enable women to change their position in society and therefore also serve to meet strategic interests of the women.

**Case study 6: Addressing multiple needs through income generation.**

*In Mali the Multipurpose Platform Project provides decentralized energy to rural areas in response to requests from women's associations in the villages. The fundamental energy need for poor rural women in Mali is to find appropriate and affordable substitutes for their own energy, so that they can engage in activities that generate income, and that provide benefits for themselves and their families.*

*The platform consists of a small diesel engine mounted on a chassis, to which a variety of end use equipment can be attached, including grinding mills, battery chargers, vegetable or nut presses, welding machines etc. It can also support a mini grid for lighting and electric pumps for a small water distribution network or irrigation system. The goal of the project is to install 450 such platforms. Through these platforms it is expected that approximately 8,000 women in rural areas will have access to improved opportunities for improved micro-enterprises. Increased income generating activities are anticipated (Burn & Coche, 2001).*



**Table 1: Examples of energy projects to address women's needs and interests using different gender analytical frameworks**

(Source: Clancy, Skutsch, and Batchelor, 2002)

Energy Form	Women's needs and interests		
	<i>Practical needs</i>	<i>Productive needs</i>	<i>Community tasks</i>
	<i>Practical interests</i>		<i>Strategic interests</i>
<i>Electricity</i>	<ul style="list-style-type: none"> <li>▪ Pumping water supplies - reducing need to haul and carry</li> <li>▪ mills for grinding</li> <li>▪ lighting improves working conditions at home</li> </ul>	<ul style="list-style-type: none"> <li>▪ increase possibility of activities during evening hours</li> <li>▪ provide refrigeration for food production and sale</li> <li>▪ power for specialised enterprises such as hairdressing and internet cafes</li> </ul>	<ul style="list-style-type: none"> <li>▪ make streets safer allowing participation in other activities (e.g. evening classes and women's group meetings)</li> <li>▪ opening horizons through radio, TV and internet</li> </ul>
<i>Improved biomass (supply and conversion technology)</i>	<ul style="list-style-type: none"> <li>▪ improved health through better stoves</li> <li>▪ less time and effort in gathering and carrying firewood</li> </ul>	<ul style="list-style-type: none"> <li>▪ more time for productive activities</li> <li>▪ lower cost for process heat for income generating activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ control of natural forests in community forestry management frameworks.</li> </ul>
<i>Mechanical</i>	<ul style="list-style-type: none"> <li>▪ milling and grinding</li> <li>▪ transport and portering of water and crops</li> </ul>	<ul style="list-style-type: none"> <li>▪ increases variety of enterprises</li> </ul>	<ul style="list-style-type: none"> <li>▪ transport allowing access to commercial and social/political opportunities</li> </ul>

Table 1 gives some examples of how different energy forms can meet women's different needs or interests for the two different frameworks.

### 4.3 The value of gender analysis in development

Gender analysis is seeking to understand the differentiated development needs and pre-dispositions of men and women. It enables an understanding of the existing gender situation, before and after intervention. Hence gender analysis involves gathering information on the social-cultural roles and activities of men and women in households and communities. Through gender analysis, an assessment of access to and control over resources; and exploration of the situational factors affecting gender distinction are also facilitated as these factors can support or constrain implementation of development/-energy projects. Analysing men and women separately is important but not enough. The second stage of the analysis must involve inter-relating these roles, needs, and so on and explicitly examining the way they operate in tandem (or otherwise) at the household, community and maybe national levels. Gender analysis enables planners and other stakeholders to assess the impact of an intervention on both male and female members of households and communities. As has been stated earlier, assessment at the household or community level without gender disaggregation can give a wrong picture. But so can

disaggregation without inter-relation.

## 5 GENDER APPROACHES

Gender approaches in development have been changing over time, as a result of changes in the understanding of women's problems, as well as the interplay between gender roles in the household and elsewhere in society. This section first looks at how ideas about gender in development have changed since the 1970's and introduces the idea of gender goals. The second part looks at how our thinking on gender and energy has developed over the same period. Finally the third part looks at how gender goals can be addressed in energy.

### 5.1 Historical Development of Gender Approaches in Development

#### *The welfare approach*

Colonialism had a particular negative effect on women since the colonial rulers had assumed that all farmers and traders were men. As a consequence, agrarian reform during the colonial period resulted in many women losing land title rights they held under traditional institutions. Until the early 1970s, women were not seen as a separate stakeholder group but were defined in the context of their gender roles in the family. Development projects were aimed at men and the assumption was that women as wives, mothers and daughters would benefit from the economic improvements of their husbands and fathers (a sort of "trickle down within the family" approach). Policies with women as the target group focused on their roles within the family as wives and mothers and improving family welfare, for example, by addressing maternal and child health, childcare and nutrition. In 1970, the publication of the ground-breaking study by a Danish Economist, Ester Boserup<sup>4</sup>, into the unrecognised contribution by women to the economy through agricultural production, began to change perceptions about women's role in development. Boserup found that until then, development projects ignored women. Training in new technology was offered to men since men "understood machinery". As a consequence, women's technical knowledge did not develop, and their access to new technology and possible employment was restricted. In other words, women did not appear to be benefiting from development.

#### *The 'Women in Development' approach (WID)*

Building on Boserup's findings and influenced by the rise of the women's movement in industrialised countries, women involved in development issues in the USA lobbied policy makers to ensure that women in developing countries were not neglected by development projects. So from 1973, the US Agency for International Development Projects (USAID) aimed to help integrate women into the formal economy of their country, which would lead to increased gender equality. Following on from this, the United Nations declared 1975 the UN International Year for Women, and in 1976 the UN announced a decade for Women. During this period, we begin to see international development and donor agencies setting up special departments and designating staff to deal specifically with development projects for women. Governments also begin to

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<sup>4</sup> Boserup E (1970), *Women's Role in Economic Development*. New York: St Martin's Press.

establish ministries dedicated to women's affairs. This approach can be seen as women's development taking place separately from mainstream development. There was considerable resistance to these developments from within development agencies and the South.

Since this was very much a donor driven agenda, development was measured by the adoption of Western technologies, institutions and values. Projects were to focus on women, in particular their productive role, and so income generation projects were the main output. The approach became known as *Women in Development* (WID). In order to overcome resistance to projects focusing on women, at least amongst development agency technocrats, it was argued that WID projects would improve women's efficiency, which would in turn contribute to economic development.

The WID approach has been criticised from a number of perspectives. In particular, by concentrating on women's productive role, it fails to address the underlying causes of why and how women are marginalised. It does not address women's position in the household nor the influence of other factors, such as race and class, on women's lives. In other words, women were treated as a homogeneous group. Mainstream development was unchanged and WID departments and projects suffered from under-funding. Governments were seen as part of the solution rather than part of the problem. Some argued that trying to integrate women into development was a fallacy since women were already part of development, a situation that appeared not to be recognised by male dominated institutions. WID could also be considered top-down and imposed from outside. Much of the WID literature does not recognise that women in the South were active during this period, mainly working at the grassroots level through NGOs on women's concerns and a critique of WID began to emerge from these activists.

#### ***The women and development approach (WAD)***

Towards the end of the 1970s, there emerged from out of these critiques by feminists in the South, such as Lourdes Beneria and Gita Sen, an approach known as *Women and Development* (WAD). The WAD perspective considered that the nature of women's inequality lay in patriarchal societies and institutions. If women were to benefit from development and fulfil their needs, then this was best achieved through separate social institutions for women and in women-only projects. The WAD perspective also stresses the distinctiveness of women's knowledge, work, responsibilities and goals. WAD activists worked both at the grass roots level, particularly building women's solidarity, and at the development agency level trying to make them more responsive to women's needs. A major criticism of WAD has been that it has operated very much at the margins of development, and that since women-only organisations tend to be small scale it limits their transformative potential. As with WID, WAD has also been criticised for seeing women as a homogeneous group.

#### ***The gender and development approach (GAD)***

At the beginning of the 1980s, a new strand of thinking began to emerge which considered that neither WID nor WAD explained why women continued to be systematically assigned inferior or secondary roles. This is the time that the term

“gender” begins to appear in the development literature. This new perspective argued that women’s inferior position is perpetuated not only because of material circumstances and their social class but also because of patriarchal structures and ideas. Gender relations are the key determinant of women’s position in society. These relations are socially constructed and subject to change. Women’s experiences are shaped by a multitude of factors including race, class, colonial history, and culture, in other words women do not make up a homogeneous group. The *gender and development* perspective (GAD) considers that women’s inequalities are also perpetuated by global inequalities. In addition, women are not to be seen as passive recipients of development. Women are, together with men, agents of change capable of contributing to development, as well as defining and meeting their own needs.

GAD also distinguishes between women’s practical needs and their strategic interests. The former relates to immediate needs, such as food, water, clothing, shelter, education, and health care, while the latter relates to changing women’s social position in any given culture. Strategic interests also relate to gender equality.

By the mid-1990s, most development agencies had changed their approach, at least in name, from WID to GAD while the WAD approach was still found amongst grass roots organisations. Many consider that in many multilateral and bilateral development agencies, while using the term “gender” actually continued to practice WID approaches. Some agencies adopted the term “gender” to reassure men that their needs were not being overlooked or their position undermined by too great a focus on women! Some argued from within development agencies that gender analysis which provides a better understanding of men and women’s roles and responsibilities made for good economic practice. It helped with better targeting and improved project efficiency and effectiveness, as well as ensuring that women as well as men played a role in development. This approach is known as the *efficiency* approach. However, groups using gender analysis and participatory approaches to development at the grass roots considered that an efficiency approach opened up opportunities to develop women’s skills and self-esteem. In other words a GAD approach *empowered* women to determine their own needs and bring change to their lives.

The term empowerment is much used and probably much misunderstood. It is not helped by the fact that it can have multiple definitions and the situation can arise where people working on the same project will be using their own, sometimes conflicting, definitions that are implicit rather than explicit. “Empowerment” has immediate connotations related to “power”. However, it is possible to arrive at least four meanings by using a different preposition with “power”, and hence by extension, different objectives: power *over*, power *to*, power *with* and power *within*.<sup>5</sup> In part, which definition is applied

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<sup>5</sup> Oxaal Z and Baden S (1997), *Gender and empowerment: definitions, approaches and implications for policy*, Briefing prepared for Swedish International Development Cooperation Agency (SIDA). Bridge Report No. 40. Institute of Development Studies, University of Sussex, Brighton, UK.  
 Batliwala, S., (1994), *The meaning of Women’s Empowerment: New Concepts from Action..*, in Sen, Gita *et al*, *Population Policies Reconsidered*, Havard Series on population and international health, Cambridge, Mass.; Oxfam (1995), *The Oxfam Handbook of Relief and Development*. Oxfam, Oxford;

depends on context and the particular perspective of the user. Most development workers would probably not subscribe to the “power over” definition, where this implies dominance and subordination, particularly where violence and intimidation are involved. They are probably consciously or unconsciously using empowerment to mean “power to make decisions and solve problems” and/or “power to organise with a common purpose or common understanding to achieve collective goals”. The feminist movement, when advocating women’s empowerment, has used both the “power with” and the “power within” meanings. “Power within” is interpreted as the creation of self-confidence, self-awareness and assertiveness. By recognising through analysing their experiences, individuals come to see how power operates in their lives, and so gain the confidence to act to influence and change this<sup>6</sup>. Box 1 gives some examples of definitions of empowerment.

### **Box 1: Perspectives on empowerment**

The Human Development Report 1995, stresses that empowerment is about participation.

Development must be *by* people, not only *for* them. People must participate fully in the decisions and processes that shape their lives. (UN, 1995: 12) but at the same time promotes a rather instrumentalist view of empowerment; Investing in women’s capabilities and empowering them to exercise their choices is not only valuable in itself but is also the surest way to contribute to economic growth and overall development (UN, 1995: iii)

For Oxfam, empowerment is about challenging oppression and inequality:

Empowerment involves challenging the forms of oppression which compel millions of people to play a part in their society on terms which are inequitable, or in ways which deny their human rights (Oxfam, 1995).

Feminist activists stress that women’s empowerment is not about replacing one form of empowerment with another:

Women’s empowerment should lead to the liberation of men from false value systems and ideologies of oppression. It should lead to a situation where each one can become a whole being regardless of gender, and use their fullest potential to construct a more humane society for all (Akhtar 1992 quoted in Batliwala 1994: 131).

Rowland’s points out that empowerment is a bottom-up process and cannot be bestowed from the top down:

The outside professional cannot expect to control the outcomes of authentic empowerment being given by one group to another hides an attempt to keep control. (Rowlands, 1995: 104)

**Source:** Oxaal and Baden (1997) – full references footnote 5.

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Rowlands, J, (1995), *Empowerment examined*. Development in Practice 5 (2); Oxfam, Oxford.; UN (1995), *The World’s Women 1995; Trends and Statistics*, United Nations, New York.

<sup>6</sup> Williams, S, Seed, J and Mwau, A (1994), *Oxfam Gender Training Manual*, Oxfam, Oxford, UK, quoted in Oxaal and Baden (1997) (see footnote 5 for full reference).

The empowerment stream within GAD has been criticised for seeing empowerment as an end rather than a means. While the efficiency stream has gone some way to bringing women into mainstream development, development has been considered as focusing on what women could do for development rather than the other way round. The integration of women into the development mainstream was given a significant boost by the Fourth International Conference on Women held in 1995 in Beijing. One of the outputs of this conference was an international agreed strategy (known as the Platform for Action) for governments and development organisations to promote gender equality. A major tool for achieving gender equality is through gender mainstreaming.

### ***Gender mainstreaming***

Currently around the world, in all cultures and societies, there is considerable inequality between women and men. Generally women are in a worse position than men as a result of gender roles; they have fewer opportunities, lower status and less power and influence than men. Gender inequality cuts across all other social and economic categories. It is institutionalised in formal and traditional laws as well as unwritten norms and values.

The concept of *gender equality* can be defined as the equal enjoyment by women and men of socially valued goods, opportunities, resources and rewards and equal participation in decision making. This does not mean that women and men become the same but that their opportunities and life chances are equal. Gender equality recognises that men and women have different needs and priorities, face different constraints, have different aspirations and can contribute in different ways. It does not mean that there should always be equal numbers of men and women, girls and boys in all activities nor does it mean that they should always be treated exactly the same.

*Women's empowerment* is regarded as a key factor in achieving gender equality. Women should be enabled to take charge of their own lives, where formerly they were under the authority of men (fathers, husbands, brothers, male bosses), and had to obey or agree, whether they liked it or not (*gender contract*). Women's empowerment implies that they should have more autonomy and be able to make decisions on issues that shape their lives, both at household level but also in society in general. This autonomy can be financial; if women as individuals have means of making money and can spend it as they chose. But it can also mean more social freedom. Empowerment of women might mean for example that in cases of divorce, they have equal rights over the children and inheritance; that they can claim protection in cases of household and sexual violence, not just in theory but in practice; that they have the right to control their own sexuality and reproductive functions; and generally that educational and career opportunities are open to them where these were formerly restricted.

The terms equality and equity are often used interchangeably. However, they have different meanings. Some feminists have argued that achieving gender equality while removing barriers to equal participation does not guarantee equality of outcomes. In order to achieve equality of outcomes, there has to be redistribution of power and resources, which is a much more radical agenda than the gender equality goal, in other words *gender equity* is the goal. Equity means a 'fair' distribution, but what is fair, has to

be decided. To you, it might mean that women and men get paid the same daily wage for the same work in transporting bags of grain. To someone else it might mean that women get paid less, because they are less strong and cannot carry so many sacks. Deciding what is fair is not always easy.

Most international development agencies subscribe to the gender equality approach. Gender equality is to be reached through a gender mainstreaming approach. To mainstream gender means to ensure that women's as well as men's concerns and experiences are integral to the design, implementation, monitoring and evaluation of all legislation, policies and programmes so that men and women benefit equally and inequality is not perpetuated. The mainstreaming approach does not exclude women-only (or men-only) projects; however, it differs in its focus to WID approaches by taking gender equality as a goal rather than women as a target group. Mainstreaming tools include gender training, introducing incentive structures which reward efforts on gender, and the development of gender-specific operational tools such as checklists and guidelines, gender budgeting, sex disaggregated data, gender sensitive indicators and institutional analysis.

There is, of course, a lot of opposition to this in some quarters to the ideas of women and men's equality, because – particularly at the level of the household – this is a very threatening idea to many people (not just to men: many women find the idea unacceptable). Some see ideas of equity as an attempt to impose an alien culture by outsiders.

### ***Gender goals***

The previous section has shown how our thinking on women and gender in the context of development has evolved since the beginning of the 1970s. Certainly women's concerns are more readily found on the agenda of international agencies than they were then, and since the Beijing Conference in 1995 programmes are now supposed to incorporate gender. Projects and programmes incorporate gender through *gender goals*. However, although many will claim that these goals are based on GAD, the goals can reflect all the different approaches that have been taken in the preceding decades: welfare, efficiency, equality/equity and empowerment. Some times they are mixed within the same project and sometimes, different stakeholder groups participating in a project can have different gender goals which may or may not be explicitly articulated. Much donor policy is written in terms of women's empowerment. However, in contrast, most energy projects are planned in welfare or efficiency terms. There is often a gap between gender policies or goals and actual practice.. Case study 7 from the Tumkur district in India describes an example of inconsistent project planning from the government.

#### **Case study 7: Inconsistent energy project planning, failure to match needs and goals.**

*In India improved stoves have been disseminated by government departments. A small NGO, Technology Informatics Design Endeavour (TIDE) assessed these improved stoves in use in rural households. TIDE observed a large-scale rejection of the stoves. Several reasons accounted for the refusal of the stoves, one of them being the inconsistency*

*between the government's goals and the needs of the women. The government aimed at improved stoves to save fuel. Women's needs however were primarily to improve their welfare by reducing the smoke. Unfortunately the stoves did not meet this requirement, causing the non-acceptance of the stoves by the women.*

*A new strategy for dissemination of household stoves was needed and TIDE has engaged rural women in dialogue about their needs/expectations of an improved woodstove.*

*Finally the project evolved towards a stove design catering for women's expressed needs and a stove dissemination strategy for rapid penetration of improved stoves without subsidy or government intervention, but completely conceived and executed by women.*

*(Bhogle, 2003)*

Case study 7 illustrates clearly the point that at the start of the project the needs of the user were not taken into account sufficiently. Hence, at the start this led to poor project efficiency. When the needs and goals were properly matched project efficiency increased. Table 2 gives an overview of different gender goals and their implications for projects.

**Table 2: Overview of the meaning of gender goals**

<b>Gender Goal</b>	<b>Meaning</b>	<b>Implies</b>
Welfare of women	Drudgery of women's work and the ill health related to this is reduced, but fundamental roles of women are not changed	Practical needs need to be met  Relates mainly to so-called reproductive activities
Productivity of women	Women able to participate more efficient in economic activities	Productive needs need to be met, but traditional roles not necessarily changed
Empowerment, equality, equity for women	Opening up of new roles and opportunities for women outside traditional ones, in economic, social, and political sphere  Women able to participate on equal basis with men in the economic sphere; earn and control income for themselves, if this was not the case before	Strategic interests need to be addressed  Relates to new types of activities and new roles and freedom for women  More emphasis on strengthening women's productive activities or opening new opportunities for women's production
Project efficiency	Women's roles properly understood; the household no longer seen as the unit in planning.	Project should be more carefully targeted.

In the next section, we will look at how our thinking on gender and energy has evolved and we will then return to see how gender goals appear in gender and energy projects.



## 5.2 Evolution of Thinking on Gender and Energy

Early analysis of gender and energy focused primarily on the South since it was assumed that in a Northern context energy is gender neutral.

In the South, initial attention was caught by the heavy burden faced primarily by women and children, in relation to traditional fuel collection and use patterns. The burdens include adverse health effects from indoor air pollution, and the opportunity costs to women of missed productive employment due to the significant amounts of time spent in the provision of fuel for household cooking and heating activities. The analysis quickly gained sophistication, broadening to include a clearer understanding of the differentiated energy use patterns of men and women based on the social and economic division of labour, as part of gender analysis in the development field. In many countries, it was observed that traditional fuel use and energy use for subsistence activities (“non-productive” activities) were more common among women, while the use of modern, traded fuels and energy services used for income earning or productive activities were more concentrated among men. This led to extensive activities intending to benefit women, in particular to liberate them from burdens associated with subsistence activities, focusing on improved cook stoves and cooking patterns. However, these concerns were not incorporated into national policies.

More recently there has begun to emerge a more complex understanding on the relation between gender and energy. Today’s debate takes as its starting point that both men and women are involved in productive activities requiring energy inputs. While the burden of household energy supplies and services remains largely the responsibility of women, access to modern energy carriers, like clean fuels and electricity, affects both men and women. What distinguishes the debate is that the availability of energy services affects men and women differently depending on the energy applications that they are most involved in. Yet most energy policy debate, and legislative frameworks have taken a gender neutral, or many would argue, a gender blind approach to energy pricing, rural energy policy and energy technology. Thus energy policies continue to fail to recognise the differences in the needs and assets of women and men.

By the mid-1990s, the concept of gender and energy had broadened from stoves, time saving, woodlots and biomass fuels, and appropriate technology to one that encompassed a broader range of issues including pricing, transport and modern energy forms, such as electricity (Cecelski, 1995). Cecelski (1995) pointed out that decentralised renewable energy systems have a good potential for contributing to labour saving and income generation in rural areas. However, she concluded, if women were to benefit equally with men, two constraints that prove a greater barrier to women than men had to be addressed: lack of credit and lack of technical information and knowledge.

Much of the early activity related to gender and energy was at the project level and it was not until the new millennium that the issue began to appear in international policy debates. The ninth meeting of the Commission for Sustainable Development (CSD-9) in 2001 was the first time that intergovernmental dialogue focused specifically on the relation between energy and multiple development issues. CSD-9 concluded that access

to energy services (rather than supplies, fuels or electricity), in other words the benefits that energy provides, is an essential prerequisite for reducing poverty. The document signed at the end of CSD-9, also was ground breaking in the sense that it recognises that there are gender and energy issues both in the North and in the South (UN, 2001).

In 2000, world leaders agreed on an ambitious set of global targets known as the Millennium Development Goals (MDGs). The MDGs, have no specific target on energy. Instead, the relations between gender, energy and development, are implicit rather than explicit. However, the UK's Department for International Development (DFID) in its publication "Energy for the Poor" demonstrated the role of energy in meeting the MDGs (DFID, 2002). Havet (2003) has taken this work further by showing how the gender dimensions of energy relate to the MDGs (See Tables 3 and 4).

While much of the gender and energy discourse has focused on the South due to the acutely manifest importance of energy in women's lives in the South, energy issues in richer countries also have important implications for gender relations, female political participation and sustainable development. In both cases, the role of women in political life, community organizations, and families points to the important opportunities for leadership that can bring about positive change to use energy as an instrument to achieve multiple objectives linked to social justice, environmental protection and economic empowerment. In the North, for many women their direct involvement in energy issues came about with political opposition to nuclear power, for example, in Europe after the Chernobyl nuclear disaster.

Evidence is now beginning to emerge, based on work carried out in the USA and the European Union (most notably Germany), that there exist the common policy challenges in the South and the North with respect to the difficulties of engendering the energy policy debate, domestic legislative and local regulatory frameworks to address gender and energy issues. Indeed, a recent article by Clancy and Roehr (2003) has reviewed the evidence and consider that there is a distinct gender dimension in the way women and men's lives in the North are affected by energy use. The gender neutrality of energy in the North, the authors argue, must be contested.

There is no doubt that over the last twenty years, there has been a considerable development in our understanding of gender and energy issues and how we should, at least in the South, address them. Household energy is no longer seen entirely as women's preserve and that it is not synonymous with cooking (Clancy, 2002). A number of researchers have taken a broader definition (see for example Clancy, 1998, Klingshirn 2000) to encompass all the activities that take place within a household and the linkages to a much wider system of energy supply and demand. In addition, there are significant linkages between household energy and other sectors, for example, agriculture (agricultural residues as fuel source), health (lung and eye diseases, nutrition), education (children's opportunity for after-school study) and income generation (cottage industries). These linkages also demonstrate that it is not sufficient to consider only women when addressing household energy issues but that men also play a significant role in decision making on household energy.

**Table 3: Millennium Development Goals - Goals and targets related to energy and gender**

(Source: Havet, 2003)

<i>Goal</i>	<i>Target</i>	<i>How energy contributes to achieving goals and targets<sup>7</sup></i>	<i>Gender perspective</i>
<b>Goal 1: Eradicate extreme poverty and hunger</b>	Target 1: Reduce by half the proportion of people living on less than a dollar a day	<ul style="list-style-type: none"> <li>■ More efficient fuels and fuel-efficient technologies reduce the time and share of household income spent on domestic energy needs for cooking, lighting and keeping warm (poor people pay proportionately more for energy)</li> <li>■ Reliability and efficient energy can improve enterprise development</li> <li>■ Lighting permits income generating activities beyond daylight hours</li> <li>■ Energy can be used to power labour-saving machinery and increase productivity of enterprises</li> </ul>	<ul style="list-style-type: none"> <li>■ Women and girls are generally responsible for the provision of energy for household use, including gathering fuel or paying for energy for cooking, lighting and heating</li> <li>■ When women's time and income is freed up from these activities, they can reallocate their time toward (1) tending to agricultural tasks and improving agricultural productivity (2) developing micro-enterprises to build assets, increase income and improve family well-being</li> </ul>
	Target 2: Reduce by half the proportion of people who suffer from hunger	<ul style="list-style-type: none"> <li>■ Improved access to cooking fuels and energy-efficient technologies increases the availability of cooked foods (the majority (95%) of staple foods need to be cooked before they can be eaten)</li> <li>■ Pumped water for drinking, cooking needs and irrigation systems that deliver more water than what can be carried</li> <li>■ Mechanical energy can be used to power labour-saving machinery and increase productivity along the food chain (for example, to process agricultural outputs, such as milling, husking)</li> <li>■ Improved access to efficient fuel and technologies reduces post harvest losses and water needs through better preservation (for example, drying and smoking)</li> </ul>	<ul style="list-style-type: none"> <li>■ Women are generally responsible for cooking and feeding their families and often for subsistence agriculture and food processing</li> <li>■ A well-developed agricultural sector helps to promote economic opportunities for women, allowing them to build assets, increase income and improving family well-being</li> </ul>
<b>Goal 2: Achieve universal primary education</b>	Target 3: Ensure that all boys and girls complete a full course of primary schooling	<ul style="list-style-type: none"> <li>■ Access to efficient fuels and technologies frees up children's time, who are often pulled out of school to help with survival activities (fetching wood, collecting water, cooking inefficiently, crop processing by hand, manual farming)</li> </ul>	<ul style="list-style-type: none"> <li>■ Girls are more likely to be taken out of school to help with domestic and agricultural chores than boys</li> <li>■ Spending on schooling, especially for girls, increases with higher incomes for women</li> </ul>

<sup>7</sup> The information contained in this column was adapted from the UK's Department for International Development (DFID)'s publication *Energy for the Poor: Underpinning the Millennium Development Goals* (2002).

<b>Goal</b>	<b>Target</b>	<b>How energy contributes to achieving goals and targets<sup>7</sup></b>	<b>Gender perspective</b>
		<ul style="list-style-type: none"> <li>work)</li> <li>■ Energy can create a child-friendly environment (access to clean water, sanitation, lighting and space heating/cooling)</li> <li>■ Lighting in schools allows night classes</li> </ul>	<ul style="list-style-type: none"> <li>■ Girls are more likely than boys to be affected by a lack of access to clean water and sanitation facilities reducing school attendance</li> </ul>
<b>Goal 3: Promote gender equality and empower women</b>	Target 4: Eliminate gender disparity in education	<ul style="list-style-type: none"> <li>■ Electricity enables access to educational information and information communications</li> <li>■ Street lighting improves the safety of women and girls at night allowing them to attend night schools and participate in community activities</li> </ul>	<ul style="list-style-type: none"> <li>■ Women are more likely than men to be illiterate</li> <li>■ Women are less likely than men to have access to information and be included in political and community life</li> </ul>
<b>Goal 4: Reduce child mortality</b>	Target 5: Reduce by two thirds the mortality rate among children under five	<ul style="list-style-type: none"> <li>■ Cleaner fuels and technologies help reduce indoor air pollution which contributes to respiratory infections that account for up to 20% of the 11 million deaths in children each year</li> <li>■ Traditional stoves can be unsafe (for example, burns and household fires)</li> <li>■ Cooked food, boiled water and space heating contributes to improved nutrition and health</li> </ul>	<ul style="list-style-type: none"> <li>■ Women have primary care for the health of children</li> <li>■ Women and young children spend the most time indoor</li> <li>■ Women and girls are generally responsible for cooking, often with unventilated open fires</li> </ul>
<b>Goal 5: Improve maternal health</b>	Target 6: Reduce by three quarters the maternal mortality ratio	<ul style="list-style-type: none"> <li>■ Energy services are needed to provide access to better medical facilities, including medicine refrigeration, equipment sterilization and operating theatres</li> <li>■ Energy can be used to produce and distribute information on sex education and contraceptives</li> </ul>	<ul style="list-style-type: none"> <li>■ Excessive workload and heavy manual labour (for example, carrying heavy loads of fuel wood and water; arduous and repetitive agricultural and food processing tasks) may affect pregnant women's health and well-being</li> </ul>
<b>Goal 7: Ensure environmental sustainability</b>	<p>Target 9: Reverse loss of environmental resources</p> <p>Target 10: Reduce by half the proportion of people without sustainable access to safe drinking water</p>	<ul style="list-style-type: none"> <li>■ Over harvesting, land clearing or environmental degradation can make fuel wood more scarce forcing the poor to travel farther and spend more time and physical energy in search for fuel</li> <li>■ Availability of cleaner fuels and energy-efficient equipment reduces demand for fuel wood and charcoal, increases availability of dung and agricultural wastes for fertiliser, and reduces air pollution and greenhouse gas emissions</li> <li>■ Motorised pumps help provide more clean water for drinking and sanitation than amounts carried</li> </ul>	<ul style="list-style-type: none"> <li>■ Women and girls are generally responsible for gathering fuel wood and collecting water</li> <li>■ The chances of sexual assault and other risks (for example, of snake bites) increases the further women and girls must travel</li> </ul>

**Table 4: An example of how the gender-energy nexus can target most of the Millennium Development Goals**

(Source: Havet, 2003)

<b>Goal</b>	<b>Main Impact</b>	<b>Additional Impacts</b>
<b>Goal 1: Eradicate extreme poverty and hunger</b>	<ul style="list-style-type: none"> <li>■ Women save a total of 8 hours per week in processing agricultural products (millet, sorghum, maize)</li> <li>■ Women save a total of 7 hours in the husking of rice that manually takes 8 hours</li> <li>■ Women save about almost half of the time spent milling and pounding shea nuts</li> <li>■ Men save time and transport costs with a battery recharger on location</li> <li>■ Men save money and time with locally supplied welding</li> <li>■ Women were able to double their rice output and triple their shea butter production on their individual plots with the time saved women due to the platform</li> </ul>	<ul style="list-style-type: none"> <li>■ Better quality product obtained after processing</li> <li>■ Reduced losses (e.g. 10% gain in the case of shea butter)</li> <li>■ Larger quantities processed (shea butte)r</li> <li>■ Better food hygiene (e.g. use of pestel and mortar or grinding stone)</li> <li>■ Creation and training of welder jobs</li> <li>■ Electricity allows the platform to be used at night</li> <li>■ Women were also able to diversify their agricultural output and engage in market trade to sell their additional product</li> <li>■ Conflicts within families have been reduced as meals are more likely to be provided on time and are of better quality</li> </ul>
<b>Goal 2: Achieve universal primary education</b>	<ul style="list-style-type: none"> <li>■ Girls perform better in school than boys when the platform is installed</li> </ul>	<ul style="list-style-type: none"> <li>■ Platform reduces the chores girls have to perform in the morning (e.g. pounding and drawing water)</li> <li>■ More regular attendance at school as girls are less likely to be taken out of school for entire days</li> <li>■ Girls are less tired in the evenings for homework</li> <li>■ Increase in women's revenues allows mothers to send their daughters to school</li> </ul>
<b>Goal 3: Promote gender equality and empower women</b>	<ul style="list-style-type: none"> <li>■ Financial management of platform by women raises their visibility in the villages</li> <li>■ Literacy training is provided to the women who manage the platform</li> <li>■ Electricity provides access to information through radio and television</li> </ul>	<ul style="list-style-type: none"> <li>■ Mobilisation of financial resources through the fee-for-service system has allowed the women to participate in the development and management of activities in the village (in some villages, the capital from the women's group is the largest source of capital available)</li> </ul>
<b>Goal 4: Reduce child mortality</b>	<ul style="list-style-type: none"> <li>■ Water pumping provides better hygiene and water quality</li> </ul>	
<b>Goal 5: Improve maternal health</b>	<ul style="list-style-type: none"> <li>■ Electricity provides lighting of maternity ward and better delivery conditions</li> </ul>	
<b>Goal 7: Ensure environmental sustainability</b>	<ul style="list-style-type: none"> <li>■ Women and girls save time drawing water when water pumping is provided</li> </ul>	<ul style="list-style-type: none"> <li>■ A water reserve is created and managed</li> <li>■ Neighbouring villages can also draw water</li> </ul>

However, why does so much of the discussion in a discourse that calls itself “gender and energy” seem to focus to a large extent on “women and energy”? Of the 1.3 billion people who live in poverty, 70% are women. Approximately one-third of the households in rural areas have female heads. Many of these women are more disadvantaged than men in similar circumstances, for example, women’s access and control over resources such as land, cash and credit is more limited than men’s. Women’s technical skills are often less than men’s, for example, compared to men, women’s reading levels are lower and their experience with hardware is less. This means that when making energy interventions to help people move out of poverty, the ability of women to respond is more restricted than men and special elements need to be included in projects and programmes to address these gender differences to ensure that anyone who wishes to participate and benefit is not excluded on the grounds of lack of assets. Case Study 8 describes a community hydro project in Nepal which used the approach of separate women and men’s groups for ensuring that women were involved and benefited along with the men.

**Case Study 8: Encouraging Women and Men’s Participation in Community Energy Projects.**

*In 1996 the Rural Energy Development Programme (REDP) in Nepal established male and female community organisations with equal responsibilities to work on the project. The REDP project aims at enhancing rural livelihoods and preserving the environment by supporting the installation of micro hydro power systems. Every participating household sends a male member to the male community and a female member to the female community. The segregation of women and men into separate community organisations encourages men and women to discuss and analyse specific problems they face. The community organisations meet every week. By the end of 2000 total membership was 20,258 women and 19,125 men in 1,021 female and 1,000 male community organisations.*

*Additionally, the project facilitates capacity building through training in reading and writing, management and leadership.*

*The equal opportunities have had a very visible and positive impact in mobilising women and integrating them into mainstream activities. The women in community organisations have a distinct voice in local affairs and self-confidence has increased, as has their capability for independent and collective action.*

*(Rana-Deuba, 2001).*

### 5.3 Gender goals in energy project planning

Understanding that women have practical and productive needs as well as strategic interests, that can be addressed by energy projects, leads to the question of what, exactly, are the gender goals of any given project. In other words, what is the reason for taking a gender approach in planning the project? What do we hope to achieve by it?

Gender goals will differ from one project to another, from one community to another, from one situation to another. It is important, however, that both the planners and the community involved in the project are clear about and agree on the gender goals in the particular case. Often, projects are said to be aimed at ‘empowering women’ when in

reality they are not able to do this – or local people may not be in agreement that this is the aim. It is better to be clear and realistic about what gender goals have been set, so that the target is visible and evaluation of the project can be made on the basis of an agreed and accepted aim. The participants in the project should also be clear about the aims. This can help overcome resistance to projects and avoid disappointments.

In Section 5.1 it was mentioned that there can be four different goals when it comes to using a gender approach in project planning: welfare, empowerment, equity/equality and efficiency. Careful thought is needed to decide *which* of these should be the guiding goal for any given project. We will now look at how energy projects can meet different gender goals.

### **1. To improve women's welfare through energy technologies**

This first goal takes as its starting point that women's lives involve a lot of drudgery, recognizing that they work longer hours than men, when their household tasks are considered as well as their other work in the family fields or in the family business, or as wage labourers. Many of the household tasks require considerable physical effort and negative effects; fetching water, fetching firewood and cooking over smoky, open fires, for example. Sympathy for the unpleasantness of these conditions has rightly given rise to the idea that such tasks should be lightened for women.

The largest energy-related health impact on women and children on a global basis is their high exposure to indoor air pollution in the more than half of the world's households that cook daily with wood, crop residues and untreated coal. Typical indoor concentrations of important pollutants, such as respirable particulates, carbon dioxide, benzene and formaldehyde, are excessive by comparison to WHO guidelines on acceptable limits for exposure. Thus it is obvious that improved stoves that are safer and produce less smoke, relate to *welfare* goals for women. Energy projects aiming to improve women's welfare may also take as their primary focus other issues such as drinking water, as the case study below shows.

#### ***Case Study 9: Solar water disinfection in Latin America***

*Solar water disinfection in Latin America is a possibility for thousands of people who, due to their precarious conditions, have no other option for obtaining clean drinking water. It especially benefits women and children since they traditionally have the responsibility within the family for water collection and its treatment. Previously chlorine and boiling have been used as strategies to clean the water. However, the problem with the use of chlorine is the bad taste it gives the water and additionally obtaining the supply of the chlorine. High costs for fuel make water boiling problematic and in many areas there is a scarcity of fuelwood. SODIS provides a simple and effective alternative. SODIS is a simple technology that utilizes the energy from the sun to inactivate and destroy pathogenic microorganisms present in water. Basically it amounts to filling transparent bottles with water and exposing them to the sun for a minimum of six hours. Disinfection takes place through the combined action of ultraviolet (UV) radiation and the increased temperatures generated by the sun. Research has demonstrated that SODIS results in reductions of up to 99.9% in faecal coliforms, a*

*good indicator of the faecal contamination of water. The same has been shown for Vibrio Cholerae bacteria.*

*The benefits for women are clear, it reduces their workload and it improves health (Del Torres & Salas, 2001).*

*When the project goal is to aim at improving women's welfare in most cases this relates very closely to satisfying women's practical needs.*

## **2. To increase women's productivity through energy technologies**

Some energy projects have the potential to help women produce more efficiently and increase their output, leading to higher incomes for themselves and their families and to economic development. Electric sewing machines to replace hand machines, solar driers which give a better quality product (dried fish or fruits); improved small scale bakery ovens for women's enterprises, electric light allowing work and study in the evenings, refrigerators allowing the sale of cool drinks and computers supporting business enterprise.

### **Case Study 10: Energy project to increase productivity. Ugandan women and solar dryers**

*In Uganda, an FAO/UNDP post-harvest programme recommended small-scale solar dryers for long-term storage and household consumption of fruit and vegetables. However rural women's groups were more interested in solar dryers for income generation than for food security. Subsequently, the 'Fruits of the Nile' company was formed in 1992 to link rural producers with the market for dried fruit in Europe. Within three years more than 50 women groups had taken up the solar drier technology, and in 1995 the company exported more than 50 tonnes of dried fruit. The original food security concerns are also being addressed. When they are not drying for profit, the women use the solar dryers to preserve vegetables and fruits for home storage and consumption (Okalebo & Hankins, 1997).*

In case study 10 the solar dryers enabled women to increase their productivity.

*When the project goal is to aim at improving women's productivity, in most cases this relates very closely to satisfying women's productive needs*

## **3. To promote women's equity, equality and empowerment through energy technologies**

Case study 8 from Nepal (see Section 5.2) tried to increase women's involvement with an equality goal in mind. A project that offered a micro hydro system took both men's and women's needs into consideration by separating them into two distinct groups with equal responsibilities. The project has an equality goal, whereby men and women have equal rights and responsibilities. In this project the women have also felt empowered by their



successes.

How can energy help “empower” women? An example is the creation of new career opportunities for women in the energy sector, for example energy entrepreneurs in any one or more of the following: producing, processing, distributing and selling energy resources (eg electricity) or technologies (solar cookers). Several projects have succeeded in educating women as energy entrepreneurs. Case study 11 from Kenya, below, shows a situation where women became energy entrepreneurs and felt empowered.

**Case study 11: Energy project for empowerment. Kenyan women producing stoves**

*Thirteen women's groups (200 people) have been trained in making stoves in the Rural Stoves West Kenya project, and many have also benefited from business management training. Annual production is estimated at 11,000 stoves annually; the profit generated by the stoves is comparable to wages in rural areas. As a result, the women potters have gained in status, self-confidence and financial independence (ITDG, 1998).*

Although ‘empowerment’ is a key aspect of current development practices, it may be difficult for most energy projects on their own to really bring empowerment to women. The reasons that women are not empowered today are complex and many sided; energy is only one of many resources to which women have little access. In general we can say that is not generally a particular energy technology that has the potential to really empower women, but the *process* by which the energy technology is introduced. A project can be planned in such a way that women get new types of opportunities, such as management positions, or technical training in maintenance, which are non-traditional. Projects can be carried out in such a way that women are properly represented in decision-making, and given scope to take on decision-making where they were previously ignored. This will depend not on the technology, but on the attitude and working practice of the implementing organization, which will have to be very sensitive to gender issues and to bring women onto the stage. There are examples where women have had access to T.V. and radio as a result of rural electrification projects that have enabled women to learn about their fundamental rights.

*Empowerment, equity and equality all relate to the strategic interests of women.*

**4. To improve the likelihood that the energy project is successful and efficient in itself**

The previous three approaches to gender planning are reasoned from the perspective of benefits to women. Another approach focuses on the benefits for the *project* of taking a gender approach.

The project efficiency goal begins with the idea that projects often fail because the planners fail to understand the people’s needs properly. Hence the idea of participation was developed, as a means of listening more to the people and finding out what it is that is needed. An extension of this is that men and women may have different needs, thus it is necessary to encourage women to participate to understand better what their needs are. It is acknowledged that unless special care is taken, men’s voices will always be heard

more than women's, for example at public meetings, or when a survey interviewer goes to a household, since generally it is the male head of household (if there is one) who is expected to be the respondent. Many such surveys ask questions about 'the household' as if it were an undifferentiated unity. In this way, women's needs are not noticed. By finding out what women need as well as what men say is needed, more economic efficiency can be drawn out of the project.

When energy projects do not take into consideration the needs of both men and women, efficiency will suffer (as demonstrated in case study 12 from Northern Thailand, where the gender contracts of women were not taken into account insufficiently and the whole forestry planting project failed). Setting up collaborative structures between men and women may also facilitate the successful implementation of energy projects, as the example of biogas cooperatives in India shows (case study 13).

**Case study 12: Problems caused by lack of gender analysis. Gender analysis for community forestry in Northern Thailand.**

*A tree planting project in northern Thailand was motivated partly for environmental reasons, and partly to reduce women's drudgery in fetching firewood. Households were interviewed, and it appeared that both men and women supported the idea that a tree plantation should be started. So the project management delivered the tree seedlings at the beginning of the rainy season – but they never got planted. Why not? Because planting, as an activity, is a women's task in that community, and in the rainy season they were 100% occupied with planting the staple food crop, which had of course a greater priority in their minds. Through lack of sensitivity to traditional gender roles, project management had assumed that men planted crops and therefore that women would have had time to plant trees. Had the planners talked to women in more detail beforehand, this kind of fact might have been discovered and a more efficient plan could have been made: possibly a deal could even have been made by which the men planted the trees! But as it was, the resources were wasted, because the men did not see it as their work – the benefit was, after all, to be for the women (Wilde & Vainio-Mattila, 1995).*

**Case study 13: Improving efficiency. Setting up cooperatives.**

*In India cases where community biogas plants have been successful, have largely been attributed to indigenous management through the formation of co-operative societies of the biogas producers and users. From village to village, the bio-gas co-operatives have, over a period of time, evolved their own unique methodologies for managing their plants. While some purchase the dung and sell the gas and slurry, others give discount on gas charges to those who contribute the most dung. Still others return the slurry to members according to their dung contributed without charging or buying anything. For instance, Motipura Village purchased a biogas plant in the form of deductions in the milk payments from the village Dairy Cooperative. A management committee was elected. At first, there were no women on the committee. After one year of operation, the crunch for dung arose – people were not supplying enough dung to the biogas plant. The men thought that only through active involvement of women could this problem be overcome. The simple logic*

*was that it is the women who tend the cattle and they are the ones who benefit the most from the gas supply. The cooperative then inducted 5 women members on the Management Committee. The decision-making was left entirely with the chairperson and the group of women who were trained to run the biogas plant. The Motipura Co-operative Biogas Plant ran well over 6 years. (Ministry of Non-Conventional Energy Sources, 2001).*

## **6 CONCLUDING REMARKS TO PART I**

The first part of this paper has introduced a number of gender concepts and set them in the context of the energy sector. It has also looked at the way thinking has changed in relation to gender and energy in the context of the evolution of changes in approach to development. The reader is invited to try to apply these concepts in their own situation. The second part of this paper looks at issues in gender and energy. It also uses some of the concepts described in Part I.

## Part II: The Issues

### 7 GENDER ANALYSIS OF ENERGY NEEDS

Energy is one of the most essential inputs for sustaining people's livelihoods. At the most basic level energy provides cooked food, boiled water, and warmth. There is definitely a difference in fuel type used based on household income. Low-income households use biomass. The fuel quality is low, burning with levels of smoke and particles that are recognised as having negative effects on health (see for example, Smith, 1999). Biomass collection can take several hours per day, time that cannot be used for other livelihood (productive and practical) activities. Although nearly all households in rural areas use some biomass, poor households rely most on this source, and tend to spend more time searching than higher income households. Wealthier households also purchase other, higher quality, fuels which will be used for a greater variety of end-uses than in poor households. In urban areas, poor people have to purchase cooking fuels, and they spend a higher proportion of their income on fuels than higher income households (ESMAP, 1999). Typically, a poor urban family may spend 20% of its income on fuels (Barnes, 1995). In rural areas, poor households will generally restrict fuel purchases to lighting uses (candles and kerosene – with their associated fire hazards). Poor households use less energy per household than wealthier ones in absolute terms. It is therefore possible to identify an energy dimension to poverty: *energy poverty*. Energy poverty has been defined as the absence of sufficient choice in accessing adequate, affordable, reliable, high quality, safe and environmentally benign, energy services to support economic and human development (Reddy, 2000).

While both men and women benefit from access to energy in terms of reducing poverty and hunger through increased food production, employment and clean water, women and girls are likely to show additional benefits due to time saving, particularly in terms of water and fuel collection, and improved health, particularly through the use of cleaner fuels. The inter-relation between energy, poverty and gender is known as the *energy-poverty-gender nexus*. The gender dimension of energy arises from the fact that within households, where there are adult men and women, the gendered division of labour generally allocates to women the responsibility for household energy provision related to their spheres of influence in the household, in particular activities centred around the kitchen. They are often supported in this work by girls and sometimes boys, who can be kept out of school thereby damaging their own future livelihood choices. Men become involved in fuelwood collection in locations where large quantities and pieces of wood need to be transported over long distances.

Another reason for the gender dimension of poverty is that of the approximately 1.3 billion people living in poverty, it is estimated that 70% are women, many of whom live in female-headed households in rural areas. Since women generally have less access to resources and decision-making than men, many poor female-headed households can be expected to be living in extreme energy poverty. It is not only the supply of energy which will be constrained, but also the important services for the household which will be

affected, such as clean water provision. Their lack of resources makes them vulnerable to changes outside of their control e.g. drought.

When designing energy strategies that are intended to assist people to move out of poverty the gender dimension of the routes into poverty must be taken into account, since these will influence not only what has to be done but the strategies that can be employed. Poor men and women do not necessarily become poor in the same ways. For example, a man might lose his job, and a woman, who has always depended on her husband for financial support, may become a widow, forcing her to start looking for a paying job later in her life, which she might be ill equipped to do. Men and women have different ways of adopting strategies for addressing their poverty. For example, men are more easily able to migrate while women stay put managing the household and creating informal sector business they can run from home.

Other gender issues which influence the form of energy intervention strategies include the fact that women's influence over decision-making within the household and community is restricted. Women's lack of influence limits their capacity to control processes and resource allocation on many issues including energy. Women and men have different perceptions about the benefits of energy, for example, a research study on the gender related impact of micro-hydro in Sri Lanka, found that men in the area under study saw the benefits of electricity in terms of leisure, quality of life, and education for their children; while women saw electricity as providing the means for reducing their workload, improving health, and reducing expenditure (Dhanapala (1995) quoted in Barnett, 2000). The impact on poverty of improved energy services is determined by the choice of end-use to which energy is put. Therefore, gender analysis of household energy would pose key questions such as: who chooses which energy carrier?; how is it used?; and who benefits from this use?

Gender interests are not always obvious, neither are potential impacts of project interventions. Emphasis in energy planning for the benefit of women has long concentrated around cooking, with firewood collection being seen as the central problem to be tackled. A proper analysis of women's workload often reveals quite different priorities as is illustrated in case study 14.

According to the analysis in the case study 14, the most significant energy intervention may be for water collection and market trips!

One consequence of adopting a gender approach is that 'the household' is no longer the basic unit of the planning process, since it is acknowledged that within the family, men and women have different views, roles and needs, as well as access to and control over resources, which need to be considered. Case study 15 clearly illustrates the consequences of not taking into account gender relations when planning energy interventions which are intended to benefit women.

**Case study 14: Water not energy provision as main household core.**

*A study by Mehretu and Mutambira (1992) measured the time and energy used by different family members in transport connected with regular household activities. Chiduku Communal Area in eastern Zimbabwe is a resource deficient area with high population density. There is no electricity and kerosene, which is used only for lighting, is very expensive.*

*Seven routine-trip generating household activities were considered:*

- *Fetching water for domestic consumption (represented as water)*
- *Doing the family laundry (laundry)*
- *Collecting firewood (firewood)*
- *Grazing livestock (Livestock, G)*
- *Watering livestock (Livestock, W)*
- *Visits to local markets (Markets, L)*
- *Visits to regional markets (Markets, R)*

*(Note that average daily calorie intake in Zimbabwe is about 2,132. For each activity, the number of trip making persons per household is about 1.5)*

<i>Activity</i>	<i>Female Contribution %</i>	<i>Total week's household time (hours)</i>	<i>Female Share of time (hours)</i>	<i>Energy cost (Calories)</i>	<i>Female share of energy cost (calories)</i>
<b><i>Water</i></b>	99.4	10.3	9.3	2,495	2,270
<b><i>Laundry</i></b>	99.4	1.3	1.1	304	270
<b><i>Firewood</i></b>	96.1	4.5	4.1	1,068	972
<b><i>Livestock G</i></b>	67.4	7.7	3.0	1,672	652
<b><i>Livestock W</i></b>	67.7	6.9	2.3	1,484	579
<b><i>Markets L</i></b>	78.9	15.0	9.5	3,585	2,258
<b><i>Markets R</i></b>	61.3	0.3	0.2	76	46

**Case study 15: Who controls energy assets in the household?**

*In the drought of 1987, in Solan District, the NGO SUTRA tried to motivate women to plant trees since the women were walking 20 km to get fodder. SUTRA introduced the idea of multi-purpose trees and provided seedlings based on a list of preferred species given by the women.*

*However, when the seedlings arrived, few were taken by the women and of those that were taken, few survived. Analysis showed that the women were simply too busy during the rainy season to plant the trees. The areas with the greatest potential for growing trees are the privately owned grazing lands since here the trees will not compete with valuable food or cash crops. But these are far from the home and difficult to protect. In general, there is a shortage of fodder types of trees on these lands, brought about by the men's cutting of any trees with commercial value, for timber. Thus the women were afraid the same fate would befall their newly planted trees. The men after all have the last word on the management of resources on family property. The men were not at all concerned with fodder trees.*

*SUTRA then realised they had made a classic error in formulating their strategy. Simply because women have the primary responsibility for gathering biomass for fodder and fuel*

*does not mean that they should be considered responsible for replenishing the source. By asking the women to plant trees, SUTRA was increasing their work levels, but not their control over the use of the trees. (Sarin, 1992).*

Another important factor that can be missed by taking the household as a homogenous unit relates to the way in which family finances are shared. Some studies from Africa show that male and female incomes are generally not pooled. As studies from West Africa have shown:

*A husband's income is normally kept secret from his wife, so is hers from him, and each covers a defined set of expenses, often borrowing from each other. (Sigot et al, 1995)*

### 7.1 Household energy is a woman's concern?

Household energy is usually equated with cooking. As was indicated in the previous section women are responsible for energy provision related to their spheres of influence in the household, in particular activities centred on the kitchen. However, men become involved where fuel has to be collected over long distances, where fuel is purchased, or there are social restrictions on women leaving their homes. Collection of fuel is only one part of a more complex system of household energy management. Dutta (1997) identifies an interconnected subsystem of six components: kitchen, fuel, devices and equipment, cooking, vessels, and food. Men and women play very distinct roles in carrying out the activities and decision-making around these six components. Understanding these roles is important for designing effective and sustainable interventions.

When energy has to be purchased, men enter the decision-making process. For example, in India, if a stove is to be purchased men will decide on the technology (Dutta, 1997). In South Africa, it was found that the high expenditure on batteries was for young men to listen to taped music; in many cases female members of the household had no access to the equipment and no control over battery purchase (Makan, 1995). In some households, recreational equipment, such as TVs and radios, was bought before labour-saving equipment for domestic chores. The male members of the household made decisions about what to buy and who owned it. The impact of such decisions on total household budgets should not be overlooked. Survey data from Uganda in 1996, showed that 94% of rural households not connected to the electricity grid used dry cell batteries and were estimated to be spending about US\$6 per household per month on batteries (quoted in Barnett 2000)<sup>8</sup>.

Access to modern forms of energy can also have unforeseen positive social benefits. For example, women have been found to benefit in terms of their self-esteem from access to television (impossible without electricity). In Nepal, it has been reported that women's

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<sup>8</sup> Barnett (2000) points out that although such batteries are convenient, they are a very expensive way of buying electricity, in terms of energy supplied, the electricity probably costs more than US\$400 per kWh.

empowerment was enhanced when they could see pictures showing that they “don’t have to remain as second class citizens” (quoted in Barnett, 2000).

Men can also influence the uptake of energy technologies in the women’s domain of the kitchen. In Zimbabwe, men are reported to have rejected the use of solar cookers by their wives, since technology and its development are seen traditionally as a male preserve. Some men have also expressed concern about the use their wives would make of the time saved through using new stoves, while others saw it as an opportunity for their wives to undertake more productive activities (Wilson and Green, 2000). Women are also aware of the fact that savings in one area of drudgery can result in increased drudgery in other areas leading them to reject “labour saving” devices)<sup>9</sup>.

## **8 ENERGY AND WOMEN'S HEALTH AND SAFETY**

There is a two-fold relationship between women on one hand and energy and health on the other. The first relationship is where the production, transportation and utilisation of energy adversely affect women’s health and safety which in turn affects the productivity of women and their time-use efficiency, hence women’s productive and community roles. The second relationship is where energy and energy systems provide crucial inputs to the management of women’s health which directly affects women’s reproductive role, with possible secondary effects on their other roles.

### **8.1 The Fuel Cycle: Bad for women’s health**

Poor women in the developing world use cooking energy systems that are unsafe and polluting; food-processing technologies that are rudimentary and laborious; transport modes and food processing techniques that are punishment to the body; fuel and water collection systems that expose them to physical assault and traumatic experiences at the hands of men and wild animals; and land management practices that tax human endurance.

Combustion of traditional biomass fuels and coal exposes low-income households to serious health hazards. WHO estimates that around three million deaths a year occur in the South related to indoor air pollution from biomass combustion for cooking and space-heating. Since household energy provision and use for household survival needs is women’s responsibility, it is not unreasonable to expect that biomass use affects women’s health disproportionately to men’s. For example, the longer hours of exposure to smoke and particulates in smoky kitchens experienced by women compared to men are considered to be a contributing factor in women having higher levels of lung and eye diseases than men. Research in Kenya (reported by von Schirnding, 2001) has shown that women are twice as likely as men to be diagnosed with acute respiratory infections. This infection rate has been linked to the greater exposure to indoor air pollution by women compared to men. This finding is supported by similar research in South Africa conducted as part of the same study. However, research in India (also part of the same

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<sup>9</sup> Work by Jackson (1997) in the water sector showed that some women deliberately adopt a non-participation strategy in projects to avoid increasing their workloads.



study) showed higher levels of respiratory infections in young boys and men than in girls and women. What these findings demonstrate is the importance of including gender as a factor of analysis. Also impacts from energy use can be context specific; they are related to a complex set of relationships between social, environmental and economic factors.

Biomass and health has tended to be analysed only in terms of biomass combustion impacts, whereas the combustion forms only one part of a fuel cycle of collection, transformation, transport and use and each stage has its own specific impacts. The collection and transportation of biomass is primarily the task of women and girls. While there is some excellent research being carried out, much with the support of WHO, into the effect of smoky kitchens on women's and children's health (see for example, Smith (1999)), other health linkages are not so well researched. For example, although the amount of time spent by women in collecting and carrying heavy loads of fuel is often noted, the damage these loads cause to women's spines is not well documented. Wickramasinghe (2001) has reported the negative impacts of fuel collection in rural Sri Lanka: women suffered from a range of injuries (cuts, broken bones etc), skin irritations, infections, snakebites and trauma (including sexual harassment and rape). Transporting biomass is by headloading, leading to women suffering from headaches, aches in the back and other joints. The accumulated effects of 30 or more years transporting fuel leads to many older women suffering from weakened backs and more open to infection. Men in Sri Lanka do assist in fuelwood collection but only when biomass sources are located close to the household<sup>10</sup>, however, they do not complain of the same symptoms as women. Women also face violence where fuel must be collected in areas of contested access or civil disturbances: for example in Sarajevo, where women faced snipers while seeking fuel supplies, or in Somalia, where UNHCR documented hundreds of cases of refugee women raped and brutalized by bandits while away from camps to collect wood fuel (The Economist, 1993). There are even reports of bride suicides in India partly due to women's inability to meet their family's fuelwood needs (Agarwal, 1986).

Women in biomass energy-using industries are exposed to burns and smoke, although the impacts on their health are not as well-documented as the exposure of women using biomass as domestic fuel (BEST, 1988).

Health and safety are major concerns of women in their use of biomass fuels. Smoke reduction and improved safety for children are often the two most important reasons cited by women for adopting improved stoves and fuels. In South African urban townships, the prevention of accidental kerosene poisoning of children, and the prevention in the devastating housing fires caused by kerosene cooking and lighting, are important motivations given by both women and men for desiring household electrification (Mehlwana & Qase, 1996; Jones et al 1996; Banks et al 1996).

## 8.2 Energy improving women's health

As mentioned in the introduction to this section, energy systems are important for

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<sup>10</sup> This pattern of support by men in fuelwood collection in Sri Lanka is not consistent with the general pattern where men tend to get involved when fuelwood has to be collected from long distances and there is a transition to using carts or mechanized vehicles.

managing the health and ensuring the safety of women. Women giving birth at night often do so without the aid of reliable lighting and transport systems. Good quality lighting would not only reduce women's stress during labour but might also help to reduce maternal and infant mortality. Electricity plays a particularly important role since it can power regular health facilities, for example storage of vaccines, mobile reproductive/ maternal-child health clinics as well as ICT centres which could enable access to emergency advice on midwifery and other ailments. In Tunisia, rural electrification is considered to have benefited women and girls' health, through access to improved health care facilities (expanding range of equipment in clinics) and information services (TV and video) (Chaieb and Ounalli, 2001). Eye problems were found to decrease through the substitution of electric light for candles and kerosene lamps.

One consequence of energy poverty is that less water is boiled for drinking and other hygiene purposes. This increases the likelihood of waterborne diseases, which in turn, reduces the ability of poor people to improve their livelihoods, by not only preventing adults from working effectively but also negatively effecting children's learning.

To improve women's health within the household a broad view of the entire household fuel cycle needs to be taken, including not just improved stoves but kitchen and housing design, food preparation and processing, and improved technology for the energy efficient collection and transportation of firewood (Clancy, 2002).

## **9 ENERGY IMPROVING WOMEN'S LIVES**

### **9.1 Reducing drudgery; saving time**

Human energy is essential to survival in the rural production system. Much of this human energy is unpaid family labour provided by women. Metabolic energy is the energy derived from the food we eat. This metabolic energy is difficult to measure, and is not included in the conventional national energy accounting system, resulting in the exclusion of substitution for this energy source in energy planning and major energy projects (Cecelski, 1995). The challenge here may be to convert human energy to work-equivalent of an electric or diesel system in order to increase its visibility. Drudgery describes work that is repetitious, physically demanding and tedious. A large number of tasks related to women's role in production and reproduction involve drudgery and are time consuming. Women's tasks include planting, weeding, harvesting, food processing and transportation of produce, as well as preparing and cooking food, as well as collecting and transporting water and energy. Women work more hours per day than men in relation to their productive and reproductive tasks. Table 5 gives gender disaggregated data for household survival activities. A significant portion of drudgery can be eliminated and significant amounts of time can be saved through the use of mechanical, thermal and electrical energy technologies.

**Table 5: Time Allocation to Survival Activities among Women and Men (hours per day)****(Source: Cecelski, 2000)**

Activity	Indonesia	Burkina Faso	India	Nepal
Firewood collection				
Women	0.09	0.10	0.65	2.37 <sup>a</sup>
Men	0.21	0.03	0.57	0.83 <sup>a</sup>
Water hauling				
Women	0	0.63	1.23	0.67
Men	0	0	0.04	0.07
Food processing				
Women	2.72 <sup>b</sup>	2.02	1.42	0.70
Men	0.10 <sup>b</sup>	0.17	0.27	0.20
Cooking				
Women	-	2.35	3.65	2.10
Men	-	0.01	0.03	0.38
Average total work time				
Women	11.02	9.08	9.07	11.88
Men	8.07	7.05	5.07	6.53
<sup>a</sup> Includes grass and leaf fodder collection.				
<sup>b</sup> Includes cooking.				

However, can women afford to purchase improved household energy technologies? There is some evidence that so long as the opportunity cost of women's unpaid labour remains low, they and their families will not consider labour-saving a priority. For example, a significant difference has been observed between China and India in the success in commercial dissemination of improved stoves. By the early 1990s, 150 million or 70% of farm households in China had adopted improved stoves sold at commercial prices, yet in India only 15% of households had adopted improved stoves, even though the stoves were offered at highly subsidized prices (Barnes, et. al., 1994)..In part this difference in dissemination has been attributed to in India women's labour is perceived as having little cash value, whereas in China women's paid employment outside the home means that time spent gathering fuels is a cash opportunity lost (Nathan and Kelkar, 1997).

Engaging in income-earning activities may in fact be the only way that many women can afford to purchase labour-saving energy technologies for their households. Thus, before some basic needs can be addressed in the case of poor women, it may be necessary to address a strategic need for income. This is because women's time is not tradable. Labour-saving devices are clearly a priority for rural women, given the inordinate amount

of time and energy that they expend in necessary household drudgery. Two phases in rural technology initiatives can be identified that have had gender effects: those introduced to improve efficiency of production in general (time saving), and those aimed specifically at reducing women's drudgery.

Unfortunately, numerous studies have shown that not only have many energy technologies introduced to save women's time and energy failed to do so (see Case study 16), but they have sometimes even worsened women's social and economic conditions (Case study 17).

**Case study 16: Biogas increasing women's work load.**

*Biogas systems have only recently begun to be adopted in Kenya. The most frequent reason for failure of new biogas plants was lack of technical back-up within reach. Another reason was poor technical design and construction, where the extension agent had more zeal than accurate knowledge about the technology. But by far the most serious reason for failure of women to take up the technology has been the amount of work needed for the initial filling of the digester with dung; followed by the process of cleaning up. In some cases time taken to collect water for a digester has turned out to be more than time for fuelwood collection! Of course for the women who have persevered through the initial drudgery, the results of using biogas have been well-worth the effort: a clean kitchen, fast cooking, less time and money spent collecting or purchasing fuel wood, convenient lighting system with all the attendant benefits for the whole household... Consequently having working plants where the benefits of the system can be clearly demonstrated has proved to be a vital link in the dissemination strategy of biogas technology.*

Whereas it is desirable to cut down on the drudgery in order to improve working conditions of women, and increase efficiency and profitability, care has to be taken lest women are totally displaced from their traditional sources of livelihood.

**Case study 17: Mechanisation displacing women's labour.**

*"Traditional rice-milling in Java, Sri Lanka and Bangladesh involved hand pounding of rice, a drudgerous, labour intensive female task paid very low wage rates. This was almost totally replaced in a short period by mechanized milling - employing mainly male labour.*

*Thus, a task full of drudgery was removed, but at great cost by placing women back into unpaid domestic work".*

*In Indonesia, following a government initiative, mechanized Rice hullers replaced 90% of manual rice hulling between 1970 and 1978, with estimates of jobs lost as high as 1.2 million in Java alone and 7.7 million in all of Indonesia as a result. It is estimated that the loss in earnings to women who used to pound rice manually was US \$50 million annually in Java, representing 125 million woman days of labour (Dauber and Cain, 1981).*

Experience has shown that when attempts are made to introduce improved techniques or technologies aimed at increasing productivity, the result can often be that men take over

traditional women's industries. Once a new technology brings upgraded skills and higher returns, men tend to take over (see for example, palm oil milling in Nigeria and improved fish-smokers in Senegal (Bryceson & McCall, 1997) as well as improved *gari* processing in Nigeria (UNIFEM 1989)).

Such displacement of women brings into focus, again, the need for rigorous gender analysis of a situation, including an assessment of potential impacts of an intervention.

## 9.2 Energy for Cooking

Cooking for the family is one of a woman's most significant daily activities. Significant in the sense that the type of energy used influences the time she has available for other activities (including rest) and the potential impacts it has on her health. It is not surprising that this energy service has received so much attention. In this section, we will briefly review four of the main energy types promoted for cooking.

- *Electricity*

Unfortunately, electricity is not the cheapest option for cooking many basic foods, although cooks do appreciate the cleanliness of the energy form. There are examples of successful projects, for example in Nepal, involving electricity for cooking based on mini- or micro-hydro power schemes (Anderson et al., 1999). It should be kept in mind that it is not enough to supply the electricity but there must also be appropriate stoves available as well as the need to work with cooks to adapt cooking techniques.

Solar home systems cannot be used for cooking since their output is too low.

- *Solar cookers*

There are many enthusiastic promoters and users of this technology. However, there are still a number of challenges to overcome with this technology including variations in sizing to accommodate the cooking needs of different household sizes. One

person's advantage (portability for moving around the household) soon becomes another's disadvantage: easy to steal! The technology requires changes in cooking practices and these can be difficult to achieve and sustain. A major drawback of this technology is that it has often been taken up by enthusiastic well-meaning amateurs, and cookers with poor aesthetic design are produced. While this might work in emergency situations, e.g. refugee camps, when people are asked to part with hard earned cash they do not want to buy something

### Box 2: Solar Cooking in Kenya

Various attempts have been made to introduce solar cookers in Kenya. However, there have been major problems with the acceptability of this type of cooking. Of the people interviewed in a review survey, 90 per cent found the cooker to be too slow. Fifty-four percent complained that it could not cook preferred dishes, and in many cases the cooker could not cook enough for all the family members. In some areas where the solar box cooker is promoted there is a real scarcity of food and people will not experiment with the little food that they have. The cooker is seen as very expensive item by over 53% of the respondents, especially since it can cook only during the day.

(Stephen Gitonga, Intermediate Technology Kenya, quoted in Anderson et al., 1999).

which looks second rate<sup>11</sup>. Box 2 gives some experiences from Kenya with attempts to introduce solar cookers. Whilst resistance can often be overcome in the long term with sensitive approaches, there are possibilities that social resistance will be too strong. The cooking fire is seen in many societies as the social hub of the family, the women of the household are able to socialise with their families in the kitchen while cooking. Based on her field work in South Africa, Green (2001) suggested that solar cookers, since they require cooks to work outside, might even lead to a breakdown of this social web and a reduction of women's influence on the socialisation of their children.

- *Biogas*  
Cooks who use biogas respond enthusiastically to its controllability and cleanliness. However, the cost of a digester and the number of animals required to produce sufficient gas for the household's daily cooking needs is usually beyond low-income households. The collection of the water needed as an input adds considerably to women's burden (in other words the savings of metabolic energy/time spent on fuel collection is switched to water collection). There can be gender differences in perceptions of the benefits of biogas. Dutta and her colleagues (1997) in an evaluation of a biogas programme in rural India found that men and women both valued the time saving element but for different reasons. The women mainly spoke of time saved in fuelwood collection and cooking (allowing more time to be spent with their families), the men appreciated faster cooking and more timely meals.
- *Improved biomass stoves*  
Biomass will remain the fuel option for many households for the foreseeable future. Therefore, there is a need to produce wood and charcoal stoves that are more efficient and pay attention to safety issues (smoke with wood, and carbon monoxide with charcoal). Supply side issues of sustainable biomass also need to be addressed. It would not be unreasonable to say that there has been a certain disillusionment with improved cook stove programmes and other interventions, such as biogas and solar cookers, because they have failed to live up to their expectations. Over the last decade there has been declining support for stoves programmes amongst donors (for example, the scaling back of the GTZ Household Energy Programme<sup>12</sup>) and national governments (for example, the Central Indian Government's decision to hand over its stoves programme to state governments without financial support from the centre) (Clancy, 2002).

### 9.3 Electricity improving women's lives

Electricity is a versatile energy source, and ranks highest in a hierarchy of preferred energy. The supply of electricity also receives high priority in energy planning so it is worth examining gender differences in benefit from access to electricity. In the previous section we looked at electricity for cooking in which it was concluded that labour and time saving in cooking is limited. However, there are other household uses of electricity that can also be able to bring significant improvements in daily living. Cecelski (2002)

<sup>11</sup> This applies to any technology.

<sup>12</sup> Although GTZ has an energy conservation programme in the SADC region (Africa) which includes household stoves projects. <http://www.gtz.de/hep/english/index.html>

considers that electricity specifically addresses women's needs for time saving, for improved health, for security and for income generation. Time saving and reduced drudgery are particularly addressed by water pumping and agricultural products processing (such as grain milling and oil extraction). Improving security for enabling participation in evening events through street lighting is a concern for both men and women.

*One of the main problems for the women of [marginalized urban shantytowns of] Tacna [Peru] was the absence of electricity in their homes, for several reasons: they wanted to make the most of the evening to speed up their textile work; they needed to feel secure in their homes; they needed to facilitate the task of caring for their children; they needed to make the night less dark; they needed to light the streets that they and their families used. Yturregui, 1998*

The recent World Bank ENPOGEN study in Sri Lanka, China and Indonesia found that rural people regarded electricity as a basic necessity of daily life. The most significant benefits ascribed to electricity are that it makes home life more convenient and housework easier (Ramani and Heijndermans, 2003). The study found that, at least in Sri Lanka, the major benefit of electricity is the time that women save. Eighty per cent of the interviewees reported to save between one and two hours through avoided journeys (taking batteries to be recharged, and going to the city to buy kerosene, medication, and vaccinations) and on household activities (such as firewood collection, cooking, ironing, boiling water, house cleaning, and chimney cleaning) (Massé and Samaranayake, 2003). It is interesting to note how women made use of their extra "free time". Twenty-nine per cent of the female household members said that the time they saved was spent on extra housework, while less than 5% reported using it for productive activities.

Interestingly there would appear to be differences in the way women and men appreciate electricity. An evaluation of the impact of micro-hydro in Sri Lanka, found that men in the area under study saw the benefits of electricity in terms of leisure, quality of life, and education for their children; while women saw electricity as providing the means for reducing their workload, improving health, and reducing expenditure (Dhanapala (1995) quoted in Barnet, 2000).

It is also possible that electricity can contribute to improvements in gender equity with regard to household tasks if the views of one man from an electrified household quoted in the ENPOGEN Sri Lanka study become the norm:

*"I am now prepared to do ironing and assist my wife in her work: ironing, boiling of water, cooking".*

However, in rural Bangladesh access to electricity does not appear to have influenced the prevailing gender division of labour; women's responsibilities remained largely the same in electrified households. as those of their counterparts in the non-electrified households. However, women did report that they had more flexibility in organizing their work according to their convenience which women considered a benefit (Clancy et al, 2004).

*“Our household work has reduced a lot because of electricity. Apart from learning on various issue like vegetable gardening, poultry through TV/Radio, we are able to spend more time in teaching kids due to this addition time”. (Focus Group Discussion with Female household members; Village: Rahmatpur, Union: Rahmatpur, Thana: Babuganj, District: Barisal) HDRC (2002).*

Where electricity is available in rural areas, it is mainly used for lighting, which can extend evening working hours with both positive and negative effects. A common fear is that electricity may add to the burden of a woman’s working day. The study in Bangladesh reported no significant change. If as a result of improved lighting, women themselves choose to work longer hours to increase their own income, this could be seen as an indicator of empowerment rather than as a loss of welfare.

The implications of no reduction in working hours through access to electricity are that women have less time for self-improvement or relaxation. It might prove difficult to generalise about these issues. A World Bank study (cited in Cecelski, 2002) found some evidence that women’s leisure time increases with electrification. While a study into the socioeconomic impacts of rural electrification in Namibia showed that women did stay up later than men, not working but socialising. (Wamukonya and Davis, 1999).

#### **9.4 Improved Transport for Women**

It is said that ‘rural Africa walks and carries its burden, and most of this burden falls on women’. The same is applicable in most of the developing world. Lack of appropriate, affordable and reliable transport systems affect productive activities by constraining access to markets for inputs and products; constrains access to health and education facilities; and influences the quality water and energy resources procured.

Studies reveal that women walk and take public transport more frequently than men (Cecelski, 1995). In many countries there are large differences between men and women in automobile access and ownership, as well as in possession of drivers' licenses. Women tend to make a number of shorter and more complex daily trips for shopping, schools, part-time employment and volunteer work. Current urban transport systems are not only energy-intensive, but can often restrict the mobility of those who do not use them, including pedestrians, cyclists and users of public transport. (Spitzner, 1993; Sloman, 1993).

#### **Case study 18: Addressing women's urban transport needs.**

*One energy efficiency effort that has sought to address women's urban transport needs is the mini-van taxi program of the Mid-Rand Transport Association in South Africa.*

*Private mini-van taxis provide the main source of cheap, rapid public transport in urban areas in South Africa, but are plagued with problems of safety, inadequate service, and violence related to competing lines. These problems especially affect women, who travelling with children or moving around each day to a different work site, must change taxis numerous times or take long detours to avoid violence. With assistance from the Ministry of Energy and the International Institute for Energy Efficiency (IIEC), the Association has been addressing these problems; a woman currently heads the program.*



*She cites women's negotiating skills as a major factor in its success in providing a safer and more energy efficient public transport system (Wonfor, 1998).*

As in energy planning, national planning for transport infrastructure is overwhelmingly biased towards large road projects, which are more beneficial to users of motorised transport. Transport is a major factor in access to and procurement of basic services, including energy, water, health and education. As noted in an earlier example, fetching fuel and water and visiting markets takes up inordinately large portions of women's time and energy, especially in rural areas of developing countries.

In the absence of motorised transport, head-loading and back-loading especially by women walking is the only alternative. As was pointed out in Section 8 head-loading has long term negative physical consequences for women.

Where infrastructure is underdeveloped, it is necessary to plan for alternative transport systems that are compatible with prevailing circumstances. In order to optimise the usefulness of traditional alternatives, relevant cultural norms and contracts have to be addressed. The next two case studies show how women can benefit from using animals for transport despite practices that men control or own animals,.

#### **Case study 19.**

*To collect water for their households, Maasai women trek between 6 and 14 km, taking three to eight hours to access water points. A donkey is allowed to carry 30 litres of water per trip, whilst a woman with no donkey has to carry between 15 and 20 litres on her back per trip. Even for those women with donkeys, cultural values associated with donkeys mean that women are unable to make full use of the animals, and they end up having to make extra trips.*

*In the dry season, the number of required trips for water leaves women with little time for other group activities like vegetable gardening. Group activities are therefore limited to rainy seasons, when water is abundant. Consequently, garden activities increase when vegetable markets are not so favourable – since there is a glut in vegetable production. The ability of the community to fully exploit market opportunities arising from their gardens is circumscribed (Macharia, personal communication quoted in Denton, 2002).*

#### **Case Study 20: Women using donkeys to lighten their load**

In western Kenya a collaborative project between IT Kenya and a local NGO, Future Forest, used an existing revolving savings and loan scheme to enable a women's group to acquire donkeys. Women grouped together in threes to save half of the cost of a donkey, with the balance provided on credit. The donkeys were mainly used for collecting water (twice as much as before) and the transport of soda ash, sand and grains. Loan repayment was possible through income generation from hiring to others and from the trading of transported goods (such as soda ash). Although women still spend a similar time on transport, their personal energy expenditure and drudgery has been reduced and their income and economic security has increased. (Fernando and Keter, 1996)

## 10 ENERGY ENABLING WOMEN IN INCOME GENERATION

Energy offers women opportunities for income generation either as an input into running their own businesses or through employment opportunities in the formal or informal energy sector. This section looks at both aspects: the role of energy in women's enterprises and the role of women in energy service companies.

### 10.1 Energy for Women's Productive Enterprises

Enterprises usually operated by women include food-processing industries, kiln-using manufacturing activities and numerous service-sector activities. These industries tend to be low-wage, labour- and effort-intensive and tiring as well as sometimes dangerous to women's health. As much as 106 hours are reported as needed for processing 30 kg of shea nuts. The production of kenkey (maize balls) can take up to six days, involving soaking, milling, fermentation, dough making, cooking, ball making and boiling. The production of palm and other oils is extremely arduous, requiring lifting and moving heavy containers of hot liquid. As well as the process heat, derived mainly from burning biomass, these tasks use large quantities of metabolic energy. Much could be done to reduce the demands on women's metabolic energy by the substitution of their labour by machines. This topic is discussed in Section 9.1.

Most of the enterprises using process heat depend on fuelwood for energy. Since fuel is a significant cost factor, there is a commercial motivation to improve the energy efficiency of the production processes. An estimated 816,865 metric tonnes of fuelwood is consumed annually by hotels, restaurants, guest houses and tea shops in Nepal, nearly half the total consumption of rural industries. In Mopti, Mali, fish processing accounts for 40,000 tons of wood annually. In Abidjan, street food vendors, fish smokers and restaurants were estimated to consume 60% of wood fuel.

Small industries generally buy their fuel and they have been severely affected by rising energy costs, fuel shortages and deforestation. In the industries mentioned above, energy is a significant cost factor. Wood fuel is estimated as 25% of production costs of dolo beer in Burkina Faso, 30% of bread baking in Kenya and Peru, and about 20-25% of food processing production costs generally (BEST, 1988).

Food processing was identified in an urban energy study in Dar-es-Salaam, Tanzania, as the least efficient energy user in the urban informal sector (Hosier, 1994). Although some producers are able to substitute more efficient modern fuels, there is evidence that fuelwood scarcities and rising costs pose a constraint on production.

Given that women's enterprises have a strong reliance on biomass, the sustainability of this energy supply needs attention. Unfortunately, biomass production for energy falls between Ministries (usually Energy and Forestry) and as a consequence gets neglected. In this regard the initiative by GTZ might present an interesting case of best practice. In 1998, GTZ began to implement a project on Biomass Energy Conservation (known as ProBEC<sup>13</sup>) in six SADC countries to support local, national and regional initiatives aimed

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<sup>13</sup> <http://www.probec.org/>

at improving the energy situation for poor urban and rural households and small businesses using biomass energy. Initially the programme did not use gender analysis. However, a study in Namibia of a stoves programme to train men and women to build and market improved biomass stoves and a solar cooker, found that if gender analysis had been systematically used in the project design there probably would have been a lower drop out rate from the training courses and that the requirements of both men and women as end-users of the stove would have been matched which would contribute to a better take-up of the new technologies. The solar stove design would have taken into account, and hence increased the rate of acceptability, that household stoves are also used for producing food for sale. However, the solar stoves normally designed for the household are not large enough to cook the quantities of food prepared for commercial purposes (Cecelski et al., 2001).

Women frequently run income generating activities from home since it enables them to combine productive tasks with reproductive tasks, such as childcare. This is one of the reasons women like to have electric light, it enables them to work from home. Rural women in Tunisia cited having electricity in their homes, meant not having to leave for work in towns as maids (Chaieb and Ounalli, 2001). This could be interpreted that working from home empowered them to be their own bosses, as well as removing the need to work outside of their own familiar environment and culture. Certainly, electric light can benefit small enterprises with greater efficiency and quality of work, better working environment and a more attractive and secure environment for customers (security is particularly important for women) (Barua, 1998 quoted in Cecelski, 2002).

However, a number of researchers have expressed reservations that if electric light extends working hours into the evening, this adds to women's already long working day (see for example, Clancy, 2000). Unfortunately, there are insufficient empirical data on what use is actually made of the lighting to enable a definitive answer, and it would be foolish to prejudge. One of the few detailed studies with gender-disaggregated data on rural electrification reported that women in rural Bangladesh felt that while electricity had not brought a real reduction in their workload it had given them greater flexibility (through electric lighting) in the organisation of their work patterns (HDRC, 2002).

**Box 3: Energy as an opportunity or a constraint on women's productive activities.**

Energy availability that creates opportunities (increased income/more sustainable use of natural resources)

- Community-level sustainable management of forests can provide income through organised firewood production and sale.
- Energy entrepreneurship as a secondary activity for community service and income generation.
- Improved technologies for charcoal production can boost sustainability and incomes.
- Availability of mechanical and process heat technologies can be a stimulus to the start up of various small-scale enterprises (sawing, food processing etc.).
- Electricity may enable the start up or expansion of small-scale service enterprises such as hairdressing, photocopying and internet cafes.

Energy scarcity as a constraint (which if removed, can bolster other activities, reduce vulnerability, improve food security, increase wellbeing)

- Lack of transport for moving harvest products to storage and to market may be a disincentive to produce (increases vulnerability, and reduces food security).
- Lack of electricity may hold back development of services in rural areas (both public and private).
- Poor cooking technology results in unnecessary ill health for women and children reducing their productivity (and threatening wellbeing).
- Lack of cheap, easily available, fuel forces women to spend large amounts of time gathering fuel, and restricts the boiling of water and in some cases the adequate cooking of food resulting in ill health (threatens wellbeing, increases vulnerability) as well as limiting time available for other enterprises.

*Source: Clancy, Skutsch and Batchelor (2002)*

Given the focus on electricity supply within energy planning it should not be forgotten that women's enterprises mainly use process heat and their metabolic energy. Box 3 gives some examples of how energy can act as an enabling factor or a constraint on women's productive activities. Women entrepreneurs do want technologies that improve their incomes and the viability of their businesses. For example, there are women's groups in Uganda who use solar dryers for fruit preservation which gives them a better quality product and enables them to export 50 tonnes annually which has significant positive impacts on the income they are able to earn (see case study 22).

**Case study 22: Energy Projects Increasing Women's Income Generation Potential**

*In Uganda, an FAO/UNDP post-harvest programme recommended small-scale solar dryers for long-term storage and eventual household consumption of fruit and vegetables. However rural women's groups were more interested in solar dryers for income generation than for food security. Subsequently, the 'Fruits of the Nile' company was*

*formed in 1992 to link rural producers with the market for dried fruit in Europe. Within three years, more than 50 women's groups had taken up the solar drier technology, and in 1995 the company exported more than 50 tonnes of dried fruit. The original food security concerns are also being addressed: when they are not drying for profit, the women use the solar dryers to preserve vegetables and fruits for home storage and consumption. (Okalebo & Hankins, 1997)*

Although energy can form a major constraint on women's enterprises it should not be forgotten that there are other significant barriers that can also affect enterprise start-up or viability, such as lack of capital or cultural practices<sup>14</sup>.

## 10.2 Promoting Women as Energy Entrepreneurs

An energy entrepreneur is one who supports the energy economy by doing any one or more of the following: producing, processing, distributing and selling energy or energy resources. The liberalisation of energy markets is opening up new opportunities for the provision of energy services. Energy Service Companies (ESCOs) are springing up, many focusing on rural areas, offering the potential of good incomes. Women should not be excluded from these opportunities – particularly when based on prejudices that women are not interested in technical matters. Women are good candidates to be successful energy entrepreneurs (Batliwala and Reddy, 1996). Women who live in rural areas know local circumstances and understand local needs. A woman may be able to sell more effectively to other women, and access to potential female clients is not hindered by social constraints. Energy companies can also employ women as operation and maintenance technicians at the local level. The water sector long ago began to train women in the operation and maintenance of hand pumps. Women have proved to be more effective in regular and preventative maintenance than men (Cecelski, 2000).

As in most business enterprises, women are more likely to be found among the micro and small scale energy entrepreneurs; more likely to be dealing with biomass energy resources; more likely to be 'involved in retail rather than whole-sale; more likely to operate in the 'informal' rather than formal sector; and consequently, more likely to be involved in parts of the economy that are insufficiently reflected in official statistics. As a result, too many women entrepreneurs operate in a policy vacuum and have no automatic recourse to supportive legal and policy structures.

Women are therefore to be found among small-scale tree farmers; producers, distributors and vendors of fuelwood and charcoal. They also distribute and sell kerosene and related equipment such as stoves and lanterns. A small number of women may be found in the petroleum sub-sector where they own petrol service stations. Women have already made their mark as energy entrepreneurs as stoves producers (see case study 23).

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<sup>14</sup> For further discussion of these barriers see for example: Clancy, Oparaocha and Roehr (2004)

**Case study 23: Upesi Stove Project in Kenya.**

*The Upesi project was initiated in 1995 to promote the adoption of more efficient stoves in rural areas of Western Kenya. Its goal was to improve living and working conditions of women in rural households by enabling a significant and increasing number of women and families to benefit from fuel-saving wood-burning stoves. The project has cooperated with women's groups and involved them in design and field-testing of the stove. The women have been trained in producing, distributing, and installing the stoves. Additionally, their marketing skills have also been improved. Thus, their ability to earn their own income from stove-related activities has increased. Over 16,000 stoves have been installed, providing significant poverty alleviation. The benefits to men and women in the project areas include improved health and time savings for users of the energy efficient stoves, as well as relief from pressures caused by fuelwood shortage (Khamati-Njenga, 2001).*

At the present time, the literature offers only a few examples of women working outside of the more traditional areas related to household energy, such as producing solar panels, manufacturing pumps and turbines, or owning power generation plants. Those examples that do exist provide some important lessons in ways to enable women to become energy entrepreneurs. Case study 24 describes a project in which women have been trained to produce battery-operated lamps. An important element in the project is inclusion of appropriate training and support to overcome knowledge, skill and confidence barriers women face.

**Case study 24: Battery-operated lamps produced by rural women in Bangladesh**

*A project, funded by the World Bank Energy Sector Management Programme (ESMAP), has been running on the remote island of Char Montaz in the south of Bangladesh since 1999 and aims to improve the lighting and indoor air quality of rural households by replacing the traditional kerosene lamps with modern fluorescent battery-powered lamps. The fluorescent lamps are produced and marketed by a women's micro-enterprise and, by 2001, about one thousand households were using these lamps. The long term potential is good with a market of 20,000 households and grid extension within the next 20 years highly unlikely.*

*The lamp business represents an important opportunity for the women to earn a relatively good wage. If a woman constructs and sells two lamps a day she earns the wages equivalent to a skilled labourer, a significant opportunity which both benefits her family and improves her social status.*

*The remote community also benefits from the lamps, which have a high efficiency and low energy consumption. The advantage over kerosene lamps is the reduced risk of fire, as well as the elimination of smoke and other emissions with their negative health impacts.*

*The project, from the start, has recognised the importance of the knowledge of rural women about local conditions and has used major inputs by rural women in the design of the energy service mechanisms. Recognising that women had gaps in their knowledge of electronic components, and a lack of skills with the tools needed to work with the components, the project gave appropriate training to ensure that reliable lamps were*

*produced. Training was also given in accounting and bookkeeping. Male family members have also been encouraged to act as advisers to the women, especially on marketing, sales, and operating battery-charging services, a new activity that has developed out of the original project.*

*What are the indicators of success for the project? Taking gender issues into account; using women's existing knowledge in the project design; providing compensatory training for gaps in technical and business knowledge; gaining male family members support; providing income generating opportunities; and providing a service the community wants (Khan, 2001).*

Schemes designed to assist entrepreneurs to set up businesses supplying and servicing energy technologies can unwittingly fail to take women's particular barriers into account and end-up discriminate against women. A project in Zambia to establish solar home system installation and maintenance provided training for interested entrepreneurs. One of the selection criteria was that the entrepreneur must have knowledge of electricity and electrical systems (Munyeme, 1999). This criterion ruled out most women. The project offered no supplementary training, and overlooked the possibility that a woman, despite not having technical skills, could successfully own and run a business (as so many already do) by employing people with the required technical skills.

Women can use other mechanisms to overcome the barriers to becoming energy entrepreneurs, for example, through the formation of co-operatives. Through co-operatives, strengths and abilities of members are synergised to achieve more than the sum total of individual efforts. Co-operatives are particularly useful for marginalized and poorer members of the business community since they can increase the bargaining power of members and can force recognition of particular issues. The following case study (25) shows how women in Mali came together as energy entrepreneurs in a more traditional energy source: charcoal.

**Case study 25: Women's co-operative for charcoal production.**

*In Mali, a local women's charcoal making cooperative has facilitated the adoption of an improved charcoal production technology: the casamance kiln. The traditional kiln costs almost nothing, whereas the casamance kiln costs about US\$200. The women's group has 25 members, who pay 20% of their profits into their common fund. The money was used to acquire the vital components of the casamance kiln, that is, the chimneys, as well as pay for attendants who watch over the kilns (Skutsch and Sanogo 2001).*

Women do seem to find that working together provides solidarity and support to overcome challenges. Case study 26 from Western Solomons demonstrates that women working together as energy entrepreneurs does not necessarily meet male resistance.

**Case study 25: Community-owned Microhydro System by Village Women in the Western Solomons.**

*The women in Bulelavata, a small, remote village in the Western Solomons accessible only by sea, used to live a subsistence lifestyle typical of women in tens of thousands of*

*other villages across the Pacific Islands. Then, in 1998, the community chose to begin the process of establishing an energy-for-development project. In 2001, the community-owned microhydro system, funded by the Australian International Greenhouse Partnerships, Caritas, and the Provincial Government, was officially opened by the Provincial Premier. The system produces 24kw and has 1.5 km of high voltage transmission line enabling the community to sell power to the Provincial Secondary School.*

*For the women of Bulelavata the energy project has had some significant and profound impacts ranging from the practical, quantifiable advantages of lighting and community income to qualitative outcomes such as solidarity and empowerment. The project design of the Bulelavata community microhydro scheme used a women's participatory action agenda, exploiting "action learning" (or learning-by-doing). They had the decided advantage of a context where a relevant project was happening in their lives, one in which workshops could be grounded. The facets encompassed project policy support, female project management, female role modelling at varying levels, specific women's awareness and training workshops (although community ones were also held in which women participated), visits by women to other villages, management committee positions for women, a new village institution for women, technical team leadership by women, and logistical project support teams being given equal status to technical project teams. This affirmative agenda was designed to encourage and facilitate active and meaningful opportunities for participation by the village women, and operated within existing Melanesian cultural and village religious mores while at the same time challenging the boundaries of perceived gender roles through the medium of the new technology. The Bulelavata village men say that the electricity project has changed their women; that they are now more confident and outspoken and participate more in community development activities. The men think this is a good outcome in terms of the whole project, and rate it second only (by general consensus) to the community's understanding of "planning for tomorrow" (Bryce and Soo, 2004)*

### **10.3 Promoting the Role of Women in the Energy Sector: Career Development**

Does it matter if women are not employed in the renewable energy industry? Social justice arguments of fairness or equality would imply that all women and men have the right to the equal enjoyment of socially valued goods, opportunities, resources, and rewards; and equal participation in decision-making about those goods (Clancy and Roehr, 2003). Energy is a commodity which provides services and offers job opportunities. Therefore, women and men should, based on equality principles, have equal opportunities not only to make use of energy but also be able to participate in all aspects related to energy, including employment. Women should be able to choose whether or not to work in the renewable energy sector and not be excluded by artificial barriers. From an economic perspective, can the renewable energy industry miss out on the pool of female talent?

Experience tells us that women are by far under-represented professionally in the energy sector. Although gender disaggregated data is difficult to find, proxy data would appear to confirm women's low representation in the formal energy sector. An example from



Zambia shows the low proportion of women among those who took part in the national energy policy formulation process (Table 5).

**Table 5: Participants in National Energy Policy Forum, Zambia, 2001**

<i>Sub-sector</i>	<i>Total Number of Participants</i>	<i>Number of Women Participants</i>	<i>Percentage of Women</i>
<i>Wood fuel</i>	35	4	11%
<i>Renewable Energy</i>	31	1	3%
<i>Petroleum</i>	31	1	3%
<i>Coal</i>	22	3	14%
<i>Electricity</i>	39	3	8%
<i>Energy Conservation</i>	36	3	8%

(source Chandi, 2001)

In part the low representation can be attributed to the low numbers of women graduating in technical fields that would enable them to pursue careers in the energy sector. Table 6 gives gender disaggregated data for Nigeria on the numbers of men and women graduating in science and engineering fields. Women make up only a small percentage. This type of gender division is a global phenomenon<sup>15</sup>

**Table 6: Degree, diploma and certificate awards in energy related subjects in federal universities of Nigeria disaggregated by gender**

	1993 / 94		1995 / 96		1996 / 97		1997 / 98	
	M	F	M	F	M	F	M	F
<b>Total no of graduates in all disciplines</b>	<b>4,687</b>	<b>801</b>	<b>4,888</b>	<b>1,602</b>	<b>5,912</b>	<b>1,472</b>	<b>7,682</b>	<b>2,597</b>
Graduates in Energy related disciplines								
Engr/Tech.	274	10	345	41	436	51	424	39
Env. Science	69	5	93	9	86	16	79	5
Sciences	629	77	467	139	603	117	655	164

Federal Office of Statistics, Nigeria 2002

<sup>15</sup> Before the end of the Cold War, women in the Soviet Union and other Eastern Block Countries were a significant presence in the science and engineering fields. Since the Berlin Wall has come down, young women in those countries appear to be adopting similar career paths as their sisters elsewhere in the world.

Researchers in the North consider that the energy sector suffers from the perception that it offers a professional career dominated by 50-year-old males, particularly in the technical areas- which makes the sector unattractive to women (Clancy et al, 2001). There are encouraging signs at least in the private sector. Energy companies are beginning to recognize that it is not merely a question of recruiting women to help fill professional vacancies, but also that women bring particular benefits to the workplace. Women's skills can be complementary to men's, which leads to a more balanced and efficient organisation. Recent initiatives to recruit more women include the ENEQO<sup>16</sup> project within the Electricity Industry in Europe, which aims to advance equal opportunities by promoting the positive benefits brought to the working environment by employing women. In Canada, the Oil and Gas Sector is promoting a diverse workforce and adopting the approach of recognising the contributions people make as capable individuals rather than as members of designated groups (Dowse et al., 1999).

Gender approaches in energy development and planning are intended ultimately, to raise the visibility of women in the energy sector and in so doing enable women's views to be better taken into account and their needs addressed. To achieve this objective, it is necessary to increase the opportunity for gender sensitive women and men to be involved in all aspects of energy. Such aspects include energy planning and policy development, energy research and engineering, management of energy systems and projects, energy technology dissemination, energy enterprise, energy production and distribution, and energy use. The involvement should cut across all levels of representation- national, international and local-; as well as all types and forms of energy.

Equal opportunity policies by institutions and governments can help to increase the numbers of women in the energy professions (case study 27).

**Case study 27: promoting women in the energy sector.**

*In the US National Renewable Energy Laboratory (NREL), fully half of professional staff are women. In most energy institutions, however, the participation of women is still relatively small. In Latin America, the number of women participants in an energy training course given by the Institute for Energy Economics in Bariloche, Argentina, has risen steadily, from 10% in the 1970s, to 17.2% in the 1980s and 23.5% in the 1990s (Torres, 1998).*

For many women the experience of being part of a small minority working in the energy sector can create the feeling of a sense of isolation. Sometimes this leads them to abandon their careers; sometimes they leave to set up businesses with other women. (Case study 28 describes the response of some women from the North to professional isolation in the energy sector).

**Case study 28: Windfang: women making energy for themselves.**

*A company (Windfang), owned by 200 women working on co-operative principles, operates a 450 kW wind turbine, which is feeding into the national grid to the north of*

<sup>16</sup> <http://www1.sydskraft.se/eneqo/home.htm>

*Hamburg in Northern Germany. The company grew out of an initiative by three women who had grown disillusioned with the unsupportive male dominated working environment they had encountered in the energy sector. Although most of the founding members were technically oriented, the group is now multidisciplinary and has members of all ages, from students to women professionals, and from a broad range of disciplines such as theatre and economics. Of importance to most of the members is the peer support gained from working within a group of women. Not all of the women work in the company but have provided some of the finance for the company and have the self-gratification from pragmatically working towards a cleaner environment. In addition, the way in which decision making is carried out within the company was an important principle. The women opted for a democratic structure which allows all members to elect the steering committee and board, while major decisions are taken at a general assembly. One of Windfang's objectives is to increase the work experience of women in energy projects and thus improve their chance of a good job in the energy sector. Having gained confidence while working in a supportive environment several of the founding members have now moved on to set up their own businesses or have found jobs in the renewable energy industries (Delfs, 2000).*

Networking is a potential solution to feelings of isolation. There are a small number of professional organisations for women in energy around the world attempting to meet this void.

**Case study 29: Women's networks in the energy industry.**

*Ms. Mary M'Mukindia, the of the Petroleum Institute of East Africa says: " I would encourage women to enter this male-dominated industry as many companies do have good gender policies. What you need is to establish an identity as a competent, ambitious worker and not be turned into this nice lady who serves tea during meetings, or takes minutes, or is constantly complimented on 'how nice you look today'!. This is the quickest male route I have seen to eliminating effective women competition. You will of course now be called aggressive but do not worry, who isn't! (Oparaocha 2001)*

However, it is one challenge getting women into the energy sector; and another is keeping women there. It is not only an issue of finding the subject stimulating but the working environment has to be conducive to remaining there. A cultural change in working practices that recognise women's family responsibilities, such as flexible working conditions and whole day nursery are strategies, as well as increased involvement of men in child-care, which could contribute to bringing women into the management of the energy industry and hopefully keep them there.

## 11 ENGENDERING ENERGY

In the previous sections we have looked at gender differences in energy use, how energy can improve women's lives directly and their families' lives indirectly and the different ways energy can play a role in women generating income. Energy can be a major item of expenditure in the household and enterprises. Energy may be a barrier to improvements in livelihood due to problems of accessibility, affordability, ability to understand and use

the energy resource, the energy conversion technology and associated equipment. However, there are a number of other factors which hinder poor people from improving their livelihoods, but as we have described earlier the barriers are sometimes different for women compared to men and they are generally higher. These barriers include access to raw materials, technologies, and finance, education and skill levels, confidence with new and complex technology as well as the availability of technical back-up systems for production and maintenance. In this section we will look at some of these barriers for women and how they can be overcome.

### 11.1 Financial Barriers

Most poor households have little capital to help them acquire energy conversion technologies and associated labour saving equipment, or to get grid connection or an LPG cylinder. For women, there are additional problems of access to capital not faced by men. Families are often the source of the type of capital needed for business ventures. There may be cultural barriers which deny women access to this source of family funds. Banks and lending institutions have conditions for lending, such as collateral and credit history requirements that exclude poorer borrowers. These requirements generally have a greater impact on women, who may face legal restrictions making it difficult for them to own land or other assets, or to take action without their husbands' consent. They may also be discouraged from borrowing or engaging in business by social and cultural barriers limiting women's activities and mobility. Illiteracy, which is more prevalent for women than men due to less access to schooling can make formal loans virtually impossible. Even though it has been well documented that women have a better record of credit repayment than men, women still receive a disproportionately small share of credit from formal banking institutions. In Latin America and the Caribbean, women constitute only 7-11% of the beneficiaries of credit programs. In many African countries, women account for more than 60% of the agricultural labour force and contribute up to 80% of total food production - yet receive less than 10 % of credit to small farmers and 1% of total credit in agriculture. A study of 38 branches of major banks in India found that only 11% of borrowers were women. (UNDP, 1995)

Access to technologies has in the past been promoted through donor-funded projects. Recently micro-credit financing has emerged as a valuable tool for donors to provide capital to poor people who were previously viewed as bad credit risks – especially poor women. Many of the micro-credit programmes are modelled after the Grameen Bank in Bangladesh, which offers women loans of small amounts of short-term working capital without the need for collateral. Repayments are made at frequent intervals. By establishing a credit history based on repayment of very small loans, women can graduate to bigger loans to build up their business activities. It has to be kept in mind that the amounts available under this type of financing are often insufficient to purchase many small-scale energy technologies. To enable women to become energy entrepreneurs or purchasing renewable energy systems or appropriate appliances for their home or enterprise would need different levels of finance and longer time frame for borrowers.

However, projects aimed at enabling women's access to technologies can still go wrong if they do not also take into account the reality of women's lives. A project in Uganda

which set out to encourage women entrepreneurs to purchase solar systems by offering credit through a women's bank failed to reach the target group because interest rates were set well above levels women could meet, repayment schedules were too short and collateral requirements did not match women's resources (Sengendo, 2001). An example of best practice in micro-credit is the ENSIGN project of the Asia/Pacific Development Centre and UNDP, which combines micro-credit loans for energy services and for corresponding income-generating activities for the poor, including women (see Case study 30). The services are co-financed by a revolving fund and national financing institutions, such as the Self-Employed Women's Association (SEWA) Bank in India. Women seem to be most comfortable taking out loans for energy equipment which can be used for income generation.

**Case study 30: An example of best practice in financing energy for micro-enterprises: ENSIGN Project.**

*The ENSIGN project was implemented in eight countries in Asia in a UNDP-financed project led by the Asia-Pacific Development Centre. Energy-linked micro-enterprise portfolios were developed through micro-credit banks and institutions in each country. In urban areas, connecting to the grid and more-efficient appliances were the most important desires. In rural areas, however, renewable energy, coal briquettes, and diesel fuels were preferred. In both rural and urban contexts, process heat and motive power were more crucial to income-generation than lighting. The ENSIGN Revolving Fund provided 36 per cent of total loan funds, national financing institutions 50 per cent, and borrowers' equity 14 per cent. Interest rates were 15 to 20 per cent, somewhat below market rates, with repayment periods of 2 to 6 years. Both individuals and communities were financed, and the average increase in income was 124 per cent (higher for the community projects).*

*Many activities were financed, including garment making, embroidery, felt and leather goods manufacturing, copper welding, utensil manufacturing, baking, cold storage, rubber stamp making, beauty salons, grain grinding, threshing, fish drying and powdering, soybean processing, rice husk cook stove, spice drying, beedi (flavored handmade cigarettes) wrapping, cinnamon peeling, and rice processing.*

*Some lessons from the ENSIGN project include:*

- *Although this was not planned, the vast majority of borrowers were women, who proved to be enterprising, innovative, and creditworthy.*
- *Significant benefits for women, in addition to income impacts, were time savings and enhanced self-confidence from improved ability to support household income and greater control over self-generated finances.*

*(Ramani 2002)*

However, research is increasingly questioning whether women are able to fully utilise the credit, and what degree of control they retain over the loans once disbursed. For example, Baden et al. (1994) report a study in Bangladesh of 250 loan histories from some of the leading micro-credit agencies that found on average 20% of loans to women were used by male household members. A worrying aspect is that the larger the size of the loan the greater the likelihood it will be appropriated by male family members. This

would be a particular cause for concern with the size of funding required for some decentralised energy conversion technologies, such as PV solar home systems. One possibility to prevent male appropriation of loans might be through the exercising of social control. By working together women are able to build solidarity which leads to their empowerment. Women feel in a position of strength to challenge their men in their families, in other words, there is a shift in gender relations<sup>17</sup>. Women's traditional savings groups can be used as a model to encourage women to join together with the specific objective of buying energy technologies by means of loans on a rotating basis from the group (Denton, 2002).

Some energy technologies such as wind and micro hydro generators are generally too large for individuals to purchase by themselves, but may be affordable sources of electrical power for communities if they are purchased collectively. For example, the Mali Multi-purpose platform is a well-known example of best practice in collective ownership of energy (see Case study 6; Case studies 13 and 24 give other examples of women's cooperatives).

## 11.2 Capacity building and training

To be able to participate more substantively at all levels in the energy sector, the education profile of women everywhere has to undergo transformation.

Men also need to become more gender sensitive, not only in terms of the content of their work, but also in their behaviour in the work environment. Table 7 summarises capacity building needs for different stakeholders and suggests means to meet those needs.

More women will need to study science and technology based subjects in school, college and University. All over the world enrolment of women in technical subjects lags far behind that of men (see Table 6 for a not untypical example from Nigeria). If numbers of women in key positions are important to re-ordering the gender and energy 'playing field', especially as concerns appropriate policies and technologies to meet poor women's energy-related needs, then more women and girls must be encouraged and persuaded to study technical subjects.

Technical training programmes can be designed so that they are more sensitive to women's needs, offered at times and locations compatible with women's family roles, and adapted to women's levels of skills and confidence. Locations need to also take into account women's access and specific constraints in travelling to these locations. Trainers can be coached on gender concerns, or selected for their support of women's enterprises and social advancement. Trainers also need to be sensitive to the fact that women often feel more comfortable in women only environments when acquiring new technical skills. It is important also to develop schemes for encouraging and preparing girls early for careers in science and technology. Role models are considered to play a vital role in

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<sup>17</sup> This is very much a GAD perspective and it should be pointed out that there is little empirical evidence to support the view (Mayox, 2001).

encouraging young people to take specific career paths. Therefore, providing girls with positive images of women professionals in the energy sector could be a simple but effective way of encouraging young girls to study appropriate subjects for a career in energy (Clancy et al., 2001).

Networking and advocacy by women's organisations represent important ways of promoting the acceptance of women as energy experts. In the Pakistan Oil and Gas Sector, the Canadian agency CIDA has supported the development of a network of women professionals to exchange experiences about overcoming the barriers they face in their working life (Lele, 1998) (see case study 31). Unfortunately such initiatives are few and far between in the energy sector.

### **Case Study 31: Capacity building through networking in the Petroleum Sector in Pakistan**

*Canadian International Development Agency (CIDA) has a Gender Equity Policy which requires that efforts are made to integrate gender in all of its projects, including the Pakistan Oil and Gas Sector Programme (OGSP). On the one hand, the general attitude is that the petroleum sector [in Pakistan] is not a place for women – it requires fieldwork, which is physically demanding and often dangerous. On the other hand, many senior managers, in both the public and private sectors, recognised the need to attract the best young graduates to their workforce as it rapidly evolves into a knowledge-based employment field. These graduates include women. There may be fewer female students, especially in the sciences, but many of them are the top performers at university.*

*Senior oil company executives were invited to two Gender Equity Seminars and were encouraged by their positive response and ideas. With their support, professional women were invited from their companies to get together for the first time at a Gender Equity Workshop, and heard from them about the problems they face. There are women without access to a women's washroom, a doctor who cannot be promoted solely because she is a woman, a mechanical engineer whose work was sabotaged, and others facing different forms of harassment.*

*This workshop was an inspiring experience, hearing from individuals how they overcame obstacles, or at least managed to survive them. It resulted in the formation of the Gender Equity in the Oil and Gas Sector – Pakistan Petroleum Women's Network (PPWN), a group of professional women now meeting regularly to share concerns and to work for improvements.*

*The women themselves have pointed out the need to increase their visibility as valuable employees. They will be the stars of a 15-minute promotional film on women in the petroleum industry. Newspaper coverage and TV and radio exposure of events and accomplishments will also be organised. (Lele, 1998)*

At the project level, capacity building can mean learning new skills and gaining confidence in defining community problems and designing appropriate solutions. Through implementation activities, it can also involve acquisition of technical skills, such as bookkeeping, marketing, managing a plant, or learning about new energy technologies and how to run them. In terms of policy changes, capacity building may mean promoting

and facilitating the involvement of women's organisations in decision-making processes, and expanding the development opportunities for their members.

**Table 7: Capacity Building Needs for Mainstreaming Gender in Energy**  
(Karlsson and Clancy, 2004)

Target Group	Capacity building need	Means
National policy makers	Sensitisation towards: <ul style="list-style-type: none"> <li>• Openness to try out new methods and tools</li> <li>• Willingness to make space and strengthen women staff in organization's set up</li> </ul>	<ul style="list-style-type: none"> <li>• Advocacy through sharp media and print messages</li> <li>• Well structured and focused interaction with researchers and NGOs</li> </ul>
Implementers of energy programmes	<ul style="list-style-type: none"> <li>• Sensitisation towards gender issues</li> <li>• Practical tools and techniques to incorporate women's role in planning</li> </ul>	<ul style="list-style-type: none"> <li>• Field level workshops in local language</li> <li>• Exchange visits and interaction with local organizations working on gender issues</li> </ul>
Village communities	<ul style="list-style-type: none"> <li>• For men, sensitisation and assurance that women can meaningfully participate in programmes while respecting their traditionally accepted space and roles</li> <li>• Willingness to participate in social empowerment process of women</li> </ul>	<ul style="list-style-type: none"> <li>• Exposure visits</li> <li>• Focus group discussions</li> </ul>
NGOs	<ul style="list-style-type: none"> <li>• Tools and techniques to incorporate women's role in planning orientation towards new methodologies</li> </ul>	<ul style="list-style-type: none"> <li>• Local level workshops</li> <li>• Interaction with researchers and policy makers</li> </ul>

Many people view operating machinery as men's work, not appropriate for women. Technical experts and educators may feel this way, as well as men and women in rural communities. In some areas, women are discouraged from running any kind of business, and women are expected to stay at home taking care of family responsibilities. In other areas, women engage in a variety of small income-producing enterprises in addition to maintaining their households, but larger businesses are managed primarily by men. Overcoming these prejudices to enable those women who want to use technology to have access to training requires awareness raising in the community.

### 11.3 A gender sensitive energy policy environment

There is no doubt that a gender sensitive energy policy would help ensure that both women and men's energy needs were equally addressed. The challenge is in engendering



not only the content of such a policy but also the actual process of policy formulation and implementation.<sup>18</sup> Energy institutions tend to be male-dominated, particularly in the professional posts. This creates situations where the issues identified and the solutions offered have a male bias. Increased participation of women in the energy sector and improvement of their status relative to men can help to incorporate gender as an integral part of energy policies and practices, although it will not guarantee the adoption of gender-sensitive policy goals. The case study from South Africa describes an outcome of having more women in policy-making positions as well as active in key stakeholder lobby groups.

**Case study 30: Women mobilising for gender sensitive energy policies**

*In 1993 a small group of women activists in South Africa attended a National Energy forum and were struck by the lack of women at the meeting. These activists requested that more women be able to attend the Forum, and initiated a support group for women participants. The women eventually formed a network: Women's Energy Group (WEG). WEG adopted an inclusive approach. Their activities after 1993 included improving their own and other women's technical skills; developing alliances, in order to be heard, with energy professionals and broad based political organisations, pressuring political bodies to place women and energy issues on their agendas. WEG participated in the consultative process leading to the drafting of the Energy 'Green Paper', a preliminary policy paper. The Green paper was explicit on the gender issues that need to be addressed in the final policy document. A team of 6 men and 2 women was then appointed to produce the final energy policy document in 1998. Despite intensive lobbying by WEG, they failed to increase the number of women in the team.*

*In 1994, a female Deputy Minister for Energy, Minerals and Mines was appointed. In 1999 a woman who had long been a champion of gender issues was appointed Minister in the same ministry.*

*The final energy policy document published in 1998 demonstrated a paradigm shift towards equity, efficiency and environmental sustainability. However, it gave little specific attention to women, despite an explicit acknowledgement of women's subordinate position and gender imbalances in the sector: women comprise only 11% of the total workforce and 5% of management in the energy sector. Women's issues were assumed to be addressed under the categories of 'the poor' and 'low-income households'. (Annecke 2001)*

There are some important lessons to be learnt from the South African experience described in case study 30 in terms of trying to engender energy policy. There was clearly a difference of opinion amongst activists about gender goals and whether or not gender and energy issues could be achieved solely within the energy sector. Such divisions weaken the message. It is also simplistic to expect that the appointment of a woman minister will bring sweeping transformations overnight – gender relations are too deeply embedded with the administration of ministries. Perhaps it is here that the critical

<sup>18</sup> The topic of engendering energy policy is the subject of a separate paper by ENERGIA.

mass of gender sensitive men and women are needed.

Unavailability of appropriate information to stakeholders can also constrain engendering energy planning and project implementation. *Gender disaggregated data* from qualitative and quantitative research about gender based needs, capabilities and resources in the energy sector is needed by planners, policy makers and management teams. The data is needed at each step of the policy process – defining the issues, examining policy alternatives, making policy choices, implementing policies, and evaluating results. Women’s groups also need this type of data for advocacy activities as well as information on available energy options and labour saving devices, and their impacts of their use on the environment.

Budgetary allocations have the power to transform gender inequalities. The Energy Ministry’s budget allocations demonstrate which areas of activity have priority. Which area gets the larger allocation or any allocation at all: electricity generation or biomass supply? A tool which is being increasingly used for highlighting the gender bias in government policies is *gender budgeting*. Gender budgeting can be used to break down and identify the differentiated impacts of public revenue allocations and expenditures as they affect men and women. An analysis would look at inputs, outputs and outcomes. Presenting Government Budgets in a gender disaggregated way helps raise awareness about inequalities in Government Policies. Women in a number of countries have now begun to apply this tool and the case study below gives the results of an analysis of the energy sector in South Africa.

**Case study 31: The South African women’s budget initiative.**

*The South African Women’s Budget Initiative in the energy sector has looked at the budgetary allocations of the Department of Minerals and Energy (DME) and at the governance of the sector. In relation to the latter, the Initiative has argued that women’s needs will not be truly addressed unless women have a major contribution to the decision-making machinery of the sector. In 1995, an analysis of the gender composition of the Council of ESKOM (the state owned electricity utility) showed that women made up 2 of 18 members.*

*In terms of the budget, the focus was on the Energy Management Programme (EMP) component, which determines policy formulation and implementation for the entire sector. The DEM recognises in its policy statements that “gender issues and the role of women in energy decisions” is one of the key issues facing the Department in achieving its objectives. Despite this statement and the existence of an active and vocal group of women researchers engaged in gender analysis of the household energy sector, only 2.7% of the EMP budget was allocated to projects related to gender or women. Between 1994 and 1997, research had been entirely confined to the household sector and there had been no projects in sub-sectors such as agriculture, transport, industry and commerce.*

*Source: “The Second Women’s Budget”, Debbie Budlender (ed.), 1997. IDASA, Cape Town, South Africa.*

It is considered that a shift towards a *demand side approach* in energy policy formulation which looks at energy as an aspect of a social and cultural setting, rather than the traditional supply side approach which focuses primarily on technology and resource solutions, would contribute to better addressing gender energy needs (Karlsson and Clancy, 2004).

#### 11.4 Information

Ngoo and Shuma (2001) have summarised the reasons why women lack information about energy and why this situation needs to be addressed:

*Women need information in order to make informed choices about energy sources, technologies and equipment. A number of factors play a role in addressing energy information barriers: gender and energy lobby groups, infrastructure in information and communication technologies, literacy levels*

Publicity and marketing campaigns must contend with low literacy rates, undeveloped market systems and weak communications. Radio and television programming could be used to provide basic information in some areas. Over time, access to computers and internet connections in village schools and community facilities could bring large amounts of technical information into rural areas, but currently few people in remote communities currently have computers and internet connections or the electricity supply to power the technology. Places where women gather, such as markets or clinics, can also be useful contact points with women for disseminating information about and demonstrating new technologies.

Networking among women's groups at the community, national, regional and international levels provides a relatively simple way of sharing information about gender and energy issues, but one which requires widespread organisation and technical support. Case study 32 describes a sub-regional meeting in Central America which brought women and men together to discuss gender issues in energy. One of the outcomes of the meeting was the recognition of the role of a network in building capacity.

#### **Case study 32: Networking for capacity building in gender and energy.**

*In October 1998, the Central America Gender in Sustainable Energy Network, (GENES) was formed with the consensus of over 50 organisations ranging from women's co-operatives to agricultural producer associations and national energy agencies. This network resulted from a workshop on the gender and energy nexus held in Antigua Guatemala. Every one of the over 80 men and women attending the workshop engaged in active discussion and participated in small working groups, on questions some as seemingly basic as "what is gender?" Also discussed was its relevance to energy use and management in the context of different development objectives; and how to approach the challenge of increasing women's involvement in decision-making and planning of energy-related activities since their input is particularly relevant yet sorely absent throughout the region, as it is around the world.*

*For most participants, this was a unique eye-opening event: never had they participated in a forum that brought women and men together to address the different roles that each*

*plays in energy use and management. Just as women are traditionally left out of critical decision-making, men are rarely invited to join discussions on topics involving women's empowerment. The broad range of perspectives—from women, men, technicians, energy specialists, feminists, anthropologists and other development specialists—generated lively and fruitful discussion, and ultimately led to a consensus on the need for an ongoing forum for dialogue and capacity-building on these issues. (Winkler and Büttner, 2000)*

### 11.5 Technology meeting women's needs

Technology adoption is subject to the cultural context, especially for women. This is partly because of the multiplicity of their tasks, where certain orders of doing things (*gender roles*) have to be maintained. Improved cooking systems are particularly prone to rejection when the design is gender blind and the functioning is culture blind. The example of solar cookers in Case study 33 attests to this.

#### **Case study 33: Culture influencing energy technology acceptability.**

*Different frameworks of cultural preferences have clearly played a part in lack of acceptance of solar cookers, more fuel-efficient stoves and biogas plants. Solar cookers, in spite of their image as clean and cost-free in use, have not received widespread acceptance even among the poor who are in desperate need of alternative energy. Tastes or habits may define the parameters of potentially suitable energy sources and technologies. In some parts of Sudan where breakfast is at 10 am and dinner is at 4 pm, solar cookers may be culturally more acceptable than in places where breakfast is before sunrise and dinner after dark. The latter is the case in most of India and Africa. (Denton, 2002)*

Addressing women's energy needs has in the past been through special programmes mostly related to cooking, for example, the introduction of more efficient or less smoky stoves, or encouragement to switch to solar power or biogas for cooking. Other programmes have tried to involve women in the growing of trees to increase the level of firewood supply. Such programmes have met mixed success. An analysis of a number of energy projects with women as the intended beneficiaries, found that it was easier to mobilise uptake of the technology if it provided women with financial benefits through income generation. However, a number of other factors were identified as key contributors to success:

- Access to markets and an effective marketing strategy for commercial activities;
- Innovative financing and credit arrangements for access to energy equipment<sup>19</sup>;
- Technical capacity building to enable women to operate and maintain unfamiliar technologies;
- Involvement of women in the design, implementation and evaluation of energy equipment intended to benefit them. (Karlsson and McDade, 2001)

<sup>19</sup> Clancy (2001) has argued that, with the possible exception of stoves, micro-financing is of an insufficient level to enable women to purchase most energy equipment. However, it would appear that the international community has now begun to address this issue, see for example GVEP, 2004 (although gender was not a factor raised to any significant extent in the discussion).

Another factor of success in technology acceptance is the full participation of the intended beneficiaries in all aspects of energy project identification, design, financing, mobilisation, implementation and evaluation. There is often a wide gap between the people who design and produce technologies and those who actually use them. Those whose lives will be directly affected by project outcomes generally have the best understanding of local needs, resources and dynamics. Since in many areas women are primary users of energy equipment, it makes good sense for them to be involved in designing and implementing projects to meet their own energy needs. Women already have valuable knowledge about local conditions and resources. However, it may require special efforts to ensure women's participation. In many cases women traditionally are excluded from decision-making processes and men are asked about women's areas of responsibility (see case study 34). There may be particular responsibilities and constraints that keep women's voices from being heard. Therefore, specific measures will need to be adopted to enable women to effectively contribute, for example, separate planning committees for women and men creating an environment where women feel free to speak up.

**Case study 34: If it's about cooking, then ask the women**

*In Fateh Singh ka Purwa (India), a community biogas plant was installed to provide cooking energy. Technically this plant can be considered a success, but socially a failure. Male community leaders pointed out that they were not interested in energy for cooking – they would rather have energy to power irrigation pumps, chaff cutters and milling machines. Women were extremely critical about the plant. It was decided, without consulting the women that the gas supply would be limited to 2 hours (8am-10am) in the morning when the women were already in the fields. This fact was completely ignored by the plant organizers. The gas therefore did not provide even 25% of the day's cooking and the women had to look for wood as substitute for the dung cakes, which went to the biogas plant. (Ministry of Non-Conventional Energy Sources, 2001).*

Additional education of women and women's organisations about new energy options and technologies can increase their ability to contribute to energy solutions, including the adoption of cleaner fuels and equipment. Case studies 22 and 35 give examples of women building energy technologies. Training was an important element in the project success.

**Case study 35: Women producing energy technologies**

*In Malawi, the Ndirande Nkhuni Biomass Briquette Programme involved training women's groups to produce briquettes from waste materials for use and sale as an alternative fuel source. Women were involved with the design of the wooden briquette-making machines, which are inexpensive and easy to maintain. Spare parts are easy to get and local artisans have been trained by the project to make new machines when necessary. The training focused on women because they are the main users of household energy. The women's groups also received training in maintenance skills,*

*entrepreneurship and business management. As in the Kenya project, some women went on to train others for a fee (Mabona, 2001).*

## 12 EMERGING ISSUES

Gender and energy is a relatively new topic of research and our body of knowledge is constantly expanding and concepts are being applied to new areas. Most of our knowledge is based on gender and energy issues in rural areas of the South. Urban areas and the North are new fields of research. This section briefly reviews three emerging areas.

### 12.1 Gender, energy and poverty

Poverty is one of the world's most fundamental issues, and urgently needs to be addressed. Moving people out of poverty forms a cornerstone of much international development policy. The way poverty is conceptualised has changed in recent years. Initially it was defined very much in economic terms; people with an income of less than \$1 a day are considered to be living in extreme poverty. However, as research into poverty has shown that there are more dimensions of poverty than low cash incomes. When people we regard as "poor" describe their own situation, they consider that their well-being is inadequate, for example, they feel a lack of access to sufficient levels of food, water, clothing, shelter, sanitation, healthcare, and education. The change in conceptualisation of poverty has led to new ways of moving people out of poverty. Although, there is still an emphasis on income generation through increasing the opportunities for the poor to participate in markets, there has been a broadening of strategies to enable the empowerment of poor people. Empowerment aims to address the inequalities, including gender inequalities, which prevent people from influencing policies and interventions which affect their lives. Increasing the security of poor people by addressing the factors which create their vulnerability has become a part of international development thinking.

How is energy seen in the new approaches to poverty alleviation? Energy is recognised as one of the most essential inputs for sustaining people's livelihoods. At the most basic level, energy provides cooked food, boiled water and warmth. However, energy has not been widely accepted within development circles as a basic need, as have water and food (Clancy, 2004).

It has long been established that poor people mostly use biomass as their energy carrier and that in many areas there is an increasing shortage in supply, which adds to the burden of the women whose responsibility it is to collect. However, despite the fact that around two billion people still use biomass fuels (World Bank, 1996), and the fact that these are also the two billion poorest people on earth, there has been little attempt until recently to analyse the energy-poverty nexus in depth.

Energy has an equity dimension: poor households use less energy than wealthier ones in absolute terms. Less water is boiled for drinking and other hygiene purposes, increasing the likelihood of water-borne diseases. Illness reduces the ability of poor people to

improve their livelihoods and increases their vulnerability, not only preventing adults from working effectively but also negatively affecting children's learning by keeping them from school.

Of the approximately 1.3 billion people living in poverty, it is estimated that 70% are women, many of whom live in female-headed households in rural areas. Since women generally have less access to resources and decision-making than men, many poor female-headed households can be expected to be living in extreme energy poverty. It is not only the supply of energy which will be constrained, but also the important services for the household which will be affected, such as clean water provision. Their lack of resources makes poor households vulnerable to changes outside of their control e.g. drought.

Towards the end of the 1990s, there had been some discussion about providing energy services for the poor, for example, the World Bank's *Rural Energy and Development: Improving Energy Supplies for Two Billion People*. However, it is during the preparations leading up to the World Summit on Sustainable Development in 2002, that a shift towards a more explicit recognition of the role of energy in the fight against poverty began to emerge. For example, UNDP began to advocate the adoption of a new global target for energy as a prerequisite to fulfilling other international development targets of the Millennium Goals adopted by the UN General Assembly in 2001. The target aimed to halve the proportion of people without access to clean and affordable fuels and electricity by 2015. The UK's Department for International Cooperation (DFID) released "Energy for the Poor" which set out its vision for the role of energy services for helping the poor move out of poverty and how access to energy for the people can be facilitated<sup>20</sup>. The World Bank's Asia Alternative Energy Programme (ASTAE) recently undertook a study to identify and quantify as far as possible the potential benefits of energy in general, and of electricity in particular, to the poor (Heijndermans, 2002).

Box 4 summarises current thinking on the energy-poverty nexus.

## 12.2 Gender, Household Energy and Privatisation of the Energy Sector

The energy sector in developing countries is not immune from transformations that are taking place in the global economy, which are intended to bring about increased efficiency and lower costs, as well as increasing access. There are two particular changes taking place that are likely to have specific consequences for poor people: privatisation and commercialisation. Privatisation in the energy sector involves the sale of state energy companies, particularly the electricity utilities, to the private sector, as well as the opening up of the market for the private sector to provide other energy services. These trends bring with them wholly new concerns that need to be studied: particularly, how the private sector will respond to the demand from the rural poor for household energy services. Will the poor be seen as a mass market needing creative financing programmes to facilitate access to energy services, or will they be regarded as too high a risk, providing too low a profit margin? Private sector electricity suppliers might consider

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<sup>20</sup> Table 3 shows how energy can help in reaching the MDGS.

#### **Box 4 Current thinking on the energy-poverty nexus**

- Approximately two billion people do not have access to 'modern' forms of energy, such as electricity, and liquid fuels.
- Modern forms of energy are a necessary input for economic development and the elimination of poverty. The substitution of inanimate energy for human energy has proven to be an essential element in removing drudgery, and increasing well-being.
- But improved forms of energy are not sufficient conditions for development. Many 'complementary inputs' are also required, including 'end-use' technology to convert energy into useful outputs, such as illumination, milling, pumping, transport and communication.
- Conventional modern forms of energy (fossil fuels and electricity) will remain the fuel of first choice for many poor people for many years to come, while traditional biomass fuels will remain the main fuels of necessity.
- Biomass fuels are not always 'renewable' as sometimes they are harvested renewably and sometimes 'mined' destructively.
- Poor people need energy for many tasks (lighting, cooking, mechanical power, heating and cooling, communication) and they require multiple fuels (electricity is not enough).
- Women and children usually form the majority of poor people in any community; and women are usually major users and suppliers of energy resources in marginalized communities.
- Poor people already pay cash for improved energy services, particularly for the convenience of electric lighting and radios. Beyond this, the additional income to pay for modern energy services will usually be associated with investment in sustainable (profitable) and productive energy end-use activities.
- The fuels and technologies traditionally available to poor people result in very low energy conversion efficiency. However, this efficiency can be improved both domestically, and in commercial and institutional uses through changes in technology.
- The energy supply sectors of many developing countries are in the process of being restructured to attract private capital. This poses both a threat and an opportunity for poor people. As energy supplies are delivered on a more commercial basis, their availability to poor people may reduce. However 'unpackaging' energy supply systems opens up opportunities for the private sector to supply energy services to poor people who would do not have access under current arrangements.
- Funds from tax revenues, aid agencies and charities are unlikely to be able to provide energy services directly to any but the smallest fraction of poor people. This means that market mechanisms will have to provide the finance for improved energy services, but their extent and effectiveness will have to be massively expanded to meet current unmet needs and the needs of growing populations.
- The State has a vital role to play in providing the 'enabling environment' that is necessary for the private sector to supply improved energy services to poor people. Subsidies (including aid) may well be essential, but they need to be applied with great care so that they may make markets rather than destroy them.

*Barnett, 1999*

themselves under no obligation to implement schemes with a high social value (for example, lifeline tariffs sufficient to light one or two lamps) that many public utilities have addressed. Since a disproportionate number of poor households are headed by women, then women (at least in this group) might consider that the market also does not benefit them if the private sector fails to recognise them as prospective clients. It is, as yet, not clear whether privatisation will result in more, or less, access for the rural poor to modern energy forms, although emerging evidence from India is not positive (Sinha, forthcoming 2005). In some cases, the boundaries of existing services, originally provided with an element of social welfare, are being retracted, as can be seen, for example, in India where previously electrified areas are having services withdrawn based



solely on financial criteria (Ministry of Power, 2001). Conversely, privatisation might contribute to sustainable livelihoods by providing new entrepreneurs with the opportunity to enter the market by providing local level energy services in rural areas. Although this is much to be hoped, the scanty evidence so far is not very encouraging. Barja and Uriquiola (2001) report that following the privatisation of the utilities in Bolivia, there have been no improvements in access to electricity for the poor in rural areas, whereas in urban areas there was access by more than 95% in the lowest income quintile compared with 86% prior to privatisation. Whether this trend is general is not known, although a body of knowledge is beginning to emerge (see for example, Doig (1998)).

Commercialisation is a process of reducing public expenditure that also aims to reduce the market inefficiencies induced by subsidies. For the energy sector, it has meant the removal of direct subsidies on fuels and appliances, and a shift towards market-based solutions in the provision of energy services. This has increased the cost of household energy, particularly for lighting. Kerosene is the preferred option in non-electrified households. Petroleum supply is in both public and private ownership, although generally governments still control kerosene prices. Women are able to buy this lighting fuel in small quantities, to match their cash flows, at reasonable prices. Although many households would like to have access to electricity for lighting and LPG for cooking, the method of payment does not always match the cash flow in low-income households. Empirical evidence of women using micro credit for access to modern energy sources is lacking (see case study 37).

In terms of addressing gender differences around energy choices certain modern marketing strategies might be more ready to take gender differences into account when analysing the potential clients and would disaggregate both between and within households. Targeting of advertising would sell products to men and women in different ways. A company could promote their new products (energy forms can also be seen in terms of a “product”) through imaginative training programmes, which are client centred taking into account availability and skills. The company would arrange financing for its products and any associated equipment.

Market approaches would probably address gender issues from an efficiency basis. Enabling equity or empowerment is not a market objective. However, these objectives might be reached indirectly. For example, women who participate in the market as entrepreneurs would certainly be empowered and may be move towards greater equality, through increased status accrued from increased contribution to family income.

### **12.3 Gender, energy and climate change**

The international debate on energy and climate change has given scant attention to gender issues. Denton (2000) commented that the climate change debate had essentially been science driven and had lacked a social dimension. (Alber (2002) described the negotiations around climate change as “a playground for economics addicts and number crunchers”.) Denton argued that if one analysed the social dimension of the effects of climate change then gender issues clearly emerged. Climate change is likely to affect food production and floods will threaten houses. Both endanger human security and it is

the poor and vulnerable groups who will be most at risk since they have the least access to resources to respond to the threats posed by unstable and shifting weather patterns. Women feature strongly in the groups most at risk since they form the majority amongst low-income earners and they play a key role in food security for the family. It is estimated that 59% of the world's food production (80% in some parts of Africa) is by women (Denton, 2000). At present, we are in a period of uncertainty since no one knows with any degree of certainty what the effects of climate change are likely to be on food production. However, if the negative scenarios of increased crop failures become real, then the fear is that women's low incomes and role as food provider could become negatively re-enforcing and increase their vulnerability and stress. Women will not be able to afford to buy nutritious food to replace failed crops. In addition, their own calorie intake will be reduced even further (in many cultures women eat last and eat least) reducing their own energy levels (metabolic energy) on which so much of household survival tasks depend on. In addition, the sorts of crops that will grow under new weather patterns may require longer cooking; hence, food preparation could be more energy expensive. Agricultural residues output could also fall, affecting both animal feed and household energy supplies (including reduced dung production through lower food intake levels for animals). Any reduction in biomass availability can threaten a household's capacity to boil water which in turn increases the transmission of water borne diseases.

Southern Africa is heavily dependent on rain-fed agriculture. Any increase in flooding or droughts will contribute to reducing agricultural output and hence increase social vulnerability. The role of women in food production in Southern Africa is crucial. Most economically active women are employed in agriculture, which can in part be attributed to male urban migration, wars and changes in socio-cultural structures. In Mozambique, for example, in 1998 for every 100 men working in agriculture, there were 153 women similarly employed (quoted in Wamukonya and Rukato, 2001). In Southern Africa, women will be expected to respond to the changes brought by changes in weather patterns. However, they tend to be less educated than their male counterparts, generally have less land to work, and less capital and access to extra farm labour. This reduces their capacity to respond to outside threats and hence their vulnerability increases.

It was only after the so-called COP-6 meeting (international meeting on climate change) held in The Hague in November 2000, that the need for mainstreaming gender into climate change debates and responses became more clearly heard. A first step by governments towards addressing women's issues came during COP-7 in Marrakech in autumn 2001. A proposal put forward by the Samoan delegation to improve the participation of women in the representation of Parties in the international climate process was approved. The following COP-8 included a side event dedicated to gender aspects. Despite the increasing presence of gender advocates, the specific dimension of women's rights has not been as well incorporated as have, for example, indigenous peoples' rights (Alber, 2002).

In part, this failure to incorporate gender into the international debates on climate can be attributed to a lack of vigorous gender analysis in the field, with only a small number of

researchers contributing to the debate. Wamukonya and Rukato (2001) have attributed the lack of attention to gender in climate change fora to a number of factors:

- gender is only just beginning to be mainstreamed into energy policy making;
- the gender and energy debate has not kept pace with international developments in climate change;
- the links between gender and energy, climate change and its adverse impacts have not been well articulated at international, regional and local levels; and
- the climate change agenda is set at the international level and therefore fails to address what is in effect experienced at the local level.

Alber (2002) attributes the gender and energy debate not keeping pace with international developments in climate change to the complex language used during the negotiations which can be a barrier to “outsiders” wishing to break into the debate. She sees capacity building as an important part of getting gender onto the climate agenda.

Wamukonya and Skutsch (2001) took Denton’s discussion of the vulnerability aspects of the effects of climate change further and identified a number of additional areas where gender issues could play a role: responsibility for the emissions; mitigation of emissions; and adaptability to climate change. In terms of responsibility for emissions, ecofeminists would argue that industrial economies and their production processes stem from a male dominated culture and that if female norms dominated the economy, industry would look very different and probably be more environmental friendly. However, one has to consider if it is either feasible or useful to determine whether or not women or men are responsible for specific Green House Gas (GHG) Emissions linked to climate change. This type of analysis might lead to arguments which would distract from solving the problems arising out of the environmental crisis facing us. There are a number of international instruments which have been negotiated to mitigate the production of GHGs, for example, the Clean Development Mechanism (CDM) which allows for technology transfer of energy efficient technologies from the North to the South. Currently, the approach under the CDM is gender neutral, it assumes that energy is gender neutral and so does not deliberately set out to specifically target men or women and as a result misses out the gender differences in energy technology needs and capabilities. Women generally have a lower confidence level to spontaneously take up technologies, but with the right sort of training and support can do so most enthusiastically and successfully (see for example, case studies 6, 13, 21, and 35). This would suggest the need for technology transfer projects which specifically target women both to meet their specific needs and to bridge their technical knowledge gaps. However, not everyone supports this approach, fearing male resentment and backlash (Wamukonya and Skutsch. 2001). An alternative might be to adapt strategies to local circumstances, and where appropriate a family or partnership approach could be employed or to use poverty alleviation as a point of entry.

Voices from the South have called for assistance in adaptation to the effects of climate change, such as adjusting agricultural systems, flood control and health services. However, unlike with mitigation, there is no agreed programme for this approach. If any programmes should materialise, it would be important that at least a gender dimension

should be recognised and appropriate strategies developed. Again, it would need to be debated whether or not a woman-focused approach would be strategic for achieving goals.

### **13 CONCLUDING REMARKS TO PART II**

In the second part of the text we have examined a number of issues in relation to gender and energy, applying some of the concepts we introduced in Part I. Gender and energy is a relatively new field of research and new ideas and issues are continuously emerging. Our knowledge about gender issues in energy is also expanding. As we have seen, gender and energy, was originally considered to be women and energy which focused entirely on cooking. Now we know that the situation is more complex - that men do play a role and that women use energy for more things than cooking. We are also being to build up a body of ideas about how to address many of the barriers that face women in relation to their energy needs. Again if one looks at the early literature the examples on gender and energy mainly came from fuelwood collection and use, often adapted to the forestry sector. We are now beginning to amass case studies from within the energy sector and across a broader base than fuelwood (although this continues to be a very significant issue for women).

We hope that this paper can help the reader understand the issues in gender and energy and be able to apply them in their own context.

## 14 BIBLIOGRAPHY

- Agarwal, B. (1986): *Cold Hearths and Barren Slopes: The Woodfuel Crisis in the Third World*, London: Zed Books, 209pp.
- Alber G (2002), *Climate Justice and Gender: the Need for Capacity Building*, ENERGIA News Vol.5 No.4. p23.
- Anderson, T., Doig, A., Rees, D. and Khennas, S. (1999), *Rural Energy Services*. IT Publications, London. ISBN 1-85339-462-9.
- Annecke, W. (2001): *Impact of the Women's Energy Group on South African National Policy* Energia News 4(3) pp16-17
- Baden S, Goetz A M, Green C and Guhathakurta M (1994), *Background to Gender Issues in Bangladesh*. BRIDGE Report No 26. <http://www.ids.ac.uk/bridge>.
- Banks, L., Bongani, M. & Phumeza, L. (1996): *Social Determinants of Energy Use in Low-Income Households in Metropolitan Areas (Eastern Cape)*, Johannesburg, South Africa report to the Department of Minerals & Energy
- Barja, G., and Urquiola, M. (2001), *Capitalization, Regulation, and the Poor: Access to Basic Services in Bolivia*, UNU/WIDER Discussion Paper No 2001/34.
- Barnes D (1995), *Consequences of Energy Policies for the Urban Poor*. FPD Energy Note No. 7. Washington DC: The World Bank.
- Barnes, D. F., Openshaw, K., Smith, K. & Robert van der Plas. (1994): *What Makes People Cook with Improved Stoves? A Comparative International Review of Stove Programs*, Technical Paper No. 242, Energy Series, Washington, DC: The World Bank
- Barnett, A. (1999), "*Increasing Access to Sustainable Energy Sources: A Summary of Recommendations Made to the Sustainable Energy Programme of the Shell Foundation*" 20th Sept. 1999.
- Barnett A (2000), *Energy and the Fight against Poverty*, Paper given as part of series of Economic Research Seminars at Institute of Social Studies, The Hague, 29<sup>th</sup> June 2000.
- Barua, D., (1998), "*Energy's Role in rural Income Generation: The Grameen Strategy*", paper presented at 'Village Power '98:Scaling Up Electricity Access for Sustainable Rural Development, NREL/World Bank, Washington, DC, October 6-8 1998.
- Batliwala, S., and Reddy, A. (1996), "*Energy for Women and Women for Energy: Empowering Women through Energy Entrepreneurship*", ENERGIA News, Vol. 1, No. 1.
- BEST (Biomass Energy Services and Technology) (1988): *The Use of Wood Fuels in Rural Industries in Asia and Pacific Region*, Bangkok: Regional Wood Energy Development Programme in Asia/Food and Agriculture Organisation (RWEDP/FAO).
- Bhogle, S. (2003). Rural women as agents of improved woodstove dissemination: a case study in Huluvangala village, Karnatake, India. *Energy for Sustainable Development: The Journal of the International Energy Initiative*, 7(3),pp 70-75.

- Bradley, P. N. (1991): *Woodfuel, Women and Woodlots*. Vol. 1: A basis for effective research and development in East Africa. Basingstoke: Macmillan Education. ISBN 0-333-54378-5.
- Bryce, D., and Soo, C.C., (2003), *Bulelavata women speak*, ENERGIA News, Vol. 6, No. 2.
- Bryceson, D.F. & McCall, M.K. (1997): *Lightening the Load on Rural Women: How Appropriate is the Technology Directed Towards Africa?* Gender, Technology and Development 1 (1) pp.23-45.
- Budlender, D. (ed.), (1997) *The Second Women's Budget*. IDASA, Cape Town, South Africa.
- Burn N and Coche L (2001), *Multifunctional Platform for Village Power*, in "Generating Opportunities: Case Studies on Energy and Women", UNDP, New York. ISBN 92-1-126124-4.
- Cecelski, E (1995), *From Rio to Beijing: Engendering the energy debate*. Energy Policy Vol. 23, No. 6, pp 561-575.
- Cecelski, E. (2000), *The Role of Women in Sustainable Energy Development*. NREL/SR-550-26889. NREL, Golden, Colorado, USA.
- Cecelski, E (2002), *Enabling Equitable Access to Rural Electrification: Current Thinking on Energy, Poverty and Gender*. Briefing Paper for the Asia Alternative Energy Policy and Project Development Support: "Emphasis on Poverty Alleviation and Women". Washington, DC: Asia Alternative Energy Unit, The World Bank. [www.worldbank.org/astae](http://www.worldbank.org/astae).
- Cecelski E., with Makhabane, T.T., Ndevashiya, W.N., and Hasheela, T.H., (2001), *Gender and Biomass Energy Conservation in Namibia: A Case Study with Special Reference to GTZ/ProBEC Interventions*. Draft Report to the Program on Biomass Energy Conservation (ProBEC) in Southern Africa. 9 December 2001. [www.energia.org](http://www.energia.org).
- Chaieb S and Ounalli A (2001), *Rural Electrification Benefits Women's Health, Income And Status In Tunisia*. ENERGIA News Vol. 4 No. 4 pp18-20
- Chandi, L. (2001): *Gender and Energy in Zambia: Proceedings of a National Policy Seminar*; Afrepren Occasional Paper No. 14.
- Clancy J S (1998), *Household Energy is more than Stoves*, Boiling Point No 41. IT Publications, London. Autumn 1998.
- Clancy J S (2000), *Policies, Projects and the Market - Empowering Women? Some initial reactions to developments in the energy sector*. Paper prepared for ENERGIA. <http://www.energia.org>
- Clancy J S (2001), *Women, Energy and Small Scale Enterprises*. International Conference on Community Technology, Murdoch University, Perth, Australia. July.
- Clancy, J S, Stienstra M, Gregory J and Cornland D (2001), *Gender and energy–women's concerns in energy :Background and state of the art*. Working Paper 1. Study carried out for the European Commission Research Directorate.
- Clancy, J.S. (2002), *Blowing the smoke out of the kitchen: Gender Issues in Household Energy*. Paper prepared for SPARKNET, knowledge network on household energy. <http://www.sparknet.info>

- Clancy, J.S., Skutsch, M.M., and Batchelor, S. (2002): *The Gender-Energy-Poverty Nexus: Finding the energy to address gender concerns in development*. Prepared under DFID contract CNTR998521.
- Clancy, J.S., and Roehr, U. (2003), *Gender and Energy: Is There a Northern Perspective?*, J. Energy for Sustainable Development, p44-50.
- Clancy, J.S., (2004), *Gender and Household Energy Concerns: the Global Context*. Brief 2, SPARKNET. <http://www.sparknet.info>
- Clancy, J.S., Ekram, L.N., Halim, S., and Mahtab, N.(2004) *Gender Mainstreaming in the Bangladesh Rural Electrification Board*, ENERGIA News, Vol. 7 No.1, p18-19.
- Dauber, R. & Cain, M. (eds) (1981) *Women and Technological Change in Developing Countries*, Boulder: Westview Press.
- Delfs, C. (2000), *Women producing electricity from renewables: from 'project' to 'market': The 'Windfang' project in Germany*, ENERGIA news, vol. 3, nr. 1.
- Del Rosario Torres, X. & Salas, A.C. (2001). *Solar Disinfection of Water in Latin America Benefits Women and their Families*. ENERGIA News, 4(4), pp 16-18.
- Denton F (2000), *Gendered Impacts of Climate Change – A Human Security Dimension*. ENERGIA News (2000) vol. 3 nr. 3 p 13-14.
- Denton, F. (2002): *Gender: The Missing Link to Energy for Sustainable Development: Rethinking Gender Dynamics and Strategies Through Sustainable Energy Services and Integrated Solutions* Enda Tiers Monde Energy Programme Paper prepared for WSSD.
- DFID (2002), *Energy for the Poor: Underpinning the Millennium Development Goals*. Department for International Development, London. <http://www.dfid.gov.uk>. ISBN 1-86192-490-9.
- Dhanapala K., (1995), *Report on the Gender Related Impact of Micro Hydro technology at the Village Level*, Intermediate Technology, Study Report Number 2, 59 pages.
- Diagana, M. (2001), *Impact Study of the Multifunctional Platform on the Living Conditions of Women*. Bamako, Mali: Multifunctional Platform for Poverty Alleviation, UNDP Project MLI/99/001.
- Doig A (1998), *Energy Provision to the Urban Poor*. DFID KaR Energy Project R7182. <http://www.dfid-kar-energy.org.uk>
- Dowse, S. Horton, K. Lele D, and Sherk S (1999), *Women in Canada's Oil and Gas Sector*, Report prepared for the Canadian International Development Agency's Oil and Gas Sector Programme Pakistan.
- Dutta S (1997), *Role of Women in Rural Energy Programmes: Issues, Problems and Opportunities*, ENERGIA News No.4, p11-14.
- Dutta, S., Ibrahim, H., Malhotra, P., and Venkata Ramana, P., (1997), *Biogas: The Indian NGO Experience*, AFPRO-CHF Network Programme, New Delhi: Tata Energy Research Institute.
- ESMAP (1999), *Household Energy Strategies for Urban India: The Case of Hyderabad*, Washington.
- Fernando, P., and Keter, S., (1996), *Internal Evaluation of IT Kenya's Rural Transport Programme*. Intermediate Technology Kenya, P O Box 39493, Nairobi,

Kenya and Intermediate Technology, Bourton Hall, Bourton on Dunsmore, Rugby, Warwickshire. CV23 9QZ, UK.

- Fong, M. S., Wakeman, W. and Bhushan, A. (1996): *Toolkit on Gender in Water and Sanitation*. Gender Toolkit Series No. 2, Gender Analysis and Policy, Poverty and Social Policy Department, UNDP-World Bank Water and Sanitation Program, Transportation, Water and Urban Development Department Water and Sewerage Division (TWUWS).
- Green M G (2001), *Solar Cookers as a Mechanism for Women's Empowerment*, ISES World Solar Congress, Adelaide, Australia. December 2001.
- Havet, I. (2003), *Linking Women and Energy at the Local Level to Global Goals and Targets*. J. Energy for Sustainable Development, p75-79.
- HDRC (2002), *Economic and Social Impact Evaluation Study of the Rural Electrification Program*, Human Development Research Centre, for NRECA International Ltd's Rural Power for Poverty Reduction Program (USAID CA388-A-00-97-0040-00), Dhaka, October 2002.
- Heijndermans, E., (2002), *Asia Alternative Energy Programme of the World Bank: Energy, Poverty, and Gender Work*. ENERIGA News vol. 5, nr 3, p4-5.
- Hosier, R. (1994): *Informal Sector Energy Use in Tanzania: Efficiency and Employment Potential*, Energy, Environment and Development Series - No. 25, Stockholm Environment Institute
- Jones, S., Aitken, R. & Luckin, L. (1996): *An Ethnographic Study of the Social Determinants of Fuel Use in Cato Manor, Durban*, Report to the Department of Mineral & Energy Affairs, Johannesburg, South Africa
- Kabeer, N. (1994): *Reversed Realities: Gender Hierarchies in Development Thought*. London: Verso.
- Karlsson, G.V., and Clancy, J.S. (2004), *Gender and Energy for Sustainable Development: A tool kit and resource guide*. UNDP/ENERGIA. [www.undp.org/energyandenvironment](http://www.undp.org/energyandenvironment) and [www.energia.org](http://www.energia.org).
- Karlsson, G.V. and McDade S.E. (2001), *Sustainable Energy and Women*. Introduction to "Generating Opportunities: Case Studies on Energy and Women". New York: UNDP. ISBN 92-1-126124-4.
- Khamati-Njenga, B. (2001). *Upesi Rural Stoves Project*, in: Misana, S. and G. Karlsson (eds), "Generating opportunities: Case studies on energy and women". New York: UNDP. ISBN 92-1-26124-4.
- Khan, H. (2001) *Battery-Operated lamps Produced by Rural Women* ENERIGIA News 4(3) pp12-13
- Klingshirn A (2000), *Integrating Household Energy into Rural Development Programmes*. <http://www.energia.org>
- Lele, D., (1998), *Gender and Equity in International Petroleum Projects: Women in the oil and gas sector*, ENERIGIA News, Vol. 2, Nr. 3.
- Mabona, M., (2001), *Ndirande Nkhuni Biomass Briquette Programme*, United Nations Development Program (2001): "Generating opportunities: Case studies on energy and women". New York: UNDP.



- Makan A (1995), *Power for women and men: Towards a gendered approach to domestic policy and planning in South Africa*, Third World Policy Review, Vol 17 (2).
- March, C., Smyth, I., and Mukhopadhyay, M., (1999) *A Guide to Gender-Analysis Frameworks*. Oxford, UK: Oxfam GB. ISBN 0-85598-4031.
- Massé, R., and Samaranayake, M. R. (2003), *EnPoGen Study in Sri Lanka*. ENERGIA News, Vol..5, No. 3: pp. 14-16.
- Mehlwana, A. Qase, N. (1996): *Social Determinants of Energy Use in Low-Income Metropolitan Households in the Western Cape (Phase 1)*, Report to the Department of Mineral & Energy Affairs, Johannesburg, South Africa
- Mehretu, A. and Mutambira, C. (1992): *Gender Differences in Time and energy costs of distance for regular domestic chores in rural Zimbabwe*. World Development 20(11)
- Ministry of Non-Conventional Energy Sources (2001), *Women, Energy and Development*. Urja Bharati Special Issue June 2001. New Delhi, India.
- Munyeme, G. (1999), Visiting lecture to the International Training Workshop on Stand-alone Rural Electrification, Technology and Development Group, University of Twente, The Netherlands. 17 May-19 June, 1999.
- Nathan, D and Kelkar G, (1997) *Wood Energy: The Role of Women's Unvalued Labor*, Gender Technology and Development 1 (2), pp 205-224.
- Ngoo, G. & Shuma, J. (2001): *Information and Women in the Supply Side of the Energy sector* Energia News 4(2) pp 5-6
- Okalebo, J. & Hankins, M. (1997): *Why Women Adopt Solar Dryers*, ENERGIA News 1(3) pp. 6-7.
- Oparaocha, S. (2001): *Interview with Mary Kimotho M'Mukindia, General manager Petroleum Institute of East Africa*, ENERGIA News 4(2) pp4
- Pasteur, K. (2002) *Gender Analysis for Sustainable Livelihoods Frameworks: tools and links to other sources* (draft). Institute of Development Studies, Brighton. <http://www.livelihoods.org/info/tools/pas-GENDER.rtf>
- Ramani, K.V. (2002): *Energy as an Instrument of Women's Economic Empowerment* ENERGIA News 5(1) pp8-10.
- Ramani, K. V. and Heijndermans, E. (2003), *Energy, Poverty, and Gender: A Synthesis*, The World Bank, Washington DC.
- Rana-Deuba, A. (2001). *Rural Micro Hydro Development Programme*. In: United Nations Development Program (2001): "Generating opportunities: Case studies on energy and women". New York: UNDP.
- Reddy, A.K.N. (2000), *Energy and Social Issues*, in "World Energy Assessment", UNPD, New York. ISBN 92-1-126-126-0.
- Sarin, M (1992): *The Potential Role of Rural Women's Organisations in Natural Resource Management*. In 'Local Organisations in Community Forestry Extension in Asia'. FAO/RWEDP.
- Schirnding, Y. von (2001), Gender Differences in the Impact of Biomass Fuel on Health. ENERGIA News Vol. 4 No. 4 pp10-11.
- Sengendo, M. (2001): *Photovoltaic Project for Rural Electrification- Uganda* Energia News 4(3) pp14-15

- Sigot, A. et al (1995): *Towards Common Ground: Gender and Natural Resource Management in Africa*. ACTS Press Nairobi.
- Sinha, S., (2005 forthcoming), *Reaching the Unreached: Energy sector reforms in India – alleviating or aggravating energy poverty?* PhD Thesis, University of Twente, Enschede, The Netherlands.
- **Skutsch, M. (2004):** *Tooling up for Gender in Energy*. Paper prepared for ENERGIA. June 2004. [www.energia.org](http://www.energia.org)
- Skutsch, M. and Sanogo, C. (2001): *A Tale of Two women and their Charcoal Technology: A Case from Mali* *Energia News* 4(2) pp9-10
- Sloman, L. (1993): *Putting Women in the Picture: Participation in Transport Policy-Making*, in Velo-City Report, VIIth VeloCity Conference, Nottingham, pp 537-540.
- Smith K R (1999), *Indoor Air Pollution*, *Pollution Management in Focus*, Discussion Note No. 4, August. World Bank, Washington.
- Spitzner, M. (1993): *Approaches to Reducing Road Traffic Volumes*, Contribution to the First Session of the Wuppertal International Advisory Council, Wuppertal, Germany: Wuppertal Institute for Climate, Environment and Energy
- Suryakumari, D. (2001): *Involvement of Women in Joint Forest Management in Andhra Pradesh State- Grass roots concerns*. *Energia News* 4(2) pp13-14
- TGNP, (1996): *Gender Relations Study: Gender Roles in Village Development Programme*, Tanzania Gender Networking Group
- The Economist (1993), *Horror in the Woods*, October 23, p. 62.
- Torres, S.M. (1998): *Women as Professionals in Energy in Latin America: How Many?* *ENERGIA News*, 2(1) pp 16-17.
- UN (2001), *Commission on Sustainable Development Report on the Ninth session*. 5. May 2000 and 16-27 April 2001, New York.
- UNDP (1995): *Human Development Report 1995* New York: UN
- UNIFEM with ITDG (1989): *Root Crop Processing*, *Food Cycle Technology Sourcebook No.5*, New York: UNIFEM
- Wamykonya L. and Davis M. (1999), *Socio-economic impacts of rural electrification in Namibia. Report 1: Comparisons between grid, solar and unelectrified households*. EDRC, University of Cape Town, South Africa.
- Wamukonya N and Rukato H (2001), *Climate Change Implications for Southern Africa: A Gendered Perspective*. Paper prepared for the Southern African Gender and Energy Network (SAGEN). <http://www.energia.org>
- Wamukonya N and Skutsch M (2001), *CoP-6: The Gender Issue Forgotten?* *ENERGIA News*, vol. 4 no.1, p14
- Wickramasinghe, A (2001) *Gendered Sights and Health Issues in the Paradigm of Biofuel in Sri Lanka*. *ENERGIA News* Vol.4 No. 4
- Wilde, V.L. & Vainio-Mattila, A.C. (1995). *Training Package: Gender Analysis and Forestry*. Rome: FAO.
- Winkler, K., and Büttner L., (2000), *Central American GENES Network*, *ENERGIA News* Vol.3 No. 1 pp6-8.
- Wilson, M., and Green, J. M., (2000), *The Feasibility of Introducing Solar Ovens to Rural Women in Maphephethe*, *Tydskrif vir Gesinsekologie en Verbruikerswetenskappe*, Vol 28, 54-61. ISSN 0378-5254

- Wonfor, C. (1998): Improving Public Transport In A South African Urban Community: Gender, Energy And Environmental Perspective On The Taxi Industry, *ENERGIA News*, 2(3) pp 5-7.
- World Bank (1996), *Rural Energy and Development: Improving Energy Supplies to Two Billion People*, Washington DC. ISBN 0-8213-3806-4.
- Yturregui, Lourdes Palao. (1998). *Coping with a Lack of Electricity in Marginal Urban Areas*, *ENERGIA News*, vol 2 no 1.